

BRITISH COLUMBIA

FRUIT and FARM

MAGAZINE

An illustration of a farm scene. On the left, there are several red apples on a branch. In the center, a large red barn with a white roof is visible, surrounded by trees and a fence. On the right, there are several cows and horses in a field. The title 'FRUIT and FARM' is written in large, bold, red letters, with 'and' in a smaller, cursive font. Below the title, the word 'MAGAZINE' is written in a smaller, black, serif font.

Vol. X., No. 5

MAY, 1917



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BRITISH COLUMBIA Fruit and Farm Magazine

A Monthly Journal Devoted to the Interests of the Man on the Land.

Vol. X.—No. 5

Vancouver, British Columbia

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in Advance

Codling Moth Control

By R. C. Treherne, Dominion Field Entomologist.

For the purpose of placing before the fruit-growers of British Columbia, more particularly those residing in the Okanagan, a few notes on the control of the codling-moth, in anticipation of this insect assuming importance as a pest in the province, it has been thought advisable to mention a few important considerations bearing on its life-history and methods of control. We have not had any opportunity, as yet, to make a searching inquiry into the life-history, the number of broods, or the relation of movements of the larvae to the development of the apple under conditions that prevail in the Okanagan Valley. As has already been stated, several small outbreaks have occurred from time to time at one or two points, but the efforts of the inspectors have been directed mainly towards extermination of the insect rather than to any serious attempt to determine

distinct and different stages are undergone before the adult moth is formed—namely, the egg, the larva, and the pupa. It passes the winter as a "worm" or larva inside a silken cocoon in cracks and crevices of the bark, in shelters under leaves or stones on the ground, and in varied locations in fruit sheds and store-rooms. In the spring this "worm" forms a chrysalis or pupa inside the silken cocoon, from which the adult moth will eventually emerge. The emergence of the moth occurs during the latter part of May, during June and part of July also. After emergence the adult females prepare to deposit eggs, laying them in due course on the leaves and on the young developing fruits. The eggs eventually hatch to very small larvae, which penetrate to the core of an apple by way of the calyx. Later, when full-grown, these larvae leave the apple, as a rule, through the side of the

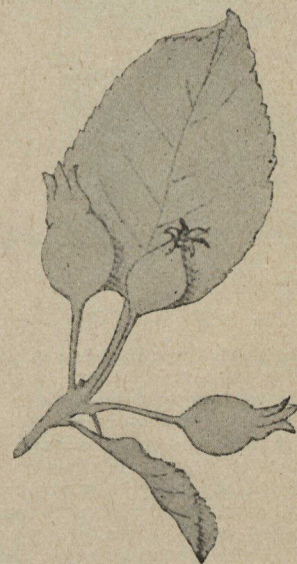
apples, and pass the dormant season in the usual manner as larvae in cocoons. In southerly and warmer climates the number of "heat units" are sufficient to force a very rapid development, with a result that we find sometimes three and at times four generations occurring during the course of the year. In the entire Okanagan Valley there is little doubt that the climate conditions will favor two complete broods, and there is a possibility that in the southern sections of the valley a third or partial third brood will be found. Future investigation will determine this point, which as may readily be supposed, is of great importance to the fruit-grower, in that it governs the requisite number of sprays.

Control by Spraying.

The most effectual method of combating the codling-moth is by applying a poisonous



Showing calyxes of apple ready for first spraying against the codling-moth. A trifle early on left; a trifle late on right; about right in the centre. (After Ball, Utah.)



"Too late to spray." (After Ball, Utah.)

the important points in the life-history of the moth, which would naturally govern the effectual method of control. It is not supposed that the habits of the moth will vary very much from its habits in the States of Washington and Oregon, in districts of similar climatic influences; consequently, until we have experimental evidence of our own to bear out or to modify the experience of others, we may accept evidence from the south to approximate our conditions.

With the understanding, therefore, that we do not as yet know with certainty the details of the life-history of this insect under Okanagan conditions, the following notes are given:

The life-history in General.—The adult, as the name implies, is a moth, and three

fruit, and forms cocoons in places mentioned above. In northerly latitudes these cocoons are the ones that pass the winter, giving rise to the moths in the spring; but, unfortunately, in the Okanagan there is little doubt that the number of "heat units" that prevail will be sufficient to force development to such an extent that the first eggs, larvae, and pupae of the spring will undergo their transformation in shorter time, so that the moths will develop from these early stages, during part of July, in August, and in September. These second-generation moths lay eggs which develop to larvae, causing a common form of injury known as "side worm injury," which means the penetration of the fruit by these young larvae through the side. These worms attain their full growth before winter in

liquid to apple trees in the spring and during summer.

The machine used for applying this spray should be a high-power gasoline outfit, capable of generating over 200 pound pressure. The hose should be guaranteed to stand at least 300 pound pressure. Hand-power pumps are effective if time and care is taken in directing the sprays. A hand-syringe would also be of use if the application be made correctly. However, the time required and the relative effectiveness of the spray varies in due proportion to the type of machine used. A gasoline-power outfit, for instance, might be expected to handle 20 acres of large (20 year) trees or

40 acres of small (8-10 year) trees at the critical period in the spring. A hand-powder might be expected to handle, respectively, from 5 to 10 acres. A hand-syringe or knapsack pump might spray from six to twelve trees. The last two machines are, of course, not recommended in practice.

The object of the spray is to fill the calyx-cup of the apple with particles of insoluble poison, so that the young worm which usually enters through the calyx will be killed by arsenical poisoning. Pressure and care in directing the spray are requisite for effectiveness, so that particles of arsenic are even forced into the cup between the stamens surrounding the calyx.

Time to spray is immediately after the blossoms have fallen, after the fertilization of the flower has taken place. The calyx-cup will be found to be most receptive in shape and condition at this time. It is doubtful whether more than ten days will be allowed the orchardist to finish this spraying, so rapidly does the growth of the young apple proceed in the spring. If the calyx-lobes are closed the abject and effectiveness of the spray is offset in due proportion to the degree of development.



A band in place on trunk of tree. (After Ball. Utah.)

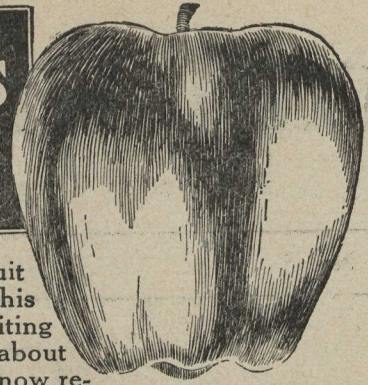
How many times to spray depends on future investigation under local conditions. However, for the present, a single thorough spray applied after the blossoms fall ought to suffice for the season. A second poison spray, applied ten days from the first spraying, is advisable in heavily infested localities. A third and even a fourth spraying is often applied in those sections where the generations of the moth are more frequent.

The spray material advised for use is arsenate of lead mixed at the rate of 2 pounds to 40 gallons of water. Bordeaux mixture, or diluted lime-sulphur solution. The type of spray-nozzle required is one capable of throwing a coarse driving stream set at an angle of 45 degrees to the spray-rod.

The amount of material required per tree varies considerably according to the type of the tree and the amount of bloom the tree is showing at the time. Experience will offer the most reliable guide, but for the sake of assisting those with no experience the following formula is suggested:

For a heavy blooming tree, multiply the age of the tree by three-quarters, or with a light amount of bloom multiply the age by one-half, and the result in each case

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will give the approximate amount of the diluted mixture required for spraying that individual tree. For instance, if we had five twelve-year-old apple trees in heavy bloom, to estimate the amount of liquid required 12x3-4x5 45 gallons. This amount of diluted spray would require 2.1 pounds of arsenate of lead; consequently in this way

a fruit-grower will, with little difficulty, be able to estimate the amount of material required to be on hand.

Old method of control banding consists in tying a piece of cloth or a strip of burlap about eight inches wide around a tree about 18 inches from the ground. The object of this can be readily surmised from a

study of the life-history, previously mentioned. The larvae after completing their growth prepare for pupation, in the summer as well as in the autumn, and in doing so seek the most convenient and suitable place ready at hand. A cloth band on the trunk of the tree is evidently preferable to a flake of bark or a crevice, hence they have no hesitation in forming their cocoons under this band, which becomes a trap. The band may be placed early in July and may be left on until the end of November. The whole effectiveness of this plan, however, depends on the occasional examination of these bands and the destruction of the cocoons found under them; otherwise, if left untouched, the bands become breeding centres most suitable to the propagation of the moth.

The point, therefore, should be carefully watched and the bands examined every ten days to two weeks. The most convenient method of setting the bands is in the use of long finishing nails driven through one end of the "band" halfway into the tree. The band then can be loosely passed round the tree and drawn over the nails and fixed.

OUTLINES PLAN FOR HARVESTING FRUIT

Employment Bureaus to Be Opened in Vancouver and Victoria.

Mr. R. M. Winslow, provincial horticulturist and secretary of the B. C. Fruit Growers' Association, on the matter of labor for fruit harvesting, submits the following report of the department of agriculture and the Fruit Growers' Association up to this date:

"The B. C. Consumers' League and the Vancouver Y. W. C. A. will jointly operate an employment bureau for women, boys and girls. Correspondence, until further notice, should be with Mrs. J. C. Kemp, president of the B. C. Consumers' League.

"The municipal free employment bureau of Vancouver will endeavor to secure the men required. Mr. Arnott is in charge of the bureau. The extent to which these agencies will operate depends very largely on the use they are made of by the fruit growers' labor agencies.

"At Victoria, the local fruit growers' associations are co-operating with the Victoria Local Council of Women, with a view to an adequate supply of strawberry pickers and packers. It is needless to emphasize the necessity for adequate and comfortable accommodations. Many growers are already preparing to take proper care of their help.

"It has been suggested that the help of schoolboys would be much more efficient and more readily handled if the Boy Scout plan of organization, with scoutmasters in charge were used. This suggestion is a good one, and should be followed up.

"The B. C. F. G. A. executive has been pressing on the department of agriculture that the railways should give rates for fruit harvesting labor similar to those to the prairies. Rates would then be 1 cent a mile going, and 1 1-2 cents a mile return, or thereabouts. The department is taking up the matter with the railways and results will be announced shortly. At any rate, the rates will be fairly low."

GREEN MANURING FOR FERTILITY OF SOIL

Green manuring, or cover cropping, should be practised more. Green manuring prevents washing, adds organic matter to the soil, prevents leaching and affords winter pasture.

Summer fallowed fields, corn fields and even stubble fields wash badly in spring, due to the heavy rains and frosts, this can be largely prevented by a green manure crop. In some sections where the organic matter is getting low and there is a rainfall of 15 inches or more, rye can be sown in the stubble in the fall and plowed in in the spring when the rye is about 8 to 10 inches high. This matter will easily decompose during the following season.

In orchards, crops that are well suited for this, especially in the irrigated sections, are vetch, rye, wheat, rape and peas. In sections where the rainfall is high a large amount of plant food material is leached beyond the root zone. This can be prevented by the use of green manures, which will take up the soluble plant food materials and return them again to the soil when plowed under in the spring.

In addition to the beneficial effects upon the soil, green manuring crops make good winter pastures. Much better results can be secured by plowing under two or three tons of barnyard manure per acre with the cover crop. Organic matter must be sustained either by green manuring, crop residues or barnyard manure if the soil fertility is to be maintained.

NELSON

The Arrow Park fruit growers urged an embargo on the importation of fruit into Canada by adopting the following resolution: "That owing to the embargo on fruit now in force in Great Britain and the contemplated embargo to go in force in Australia, be it resolved, that the Arrow Park Farmers' Institute strongly urge that the Dominion Government do all in its power to preserve the Canadian market for Canadian fruit and prohibit the importation of fruit that can be produced in Canada."

FRASER VALLEY NEWS

The Hatzic Fruit Growers' Association, with head office at Hatzic, B. C., has been incorporated to do business in the district of New Westminster. The amount of the capital is \$1,000, and the liability of each shareholder is limited to the amount unpaid on the shares held or subscribed for by the shareholder. The number of persons asking for the incorporation of the company is forty-three.

Several strips of road in the Hatzic district are hardly passable, states the Record, their condition being almost dangerous to any who are not acquainted with the fact that Hatzic roads were never much worse than at present. On one particular spot along the Trunk road, for instance, the condition of the road is disgraceful. Municipal roads in this district are very bad in some places.

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Good Advice on Apple Scab

Farmers' Institute Hears Useful Lecture

By Provincial Horticulturist Middleton.

For a farmer's institute meeting or lecture, there was an unusually good turnout at the meeting held in the Kaslo city hall auditorium on Friday afternoon, April 13, when Provincial Horticulturist Middleton gave some good advice on how to get rid of the bothersome scab, that has been playing hob with the local apple crop of late years.

In his preliminary remarks, Mr. Middleton stated that most of the apple growers in British Columbia were pretty well acquainted with apple scab now, as the disease is getting very common.

Cannot Eradicate It.

The speaker stated that the disease could not be entirely eradicated, except perhaps in a few isolated sections. It could, however, be brought under control to such an extent as to render it practically harmless. In the Kootenays there was no scab at all a few years ago except in a few isolated sections. There are only a few sections now where it has not gained a sure foothold. It is not so bad in dry sections as in a district where there is a great deal of precipitation, and the West Kootenay district, because of its unusually heavy rainfall is more likely to be affected than the Okanagan, or any other section of the dry belt. While it cannot be absolutely brought under control, it is possible at the same time to render it harmless enough to enable about 90 per cent of an apple crop to be marketed.

A Fungus Disease.

Apple scab belongs to the group of fungus diseases, and is peculiar to the apple trees alone. The apple scab has to find its home on the apple tree, leaves or fruits in order to have continued existence and can live on no other kind of plant or fruit.

Where the Seeds Come From.

During the winter the scab spores or seeds cling to the dead leaves in sacs which lie dormant until conditions are right for them to open up and release the seeds. After the snow and frost are gone and the weather begins to get warmer in the early spring, provided there is a sufficient amount of moisture, these sacs open up and millions of tiny seeds in each one of them fly all over. They are so small as to be invisible, but they exist, nevertheless, and although only a very small percentage of the seeds in each sac find a lighting place suitable to their development, there are so many of the seeds flying about that in a very short time a whole orchard or a number of orchards are infected with the fungus growth.

Blossoming Time Most Favorable for Release.

It is at blossoming time that most of the seeds get loose. It is therefore, at about that period that the disease must be attacked, if anything is to be done at all in

the direction of bringing it under control. It is not to be imagined that once it gets a foothold that it can be eradicated entirely, because that cannot be accomplished. It cannot be done even when the disease makes its first appearance.

The Remedy.

There was but one sovereign remedy and that was spraying. To be effective the campaign of spraying the trees must be started before the spores get loose. Last year a number of experiments had been conducted on behalf of the department of agriculture in this district and in other parts, and with encouraging results as far as scab control was concerned, and it had been demonstrated beyond a doubt that with a small expenditure of money and by putting some time into it, and hard work, any grower would be able to so bring the disease under his control as to get at least 90 per cent clean apples.

Five Sprays Used.

In the experiments referred to, and which had been carried on near Nelson and at Creston, particular attention had been paid to the McIntosh Red, a variety which was generally recognized as being most susceptible of attack from scab. It was also more difficult to get rid of the disease from this particular variety of apple than any other.

The spray used was the ordinary commercial lime and sulphur dope, the best all-round spray and experiments had shown that at least three sprayings were required, while five would make the job still more sure.

The first or "delayed dormant" spray, as it was called, was put on just as the buds were coming out. As a general rule results had been good and he was inclined to recommend it.

The second or "pink" spray was an absolute necessity in any effort made to control scab. It should be put on when the blossoms are pretty well out.

The third, or "calyx" spray needs to go on just before the blossoms fall. It is as important as the second.

The fourth spray should be applied somewhere about fourteen days after the third. He considered it as being important also, and in this particular section should not be omitted.

Fourteen days after the putting on of the fourth spray, the fifth spray should be used. It, however, was not absolutely necessary, but in case of the spring being a wet one, there should be no hesitation about using it as a precautionary measure. There was no need of any other spraying after this, as summer weather was not favorable to the propagation of scab.

Lime and Sulphur.

Commercial lime and sulphur was the

best and safest spray mixture, the materials for which could be purchased at the general stores. For the first spray the mixture should be 1-25, 1-30 for the second, 1-35 for the third and also for the fourth and fifth, although in the last two it might even be weaker and be just as effective. He recommended that a hydrometer be used for testing the strength of the spray, because if the spray was too strong it would burn and not give any better control. The orchardist had considerable leeway as to time of spraying, as the times he had given were only approximate. At the same time judgment would have to be used as to weather conditions.

Applying the Spray.

In applying the spray about 150 pounds pressure should be used with a hand pump and 200 hundred pounds with a power pump. It should be borne in mind that spraying was done as a preventive, and that the trees must be covered thoroughly. Plenty of people when engaged in spraying merely gave the trees a lick and a promise and then wondered why it was they did not get results. In a method of this kind, there were any number of open spaces left, and these were, of course, open to attack from the flying scab seeds, just the same as if the tree had not been sprayed at all.

He advised starting at the bottom first and working up to the main branches, and seeing that these were thoroughly covered before going on to the smaller branches. If these rules were observed and the tree began to drip freely, there would be no doubt about it being well sprayed. An extra amount might be worked in where the fruit forms. Never mind if a little of the dope got wasted. A greater quantity of clean fruit would pay for that many times over.

Hand Pumps Should Have Air Cylinders.

A large number of growers had the small hand outfits, but these were not satisfactory as far as pressure regulation is concerned. A hand pump should have an air cylinder. At the end of each spraying season, a spray outfit should be thoroughly cleaned out and put carefully away. Most spraying outfits did not have sufficient hose. There should be fifty feet at least of this. The lighter the spraying rod the better the work that could be performed, because a man wielding a heavy rod would be all the more likely to get tired and not spray a tree as thoroughly as if he was swinging a light rod. In the speaker's estimation one of the best all around rods was the bamboo with an aluminum center. A lot of poor spraying was due to the rod being too heavy. These bamboo rods cost more than the iron but were worth the difference.

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The Nozzles.

Two nozzles were required, one giving a fan-shaped spray and used the first two or three times. For the last two sprays the "mist" nozzle would be found the most advantageous. A nozzle should have a 45 degree elbow attached, so that it could be used to get at all parts of the tree to better advantage.

Mr. Middleton showed in a vivid way the results to be had from spraying by means of charts, which tabulated in concrete form the work that had been done last season. He advocated the spraying of non-bearing as well as the bearing trees, because scab would be just as likely to attack the leaves of the former, and thus spread the disease. The figures, which were on large charts, showed the difference in results achieved in cases where different numbers of sprays had been used, the effect on different varieties of apples, and the success of the experiments from a commercial standpoint, plots that had been consistently sprayed yielding something like 100 or 90 per cent of clean fruit, varying down to those orchards which received no attention at all and which yielded only about 10 per cent, and in some cases not a single apple that could be put on the market.

Costs.

Fairly accurate records had been kept of the cost of labor and the material used, and it had been found that at Nelson the cost per tree of spraying throughout the season was 11 cents, while at Creston it had been 14 cents. In commercial orchards these costs could be cut in half, and it had been clearly demonstrated that the extra weight of the fruit as a result of the spraying was sufficient alone to meet the cost of the work.

Before the meeting adjourned the speaker was asked a number of questions by parties to whom some of the points were not quite clear, and was also asked questions regarding the best methods of treatment for diseases that attacked various other fruits, small as well as large.

THE FUNCTION OF MANURES AND FERTILIZERS AND THE NEED OF ARTIFICIAL FERTILIZERS

The Need of Artificial Fertilizers.

The conditions of farming have greatly changed in the past 30 years, and these changes have, perhaps, a still more important bearing in showing the need of improved fertility. The first direction in which important changes have taken place is in the increased cost of labor. The cost of farm labor has increased because higher wages are now paid and because the labor now obtainable is on the whole less efficient, being performed more largely by those untrained for the work. This increased cost of labor makes the cost of growing the crops very much higher. In the second place, farming today consists of much more than the simple production. Changed conditions are shown very clearly in the increased production of medicinal plants, nuts, nursery stock, market garden products, fruits and special poultry, dairy and swine products. Some years ago the garden of vegetables and fruits was limited, they were regarded as luxuries, and the area given to them was on most

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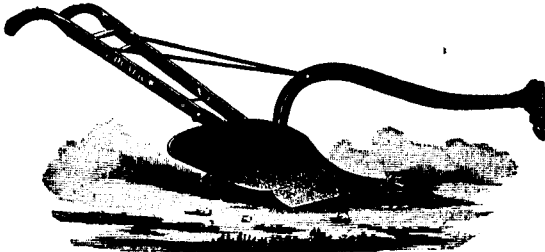
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farms only sufficient to meet the needs of the home; they were not regarded as crops in the same light as the others, and not considered of the same commercial value. But the farmer is rapidly realizing that even as a side line his berry patch, small fruits and orchard show him handsome returns.

Farm measures might meet the needs for the staple crops as they are adopted in many respects for the purpose. The natural manures of both farm and city are not only not sufficient, but, because of their character and composition, are not well adapted to meet economically the entire demands of the plants. In the first place they are bulky and thus expensive to han-

dle. In the second place the fertility elements results in a waste of the nitrogen. Third, the constituents contained in them are not in sufficiently active forms to provide for a rapid and continuous growth without an excessive application, which frequently results in a serious waste not only of the nitrogen, but in the case of many crops, an abnormal growth of vine or stalks, which may seriously injure the marketable quality of the crops. For many crops economical production requires that the natural manures be supplemented by artificial supplies, by means of which the form and amount of the individual constituent can be regulated to meet the needs of the various plants.

In another part of this issue, the B. C. Nurseries are offering a pretty colored calendar to all who write them, mentioning this magazine.

The Disinfection of Seed Potatoes

By J. W. Eastham, Provincial Plant Pathologist.

The disinfection of seed-potatoes is of use only against external diseases such as scab and powdery scab. It is useless against internal ones like late blight and wilt. Pick over the potatoes before treating, rejecting those visibly affected with rots, late blight, or badly attacked by scab.

If a sample shows 10 per cent. infection with wilt, do not use it for seed. It is likely, in such case, that even apparently sound seed may carry the disease. Wilt is detected by cutting off a thin slice from the stem end, when infection is revealed by the ring of brownish or blackish dots. Enough potatoes should be examined in this way to form an accurate idea of the percentage of infection. When only a small amount is present each tuber must be examined and diseased ones thrown out. This may be done before or after treating, whichever is more convenient. Where the seed is cut before planting the stem half of the tuber alone may be discarded, as the rest of the tuber will probably be found to be sound. Potatoes from a crop infected with powdery scab should not be used for seed, even if apparently sound, unless no other can be obtained. Every tuber showing infection should in any case be rejected and the seed treated. Tubers showing much *Rhizoctonia* should be treated with corrosive sublimate, as formaldehyde is not very effective against this disease, and tubers with large nodules of the fungus on them cannot be satisfactorily treated at all.

Formaldehyde Treatment.

Formaldehyde is a gas. The commercial article (also called formalin) is a solution of this gas in water. (It should be guaranteed to contain 40 per cent. of formaldehyde. If weaker, the figures for dilution here given will make the dipping solution too weak. In buying by measure know what you are getting. The usual druggist's pint is the American or wine pint, weighing 16 oz. The imperial pint weighs 20 oz. Where large quantities are to be treated, it might pay to buy co-operatively through farmers' organizations. The present wholesale price is about \$2 per gallon, imperial (about 10 lb.), in 40-gallon barrels, while the retail price is about 50 cents a pound. It has a powerful hardening and corrosive action on the skin, especially the stronger solutions, and the gas is irritating to the eyes, throat, and nose.

Effects of Treatment

This treatment destroys spores adhering to the surface of the tubers, but the result will last only as long as the tubers are kept protected against contamination. Formaldehyde, being gas, evaporates, after which there is no further protection from it. Hence if treated tubers are to be dried and stored, instead of being planted at once, it is essential that the place of storage be also disinfected thoroughly by swabbing down with formaldehyde, 1 lb. to 10 gallons of water, or bluestone, 1 lb. to 10 gallons. A cement or board floor is preferable, and this should be similarly treated. If only an earth floor is available it should be well swept, sprinkled with one of the above solutions, and then covered with sacks or canvas soaked for an hour

in one of them, or two hours in the dipping solution. It would, however, in this case be better to treat just before planting and avoid drying and storing. It is then only necessary to spread the treated tubers on dipped sacks out-of-doors, and cut and plant as soon as the excess of liquid has drained away. If more potatoes are treated than actually planted they are not injured for human or stock food. Sprouted potatoes are liable to have some sprouts broken off and the remainder seriously damaged. Tubers intended for specially early yields must therefore be treated before putting into the prouting-boxes, which should also be disinfected.

Dipping.

Add 1 lb. 40-per cent. formaldehyde to 30 gallons of water. Put enough of this into a barrel or other vessel to completely immerse a sack of potatoes. With an ordinary 40-gallon barrel this will take about 25 gallons. The remainder can be put in some convenient container to make good the waste as each sack is dipped. Immerse a sack of potatoes, raising it up and lowering it a few times to hasten the penetration of the liquid, and leave for one hour and a half to two hours. Take out, and spread them out to dry on the prepared floor.

This method is, however, too slow if large amounts are to be treated. In this case immerse as before for fifteen to twenty minutes, then take out, put on the prepared floor or on some dipped sacks, cover with other dipped sacks or canvas to keep in the gas, and leave until one hour and a half to two hours have elapsed since the first immersion. The sacks can be put out side by side in regular order and the time when the first is taken out noted. They can then be removed from the other end of the pile in the same order, dumped, and spread out to dry. In this way six to eight times as many tubers may be treated in the same time.

After removing the sack from the solution it may be stood for a few minutes in another tub to catch the excess of liquid which drains from it. At ordinary temperatures the liquid does not become appreciably weaker, and it is only necessary to add enough fresh solution to keep the liquid at the level required for full immersion. If more convenient for any reason, the tubers can, of course, be placed directly in the liquid, but as a rule they are much more conveniently handled in sacks. After the day's work is over put into the liquid any sacks, baskets, etc., to be used afterwards in handling the treated tubers, put on the lid of the barrel or cover over, and leave for two or three hours or overnight.

Planters, wagons, etc., should all be disinfected, preferably with the stronger solution, previously used for the floors, or the liquid left over from dipping may be used. In this case it would be well to wash them down a second time before the first is quite dry.

In cutting potatoes have two knives and a small dish of the formalin solution at least as strong as that for dipping. If a diseased tuber is cut, drop the knife into the dish and take out the other. This will avoid contaminating sound tubers from diseased ones.

Treatment With Corrosive Sublimate.

This is the most effective and the only satisfactory one against *Rhizoctonia*. It has, however, the following drawbacks:—

(1.) Corrosive sublimate is a violent poison to human beings and animals if taken internally. It must therefore be used and disposed of with great care. After using, dig a hole where there is no danger of the liquid draining in surface channels, and pour it in.

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(2.) It corrodes metals, including tools, knives, etc., itself becoming weakened.

(3.) The solution becomes weaker with each lot of potatoes treated. It is generally recommended to discard it after four lots of potatoes have been immersed. As the strength of solution used is 4 oz. to 25 imperial gallons, this makes the treatment expensive. (The price of corrosive sublimate in wholesale quantities is about \$2 50 per pound.)

(4.) Treated potatoes cannot be used for human or stock food.

Where a separate seed-plot is set aside on the farm for producing the seed required to plant the main crop of the following year, the seed for this plot can be treated with corrosive sublimate. The crop from this, if properly handled and stored to avoid infection, can then be planted without seed-treatment at all. This is the system which every potato-grower should adopt, as it is possible in this way not only to control disease better, but also to secure a better selection of seed in regard to purity of variety, etc.

The Evolution of Agriculture

By L. S. KLINCK, Dean of Agriculture, University of British Columbia.

The early agricultural history of Britain is mainly a matter of guesses and inferences. Of the English invaders we have little more knowledge. Until William the Conqueror issued the first royal commission on agriculture, and collected the first agricultural statistics, our knowledge of English rural life is extremely meagre.

The most primitive form of English agriculture was that known as "wild field grass husbandry." Joint occupation and joint tillage were its characteristics. Gradually this system was displaced by the permanent separation of arable from pasture land.

At first extensive cultivation was practiced, that is, every year a fresh arable field was broken up and the one cultivated the previous year was abandoned. Gradually more intensive culture superceded this, but improvements in the art of English agriculture were, in its infancy, dependent on the exhaustion of virgin lands.

The two-field system marked the beginning of systematic rotation under which one field was cultivated and the other left fallow. This method was gradually replaced by the three-field system until, in turn, was superceded by the four-year or Norfolk rotation in which white-strawed crops, roots, grasses and legumes were judiciously rotated.

At first all lands were held by groups and not by individuals. As new tracts were cleared they were parcelled out acre by acre, to each cultivator. The typical holding of one hundred and twenty acres was generally divided among ten families in acre strips. These strips were not contiguous but were widely separated so as to admit of a more equitable distribution of arable, pasture and of waste lands. During the crop-growing season all arable fields were fenced; but after the various households had finished cutting the grass on their allotted portions of meadow, and the grain on their strips of tillage, both grass and stubble land became common property and were thrown open for the whole community to turn their stock upon. Arable lands were always ploughed by community teams and the waving ridges of thousands of acres of English pasture still represent the curve of the cumbersome village plough with its team of eight oxen.

The agricultural defects of the open-field system were obvious, and the inconveniences occasioned thereby, extreme. As it was obligatory upon all, it became, with the passing of time, increasingly galling to the more enterprising cultivators as, under it, individual initiative was impossible. Occupiers were bound by rigid, customary rules. They were compelled to treat all kinds of soil alike, and were forced to keep exact time with one another in sowing and in reaping their crops. On land which was inadequately manured, and on which neither turnips nor clover were grown till centuries later, "there could be no middle course between the exhaustion of continuous cropping and the rest-cure of barrenness." Winter crops could not be grown, and the strips of land occupied by different holders were too narrow to admit of cross-ploughing or cross-harrowing. Drainage was impossible, for if one man drained his land his neighbor might block his outlets. As a result, high, narrow lands were generally adopted; but the remedy was almost as bad as the disease. As each man's

strip lay over each of the open fields, he wasted much of his day in getting to different parts of his holding, and all his expenses of operation were enormously increased by the remoteness of the different parts of the occupation.

This primitive system of land tenure still persists in parts of Britain. "From a distance," Hall tells us, "the hillsides on the Isle of Axholme look like a patchwork quilt, so covered are they with the strange reticulation of crops in narrow strips, as though laid out in experimental plots. The land lies in one open field, and is divided into series after series of parallel strips, each a rod and a half wide, and half an acre in area. Nearly all the strips are curved, sometimes with a single sweep, sometimes with a double bend like an elongated "S." On one end they are bounded by the hard road; on the other they butt, generally at right angles, into another group of strips. The headlands on which the ploughs turn are now the high-roads. Probably all the English roads, with their apparently purposeless wanderings as they near a village, were once nothing more than the linked headlands in a common field. The strips carry various crops without any attempt at order, hence the extraordinary diversified aspect of the 'countryside, corduroy farming, as it is locally called."

The communistic holding of land, while uneconomical from the standpoint of labor, was suitable to the condition which obtained in early English times. "As the law

was," to quote from Prothero, "powerless to protect individual independence, or to safeguard individual rights, agriculture, like other industries, was organized on principles of graduated dependence and collective responsibility. Mediaeval manors, in fact, resembled trade guilds, and proved excellent organizations for mutual help and protection. Communities grouped together were less liable to attack than detached houses, while common methods of farming facilitated that continuous cultivation which might otherwise have been interrupted by the frequent absence of men on military expeditions."

Means of communication were very poor. The old Roman roads were still in excellent repair and water transportation was more used than now. Aside from a few of the principal roads leading to the large towns they were little better than mud tracks. Parliament adjourned three times between 1331 and 1380 because the state of the roads kept many away. If members of parliament, mounted on good horses, could not get to London, how did the clumsy wagons and carts of the day fare? "The church might well pity the traveller, and class him with the sick and the captive among the unfortunate whom she recommended to the daily prayers of pious souls."

Cattle were seldom fatted even for the tables of the rich. Oxen were valued for their power to draft; cows for their milk. Fresh meat was rarely eaten, and it was almost invariably grass fed. No succulent

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foods for winter feeding were available. Stock only survived the winter months in a state of semi-starvation on hay, straw and tree-loppings. "It was, therefore, the practice at the end of June to draft the aged cows, worn out oxen, and toothless sheep, prepare them as far as possible for the butcher, slaughter them in the autumn, and either eat them fresh or throw them into the powdering tub to be salted for winter consumption."

Swine were the almost universal live stock of rich and poor. A hog was considered as more profitable than a cow. For nine months of the year they were self-supporting, and always possessed the qualities necessary for taking care of themselves. The ordinary hogs of the middle ages were "long, flat-sided, coarse-boned, lop-eared, omnivorous animals, whose agility was more valuable than their early maturity."

"Sheep," we are told by Prothero, "were the sheet anchor of farming. But it was not for their mutton, for their milk, or even their skins that they were chiefly valued. Already the mediaeval agriculturalist took his seat on the wool sack, and maids of all degrees were spinsters. As a marketable commodity, English long wool always commanded a price. It was less perishable than corn, was more easily transported, and was indispensable to the Flemish weavers, for Spanish wool could not be used alone, and the supply from Saxony was not as yet developed."

Wool was the chief source of wealth of the traders, and of the revenues of the crown. It controlled the foreign policy of England; supplied the sinews of war; built castles and adorned churches. From the

thirteenth to the sixteenth century "wool was king."

To foster the home manufacture of woolen goods parliament made it a penal offence for any person over the age of six not to wear on Sundays and holy days a cap made of English cloth. Later, legislation was enacted requiring every corpse to be wrapped in a woolen shroud.

In the middle of the fourteenth century we come to what Rew terms "the great watershed of English economic history"—the Black Death—which destroyed from one-third to one-half of the population. "The economic facts of this catastrophe were immediate and inevitable. The people perished but the land remained to be cultivated by a depleted population. Those tenants who remained found in the landlord's difficulty their opportunity of demanding increased wages; of commuting labor services for money payments; of enlarging the size of their holdings and of establishing the principle of competitive rents."

The social revolution following the Black Death practically synchronized with that of the beginning of a general impulse towards the exploitation of the land on a commercial basis. Owing to the scarcity of labor much of the arable land was seeded to permanent grass, and a marked increase in sheep farming followed. At this time eleven-twelfths of the entire population of England were employed in agriculture.

The first decided cityward movement of the rural population set in immediately following the Great Plague. Richard II. attempted to stop the migration by forbidding those who had served in agriculture until twelve years of age to be apprenticed

in the towns, "but to abide in husbandry." Legislation, however, failed to prevent a movement which harmonized and synchronized with the progressive development of the nation on commercial lines.

"It is not," to quote again from Prothero, "in the gay holiday scenes of a Chaucer, but in the grim realistic pictures of a Yangland that the features of English rural life of this period are most truly portrayed." The agricultural laborer as we understand him, a landless man working solely for wages in cash, was almost unknown. Servants in husbandry were bound to appear, tools in hand, on market days to be publicly hired, as, five centuries later, in many parts of England they frequented the local fairs, cow men with the hair of cows twisted in their buttonholes, or carters and ploughmen with whipcords in their hats. Walter of Henley tells us that, not counting Sundays, the laborer in his time lost eight weeks in the year from holidays and other hindrances; that wheat and barley were the principal grain crops; that barley was used for beer, but without hops; that pork was the main source of the meat supply, and that meadow lands were sometimes ten times as valuable as arable lands owing to the fact that hay was almost the sole winter feed for stock.

Harvest time in the middle ages was an important event. Agriculture was the great industry and when the grain was ripe the whole village turned out to gather it, the only exceptions being the housewives and sometimes the marriagable daughters. Even the larger towns suspended work that the townsmen might assist, and it is just possible that our vacation period had its origin in this custom of suspending work in order to facilitate harvesting.

The small farmer of the time is severely, but I doubt not accurately, sketched by Bishop Earle. "A plain country fellow," he tells us, "is one that manures his ground well, but lets himself lie fallow and untilled. He has reason enough to do his business, and not enough to be idle or melancholy. His hand guides the plough, and the plough his thoughts, and his ditch and landmark is the very mound of his meditation. He expostulates with his oxen very understandingly and speaks gee, and ree, better than English. He apprehends God's blessings only in a good year, or a fat pasture, and never praises him but on good ground."

But there were bright spots in his existence. The church not only afforded him the consolations of religion, but also entertainment and society. Religion was a part of the people's life. Miracle and mystery plays were common. "Labor was lightened by co-operation in the common field; a common mill ground the corn; a common oven baked the bread, and a common smith worked at the common forge."

The presentation of gloves was, for many centuries, a common agricultural custom in England. They were only presented as a recognition of good husbandry, to show that the recipient was esteemed a good farmer. Up till 1797 the busar of New College, Oxford, presented each of the tenants with two pairs, which the recipients displayed the following Sunday at church by conspicuously hanging their hands over the pew to show their neighbors that they had paid their rent. From this it would appear that the expression "kid-gloved farmer" had an entirely different connotation in England to what it has in Canada.

To English farmers in the early centuries the monks were what capitalist landlords

became in the eighteenth century, the scientific agriculturists of the day. They had access to the practical learning of the ancients, while their intercourse with their brethren abroad gave them opportunities for benefitting by foreign experience which were denied their lay contemporaries.

It was only natural, then, to find that the earliest improvements in English agriculture were due largely to the monks, who travelled widely, farmed progressively and introduced and cultivated many new crops. Throughout the middle ages it was due largely to their influence that roads and bridges were built, that live stock was improved, that marshes were drained, that forests were cleared, that wastes were reclaimed and that much barren land was brought under cultivation. Later the dissolution of the monasteries was a severe blow to agriculture for by common consent the monks were good landlords and farmers.

The reign of Elizabeth marks a definite stage in the evolution of agriculture. The mediaeval organization of society, together with the manorial system of agriculture, had broken down. Accompanying this we see the transition from an age of graduated mutual dependence towards an age of greater individual independence. This meant the removal of restrictions to personal freedom, the encouragement of individual enterprise and the establishment of the principle of competition in determining both money rent and money wages. From the fourteenth century onwards, the agricultural problem of holding the balance even between the economic and the social lines of agricultural progress has puzzled the wisest legislators.

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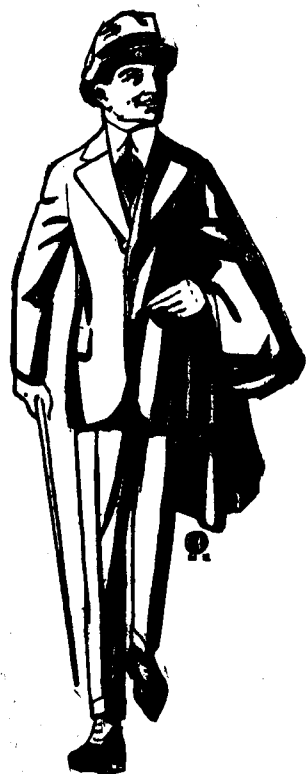
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GROWING OF ROOT CROPS IMPORTANT

Professor Boving of University of British Columbia Says Many Tons of Valuable Matter Are Lost Annually Due to Late Seeding.

Lecturing before the British Columbia Academy of Science, last month Professor Boving in the course of describing some cross-breeding in field root crops and the incidental verification of the Mendelian law of character inheritance, emphasized the enormous importance of roots to the dairy farming activity throughout the Dominion. Next to grain, hay and pasture ranked root crops.

The customary production aggregated for the Dominion a value of \$20,000,000. Potatoes at ordinary rates reached a productive value of \$40,000,000, while corn for ensilage was grown to the extent of \$5,000,000 worth and corn for husking to an equivalent of \$10,000,000. With proper care, root crops should outyield all other crops per acre, with the exception of alfalfa. The only drawback was that their cultivation involved more labor than most other crops, and in this way as wages of agricultural laborers were high, the cost of growing roots was enhanced.

For the purpose of comparison, roots were judged by their yield of dry matter which in turn was reckoned as weight for weight of grain. On such a reckoning, ten pounds weight of mangel wurrels, Swedish turnips or carrots or twelve and a half pounds of turnips were equal to one pound of grain in feeding matter for stock.

One feature in the growing of root crops as practised in the Dominion had attracted his attention during his experimental work at Macdonald College and at the government farm, Ottawa, that was the comparative lateness, as compared with the European custom, of sowing root crops. The result was an enormous loss to the farmers of the Dominion.

In Eastern Canada, it was customary to sow mangels about June 2, and Swedes from June 12 to 15, earlier seeding would greatly increase the yield. From extensive experiments he was able to demonstrate that mangel wurzels sown later than the date he would recommend resulted as follows: Fourteen days late, loss of the equivalent of half a ton of grain in dry matter, or 34 bushels per acre, reckoned in weight of oats; still later 1.6 tons; one month late, the equivalent of 95 bushels of oats. In the case of Swede turnips the figures showed: Fourteen days' delay, a loss of feeding matter equivalent to 34 bushels of oats per acre; one month, 60 bushels; six weeks, 103 bushels of oats per acre.

"No wonder," Professor Boving commented, "the farmers say it doesn't pay to grow roots." Very many tons of valuable matter were annually lost through delayed planting.

Another great source of potential loss was postponing the thinning out of the root crops. Frequently, \$25 to \$40 per acre was the decrease over what need be. On the same scale of computation, the potential loss was represented as follows: One week's delay in thinning meant the loss of the equivalent of 10 bushels of oats; 14 days, 29 bushels; three weeks, 41 bushels per acre. For Swedish turnips, the figures were expressed as decreases of 4.17 and 26 bushels of oats.

Referring to his own experiments in cross-

fertilization to obtain new strains, out of 675,000 root species crossed, he had obtained only twelve new varieties superior in one quality or another and better fitted for Canadian conditions than those previously in existence. He had found the Mendelian inheritance of characters no less complicated in roots than in members of the vegetable family or the animal kingdom. In beetroot, he had found red color to be a dominant factor, a pale colored or yellow beet-root when crossed with a red showed

the yellow recessive to the red. Darker reds dominated lighter. Beetroot was heterozygot as to color. An interesting feature his experiments had brought to light was that there were two determinates for pointedness in the sugar beetroot roots, hence the divergency of shape and length and root-pointedness so familiar to all in the globe, or cylindrical, wedge, intermediate and oval, flat, long, the degree or absence of root pointedness of which showed a more complex operation of the law than usual.

Turn Waste Land Into Fertile Fields

Now that there is such a shortage of food in the world, and the shortage will be more serious in a few months, the government is urging upon us to plant a great deal more and make the land yield more per acre than ever before, so that we may raise the necessary food supplies for the maintenance of our huge armies in the field. There should not be a plough or a spade idle in this country if the world is to be fed.

economic use of blasting supplies is of paramount importance. It has been found that in the blasting of large stumps detonation is the best and cheapest, done with cap and fuse. Occasion but rarely arises where a blasting machine is required and the charge is placed under the centre of the stump at the point of greatest resistance. The ability to calculate this, and the amount of charge correctly, is obtained only by practice. As will readily be seen



Blasting Big Stumps, Vancouver Island.

When the farmers are thus urged to increase to the maximum their crop production, we have not in mind merely an increased yield per acre, but we, as well as the farmers, realize that there are hundreds of acres of swamp and stump land, which if reclaimed, would greatly help the situation. Many farmers have taken in and placed under cultivation acreage which was before this year, but waste and swamp, and have put it under cultivation, thereby making themselves more prosperous and playing an important part in the financial affairs of the world. But think for a minute what the farmer would be if all such land was reclaimed. Every stump, boulder or swamp hole on his farm is costing him hard earned money—think of the crops that could be raised on the land if reclaimed. By using dynamite, he can get rid of the stumps blast ditches and drain swamp land, then should the war stop, he would be on a better footing to compete with circumstances.

There are several reasons why the use of dynamite is prevalent. The main one of which is economy, and since economy is the object of blasting, it naturally follows that

a correct location and amount of charge is the secret of economy. It is best to use a bar made from a piece of steel shafting about 5½ feet long, and weighing 23 lbs. One end of this bar is drawn to a point and the other flattened like a chisel. Use the pointed end to punch holes for the charge, and the chisel end to cut off small roots that somewhat interfere. When a stump is to be blasted, the calculation of the amount of the charge is greatly facilitated by "sounding" it; this is done by swinging the bar endwise and striking the stump with the chisel end. Unless the stump is a solid one, it can be shaken more or less with a bar of this weight. In blasting on heavy clay when it is wet, the bar sometimes sticks so that it cannot be used to advantage. In this case it is better to have a 1 1-2 inch auger, with a 4 or 5-foot shank with which to bore the holes. As a rule the proper dynamite for very large stumps is a medium slow powder of 40 per cent strength. In old stumps and clay soil the use of dynamite of 20 per cent strength is recommended; and on lighter soil and fairly green stumps 60 per cent strength is better.

How to Save Money in Stump Blasting

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Vol. X. MAY No. 5

EDITORIAL

WAR THE SUPREME TEST.

"Britain calls to Canada," "An unflinching flow of food must be maintained," "Keep up the food supply and help make victory sure," "Serve, save, produce," "Mobilize for production"—these are some of the slogans that are being made use of in the Dominion department of agriculture food campaign of 1917. This advertising now appearing in the press is not addressed to farmers only, but it is an appeal to all to bear their share of the self-sacrifice and tremendous effort that war entails.

It is becoming apparent to everyone that war under present day conditions is the supreme test of a nation's strength. It is a test, not of its man power alone, but of its financial institutions, its manufactures, its commerce, and particularly of its agricultural resources. In fact it is an all-round test of productiveness.

How completely all sections of the community rely upon the farm has been less prominent perhaps in the public mind of late years than formerly. Now, we are realizing once more how much depends on a productive and profitable agriculture.

SUPPLYING PICKERS FOR FRUIT CROP.

Reference was made in a recent number of this magazine to the efforts being made to provide pickers for the small fruit crops in the Lower Fraser Valley and on Vancouver Island, and some details were given with regard to the efforts being made to secure this help in cities and from a class of the community who have not hitherto been available for this class of work.

Since this appeared, effort has been converging from several quarters looking to the same object. The Dominion Fruit Branch under the direction of Mr. Alec Johnson has been in communication with Inspector Clarke and other officers in this province, with a view to making provision for assisting the growers, from among the women of the cities, and the provincial department, under Mr. Winslow, has been supplementing this, while Mrs. Kemp of the Consumers' League has been furnishing the necessary medium between the grower and the available women.

We understand that already about 400 women have volunteered for this work, a

work almost as necessary as that of manning the front line of trenches, and one to which we think a great many women who have the time or the opportunity, would greatly contribute, with the facilities a little better understood. There are a great many available workers who are anxious to give their services. The difficulty in the past however, has been to provide the point of contact between the grower and the worker. The novelty of the task may on the one hand provide an additional appeal, while on the other hand it has a deterring effect among women who have lived for a considerable period in the cities, as they have an extraordinary notion of the isolation associated with country life; they have even a greater misconception of the character of the work which they are called upon to do. More important even than the wages to be paid in the minds of these workers are the conditions under which the work will be carried on and the facilities provided for their comfort. Here is where some of our benevolent organizations can make a real contribution to the solution of the national problem. In Ontario several hundreds of girls have volunteered their services in the Niagara district, and the Y. W. C. A. of Toronto have undertaken to follow these workers with those facilities which they have been accustomed to in city life. For \$4.00 a week they are providing the women with lodging and with board, and an organization like the Y. W. C. A. can be relied upon to supplement this by those other social accessories for which it is famous.

In the work in this province this organization might very well be enlisted, because it has the experience and the training to provide the very features in which government machinery is so deficient.

Satisfactory progress is being made to date and we feel sure that by the time the harvesting season has arrived, the women of this province will be ready to make one of the largest contributions they have yet made to the winning of the war.

PREPARATION OF SEED FOR POTATO CROP.

In another portion of this magazine, considerable space is given to a description of how to prepare the seed for potato crop. We think it wise to emphasize this, because the coming season is likely to prove as important with respect to the crop as has been in the past, and may not be lacking in the spectacular and abnormal factors which characterized the potato market during the past 12 months.

Potato growing requires perhaps less technical knowledge than almost any other form of food production which can readily be engaged in by the amateur and by the uneducated, but it also provides good reward under ordinary conditions, and during the conditions which have prevailed for sometime past, is a most attractive avenue of employment.

The shortage in this continent last year is a matter of common knowledge, and prices as a result soared, the war providing the additional stimulant, but information received from the Old Country indicates that the demand this year is as great as was last. The food controller in the old land and the department of agriculture have been strongly urging private individuals to grow potatoes and with a favorable season it is expected that the output would be increased to some extent. The limitation of prices to a certain maximum by the government has caused a great deal of resentment among potato growers, some

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of them reducing their potato area to grow more profitable crops, and this may to a degree counteract the propaganda of the government.

The Old Country last year imported exclusive of those potatoes obtained from the Channel Islands, upwards of eight million cwt. for the year. The home grown crop never suffices for the requirements of the country. It may safely be predicted that the demand this year will be extended and the prices probably good.

NEW CHAIRMAN OF AGRICULTURAL COMMISSION.

Since the last issue of the magazine a change has taken place in the chairmanship of the agricultural commissioners, a position which has been held by Hon. Wm. Manson since the act came into force. Mr. Manson remained in office some months after the Liberal government assumed power. He has now been replaced by Mr. Maxwell Smith, a gentleman whose name is very familiar to the readers of this magazine, of which he was the founder in its original name of the Fruit Magazine. Mr. Smith has been identified with the fruit growing industry of British Columbia for a great many years and up to the time of his appointment was farming in a general way at Deroche, B. C.

EMBARGO ON APPLES.

While some uncertainty still exists with respect to the embargo on apples for the Old Country, no further steps have been taken with respect to the rumored embargo to be imposed by Australia. It is now said that action will be deferred until after the elections which will be held in about a month's time.

Salvation in the Silo

Succulents for the Supplementary Feeding of Dairy Cattle on Pasture.

In view of the fact that this is the time to plan the farm work for 1917, this subject deserves attention. Many of our best dairymen in Eastern as well as in Western Canada have reached the conclusion that, especially on valuable and expensive land, it is unprofitable to follow the old practice of depending on pastures alone for the summer feeding of the dairy cows. The hot dry summers and consequent burnt-up grass, the hordes of flies, and the realization of the fact that much more feed can be grown from the same land if cultivated, have all been factors forcing the above conclusion. The question then is how to overcome these obstacles to the profitability of our dairy industry.

During the past two summers, the experimental dairy herd at the Central Experimental Farm, Ottawa, has been working to solve just such a problem. This herd is stabled during the entire summer, making it possible to carry on a fairly conclusive test of the comparative value of corn, ensilage, green clover and green peas and oats, for the purpose above mentioned. Ensilage 30 pounds, and hay six pounds, form the daily roughage ration for this herd at all times. For a period in 1915, ensilage and hay were replaced by 60 pounds of green peas and oats, and for one period in 1916, all the hay and part of the ensilage were replaced by 20 pounds of green alfalfa, while during a second period of repetition of the 1915 experiment was carried on. The results are given in the following table:

Year 1915—Milk produced per cow per day: Succulent ration fed, ensilage and hay, 31.5 lbs.; green feed (pease and oats), 30.7 lbs. Cost to produce 100 lbs. milk: Succulent ration fed, ensilage and hay, 67.8c; green feed (pease and oats), 68.2c. Cost to produce 1 lb. of fat: Succulent ration fed, ensilage and hay, 17c; green feed, (pease and oats), 17.3c.

Year 1916-A—Milk produced per cow per day: succulent ration fed, ensilage and

hay, 26.7 lbs.; ensilage and ground alfalfa, 26.2. Cost to produce 100 lbs. milk: Succulent ration fed, ensilage and hay, 63.3c; ensilage and ground alfalfa, 67.4c. Cost to produce 1 lb. of fat: Succulent ration fed, ensilage and hay, 16.2c; ensilage and ground alfalfa, 17.1c.

Year 1916-B—Milk produced per cow per day: Succulent ration fed, ensilage and hay, 25.8 lbs.; green feed (pease and oats), 21 lbs. Cost to produce 100 lbs. milk: Succulent ration fed, ensilage and hay, 69.9c; green feed (pease and oats), 103.8c. Cost to produce 1 lb. of fat: Succulent ration fed, ensilage and hay, 17.8c; green feed (pease and oats), 25.3c.

The above figures serve to show that in almost every case the cost of production of milk and butterfat was considerably higher when ensilage formed the sole ration. This is one point made in favor of ensilage. However, we have not taken into consideration the cost of putting these feeds before the cows. In the case of ensilage the silo is filled the fall before at a comparatively low cost per ton and the matter of throwing out the day's feed and giving it to the cows is a small item. In the other hand the preparation of a suitable rotation of green feed crops to ensure having such at all times and the cutting and hauling of the same to the barn or feeding paddock take much valuable time at busy seasons of the year, making another point in favor of the ensilage. Still another point in its favor is that it is always uniform in quality, whereas the quality of a green feed crop is uncertain, particularly in a season such as we have just experienced.

All the evidence then would seem to prove that the most profitable form of succulence to use to supplement the pastures for dairy cattle is corn ensilage of the previous year's growth. Now is the time, therefore, to begin to prepare by all the means at your disposal for a large crop of corn next year and either fill your present silo to its utmost capacity or build another small one especially for summer feeding.

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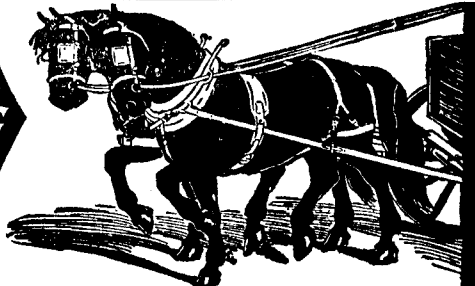
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The Loganberry

By Prof., W. S. Brown.

In view of the interest taken in the growing of Loganberries and its successful cultivation in certain parts of British Columbia, the article by Prof., W. S. Brown, of the Oregon Agricultural College, Corvallis, Ore., will be read with interest by all who are interested in the growing of small fruits. Professor V. R. Gardner, who some time ago wrote a very exhaustive article on the Loganberry, states, the following was prepared at the Experimental Station at Corvallis. We extend our appreciation to the Professor for giving us the opportunity to place before our readers the information he kindly sends.

The loganberry is one of the most recent important acquisitions to our list of small fruits. This berry was first observed growing in the garden of Judge J. H. Logan, Santa Cruz, California, in the early '80's. It was introduced into Oregon about 16 years ago. It is a product distinctive of the Northwest because, outside of California, portions of Oregon, Washington, and British Columbia west of the Cascades, and some of the warmer valleys of Idaho, it does not seem to do well elsewhere in the United States. The reason for this rather narrow limitation to the growth of the Loganberry, is that the plant is very tender both to extremes of drought and cold. Just what the possibilities for this fruit will be in future is hard to estimate, but it is certain that they will be great. Fresh and dried Loganberries, shipments of which have been widely distributed throughout the United States, have become well known, but the juice of the Loganberry bids fair to eclipse both of the other products of this wonderful berry. The value of the Loganberry juice manufactured in Oregon this year, 1917, will amount, in fact, to over one million dollars.

Soils and Slopes.

Like most of the brambles, the Loganberry loves a deep, well-drained, easily worked loam soil. Other types of soil, however, both heavy and light, will do when the berries are well cared for, when the soil is supplied with fertility, and when moisture conditions can be controlled. Southern slopes will bear more berries to the acre than northern slopes, but there is greater danger of the berries drying and becoming small in summer, especially if the ground is not as deep as it should be. Where possible, it is best to run the rows of berries north and south, so as to give the best distribution of sunlight to both sides of the plants on the trellis.

Soil Preparation and Fertilizers.

The Loganberry is a gross feeder and will stand large amounts of fertility in the soil. Well-composed stable manure scattered thickly over the ground and plowed under deeply, makes the best kind of dressing possible before the berry plants are set out. If the plants are to be set in autumn, the ground should be plowed, from eight to ten inches deep, as early in the fall as possible, and then thoroughly disked and pulverized, to put it in as fine shape as possible before planting. If planting is to be done in the spring, the ground should, if possible, be plowed and harrowed in the fall, but not given the final disking and pulverizing until shortly before the plants are set.

Commercial fertilizers have been tried on Loganberries at the State Experiment Station. The plants were growing on rather heavy clay loam soil. In the trial, lasting

several years, no appreciable benefit could be seen as a result of the applications.

It may be that Loganberry patches which are growing on light sandy loams, especially if they have been fruiting for a number of years, will be benefited by commercial fertilizers. The only way for the grower to determine whether or not his plants need fertilizers is for him to experiment on his soils himself. To do this, he should inform himself thoroughly regarding fertilizers, from books and bulletins; then he should test out different fertilizers, singly and in combination, upon equal plots of his Loganberry patch. A check plot, having no fertilizer applied to it, should be left at frequent intervals for comparison.

Propagation.

Loganberries are propagated, usually, by allowing roots to start on the ends, or "tips," of the canes. Where propagation of plants is carried on as a business, the ends of the canes are pinched to make more side branches for more "tips." In this way it is possible to raise from 1,500 to 4,000 "tips" per acre.

Young plants are obtained frequently by covering a portion of the cane and allowing roots to strike from each bud along the cane. When the plants have obtained a start, the cane is cut between the plants with a spade. These plants, as a rule, are neither as strong nor as well rooted as the tip plants, and consequently are not worth as much for planting. Poor growth or loss of plants at the time of planting can often be traced back directly to this cause.

These young plants can be taken directly to the field and set out, or they may be placed in the nursery row for one year. If land is valuable and the object is to get it to produce a crop as soon as possible, the older plants should be planted.

Planting.

After the soil has been thoroughly prepared, the ground should be laid off by a marker into rows running 8 or 9 feet apart, and then should be crossmarked for distances in the row. These distances will vary from 8 to 10 feet, according to the strength of the soil. Deep furrows should then be plowed down each row. Plants should be set at the bottom of these furrows and the roots lightly covered with earth, taking care not to cover the young plants or injure them in any way. As the plants grow larger the earth is gradually rolled down upon them by cultivation, so that by the middle of the season the ground is level once more. In this way the plants are able to stand drought much better than plants which have had shallow setting. Either well-grown tips or plants having two season's growth are used in planting. If tips are planted, it is better to set them in the spring, whereas the older plants may be planted either in the fall or the spring.

Cultivation.

In the fall, the soil is plowed towards the plants, leaving a dead furrow in the center for carrying off the water. This work is done to the best advantage with a one-horse vineyard plow. Better work can be

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done if the horse is protected with a leather apron.

In the spring, the soil is plowed back toward the center, taking care not to plow too deep near the plants. Following plowing comes a thorough disking and dragging, to put the soil in as fine shape as possible. During the summer, cultivation should be frequent but not deep enough to injure the feeding roots of the plants. The Acme harrow or the Kimball weeder are both good tools for keeping a dust mulch at this season of the year.

Time of Bearing and Life of the Vines.

When plants having had one season's growth in the nursery are set, a small crop may be expected the second year after setting, though a commercial crop of any size is not harvested before the third year. When "tips" are set, it takes one year longer to develop a crop.

The Loganberry is noted for its long life. The length of time a plantation will continue to bear well depends almost entirely upon the depth of setting and the care it receives. The writer has seen patches planted 16 years ago, which are still vigorous and bearing good crops.

Trellising and Pruning.

During the first season of the cane's growth, it should be kept within bounds in the row by placing it between stakes set in the row for that purpose. By the second season, the canes will need to be trellised. Seven-foot posts should be set about two feet deep, and about twenty-five to thirty feet apart in the row. The end posts should be especially strong and well braced. To these posts are strung wires, usually No. 12 galvanized iron wire,—either two strands or three strands, according to the preference of the grower. If two wires are used, they should be at a height of three, and four-and-a-half feet, respectively. If three wires are used, they should be three, four, and five feet above the ground. Most growers find two wires sufficient.

In pruning, the young shoots are cut back in the spring to eight or ten feet in length, depending on the vigor of the plant, and in some cases thinned out where there are too many canes to the plant. The canes

are then tied to the wires. Sometimes this work is done in the fall, but there is a little more risk from frost if the vines are on the wires during the winter than if they are lying flat on the ground. At the time the canes are tied to the wires the laterals should be cut back to 18 to 24 inches. After picking time, the old canes should be cut out and burned, so as to prevent spreading of disease from them to the young growth.

Intercropping and Cover Cropping.

During the first two seasons, well-cultivated crops are often grown between the rows, but after that time, the Loganberry, which is a gross feeder, needs all the land for producing profitable crops. Applications of barnyard manure, however, may make it possible to grow such shallow-rooted crops as corn for some years longer.

Where the soil lacks fertility, needs humus, or should have protection from winter rains to prevent erosion, a cover crop should be planted.

As is now generally understood, members of the pea family have the power of fixing free nitrogen taken from the air through the agency of bacteria growing on their roots. Plants of this family are called legumes. One of the most valuable legumes for cover crops is the ordinary spring vetch, *Vicia sativa*. If only humus or protection to the soil is needed, one of the cereals like winter rye, winter oats, or winter wheat makes a good cover crop.

Irrigation.

Only a few Loganberry patches are being irrigated in the state. On some of the soils that dry out easiest, especially in the drier seasons, irrigation would be a great help. If water could be applied once or twice before harvest, it often would mean the difference between small, seedy berries, and large, luscious ones. However, there is danger of over-irrigating, and getting the fruit too soft for shipping.

Harvesting.

Harvesting should be done in the cool of the day, if possible, when the berries are perfectly dry. Picking should be done very carefully so as not to crush the cells of the berry. When the berry is bruised it will not stand up well in shipment, nor



Synopsis of Coal Mining Regulations

COAL mining rights of the Dominion, in Manitoba, Saskatchewan and Alberta, the Yukon Territory, the North-West Territories and in a portion of the Province of British Columbia, may be leased for a term of 21 years, renewable for a further term of 21 years at an annual rental of \$1 an acre. Not more than 2,560 acres will be leased to one applicant.

Application for a lease may be made by the applicant in person to the Agent or Sub-Agent of the district in which the rights applied for are situated.

In surveyed territory the land must be described by sections, or legal subdivisions of sections, and in unsurveyed territory the tract applied for shall be staked out by the applicant himself.

Each application must be accompanied by a fee of \$5 which will be refunded if the rights applied for are not available, but not otherwise. A royalty shall be paid on the merchantable output of the mine at the rate of five cents per ton.

The person operating the mine shall furnish the Agent with sworn returns accounting for the full quantity of merchantable coal mined and pay the royalty thereon. If the coal mining rights are not being operated, such returns shall be furnished at least once a year.

The lease shall include the coal mining rights only, rescinded by Chap. 27 of 4-5 George V. assented to 13th June, 1914.

For full information application should be made to the Secretary of the Department of the Interior, Ottawa, or to any Agent or Sub-Agent of Dominion Lands.

W. W. CORY,

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will it make a satisfactory dried product. Pickers should be supplied with carriers not holding over six picking boxes, so that they will carry the berries to the packing shed often and not leave them exposed to the sun.

Berries for home consumption should be left on the vines until they turn dark red, though they should not be soft. When the fruit is to be shipped some distance, it should be picked when bright red and quite firm.

Marketing.

One of the great essentials of successful marketing is careful handling of the fruit from the vine to consumer. This is especially important if the Loganberry is to be shipped any great distance. If the berries are to be shipped, they should be hauled to the nearest shipping point in a spring wagon of some sort. The springs should be just heavy enough to cause the load to ride easily without jar; if the springs are too heavy they will do as much harm as good. For large shipments east of the Rocky Mountains, berry crates should be piled in tiers and braced much as apples are handled. They should be placed in refrigerator cars and receive good icing on the journey. For similar shipments and for short distances shipments are made by express.

Drying the Loganberry began in 1908 in Oregon, after it was seen that it was going to be impossible to market all the Loganberry crop in the fresh state. Canning at that time had not been successful, due to the fact that the berries had been put up in plain tin cans, when it was afterwards found that they must be put up in the enamel-lined cans.

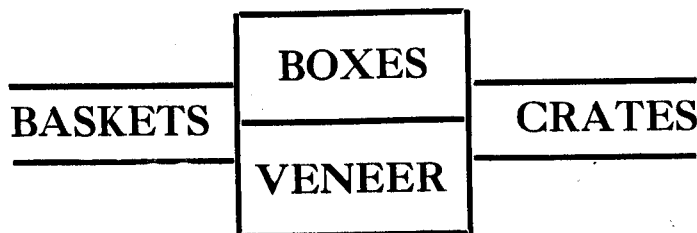
The dryer used for prunes has also been used for evaporating the Loganberry. Both the tunnel and stack types of dryers have been used, but those who have used both prefer the tunnel dryer. Without going into the matter of evaporators in detail, it may be said that many of them have tunnels which are so long that they do not give sufficient air draft for the most rapid and economical drying. In the experimental work done here by the Oregon Experiment Station tunnels from twenty to twenty-four feet long have been found more desirable than the larger ones. More careful methods of controlling the draft under different temperatures of the outside air should be worked out. To avoid dripping and to get the most salable product, the berries should be started in at a temperature of about 130 degrees F. and finished at a temperature of about 150 degrees. To sum up the whole matter, berries started at a higher temperature in shorter tunnels will be seared over at the start so they will not drip badly, will have a better air circulation, and consequently will dry much faster than berries which are placed in longer tunnels and started on lower heat.

A tunnel dryer with sufficient capacity to handle 15 acres of Loganberries will cost in the neighborhood of \$1,000 to \$1,200.

The Loganberry is now canned with safety in tin cans having enameled linings. The output of the canneries varies from the water pack used for pies, containing no sugar, to products put up in a heavy syrup testing 50 to 60 degrees by the Balling-Brix Scale. Loganberries put up in pie pack contain a great deal of water and have to be sweetened heavily when used in pastries. For this reason many bakers in the East prefer either the pie pack of the Evergreen blackberry, which contains very little water, or the Loganberries in the dried form. The present indications are that canned Loganberries when shipped to eastern

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markets, should be put up in heavy syrup for table use.

There are several growers in the state who are putting up the finest of Loganberry products with home-canning outfits and are doing well at the business. Outfits suitable for home canning are manufactured by the following firms: Northwestern Steel and Iron Works, Eau Claire, Wis.; Henninger & Ayers Mfg. Co., Portland, Oregon; Modern Canning, Company, Chattanooga, Tenn.; Sprague Canning Machinery Company, Chicago, Ill.; Monarch Mfg. Co., Chattanooga, Tenn.

The subject of Loganberry juice and Loganberry-juice manufacture is one which requires such a detailed description that it is thought best to leave this matter for a subsequent bulletin which, it is hoped, will be issued from the Experiment Station some time in the near future.

Costs.

The cost of raising Loganberries can be given only approximately at best. The following figures, for the most part, were taken from the experience of one of the largest growers in the Willamette Valley. Plowing and fitting the land will cost about \$5 an acre. Loganberry plants will come to from \$15 to \$40 a thousand, depending upon whether they are "tips" or whether they have been grown in the nursery for one season. Planting will cost from \$3 to \$5 an acre, staking and trellising from \$50 to \$55. Equipment, including horses, harness, wagons, picking trays, etc., will amount to from \$40 to \$50 an acre; cultivation, \$10 an acre; and hoeing \$5 an acre. Pruning, \$5 to \$8 an acre. Spraying, if necessary, about \$5 an acre. Picking, 25c a crate; crates with their boxes 15c apiece. Packing, handling, and hauling charges, 5c to 10c a crate. With a yield of 300 crates an acre the cost for each crate will be from 50c to 65c.

Yields and Prices.

On the average Loganberries will yield from 300 to 400 24-pound crates to the acre, though yields up to 600 crates are not uncommon. When sold fresh, the berries will bring 3c to 5c a pound. For cannery purposes, for drying, and for juice manufacture the price will range from 2 1-2c to 3c a pound; though it may be said in this connection that little money can be made growing the Loganberry for less than 3c a pound. Gross returns per acre run from \$200 to \$350.

Insects and Diseases.

The Loganberry is not affected by many serious insect pests. The three that seem to do the most damage are the raspberry cane maggot, the leaf hopper, and the raspberry rootborer.

The cane maggot causes the cane to wilt or droop. A careful examination will disclose a bluish ring just under the bark near the surface of the ground. The cane should be cut off just below this ring and destroyed. This will kill the maggots working within.

The leaf hoppers are sucking insects. They do their damage by sucking out plant juices from the leaves and young canes. They should be attacked while young or in the nymph stage. They may be killed by some contact remedy such as whale-oil soap, one pound to ten gallons of water; kerosene emulsion, 10 per cent. solution; or a mixture of Black-leaf 40, 1-2 pint, plus four pounds of whale-oil soap, to 100 gallons of water.

The root borer, when present, causes the infested plant to become yellowed and the berries to be small and seedy. Two years are required for the borer to mature. The first season it attacks the young canes, gnawing them near the surface of the soil.

The injured canes may be readily observed in late summer, lying flat on the ground with the foliage wilted. With a heavy pair of gloves the injured cane can be given a twist that will break it off at the girdle. In most cases the borer will remain in the detached cane, which should be removed from the field.

The most serious diseases are the crown

gall, mushroom root rot, and anthracnose. When affected by crown gall the plants gradually turn yellow and lose their vigor. By a careful examination corky swellings will be found on the roots, usually near the surface of the ground, but often on the smaller roots. This trouble occurs very frequently as a swelling or canker along the side of the cane.



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Mushroom root rot is a fungus trouble which attacks the roots of the plants, finally causing their death. The disease grows on old tree roots and stumps, and is more apt to affect plants set on newly cleared land. When affected with either of the above diseases, the plants, with their roots, should be removed at once and burned. No new plants should be set in their places before three years have elapsed.

A fungus disease called anthracnose seems to have done more damage to the Loganberry than any other trouble in the state. It is a disease causing lightish-grey spots to appear on the leaves and canes of the plant, and may attack the drupelets of the fruit, also causing them to turn a light grey color. Ordinarily this disease can be kept under control by carefully cutting out the old vines after fruiting and burning them. If at this time some of the new canes are found to be infested seriously they should be thinned out, also. When the infection becomes serious, spraying with Bordeaux mixture 4-4-50 is recommended. The mixture is best applied with a resin fish-oil sticker, to improve the sticking and spreading qualities of the Bordeaux. The first application should come about the time the first leaves have attained good size. The second spraying should be applied just before the blossoms open and the third may be put on about the end of summer, in case new infections begin to make their appearance on the young canes and foliage. To protect the fruit, some colorless mixture, like Burgundy mixture, should be applied about two weeks after the petals fall. The resin fish-oil sticker should be used with this also. The formula for Burgundy mixture is as follows: 2 pounds copper sulphate (bluestone), 3 pounds sodium carbonate (washing soda), 100 gallons of water.

Mix each of the chemicals separately with water before bringing them together.

WHAT IS HUMUS

The term "Humus" is frequently used in discussions of soil problems.

Humus is the substance formed in the soil by decaying vegetable matter, such as leaves, stubble, roots, manure, crop plowed under and so on. Humus not only comprises elements of plant food itself, but it has the power of holding the necessary nitrates of fertile soil to prevent their escaping through washing or other means. It also has the effect of a sponge in absorbing and holding moisture in position and form available for the use of growing plants and aids in keeping the soil porous. Humus is indispensable to plant growth. Poor crops are in many cases due to its lack.

PUMPKINS A FOOD FOR HOGS

A great aid to the hog raiser is a small crop of pumpkins. These can be grown at a small cost and form a valuable addition to the rations of hogs. The value does not lie entirely in their nutritive composition, but is due largely to the beneficial effects on the digestive tract, as they tend to regulate the bowels. It is asserted that the seeds are valuable as a verminfuge.

Pumpkins may be grown in the corn fields, especially where there is a poor stand.

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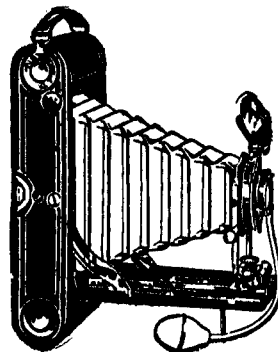
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Beekeeping in British Columbia

By Williams Hugh

A B C AND XYZ OF BEE CULTURE

I have just received my third copy of the above, published by A. I. Root Co. of Medina, Ohio. My first copy is dated 1883, my second 1908, but the 1917 edition is a veritable Encyclopedia of Bee Lore. The volume opens with a "Foreword" giving a short review of the craft, and suggesting a course of reading, A. B. C. of Beekeeping; Beginning With Bees; Anger of Bees; Manipulation of Colonies; Apiary, Smoke and Smokers; Stings; Hives; Transferring; Robbing; Feeding; Backlot Beekeeping; Swarming; Comb Honey; Extracting; Spring Management; Uniting; Wintering. Then some very useful pages for the beginner, showing what to do under almost every condition. Snodgrass takes the place of Cheshire in discussing the Anatomy of the Bee; Nelson's Embryology of the Honey Bee is distilled and made intelligible to the unscientific, under Development of the Bee, and many other scientific questions are all given in terms and language easily understood by the layman. Every phase of beekeeping is discussed, chapters are devoted to the study of honey, wax, and nectar producing plants. There is a comprehensive dictionary and a full index to all the many and varied questions set out in the volume. The whole is profusely illustrated, and printed on paper, with a type that makes reading a pleasure. It is a monument to Twentieth Century Bee Culture and will remain as such.

A meeting of the directors of the Beekeepers' Association of B. C. will be held Monday, May 7, at 7:30 p.m., in the offices of the Vancouver Exhibition Association, 214 Loo building, Hastings street, Vancouver.

The Ontario association have sent out notices to all its members asking the following questions:

1. How many colonies did you put away?
2. How many colonies in good condition?
3. Cause of loss if any?
4. What would you say is the percentage of loss in your neighborhood?
5. What are the prospects for honey crop?
6. Do you know of any honey for sale?
7. Where would you suggest holding an apiary demonstration this year?

It must be obvious to the most indifferent beekeeper, with information based upon the answers to the above questions, from our own members, we should be able to cope with many of the difficulties which confront the beekeeper every spring in this province, these losses and difficulties could be removed and the whole fraternity would go up a step in apicultural knowledge.

In one portion of the province during the winter of 1910-1911, the beekeepers' losses were estimated to be 25 per cent, and during the winter of 1915-16 the inspectors' reports show a loss of 40 per cent. In spite of work of the inspectors during the past few years we do not appear to have learned much. The individual beekeeper must do his bit towards stopping these winter losses by making a thorough investigation into the cause of the losses and report same either to the association or the department of agriculture.

The superintendent of the Dominion experimental farm at Sidney, B. C., writes: "Our colonies have all wintered very well, there has been no losses other than the old bees of each colony have died off."

One of our members writes: "One of my colonies died off when they had plenty of stores." If you are able to examine a colony that appears to be dying off through starvation, run a knife between the combs, uncapping some of the cells, the strongest bees will quickly get their fill, and will then commence feeding the weaker bees, and the whole colony will quickly revive.

HONEY PRODUCTION IN B. C. 1916 REPORT

Government reports are generally claimed to be, and should be, good authority. There should be no attempt made at exaggeration or misrepresentation by any government official, and generally the reports issued by the British Columbia government are creditable in that respect. The reports on honey production, etc., are however, in my opinion, an exception. The aim seems to be to "boost" the beekeeping industry by absurd and ridiculous statements. I made up my mind, after reading the 1915 report, that I would furnish no more figures in future, as I am opposed to anything that smacks of "wild-cat" statements. The 1916 report is not, however, as "wild" as some of the previous ones, but is wild enough.

The first of the 1916 report states that "by a little calculation" there was an average of 34 lbs. to those reporting, and a total of 120 tons procured in the province. These figures, I think, are ridiculously high, and misleading as to the averages by districts. About the same average in the report is allowed for nearly 1000 beekeepers not reporting as to the number of colonies and average per colony as for those reporting. Elsewhere on this continent beekeepers reporting are generally credited with being the most careful and enthusiastic, keep the most colonies, and secure the highest averages. Those who do not report as a rule cut a very small figure in the total

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quantity. I cannot see why, in the case of B. C., there is an exception, but in my figures I will be liberal and give a good credit to all and will then be far short of 120 tons. Figures given by me are in round numbers, it not being necessary for this article to work out the fractions.

To get at the correct averages I have divided the province into three districts—first, the Upper Mainland; second, the Lower Mainland; third, the Islands. The Upper Mainland reported 27,899 lbs. from 510 colonies, which is an average for those reporting of 54 1-2 lbs., which is a good average. There were 210 beekeepers who did not report, and it will be a very liberal figure to allow them 100 lbs. per beekeeper, which makes the total for the Upper Mainland of 48,899 lbs. The number of colonies reported was only a fraction of 5 each, so that allowing 100 lbs. for each beekeeper not reporting would give them an average of two to three colonies with a crop of about 30 to 50 lbs. per colony. A very liberal estimate.

The Lower Mainland reported 35,600 lbs. and 1236 colonies, which is an average for the 229 beekeepers reporting of only about 28 lbs., instead of 34 lbs., as one would infer from the report without separating the districts. There were 573 not reporting. I think I am fairly well posted on the Lower Mainland beekeeping, having lived here 35 years, and kept bees over 25. I made a trip through the district last fall, and from conversation with reliable parties I believe the winter losses was over 50 per cent., instead of 40 per cent as given in the report. There was a little less than six colonies each to those reporting, and those small beekeepers not reporting, I will be generous and give them—a number of which lost every colony—an average of 50 lbs. each, which amounts to 28,650 lbs., or a total of 64,250 lbs., for the Lower Mainland. But quarter to half of this was nothing but honeydew, and I am sorry that the report does not roundly criticize those beekeepers who extracted and marketed this vile stuff. Cutting out the Honeydew leaves the Lower Mainland with an average of about 201 lbs. per colony for a good grade of honey. The Islands, evidently, had a poor season, as 51 beekeepers, with 183 colonies, reported only 2172 lbs., which gives an average of 20 lbs. per colony. There was 163 not reporting, and considering the low average of honey and colonies, I cannot see why they should figure at all in the crop report, but as I started to give generous figures, will allow 20 lbs. per beekeeper, which is 3,260 lbs., or a total for the Islands of 5,432 lbs.

This gives a grand total of 118,571 lbs., or a little over 59 tons of 2000 lbs. of the entire crop of the province.

The above figures I have arrived at, being very liberal with credits to the various districts, but in my own mind I am doubtful if there was much over 45 tons produced in the province for the year 1916.

Other statements in the reports for 1915-16, I will take up in the next article. A report says, "Pay no attention to the old-timers," but now one of them is going to have a "say."

W. H. LEWIS.

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**SPECIALISTS IN BEE-KEEPING
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Beekeeping is no longer a side issue and hobby. It is now recognized as a science and is being given an ever-increasing amount of attention. New fields of activity have been opened up so rapidly that there are not enough trained men to fill the positions which have become available. While nearly everyone who keeps bees is sure to gather a surplus of honey during the years of good honey flow, it is only the specialist who can secure a good yield year after year during both lean and plentiful harvests. There probably always will be farmer-beekeepers, but the country will have to depend upon the scientific beekeepers for the bulk of its honey crop. With his more complete knowledge of bee behavior and of the proper conditions necessary to produce a surplus crop, year in and year out.

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The scientific beekeeper knows how to choose an advantageous site for his apiary and how to manipulate his bees to have strong colonies when the honey flow commences. He also knows what plants will produce the main honey crop in his territory, and how to take fullest advantage of their flow of nectar. Not only does he understand how to produce paying crops of honey, but he also knows how to prepare it for market and how to dispose of it successfully.

Men who can fulfill these qualifications are in constant demand to assist in or manage apiaries. The demand for such men, however, far exceeds the supply.

The various diseases which have so seriously threatened the beekeeping industry have led to the enactment of inspection laws in most states. These laws provide for the appointment of inspectors who shall be competent to examine colonies, detect whatever disease may be present, and direct treatment. It is evident that such men should be well trained.

Twelve years ago, none of the agricultural colleges were giving any attention to apiculture. There were some which treated the subject briefly in their regular courses in entomology. Fifteen agricultural colleges now offer full courses in beekeeping, and many others will follow along the same lines if they can secure competent men to conduct such courses.

DR. J. H. MERRILL.

**FRUIT AND ALFALFA WOULD BE
SCARCE WERE IT NOT FOR BEES**

The making of honey is a side issue in the important work of bees. Without bees there would be little fruit and little alfalfa or clover seed.

The strawberry is a plant for which insects are necessary to produce good fruit. In some varieties the staminate and pistillate flowers are borne on different plants. Experiments have been undertaken to determine whether the wind could carry pollen. Gelatin plates were exposed which would contain pollen grains if carried by the wind. In not a single case were pollen grains of the strawberry found. The regular pollinators of the strawberry are honey bees and other small bees. Bees are important in pollinating the cucumber. It is a common practice to have bees in the cucumber house—very few cucumbers would set without them. Tomatoes are sometimes

self-pollinated, but bees are an important factor in producing good fruit—the size of the fruit is slightly increased and the crossed fruits have a greater tendency to be irregular than those not crossed. Various species of plums are also pollinated by insects, and the bee is important in this work. Fruit will not set when insects are excluded. It has long been recognized that bees are valuable in the pollination of the apple and the pear.

Bees are essential for the production of a fruit-and-seed crop of many agricultural plants. Every horticulturist should keep a few colonies of bees to insure a crop of fruit.

DR. J. H. MERRILL.

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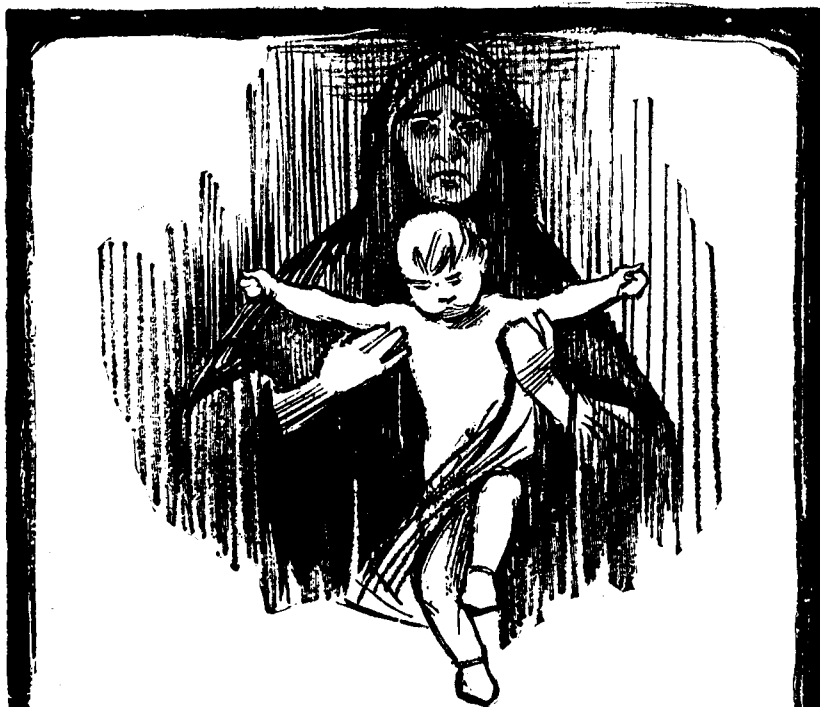
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Gardening for the Home

By H. M. EDDIE, F.R.H.S., Manager Growing Department, B. C. Nurseries.

The exceptionally cold and wet spring has kept gardening operations much later than usual and much of what ought to have been done last month is still undone. We must content ourselves with the saying "better late than never," and take the first opportunity that offers.

During broken weather like what we have had this spring much may be done by the alert gardener which may seem impossible—for instance, during unsettled weather, when it is difficult to get the surface soil dry enough to sow seeds, a morning may be selected which promises a dry day, and if you break up the surface of the plot you wish to sow with a fork or rake, the chances are that, if there is any sun or wind it will be dry enough late in the afternoon to get in the seed. Ground that was dug in the fall or winter takes a long time to get dry enough for seed sowing, if left undisturbed, more especially if it is of a retentive nature and holds the moisture near the surface.

I know several instances where seed was sown in good shape this year on the 15th March, while others nearby at time of writing—a month later—are still waiting for better weather to dry up their soil, simply by taking the first opportunity that offered and moving the soil early. Those who were fortunate enough to get peas, onions, parsnip, etc., sown early will now have them well above ground; and as soon as they can be plainly seen run the hoe or cultivator between the rows to break the surface up and allow the warm air to enter the soil. In passing, I would just like to mention what a useful implement the hand cultivator is, with all its attachments and sceder combined—it is one of the greatest assets of the modern gardener, and will allow him to tackle many times the amount of work he otherwise could.

Cabbage and cauliflower plants raised in hotbeds will be fit to plant out by the end of the first week in May, if they have been properly hardened off; the lights should be gradually removed from the frames until the plants are fully exposed night and day for a week before transplanting. When planting lift the plants with a trowel and save a small ball of soil round the roots of each plant if possible; plant carefully with the same tool and firm the soil well round the plants. Tomato plants may be planted out about the middle of the month, the same remarks as to hardening off and careful planting being equally applicable to them also. Tomatoes do best when grown on the single stem system, and should be planted in rows two and one half feet apart and two feet between the plants, a stout stake being given for support to each plant as soon as required.

Celery trenches ought to be prepared as early in the month as possible. The width of the trench will depend upon the number of rows to be planted in it, and the length on the number of plants to be

grown. Personally, I prefer two rows to the trench, and in this case it must be two feet wide; proceed by marking off the trench with a garden line, and throw out the soil equally to both sides. When the first spading has been thrown out, get down into the bottom and shovel out the loose earth, the trench will now be about a foot deep. Next, place a four or six inch layer of well-rotted manure on the bottom of the trench and dig it in, covering with three or four inches of soil. About the end of the month the plants will be ready to transplant, when they may be planted in a double alternate row in the bottom of the trench, the rows being six inches from the sides and the plants 15 inches apart.

In transplanting celery it is very important that good balls of soil should be retained round the roots, and if the weather or the soil should be at all dry, give a thorough soaking after planting. In transplanting plants of any kind it is a good plan to give the bed a thorough soaking with water, before lifting the plants; it is then much easier to protect the roots, as the soil adheres to them better. To protect cabbage, cauliflower and onion plants from the depredations of their respective enemies, the maggots, preventive measures must be taken early. In transplanting the two former the tarred paper discs are often used and are very effective. With onions, and cabbage and cauliflower plants in seed rows spraying has to be resorted to. Here is a very cheap and effective spray if conscientiously applied; kerosene one half gallon; soap, one quarter pound; water, ten gallons. Dissolve the soap in boiling water, remove from the fire and add the kerosene; churn thoroughly with switch or syringe for a few minutes until a creamy mass is obtained, when the balance of the water may be added, and it is ready for use. In applying this spray attention must be chiefly directed to the necks of the plants, and the surface soil near the plants, although it will not harm the leaves in the least. To be thoroughly effective this spray ought to be applied every week from the beginning of May till the end of June. Looks like a lot of work, but is absolutely necessary in some sections where this pest is very troublesome.

I don't know exactly how long the fly is active, but I have a suspicion that it is still busy for some time after the end of June.

Radishes suffer from the same maggot as do cabbages, and can be protected by the same means. About the middle of the month sow seeds of pumpkin, squash, marrow and citron; they are all worth growing, and growing well; give them good positions in well-prepared soil; sow five or six seeds to each hill, and thin out when well up to three of the strongest plants.

This is a very busy month in the flower garden, most of the summer annuals being planted in their flowering positions to-

wards the end of the month. Do not dispense the early flowering bulbs now and clip their leaves off because they are getting a little ragged in appearance. Plant stocks, asters, e.c., close up to them and give them



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time to ripen off naturally. If whole beds have been planted with bulbs it may be advisable to lift the bulbs and heel them in out of the way somewhere to ripen off when they can be again taken up and planted in the beds again in the fall.

In planting mixed beds or borders of flowers it is well to have an eye to a continuation of bloom, starting with say, pansies and running through asters, stocks, antiminums, fentstemour, salvias and chrysanthemums, thus ensuring having something bright from the earliest to the latest.

In some districts gooseberries and currants bear crops sparingly and in more than one case I have traced the reason to late spring frosts; where these threaten it will well repay the trouble of covering the bushes at night with squares of canvas, cotton, old sacks or anything handy, that will shield them.

The first brood of green ophir usually hatch out towards the end of the month, depending on the temperature; be ready to greet them with a drenching of spray, for by destroying the first batch much trouble may be avoided later on.

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Manager for Byers, Giegerich, Green Co., Ltd.

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THE VEGETABLE GARDEN

A Few Facts About the Cabbage Family.

Cabbage, cauliflower, kale, Brussels sprouts, radishes and turnips belong to what is known in garden science as the mustard family, but with the exception of the two latter they might well be termed the "Cabbage Family."

They all require the richest of soil, with the exception of cauliflower at one particular stage in its growth; they can endure considerable cold; none of them is able to combat extreme heat, and with the exception of the radish and the turnip, they require comparatively long seasons, except where specially early varieties of cabbage have been developed.

Cabbage, cauliflower, sprouts and kohlrabi should be started in the hot bed, but this is not essential if the season is long enough and the spring free from excessive cold.

Cabbage—One ounce of good cabbage seed will produce enough plants to set a quarter of an acre. The plants should be set in rows three feet apart and two feet apart in the row. A quarter of an acre will accommodate approximately 1,800 plants. The soil should be rich and heavy, well fertilized and containing plenty of humus. Cultivation should be intensive. As the heads begin to form, unless the soil is very rich, it is profitable to work into the surface a quantity of sodium nitrate, depending upon the degree of soil fertility and the available moisture. An application of from 20 to 30 pounds on a quarter acre cabbage patch is recommended as a general average.

Cabbage must have plenty of moisture and must be planted where extreme heat may be avoided, even though moisture is plentiful.

Cauliflower—in general, as to transplanting, soil requirements, cultivation and the like, the same rules should be followed for cauliflower as for cabbage. Prior to heading time, cauliflower is almost as resistant to frost as is cabbage, but the heads are very sensitive, and a slight touch of frost means ruin. Partially as a protection from frost, but more essentially for blanching purposes, the outside leaves of cauliflower should be tied about the head as it begins to take form. The plant is also extremely sensitive to high degrees of heat.

A quarter of an ounce of seed will produce about 800 plants. The seed is comparatively expensive. Cauliflower cultivation is considered difficult, but with proper conditions and judicious care it may be made one of the most valuable vegetables of the farm garden.

Brussels Sprouts—In starting, transplanting and cultivating follow the same general methods as with cabbage. Sprouts are hardy. They require about the same space as cabbage. They are slow growers. It requires from 16 to 20 weeks from planting to produce the little heads that develop on the main stem where the leaves branch off. Brussels sprouts are also generally admitted to be difficult of successful production in this country, but where good soil, long seasons and plenty of moisture are had they also may become valuable adjuncts of the garden.

Kohl-Rabi—This plant is also able to resist much frost and therefore may be planted in the open ground instead of the hot

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 Rennie's Mammoth Squash, specimens 403 lbs. weight; per pkg. 25c.
 XXX Scarlet Round White Tip Radish; pkg. 10c; oz. 20c; 4 ozs. 50c.
 XXX Melting Marrow Table Peas (dwarf); 4 ozs. 15c; lb. 40c; 5 lbs. \$1.90.
 Round Pod Kidney Bush Butter Beans; 4 ozs. 15c; lb. 55c; 5 lbs. \$2.40.
 Cool and Crisp Table Cucumber; pkg. 5c; oz. 15c; 4 ozs. 40c.
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 Rennie's Fireball Round Table Beet; pkg. 10c; oz. 20c; 4 ozs. 50c.
 XXX Early Summer Cabbage (heads 12 lbs. each); pkg. 10c; oz. 30c.
 Rennie's Market Garden Table Carrot; pkg. 10c; oz. 25c; 4 ozs. 75c.
 Early Yellow Danvers Onion, black seed; pkg. 5c; oz. 20c; 4 ozs. 60c; lb. \$1.90.

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bed when not desired for early production. Kohl-rabi is one of the least common of garden vegetables. Its edible part consists of an enlargement of the main stem, its nature and flavor being much the same as that of the heart of the cabbage head.

If not transplanted from the hot bed it should be sown in rows and thinned to stand five to eight inches apart. Rows should be 15 to 20 inches apart. Half an ounce of seed will produce 1,000 plants, or probably 400 feet of row after thinning.

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ALFALFA HAY FOR THE HOGS

That hogs will eat alfalfa hay and pay well for it was proved during the past winter on many farms where economy was practised by substituting hay for part of the corn and tankage or other mill feed. This is not a new idea, it was tried out before several years ago, but the farmers did not make use of it.

As an illustration, on one farm in the States, 20 April gilts raised on alfalfa pasture, corn and tankage were bred for March pigs and wintered on the same feeds, with the exception that alfalfa hay was fed in a rack after pasture failed in the fall. They ate a big armful of hay every day, and were fed just enough corn to keep them from losing flesh; that is two ears of corn apiece each morning and evening. During the last two months they each got also one-quarter of a pound tankage a day. Now the pigs are coming, and at this writ-

ing 13 gilts have farrowed and have saved 96 pigs.

On another farm visited in another part of the state there are 15 April gilts bred for April farrow and raised and wintered in the same way. They are the best looking lot of sows ever on the owner's farm at this time of year.

Fall pigs on those two farms and others were inspected recently, all red alfalfa hay from the time pasture failed last fall. Where they received lots of corn they are ready to ship. Where they had little corn they are just going on a full feed at weights of 100 to 150 pounds.

One lot of 85 wintered on alfalfa hay, a little corn, and a thin warm slop of middlings and tankage, kept every stray grain of corn picked up about the barn lots all winter, and it has cost less to raise them than any lot of fall pigs that farm ever produced. All the pigs have large frames, big bone and much vigor. They are making fast gains on corn and tankage in self-feeders.

To have a hog eat alfalfa hay in the largest quantity it must have been raised with all the alfalfa hay or pasture it would eat from weaning time.

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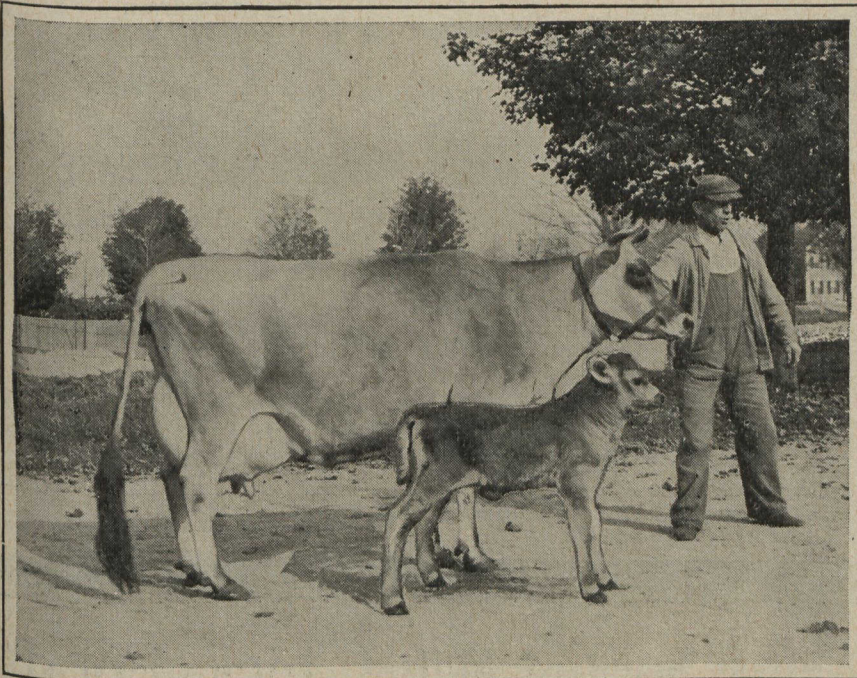
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A twenty-five thousand dollar son is the latest offering that the Jersey cow Sophie 19th of Hood Farm, the world's champion long-distance butter cow of all breeds has made to the dairy world. Sophie, for whom her owner, Mr. C. I. Hood of Lowell, Mass., refused an offer of \$50,000, is truly the dam of the golden calf, for her son now weighs about ninety pounds which in gold would be worth \$25,920, and Mr. Hood refused to consider a \$25,000 offer for the calf. Sophie has a record of over two and three-quarter tons of butter in six years, which is the greatest ever made by a cow of any breed.

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POULTRY SECTION

RANGE VS. CONFINEMENT FOR LAYING HENS

Profits Materially Increased Under Range
Conditions.

By W. J. BUSS.

In order to study the rate and economy of egg production of fowls allowed free range as compared with those kept in restricted quarters, a series of experiments was begun by the Ohio experiment station at the Southeastern Test Farm, in Meigs County, in May, 1912. The results of three experiments of this series have been reported in bulletin 791 of this station, and a brief review of this work is presented in this article. For identification the experiments will be designated as A, B and C.

Duration—The duration of the experiments were as follows:

Experiment A—May 5, 1912, to October 3, 1914, lasting 882 days.

Experiment B—November 30, 1913, to November 27, 1915, lasting 728 days.

Experiment C—November 29, 1914, to November 27, 1915, lasting 364 days.

The fowls used in these experiments were S. C. White Leghorns. Those used in experiment A were hatched in the spring of 1910. From the time they began to lay as pullets in the fall of 1910 to May 4, 1912, these fowls were divided into four uniform lots, and all given the same treatment—their treatment during that time being the same as that accorded the lot kept in confinement in this experiment. With almost exactly the same feed consumption per hen, the fowls later allowed range produced 4.2 per cent fewer eggs per hen than did those continued in confinement, which would seem to indicate that the fowls kept in confinement had a slight advantage over those on range, so far as the inherent ability to produce eggs was concerned. Moreover, the fact that the hens on range were required to adjust themselves to new conditions, while the hens in confinement were continued under conditions to which they had become accustomed, may also have tended to give the confined hens a slight advantage over those kept on range in this experiment. There were 99 hens in the confined lot and 108 in the range lot at the beginning of the experiment.

The fowls used in experiment B were hatched at the experimental station in April and May, 1913. They were kept at the station during the summer and shipped a distance of 200 miles, on October 15, 1913. The average weight of the 57 pullets in each lot at the beginning of the experiment was 3.14 pounds. In experiment C pullets hatched in April and May, 1914, were used. The treatment given these pullets prior to the beginning of the experiment was practically the same as that given the pullets used in the preceding experiment. These pullets were not as thrifty nor as well matured at the beginning of the experiment as were those used in experiment B. The average weight per pullet in the

confined lot was 2.69 pounds, and in the range lot 2.68 pounds. These were 100 pullets in the confined lot and 101 in the range lot at the beginning of the experiment.

Quarters—The fowls in experiments A and C occupied the same quarters. Each lot was kept in two pens, each 13 by 20 feet in size, in a half-monitor type of house, 20 by 60 feet in size. The lot in confinement had access to two outside yards, each 13 by 60 feet in size, which provided no green feed. The lot on range had access to a plot of bluegrass, containing approximately 2 acres. A cow and some sheep were pastured on this lot throughout the spring, summer and autumn. The lots on range were confined to the houses when the ground was covered with snow, but were allowed access to the range at other times.

Each lot in Experiment B was kept in a house of the shed-roof type, 10x24 feet in size. The lot on range has access to 1-4 acre of bluegrass sod. Some other live stock was also pastured on this plot. The lot in confinement had an outside yard 12x60 feet in size, which supplied no green feed.

Rations and method of feeding: The grain mixture used in these experiments was composed of 3 parts, by weight of cracked corn, and 1 part of wheat, and the mash mixture was composed of 4 parts of ground corn, 2 parts of wheat bran, 2 parts of meat scrap and 1 part of linseed oil meal. The grain mixture was fed twice daily in equal parts. The mash mixture was fed dry in self-feeding hoppers. In most cases the hoppers were left open at all times. The rations were planned with a view to having the hens consume half as much mash as grain. All lots had con-

stant access to hoppers containing grit and shells, while cracked corn was used in this work, its use generally is not recommended. Summary of results with laying hens on range and in confinement:

Continued on page 31



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WOMEN'S SECTION

British Columbia Women's Institutes

Motto—"FOR HOME AND COUNTRY"

BURQUITLAM NEWS

The Burquitlam Women's Institute held the second of their entertainments to raise the money to furnish a bed in the Royal Columbian hospital, and were successful in extracting the last instalment of \$50 from a large attendance. It was a delightful evening in every way, the music by Mackness' orchestra being especially good. The whist drive winners were: Ladies' first prize, Mrs. A. Shaw; second, Mrs. Worthington. Gentlemen, first, F. T. Hart; second, P. Le Brun. Consolation, E. M. Wiltshire.

As a result of the second whist drive and dance held under the auspices of the Burquitlam Women's Institute, sufficient funds have been realized to furnish a bed in the military annex of the Columbian hospital. The winners in the raffle for the gift of marmalade donated by Mrs. Hart, were: First, Miss Browning, Vancouver; second, Mrs. Wiltshire, Burquitlam.

The Women's Institute are having a whist drive and dance on April 27, in aid of the Agricultural Association.

HAZELMERE NEWS

A very instructive series of lectures was given by Mr. Chalmers on silos and silage, poultry, home canning and the curing of hams and bacon, showing how much can be taken off a very small farm if the instructions are carefully carried out. Unfortunately, owing to unfavorable weather and illness among the members, the attendance was not as large as it should have been. The next meeting of the institute will be held on Thursday, April 12, and a full attendance is hoped for.

SURREY WEST INSTITUTE

The regular monthly meeting of the Surrey Women's Institute was held April 10 in the Municipal Hall, President Mrs. Whiteley in the chair. After transacting the usual business, Mrs. McGill of Vancouver gave a very able address on "Evolution of Responsible Government," which was both interesting and instructive. Tea was served by Mrs. Whiteley and Mrs. Hornby. The meeting then adjourned to meet again May 1st. when Mrs. Ralph Smith will give an address. There will also be a competition of daffodils and narcissus at that meeting.

WOMEN'S INSTITUTE

There was a good attendance at the March meeting of the Chilliwack Women's Institute which was held in the rest room. The principal item of the afternoon was an able and timely address on the place and influence of the picture show in present day life. A brisk discussion followed and was led by Mrs. Clarke and Mrs. Whitaker. Miss Courtenay gave a splendid paper on "Food Values." A new department of the Institute is the "Question Box" and it bid fair to become a very wide-awake department. One of the many questions asked was: "Is there a law in Chilliwack prohibiting expectorating on the sidewalks and in public places? If so why is it not enforced?"—Chilliwack Progress.

HUNTINGTON NEWS

At the monthly meeting of the Upper Sumas Women's Institute, held on April 12, Mrs. Hart, on behalf of the prisoners of war committee, reported receiving \$1.50 from Miss Potter. A letter was read saying socks could not be included in the parcel sent to Mr. Munroe, so it was moved by Mrs. McMurphy, seconded by Mrs. Fadden, and carried, that the pair of socks donated should be sent to Private Norman Evans. This committee propose giving a tea to augment their fund.

The school committee were recommended to urge the introduction of manual training into the schools.

A committee for visiting sick members was formed, Mrs. McMurphy, Mrs. Hart, Mrs. Cameron volunteering to act.

A letter re the poultry competition arranged by the government was read, but no action was taken.

The secretary reported receiving acknowledgment from the Y. M. C. A. of the money collected at the previous meeting. At this April meeting \$1.65 was taken for this object, and \$2.05 for the prisoners of war.

A splendid paper on "Co-operation," giving all food for thought, was read by Mrs. McFadden. After adjournment all enjoyed the delicious refreshments provided by Mrs. McMurphy.

WOMEN'S WORK

Cowichan Women's Institute

At the meeting of the Cowichan Women's Institute Tuesday, April 10th, a resolution was adopted to be forwarded to the agricultural department requesting that department to endeavor to induce the education department to arrange that manual training, domestic science and sewing be placed permanently on the curriculum of the public schools of the province.

The Arts and Industries Club committee reported good progress and hoped at some future time to be able to take a small store and sell their products there at all times.

The Institute now has 129 members and its finances are in good shape. No reports were presented from the library, room, or Red Cross committees. Mrs. Blackwood-Wileman, president, spoke on the aims the institute had in view.

PATRIOTIC WORK OF SUMAS WEST INSTITUTE

What Organization Has Done for Red Cross and Prisoners of War Fund.

HUNTINGDON, April 16.—The Upper Sumas Women's Institute met on April 12 at the home of Mrs. Murphy, Second Street, Huntington. The following ladies were present: Mesdames Cameron, Cobby, Cox, Fadden, Fraser, Hart, Lunn, McMurphy, Munroe, Murphy, Owens, Porter, Tully, Winslow, F. York and T. York.

The president read a letter sent by Mrs. Campbell, who had been appointed to inquire into the selling of waste paper. Mag-

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Boys' Romper Suits—In all white, with collar, cuffs and belt of striped gingham or in plain or striped gingham with white collar, cuffs and belt, ages 2 to 6 years. Special at \$1.15.

Children's Romper Suits—In striped blue washing prints, in sizes 6 months to 2 years, at 60c each.

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To prove to every woman that this is the best Vacuum Washer made and to introduce it in every home we will send it complete with handle and exhaust protectors, which prevents splashing, for only \$1.75 Postpaid.
Washes anything from finest laces to heaviest blankets, without wear or tear—saves rubbing and washboard drudgery. Used equally well for rinsing, bleaching or dry cleaning with gasoline. Lasts a life time. Satisfaction guaranteed or money refunded. Send your order to-day.

GRANT & McMILLAN CO.

Dept. V. F. 5, Box 353, Toronto, Ont.

azines and writing paper bring \$20 per ton and wrapping paper \$6 per ton. It was moved by Mrs. Hart, seconded by Mrs. Fraser York, that the institute organize a collection of waste paper to be sold for charitable purposes.—Carried. Mrs. Hart kindly offered the use of her garage on Second Street, Huntington, for storing the paper. It is hoped that everyone in the neighborhood having waste paper will take it there between April 16 and 21. The institute will see to the baling and shipping.

On behalf of the Red Cross committee, Mrs. Porter reported sending 10 suits of pajamas to the society at New Westminster. Three individual members had sent socks to friends at the front. A dollar was received from Mr. Fooks and 28 cents was found in the postoffice box.

An interesting letter telling of the destination of socks was read.

Summary of Results with Laying Hens on Range and in Confinement
Continued from page 28

Lot	Average number in lot.	Mortality	Grain & loss (—) in wt. per hen.	Grain & mash consum'd per hen.	Cost of feed per hen.	Eggs produced per hen.	Cost of feed per doz. eggs produced	Value of eggs per hen*	Differ'ce in cost of feed and value of eggs
		Per cent	Pound	Pounds	Dollars		Cents	Dollars	Dollars
Experiment "A"									
Confined ..	85.35	23.23	—0.16	146.79	1.96	241.1	9.75	4.22	2.26
On range .	95.87	15.53	— .09	145.56	1.97	278.3	8.49	4.85	2.88
Experiment "B"									
Confined ..	51.18	17.5	.02	125.57	1.69	243.7	8.31	4.57	2.88
On range .	54.01	12.3	.04	127.84	1.74	316.4	6.59	6.01	4.27
Experiment "C"									
Confined ..	91.20	20.0	.41	55.69	.74	89.7	9.95	1.69	.95
On range .	92.67	21.8	.47	58.27	.79	129.1	7.30	2.41	1.62

FARMERS' HARDWARE AND IMPLEMENT STORE

In last month's issue of this magazine in an advertisement for Mark Dumond's Hardware and Agricultural Implement Store, 1048 Main street, it was mentioned that this firm also had a store at Revelstoke, whereas it should have read Ashcroft, B. C., where Mr. Dumond's opened his first store 21 years ago, and by carrying the best lines of hardware and agricultural implements,

courteous treatment of his clients, has built up one of the finest businesses in British Columbia.

The store at 1048 Main street was opened six years ago and can easily be said to be the largest farmers' supplies store in the city.

Farmers would do well to visit this store, where they will be able to fill all their requirements in the way of the McCormick disc harrows, McCormick seed drills, Planet Jur, seeders, Oliver ploughs, bee supplies and poultry supplies, and general hardware.

FEEDING VALUE OF APPLES TO STOCK

A farmer has asked "What is the feeding value of apples to milch cows, horses, hogs and chickens?"

The principal value of apples as food for stock is in the fact that they combine well with other foods, furnishing a balanced ration which is far superior to that usually given to stock. They aid digestion, satisfy the appetite, and give tone to the system.

As a single diet, apples are not good for fattening, not good muscle builders and not good egg or milk producers.

Service and Quality

Our Selling Features — Prices Commensurate

Ward, Ellwood & Pound, LIMITED Vancouver's Most Successful Printers

Printers of B. C. Fruit and Farm Magazine

318 Homer St.



Phone Sey. 1515

Wonderful Bargains in Staples For Fruit and Farm Readers

You know that the prices on staples have nearly doubled during the past two years—you know also that the staples of today are nearly as good as the staples manufactured before the war.

To get you acquainted with our Staple Department, we offer for this month only the following lines—guaranteed manufactured before the war commenced, at less than before the war prices.

Get your order in early—and be sure you say you saw the ad. in the Fruit and Farm.

SHEET BARGAINS

200 dozens of ready to use, made of full bleached, extra strong cotton sheeting that will give splendid satisfaction.

Size 70x90, regular	\$1.75, for	.....	\$1.59 pair
Size 70x90, regular	\$2.00, for	.....	\$1.69 pair
Size 80x90 regular	\$2.25, for	.....	\$1.97 pair
Size 70x90, regular	\$2.50, for	.....	\$1.97 pair
Size 80x90, regular	\$3.00, for	.....	\$2.27 pair

70c HEMSTITCHED PILLOW SLIPS 47c PAIR

200 dozens of them, made of heavy cambric finished longcloths, in assorted sizes, and nicely hemstitched. Sale price 47c pair

35c SHEETING, 27c YARD

300 yards, full bleached quality, and 70 inches wide, good round thread and very durable. Sale price, 27c yard

TABLE CLOTH BARGAINS

300 of them, marked to sell at one-third less than regular prices—all hemmed ready for use; good durable qualities, in a large assortment of pretty designs.

Size 2x2 yards, regular price \$3.00.	Sale price	.....	\$1.97
Size 2x2 yards, regular price \$4.90.	Sale price	.....	\$3.25
Size 64x86 inches, regular price \$4.50.	Sale price	.....	\$2.97
Size 2x2½ yards, regular price \$6.00.	Sale price	.....	\$4.07
Size 2x3 yards, regular price \$6.50.	Sale price	.....	\$4.27

20c BLEACHED COTTON, 14c YARD

1000 yards heavy full bleached quality and full 36 inches wide, absolutely free from all dressing and a nice firm even weave. Regular 20c yard. Sale price 14c yard

20c ROLLER TOWELLING, 14c YARD

1000 yards extra heavy crash towelling, 17 inches wide, finished with red borders. Yard 14c

15c LINEN CRASH TOWELLING, 10c YARD

1000 yards linen crash towelling, 17 inches wide, pure linen weft. Sale price, per yard .. 10c

8c ROLLER TOWELLING FOR 5c YARD

1000 yards of cotton huckaback towelling, 15 inches wide, with red border. A wonderful value. Sale price 5c yard

25c WHITE FLANNELETTE AT 19c YARD

1000 yards only, full bleached flannelette, British manufacture—nice soft fleecy finish, durable quality and full 36 inches wide. Sale price 19c yard

The Hudson's Bay Company

VANCOUVER, B. C.