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Devoted to the Interests of Bee-keepers

JAS. J. HURLEY, Editor

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The Canadian Bee Journal

PUBLISHED MONTHLY

JAS. J. HURLEY, EDITOR, BRANTFORD, ONTARIO, CANADA

Vol. 20, No. 7. JULY, 1912 Whole No. 569

CANADA FOR THE BEE-KEEPER

By Dr. C. Gordon Hewitt.

There have been many signs during the last few years that bee-keeping in Canada is receiving greater consideration than previously. Notwithstanding such favourable signs there still exists a large proportion, too large by far, of farmers, fruit growers and others who do not realize the importance of the presence of bees on the farm, on the ranch and in the garden, and the value of their products. There are others who, although they may not be aware of the fact that bees are valuable adjuncts to the farm and orchard, nevertheless would keep bees if they knew how to begin and continue. This fact is clearly indicated by the large number of letters which are continually being received, the essence of most of which is as follows: "I should like to keep bees and should be pleased if you would tell me how to begin and what to do." This bulletin has for its chief object the answering of these questions. It is not intended to be an exhaustive account of apiculture or of bees, but a guide to those whose knowledge of bee-keeping is limited or who have no previous knowledge of this profitable branch of agriculture. Not only has it been written as a guide to the beginner but also with the desire to increase the number of bee-keepers in different parts of Canada by indicating the advantages of bee-keeping and thereby wakening the interest of farmers and fruit-growers to its advantages.

Briefly, the advantages of bee-keeping are as follows: Bees produce an article which is of value as food for the owner and his family or as a saleable product and in the gathering of the nectar from the flowers they increase the yield of the crop whether it be clover or apples. Honey is valuable as an article of food and there is always a good market for it. The fertilizing value of bees in relation to flowers will be discussed later, but it should be remarked here that in many localities alsike clover is a total failure and hardly worth cutting owing to its seedless condition brought about by an absence of bees which alone fertilize the flowers. All fruit growers know that certain cross. varieties of apples, plums and other fruits will not produce unless they are cross-fertilized. In such cross-fertilization bees are the most important agents. The presence of bees, therefore, in an orchard undoubtedly increases the amount of fruit produced and this has been experimentally proved. It will be readily understood that a few hives of bees form an important and, we should think, an almost necessary adjunct to the orchard. Few people realize the enormous waste of nectar which takes place annually and which might be gathered, or appreciate the amount of clover seed and fruit which is lost each year owing to lack of bees to fertilize the flowers. Hence such a waste and loss continues. Canada is incomparable in its wealth of wild and honey producing flowers which give so great a charm to the landscape and yet their fragrance is wasted and they solicit in vain the visits of the bees.

Apart from the importance of keeping bees to ensure the fertilization of flowers,

the results of their toil may be made very profitable to the owner. He may either use the honey at home or sell it. There is an increasing number of bee-keepers who devote their whole time to the production of honey. It is estimated that the average production from a single hive is 25 to 30 lbs. of honey in the comb or 40 to 50 lbs. of extracted honey. If sold at retail prices the honey in the comb will bring 15 to 25 cents per pound and extracted honey from 10 to 20 cents per pound. The price varies according to the class of honey and the market. The wholesale prices are less, 6 to 10 cents being paid for extracted honey and 10 to 15 cents per pound for comb honey. From these returns the working expenses must be deducted. Such expenses are entailed by the provision of wax foundation, sections, etc. Many farmers may not know that a steer costing about five times as much as a hive of bees, after it has been fed and cared for during the whole of the winter, will not realize much more than the produce of a hive of bees in a single season, and that bee-keeping when properly carried on may be as profitable as the feeding of steers. It must not be imagined that bee-keeping requires very little attention. While it is true that where a few hives are kept to provide honey for the household, or as cross-fertilizing agents in the orchard, comparatively little attention is required, it is a mistake to imagine that large returns will reward the expenditure of little time and trouble. The successful bee-keepers are those who give much thought time and labour to their bees. Where they are kept on a large scale this is necessary; there are good years but there are also years when, through drought or other causes, the honey crop is a failure and it is only the careful bee-keeper who is able to make the best of such poor years.

In Canada the most important problems confronting the bee-keeper are the control and prevention of bee diseases and the swarming and wintering of the bees. All these difficulties, however, can be overcome. Mr. Morley Pettit, Provincial Apiarist, of the Ontario Agricultural College informs me that an increasing number of men and women in Ontario are making good incomes from bee-keeping alone. These incomes range from $500 to $3,500 per annum.

A large outlay of money is not required to begin bee-keeping. It is a mistake to start on a large scale with a large number of hives. Begin with one or two hives and increase the number annually as experience is gained, otherwise financial loss may occur and discouragement surely follow.

Wherever it is possible, the prospective apiarist should make the acquaintance of an experienced bee-keeper. This does not mean one who still employs antiquated methods such as keeping the bees in boxes or frameless hives, etc., but a bee-keeper who adopts the methods best suited to the production of honey and the welfare of the bees. Experience is the chief guide and, although much may be learned from books, the real knowledge is gained only by finding things out for oneself.

WHY A MALE BEE COULDN'T VOTE BUT A HUMAN FEMALE SHOULD.

By Prof. Gustav Fischer
(Of Jena University, Germany)

That the male bee should under no circumstances have a vote in a bee community has been proven by recent laboratory experimentation upon the brains of the three types of bees—the female, the male and the neutral, or worker. Both bees and ants have recognized this fact by depriving the male of any but a biological part in their activities.

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tirely certain important features present in the others. The same is true of the ant.

The bees and ants carry on their activities by instinct; the human being by reason.

Here you see how the brains of the three kinds of bees compare to each other. Beneath them is a human brain. No one, not even the keenest scientist, could tell by looking at this brain, by weighing it or measuring it or dissecting it, whether it is the brain of a human male or a human female. He might guess, because, as a rule, a man's brain is slightly heavier than a woman's and averages a few different slight measurements. The differences are not, however, either constant or proven, and so, while the clever scientist might say he thought this a man's brain or a woman's brain, he couldn't be sure which it really was.

On the other hand, the difference between the brains of the three kinds of bees is apparent at once.

It would seem, then, that for the working of instinct developed to its highest power, different kinds of brains are needed. But for the working of the higher faculty of reason, only one kind of brain is necessary. Instinct is only perhaps highly organized habit; reason is volition. The brains of the three kinds of ants are highly developed but rigid machines which can only produce just the kind of activity for which they are built. They are like a stocking machine, say, which can only produce a certain kind of stockings, but not women's wraps. The brain of man, on the other hand, is a machine of great flexibility, which can create anything. A male bee, therefore, shouldn't vote because his brain clearly shows it is not made for the activities carried on by the female and working bees who do have to look after the good of the community.

But, on the other hand, the woman's brain shows that it is able to do any work the man's brain can do.

The difficulty of studying so very small a structure and following each nerve may be appreciated by any one who will catch a bee and just look at that little brain inside of the head. I started by making a series of sections of the brains of pupæ bees—just ready to fly—and by making plaster casts of their brains.

The three orders of individuals among ants and bees have different duties to perform, and because they require the development of different instincts for the performance of this work, different parts of the brain are more fully developed in each, for its special work. The instincts act through certain nerve chords or bundles of chords running up to the brain, and therefore, as these chords and their centres are developed for the activities required of male, female and worker, the brains differ considerably.

The brain of the drone (male) has a large seeing-flap, corresponding to the large eye. The drones require good sight to follow the flight of the queen. The smelling-flap (Lobus olfactorius) is not noticeably smaller in the drone than in the worker, but is not so highly developed within, for as the drone takes no part in the gathering of food and care of the young, it does not require the smelling sense so much.

In the workers the seeing-flap is noticeably smaller than in the drones, yet somewhat larger than in the queen. The workers direct their flight by vision, so they require sight more than the queen, which, as is well known, after breeding remains in the hive until after the swarm leaves, when she is guided by the workers. The smelling-flap of the workers is much larger than the queen's, because the workers require a highly developed sense of smell for their multifarious labors, while the

queen has nothing to do with the gathering of the food, building the comb or care of the brood.

The so-called Fungoid-shaped Bodies, in which the chords from all parts of the brain meet, are decidedly larger in the workers than in the queen. If it be held that Fungoid-shaped Bodies are the seat of the intellect of insects, it is appreciable that the worker-bee, which shows the greatest thinking power, possesses this organ in well developed form.

But it is no less certain that these fungoid-shaped bodies are not merely the seat of thought, but also the centre of highly complicated instincts. This follows also from a consideration of the drones, in which the fungoid-shaped bodies are larger than in the queen and almost as large as in the workers. Even though there are differences in the structure which bespeak a relatively higher development of these important centres in the workers, we must draw the conclusion that the fungoid-shaped bodies are not exclusively the organs of intellect, but that instincts are the real basis, or they would not be so highly developed in the stupid drones.

Similar results have been secured from the study of the brains of ants, conducted first by Marion Sweet and then (after his death) by H. Pietschker.

Forel has held that the fungoid-shaped bodies were altogether lacking in the males, but Pietschker found them, although smaller than in queens and workers.

The brains of the males of the ants, just as in the drones, are notable for their large seeing-flaps, but have small smelling-flaps. In the brains of female ants the seeing-flaps are not so large as in the male, but larger than in the workers. It is well known that these last have no wings, and consequently, the need for vision is of far less importance for them than for those insects which have wings.

In the worker ants the smelling-flap is especially large, for sensations of smell are most important to them for the finding of their way and for the performance of their many duties in the nest. In the worker ants the fungoid-shaped bodies are much larger and more highly developed than in the females.

It is demonstrated by the study of the brains of the bees and ants that the different instincts of the three different classes are marked in the brain construction of each class. Herein is an additional proof that instinct is absolutely dependent upon the inherited paths of the nerve system.

WOMAN'S DEPARTMENT

CONDUCTED BY

Miss Ethel Robson, Ilderton, Ont.

Early Swarms

This year my Institute work took me up into Eastern Ontario again, Peterboro and Victoria counties. Sunday, May 26th, I spent with Mr. W. Anderson, just out of Peterboro. The dandelion and apple blossoms were at their best and the day was ideal. In the afternoon we went out to look at the bees, and there were two swarms hanging. It was something of a surprise to me, for I knew my bees would have no thought of swarming. Then I began to weigh some of the hives, and I understood. They were heavy, almost as heavy as mine were in the fall. They had an abundant flow of buckwheat, and the bees had packed the brood

chambers solid, far more than was needed for winter. The queens were crowded for room, so as soon as the weather was at all favorable they had swarmed. Next day we were busy putting on supers. I couldn't help wishing I had a little of that abundance of honey in my light hives at home, but I should hardly desire such quantities of it, as it is rather a difficult thing to dispose of in the spring. And wherever I went I found the same conditions among the bees—crowded brood chambers and swarming. Mr. Webster, at Cambray, was trying to clear the honey out of his brood chambers, but it was badly granulated, hence a difficult matter. Most of the bees, however, were in good shape, and the winter losses had been slight, which goes to show the value of buckwheat for wintering.

And Chickens

The chickens are coming on nicely. They have had the gapes and they have had lice. Now, having outlived their chicken troubles, they seem in a fair way to reach maturity. But there are disadvantages with chickens—you cannot turn them loose in your neighbors' fields as you can your bees. As they increase in size they develop enormous appetites—the grain in the bin is getting low. It is going to mean a good deal of expenditure to keep their crops full. When you are keeping chickens in the old-fashioned way, it is all right just to quietly take the grain out of the granary, if you can get it, and say nothing about it, but under new methods, where you are keeping them for profit, all these things have to be reckoned up. I am not sure that I like that part of it. But we have enjoyed the chickens; they really are almost as interesting as bees.

PROTECT YOURSELF

Do not sell your crop until you know the prices recommended by the Honey Crop Committee.

NOTES ON THE NOSEMA DISEASE OF BEES

By Dr. Maassen in the "Bienenwirtschaftliches Centralblatt."

As the result of my investigations in the Nosema disease, I can now show that it is not identical with dysentery of bees.

In the case of my first experiments in the laboratory I was struck by the fact that of those nosema-diseased colonies shut in boxes there were always some colonies that did not show any appearance of dysentery, even though they had been confined for a week. This led me to the opinion that the symptoms of dysentery—swollen abdomen, inability to fly, excessive excrement and great mortality—are not peculiar to the nosema disease.

In many cases, nosema-diseased colonies, even badly infected, behave as though healthy, and show no symptoms. Such colonies winter well, and remain free from dysentery. The examinations proved what I have repeatedly drawn attention to—that the parasite "Nosema Apis Zander" is widely distributed amongst bees, and is met with in every colony. I found later that nosema-free bees could suffer from dysentery as well as nosema-diseased bees. This was earlier observed by Zander in his apiary, and later by me in the laboratory.

Further, I established that with confined nosema-free bees, symptoms of dysentery could be artificially induced by giving them strongly pollenated honey infected with bacilli taken from the intestines of diseased bees.

With regard to the "May disease," or "spring dwindling," Zander is of the opinion that it is caused by the bacillus Nosema apis. I have had opportunity in two springs to study this disease thoroughly. I found in the course of my experiments that the bees

badly affected by Nosema apis in the spring of 1910 were found in the following spring, after minute examination, to show no trace of the organism. It is thus hardly safe to surmise that this parasite is the cause of the "May disease." I now believe that the nosema disease, as it has earlier been named by Dönhoff, is identical with no other disease.

There is no doubt that nosema is frequent amongst bees, so that it is not surprising to find the bacilli in bees suffering from other diseases, or that it should be considered to be the cause of the mortality, which really arises from some other cause.

One will therefore perceive that the simple fact of the existence of Nosema apis in diseased or dead bees is not conclusive proof that the bacillus is the cause of the disease, and only in the case of the queen, when found to be affected with nosema, can one decide that this particular parasite is the cause of death.

My observations, confirmed by those of Hein, Burri, Nussbaumer and others, show that the disease disperses, as a rule, of its own accord. The bees do not generally succumb from an attack, unless they are in bad condition from another cause. The apiarist can greatly help in preventing the disease from getting the upper hand by keeping the bees under hygienic conditions and having healthy young queens. Badly attacked bees can be cured if they have a chance of flying in propitious weather. This happened with some stocks of mine which were badly diseased, and in the course of the summer the number of bees carrying bacilli greatly decreased, so that by autumn in most colonies there were hardly any "microbe carriers."

Infected bees can remain for a while showing no sign of disease, and in some cases remain alive for two months. But this does not appear to agree with Zander's experiences.

I have seen great mortality amongst bees diseased with nosema, even when they have not been attacked by any other complaint, dysentery, for example.

The parasites locate themselves always in the middle intestine, and sometimes in the Malpighian Tubes. In general only the workers are affected—in rare cases the queens and drones—but never the brood.

In the laboratory one can infect the queens and drones as easily as the workers, but in the colony it is different, as the queens and drones take no part in the work of the hive, and so are less exposed to infection than the workers. They do not seek their food, but let themselves be fed by the workers. Here, it may be mentioned, is further proof of Schönfeld's opinion that the chyle food comes in great measure from the chyle stomach of workers, a view that the bee-keepers of to-day defend, in opposition to Schieminz, Zander and others; for the colony must in all circumstances infect the brood, queen and drones that are fed with bee food, as the chyle must contain the spores of the bacilli.—Translated from the German by Miss Newland.

THE SONG OF THE HONEY BEE

I sing the song of the honey bee,
With her legend of menace and dread,
Who gathers the sweets for you and me
That give us our daily bread.

She's a child of the warmth and the light and the air,
A child of the summer hours;
Her harvest of nectar she gathers home
From the innermost heart of the flowers.

Her sting is distilled from the burning sun,
To give scorching, withering pain
To all who would lay rough, vandal hands
On the treasures of her domain.

When the days are cold she dreams
away,
Secure in her warm winter nest;
Tho' the snow may fly and the winds
blow high,
They cannot disturb her rest.

But soon as the air grows warm and
bright
With the magical breath of spring,
She awakes from her dream and leaves
the hive,
Her cleansing flight to wing.

Dead bees are carried outside the hive,
The cells are made shining and clean
For the eggs of her who holds their
fate—
The pendulous-bodied queen.

Soon pussy willows and maple flowers
Tempt her forth for food,
And stores of pollen are carried home
For the white and hungry brood.

Then when the orchards are white with
bloom,
The pastures with dandelion glowing,
She packs her cells with the golden
drops
Till they're almost overflowing.

But when the meadows and roadsides
all
Are bright with the fragrant clover,
She hears in her heart the ancient cry
Of the future, over and over.

And at last she yields to that ancient
call—
'Tis the glory and pain of living;
The future race demands the best,
And none must refuse the giving.

Oh, the air is full of a rush of wings,
Darting and flashing and gleaming!
Then round her queen she clusters and
hangs;
Is it of the new home she is dream-
ing?

Then forth she fares with a mighty joy
To build anew a city;
She has given herself to the law of the
race,
Nor must you deem it pity.

In graceful festoons she hangs and
clings,
That the "mystery of wax" may
appear;
With wonderful skill she builds it up,
And, lo! a new home is here!

Oh, you who are weary of the world
and its ways,
Come to the bee for your learning;
The law of life is to give your life,
And this is the only gaining.

Miss Ethel Robson.

BUMBLE BEES IN HIVES

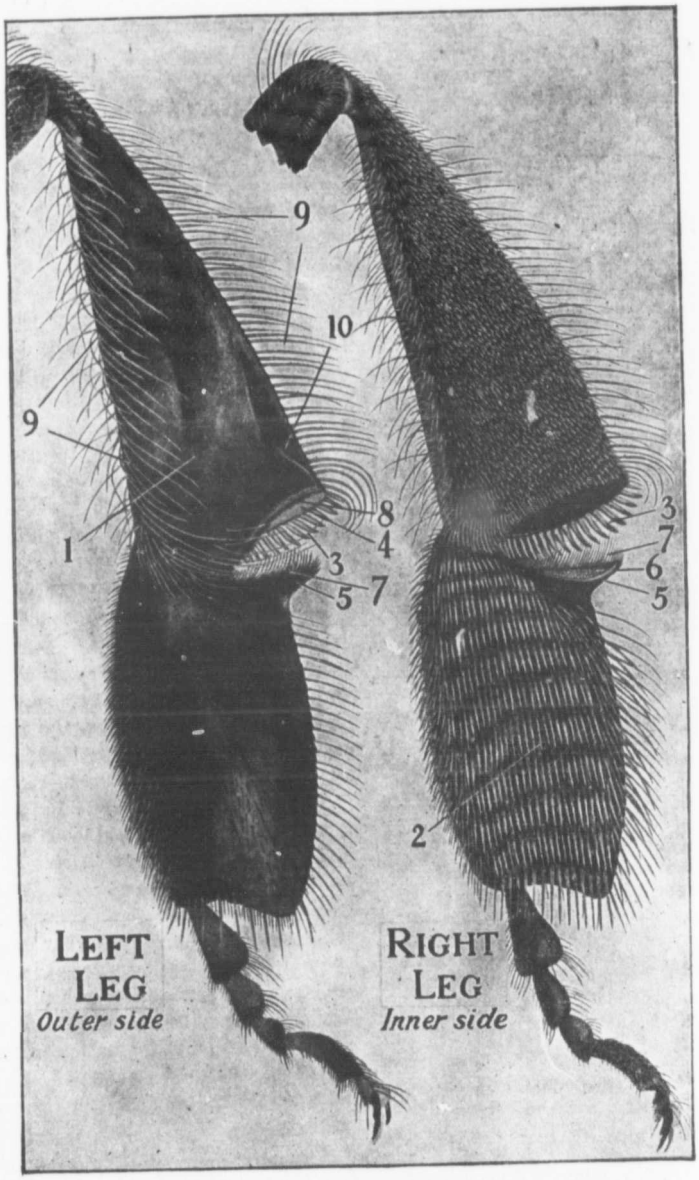
By Henry Kacer.

In your April issue Mr. Robinson described a case of strange behavior on the part of his bees, and asked whether any other bee-keepers could suggest the cause. In the May issue you printed a communication from myself, in which I attributed the occurrence to the possible fact that bumble bees may have entered the hives, and that the maimed bees seen were those that had suffered in the fight with the intruders. I had sustained losses from similar causes.

I have had the same experience repeated this spring, and I enclose herewith for your inspection one of two bumble bees which I have just taken from hives. In one case the bees had succeeded in ejecting the invader. You will notice that the bumble-bee is all bare and polished, resulting doubtless from his struggles with the honey-bees. I believe that when the latter get hold of the stranger before he has had time to get up between the combs, they are able to repel him. But when once the bumble-bee is well up on the combs, the others are unable to get rid of him, except after a long and arduous struggle, in the course of which many are wounded and leave the hive, crawling away from the entrance in the manner already described.

The specimen submitted looks very much smaller than when alive upon the combs.

[The bumble-bee has been received in the condition described by Mr. Kacer. We shall be glad to hear from other bee-keepers who may have had similar experiences.—Ed.]



HIND LEGS OF THE WORKER HONEY-BEE

Showing the Pollen-Collecting Apparatus
DRAWN BY F. W. L. SLADEN, F.E.S.

(For explanation of parts, see opposite page.)

HIND LEGS OF THE WORKER HONEY BEE

Explanation of the Parts

(See engraving on opposite page)

1.—Outer side of the tibia or shank, which is bare and slightly concave, and constitutes the **corbicula**, or pollen-basket; here the pellet of pollen is carried. 2.—Brush on the inner side of the metatarsus or basal joint of the foot; here the moistened pollen is first placed. 3.—Comb on the tibia for combing the pollen out of the metatarsal brush (the pollen is combed out of the metatarsal brush of the right leg by the comb on the left leg). 4.—**Excipula** or receiver, into which the pollen is combed. 5.—A projection on the metatarsus, called the **auricle**; this, when the leg is straightened, enters the excipula and forces the pollen out of it on to the corbicula. 6.—Working surface of the auricle, bearing pointed teeth, inclining in the direction the pollen moves. 7.—Fringe of hairs on the outer side of the auricle for guiding the pollen on to the corbicula. 8.—**Limen**, or entrance to the corbicula, covered with fine fluff, which helps to hold the pollen to the corbicula. 9.—Wall of stiff hairs surrounding the corbicula for holding the sides of the great mass of pollen that is ultimately formed on the corbicula as the result of the numerous little contributions pushed on to it by the auricle. 10.—Single hair situated some little way inside the entrance of the corbicula to hold the mass of pollen before it has grown large enough to be held by the hairs at the sides.

The metatarsus of the middle leg is used to pat the pollen down on the corbicula.

LARGE NUMBERS OF QUEEN CELLS BY A SIMPLE METHOD

By F. Greiner.

There have been various methods in vogue to have queen-cells built in either queenless or queen-right colonies. Brood-combs containing young larvae, or eggs only have been cut into narrow strips, and these have been fastened to bars flatwise. The bees have always been ready to accept them and build queen-cells from the larvae contained therein; artificial cells have been made, then provided with royal food, and larvae have been tranferred into them. The first-named method was awkward and wasteful; the second required good eyes and a steady hand. Both of these some of us do not possess any longer.

No wonder Mr. H. L. Case's method, of which I wrote in another periodical a year or more ago, and which was again explained at a bee-keepers' meeting held in Syracuse, N. Y., Jan. 30 and 31, 1912, attracted the attention of many.

Mr. Oscar Dines improved on the plan somewhat, inasmuch as he has made it applicable to the sectional hive, having the cells reared in the midst of the brood-chambers, or rather, between two of the sectional hive-bodies, by inserting a narrow rim the size of hive, be it a Heddon, Hand, or any other, and placing the combs, or the comb, containing the young larvae to be transformed into queens, into this in a horizontal position, i. e. flatwise.

The most important part, however, is the treatment and preparation of the comb to be used in this method There will be no tranferring of larvae, or looking for those just hatched, etc., all of which requires good eyesight and steady hands. The comb which we select to have our breeding-queen fill with eggs should be a nice clean comb, not too old. This to begin with is placed in the centre of the brood-nest of the breeding stock

and left 4 or 5 days. At the end of this period the comb will be found full of eggs etc., if the conditions are right. The bees are brushed off, and it is prepared as follows: Beginning at the upper end of the comb, having it lying flatwise upon a table, destroy 2 rows of cells with a knife, mashing down the cells and cutting to the midrib; leaving one row, and again destroying 2, thus following down to the bottom or as far as there is brood, destroying 2 and leaving one alternately. Now with small chisel remove those destroyed or mutilated rows of cells all over the comb in such a way that you will leave every third row of cells containing eggs or larvae uninjured.

Now, we must not leave all this brood and give it to our cell-building colony, or we would have many queen-cells built and joined together. We want these cells separate, so that we may be able to cut them out conveniently. Therefore, we take a small tool, or a match and knock out 2 cells in the row and leave one uninjured, continuing thus until we have treated each row of cells which have been left intact after the previous operation, in such a way that only every third cell is left untouched.

The cells from which queen-cells may be made by the bees are now evenly distributed over the comb, and this latter is ready to be given to the cell-building colony, which, of course, must be queenless with no brood, or only sealed brood, in the hive. It is a disputed question which is best, sealed brood or none at all. There should be an abundance of young bees in the hive, for only such produce chyle or larval food.

Mr. Dines dequeens about 6 or 7 days before he gives the prepared comb, or combs, and at the expiration of this period destroys all queen-cells which the bees have started. He thinks the colony is then in the ideal condition to go to work on the prepared combs. Mr. Case dequeens only one or two days previous to giving the comb of eggs and larvae, then he takes away all brood, giving combs with some honey and pollen instead.

The prepared comb, with young larvae, is placed flatwise on the top-bars of the frames, with space enough under the comb to give room for the queen cells.

With the hanging frame having projecting top-bars, a specially constructed arrangement to hold the prepared comb, and hold it in just the right place is very desirable. Mr. Dines showed such an arrangement at the Syracuse convention, mentioned before, and the same received the endorsement of many distinguished bee-keepers present. It consisted of a narrow rim, the same size as the hive he uses. We might call it a very low brood-chamber, 2½ inches high.

The illustration will show how the prepared comb is supported therein by having a little notch cut in it to receive the projections of the top-bar; the other end of the comb rests upon two nails driven in the proper places. Without having tried such an arrangement myself, I believe it will be a good thing to use, and may be made for any style of hive and any size of frame. Mr. Dines uses a very shallow frame, requiring two to cover the top surface of his hive.

After giving the prepared comb to the cell-building colony, in a hive with standard frames, the comb is covered with cloth and cotton batting, or other similar material. I am not sure that it will make very much diffence whether or not the bees have access to the upper surface of the prepared comb. If they do, the brood therein develops, and when the queen-cells are ready to be cut out on the 10th day, the worker-brood is sealed and will be destroyed in the operation of cutting out the queen-cells; whereas, if they do not have access, the brood does not develop, and the cutting out of the queen cells is simpler. Aparently Mr. Dines has allowed the bees to take care of the brood on the upper side of his prepared combs, as he places them between two sectional

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Naples, N. Y.

—From the Ameri

BACK ENTRANC

By C. W.

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The Advantages of

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hives with sealed brood in the one above and the other below as well. Therefore, it would be difficult for him to shut the bees away from the upper side of the prepared comb.

I hope that I have made this matter plain. Mr. H. L. Case told us that he had over 100 fine queen-cells built out on one comb, and after the queens had hatched from these cells, the amount of unconsumed royal food left in them would indicate that the queens did not lack food at any time during the time of their development.

The honey-producer who desires to rear his own queens, particularly when he wishes to requeen towards the close of the honey season, may rear by the above method a large number of good queens, rear the cells during the honey-flow, the most favorable time to rear them, and have them ready to take the place of removed queens, too old, mismated or otherwise inferior. No one is better placed to select good breeding stock than the honey producer himself, but it requires close watching and a correct and careful record. Herein the honey-producer often fails.

Naples, N. Y.

—From the American Bee Journal.

BACK ENTRANCES TO HIVES

By C. W. Carter

After experimenting for a few weeks on Mr. Holloways's idea, I would like to point out the advantage and disadvantage of back entrances to hives, and then to give an idea which is new to myself as well as a good many more people.

The Advantages of Back Entrances

In very hot weather the interior of the hives keep much cooler as the cool and refreshing air has only to be forced in one entrance and it goes out of the other entrance without any labour on the part of the bees. In the present class of hives that are made the bees have to force the air in the entrance; there are then bees scattered about inside the hive forcing the air wherever it is needed. There are also a number of bees to force impure air out. Very near all this unnecessary work is done away with when there are entrances on the supers, and very rarely are there any bees clustered on the outside of the hives. Besides there is very little danger of any comb melting down in the hot weather. When there are back entrances the bees, finding their homes much cooler and more comfortable, are less apt to swarm. With back entrances on the supers, as Mr. Holloway suggests (I see another way of having the entrance on the present class of hives, which, I think, is better), the air passing more freely in the supers helps to ripen the nectar, also to evaporate the water, which it contains, more easily. There is also another advantage: as most of the bees go in and out of the back entrance as they come in loaded with nectar, they have not got to climb over the brood frames and then into the supers to deposit their treasure; they have only to climb up the super frame until they find a cell ready to deposit the load and then they are off for another load; so they therefore save a little time on each trip, which amounts to a great deal every day, to a colony of bees. With back entrances in very hot weather, I fancy the bees, having better ventilation, would live longer and they would be healthier, and they would not be so liable to diseases. Pure air is also essential for the hatching of the bees. I have found out that the bees use the entrance to the supers much more frequently than the bottom entrance.

The Disadvantages of Back Entrances

In the first place I find it is necessary that each hive should slant forward towards the bottom entrance. This is done by elevating the back of the hive, for these reasons: to facilitate the carrying out of dead bees and other useless substances, and so that water will run off the covers; also to prevent the rain beat.

ing in the bottom entrance; and a hive thus situated with a back entrance, the rain would enter the supers at each entrance and run down the inside of the hives, very likely over the brood, should a strong cold wind be blowing. And say, for instance, the hives were facing North to South, a strong current of cold air would be passing right through the brood frames—that is, if the wind was blowing from either the back or front of the hive. The same would apply if hives were facing any other direction. A cold draught passing through the brood frames is likely to do a great deal of damage to young brood. Mr. Holloway states that when the weather suddenly turns cold he goes around and puts strips of laths in; but how about if a gale should spring up during the night? I would not care about leaving my bed on a cold, windy night to go round putting the laths in the entrances. Another fault is, when bees are attempting to enter the back entrance heavily loaded, being a narrow entrance and no alighting board (if not taken out altogether), a large number of bees fall to the ground, where a good many lose their lives.

In reference to the blocks, as illustrated for the bottom board, I cut them thus—from a piece of wood 8 inches long, making two blocks, which are placed thus, thereby saving wood; and I prefer them that way. I am now trying a different kind of blocks for wintering. I will let you know later on if they are good.

My idea is that the entrance on the supers should be reversed; i. e., facing the same way as the bottom entrance, for the reasons, with a hive elevated, as before stated, when it is raining it is impossible for the water to enter the supers, and if a strong wind is blowing towards the front of the hive I don't think there is any possibility of any draught inside of the hive as the wind would be blowing with an equal force at each entrance; so there would be no danger in a strong wind or rain doing any damage like there would be with back entrances. Again, with front entrances on the supers, any bees that fall while trying to alight in super enslanting alighting board on the bottom board where front entrances are are given. I should advise the use of a slanting alighting board on the bottom board; the bees that fall would then reach their home more safely. So after taking everything into consideration, I object to the back entrances; but I believe there is a great advantage to be derived from front entrances on the super. Of course, these entrances on the supers should be closed as soon as Autumn sets in; also if robbing begins. The bees use the front entrances as freely as the back entrances. I think the entrance on the front of the super does away with all the disadvantages of the back entrances.

As for honey boards, I don't think there is much to be gained by the use of them, as a good deal of pollen is scraped off the bees while they are going through the honey board; sometimes the bees lose the whole of their load.—(Australasian Bee-keeper.)

HELP FOR APIARISTS

A Valuable N. Z. Handbook

The New Zealand Department of Agriculture has done much to assist the bee-keeping industry in that Dominion. For many years a practical apiculturist has been employed and his work has greatly assisted the industry; moreover the passing of the Apiaries Act, which is administered under his control, has helped greatly in stamping out the foul-brood disease which was threatening to destroy the industry. No fewer than 35,000 copies of Bulletin No. 18 on bee culture have been circulated, and a further edition of 25,000 copies has now been printed. This Bulletin, prepared by Mr. Isaac Hopkins, the apiculturist to the department, is a complete treatise on modern bee keeping, with half-tone and line illustrations, and is a very valuable production.

MAKING HONEY VINEGAR

By James Brogan

To make good honey vinegar, that you are sure will keep and improve with age, which means that it must contain at least four per cent. acetic acid, it is absolutely imperative that the person undertaking the task has at his or her disposal the means of ascertaining the amount of honey in the gallon of syrup, which must be tested almost immediately after the honey is dissolved in the water, or if the slightest ferment sets in it, it is impossible to test the honey contents with any instrument. An egg is a very unreliable tester, and the Baums Hydrometer is the only instrument that I know of that is for sale and suitable for this purpose. Whatever instrument is to be used, the operator must be well acquainted with the various distances the indicator will project above the surface of the syrup; and to learn this important point it is necessary to make a gallon of each strength of syrup, using good honey —not adding the honey to a gallon of water, but having the honey contained in the gallon of syrup, when water and honey are blended. Don't use the one gallon for all the tests by adding more water or honey to it, but be sure and make a separate gallon for each strength that you wish to test. Make the test when the syrup is about the same temperature as the bulk of your syrup will be when you are making the vinegar. Always wash the instrument after being used, or the honey will dry on it and make a difference when used again. After you are well acquainted with the vagaries of your tester in the various strengths of honey syrup, you may proceed to begin making honey vinegar, making sure that you have good clean casks that never have contained spurious vinegar of any sort, for you never can expect to make good vinegar in such a cask. In purchasing casks direct from the maker, I recommend that they be made of white beech with galvanized hoops. If using second-hand casks, special attention needs be given to making bung-holes (whether large or small) vinegar-proof, always using wood bungs even in the smallest holes that may be in the casks. A good plan is to saturate the bung in molten wax before driving home. Vinegar will find its way through the minutest opening. When removing the end of the cask—which had better be the least substantial-looking end—be sure and mark all hoops so that they can be put back exactly as they were, and try and keep the removed end together, as it will make an excellent cover to put over the hessian while the vinegar is making. Do not fill the cask any closer than four or five inches of the top, and remember that the least vinegar syrup to the air surface the swifter the lot will "go over" into vinegar. If white ants are to be feared, it is advisable to give the bottoms of the cask a good coating of coal tar. Place your cask in the position most likely to conform with all that is required to promote the best results from the ferments that is to take place, having special regard for the welfare of your vinegar during very hot weather, say when the temperature approaches 100° Fah. The next move is to fill your cask with honey and water, which mixture I will forthwith call vinegar syrup. There seems to be a great diversity of opinion as to how much honey is required in each gallon of vinegar syrup, some advocating two pounds, others one and a half pounds, while some say that one pound in the gallon will make good vinegar. My experience is that it takes two pounds of honey in the gallon to make a good strong vinegar that will compare favorably with the best imported malt vinegar, and that in a climate like that of Tamworth, N. S. W., it takes two years to make. A lesser quantity of honey may do in cooler climates, but the colder the climate the slower will be the progress of the ferments that result in vinegar.

When making the vinegar-syrup from honey it is only necessary to know the number of gallons in your cask, and use just as much honey per gallon by weight as you decide will suit your purpose. If relying on the tester, be sure and make the test as soon as you think the vinegar-syrup is near the required strength, and don't defer testing it till next morning as the slightest ferment will baffle any tester ever made. If using the honey soaked from cappings, a large vessel will be required to hold all the cappings to be soaked at one time. Average cappings will contain about two pounds of honey to each three and a half pounds. Anyhow be sure to have less vinegar-syrup from the first lot soaked (that is if soaking only one cask at a time) that will fill the cask to the required amount. If there is more vinegar-syrup required, then a small lot can be easily made; but be sure and test it separately from the first, unless both lots are made during the same day. Always use rain water that has been brought to the boiling point and allowed to cool before adding the honey. When soaking the honey from cappings it is advisable to drain off the vinegar-syrup as soon as the honey is dissolved, as the wax may somewhat discolour the future vinegar.

Having filled the cask, be sure and cover with clean hessian and place the removed end on top to exclude as much air as possible during the first or alcoholic ferment, remembering that it is the action of the air on the surface of the water that contains a lesser amount of alcohol than is contained in what is known as proof spirit that makes vinegar. From the moment that the first or alcoholic ferment sets in there is present in the vinegar-syrup a certain amount of alcohol, and it is very undesirable that this alcohol be changed into vinegar until the first ferment is as near as possible to completion. Hence the advantage of excluding the air as much as can be done under the circumstances. During active fermentation the space above the vinegar-syrup and below the cover becomes filled with carbonic acid gas, which drives out nearly all the air. If the vinegar-syrup is made during the winter the first ferment may not begin to any extent until the return of warm weather; but if made in the summer, the first ferment sets in almost immediately and continues with great activity for about two months. After it appears to have finished, there will still be some honey contained in the liquor but it finally cannot be detected by taste. At this stage, if the lot is removed into a vinegar cask the making may be promoted, and for this reason:—If the wood in the cask is very porous a great quantity of honey will have soaked into it and cannot be fermented. This honey will be continually dissolving back again into vinegar and has the power of retarding the second or acetic ferment. The absence of the chances of this occurring is the reason why such splendid honey vinegar is made in real earthenware jars. During the second ferment a jelly will form on the surface which should be broken up as often as it forms and while ever it continues to form the vinegar is not matured, no matter how nice it may taste.

Finally, I do not advise that brewers' yeast be used to start fermentation, but when the first ferment is finished, if you have a small quantity of good vinegar to add, it will promote the second ferment, while if you use a vinegar cask, your vinegar will not be real honey vinegar, but will take on the nature of the vinegar the cask first contained.

If it was "rubbish" your honey vinegar will be spoilt. In setting up your cask in its permanent position, it is very important to be able to keep it cool during great heat, or else the alcoholic contents will be evaporated to a great extent and weaken the vinegar. On the other hand, if the cask can be removed into a warm position during winter, the vinegar will make quicker.

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Seventy degrees of heat and all the air that can be brought in contact with the vinegar-syrup, either by allowing it to drip from one vessel into another, or by the air passing freely over the surface of the liquor, or by spraying the liquor in the air and collecting the spray by any means, are the agents that are necessary to make vinegar quickest once the first ferment is completed.—(From the Australasian Bee-keeper.)

POLLENATION OF ALFALFA

Influence of Honey-making Insects

Nearly all experiments show that if insects are excluded from alfalfa flowers by means of screens, very few or no seeds are produced, whereas adjoining plants not screened produce an abundance of seed if other conditions are favorable. However, in northern Montana heavy seed crops have been obtained in certain seasons when general observations failed to indicate the presence of insects in numbers anywhere near what was considered sufficient to account for the fertilization of the flowers. The principal effect of the insects appears to be the tripping or releasing of certain of the flower parts, which operation is essential to fertilization. This tripping can be done artificially by thrusting a pencil point or other object into the flower, or by pressing the flower between the thumb and finger, when the tripping can readily be observed. Observations indicate that the ordinary honey bee trips the flower much less frequently than do bumblebees or some of the wild bees. The honey bee ordinarily inserts its proboscis at the side of the tripping mechanism without releasing it, while the bee's weight on the flower is not sufficient to set off the tripping mechanism, as is the case with the bumblebee. The small wild bees trip the flower owing to the fact that they must struggle to reach the nectar, and in this struggling they release the tripping mechanism. Ordinarily the alfalfa flower is fertilized with pollen from some other flower, but it is able to set seed with its own pollen if the flower be tripped.

BEES IN RELATION TO FLOWERS AND FRUIT

By Dr. Gordon Hewitt.

(From Bulletin issued by the Dominion Department of Agriculture.)

For what purpose do flowers assume such varied and beautiful colorings? Why are certain species strongly scented? The thoughtful person is no doubt sometimes puzzled by these questions. The person who does not think probably assumes that they have been provided for his special delectation. While flowers, on account of their wealth of color, form and perfume, are certainly a great source of pleasure from youth to old age, it is a mistake to assume that such is the sole purpose of such beauty and variety. The purpose of a plant is the same as the purpose of an animal, namely, the perpetuation of the species and race, and to that end the whole of the plant is adapted.

The usual mode of propagation in the case of flowering plants is by seeds. Seeds are the result of the fertilization of the female cells of the plant by the male cells. The former are called ovules and are generally borne in one or more seed chambers bearing a sticky organ known as the stigma. The male cells are the pollen grains which are developed in the anthers borne on the stamens. Before the seed can develop, therefore, the ovule must be fertilized by the male cell, and this is brought about by the transference of the pollen (the male cells) from the anthers to the female organ, the stigma. The majority of plants have flowers bearing both male

and female organs, although some plants bear flowers of one sex only.

In view of these facts, which are necessarily very briefly stated, it will be seen that, in the case of the majority of flowering plants, the perpetuation of the species is dependent upon the transference of the pollen to the stigma. It is to this end that plants have developed their great variety of color, form and perfume. It may be asked in what way does all this assist in the propagation of the species. Except in certain species, the flowers cannot fertilize themselves even though both male and female organs exist in the same flower. They have to call in the help of some agent. That agent is most commonly an insect, and, of all the insects, the bees are the chief factors in the pollination of flowers. But bees will not visit flowers merely for the pleasure of doing so. They must be attracted, and consequently they are enticed by the sweet nectar which the flowers secrete in special organs. With this knowledge, how much more interesting are all these things. The flowers flaunt their medley of colors to summon the bees to hidden feasts of nectar; for the color is developed to make the flower attractive. The attractive coloration of flowers requiring the assistance of bees in cross-pollination may be compared to the colored berries which attract the birds, upon whose services such plants are largely dependent for the distribution of their seeds. In entering or leaving the flower, the hairy body of the bee is brushed by the anthers and powdered with the contained pollen, which it carries to the female stigma of another flower, thereby ensuring cross-fertilization, which increases the production of seed and the vigor of the resulting plants. All this service the bee performs in return for the nectar and surplus pollen which it carries away to store. Space will not permit a consideration of the numerous and bewildering devices which flowers adopt to attract the bees, and to prevent their obtaining the nectar without performing their duty of cross-pollination in return, to guide them to the nectaries and to accommodate them while they are partaking of the feast, all of which forms one of the most fascinating of studies.

Briefly they be given, the foregoing facts indicate the important and wide relationship which exists between flowers and bees. When the flowers belong to cultivated plants, whether the plant be alsike clover or apple, the necessity of having as many flowers fertilized as possible is apparent. Experiments have shown that in the case of fruit trees, three or four times as much fruit sets when bees have access to the flowers, and in the case of alsike and white clover, when the bees are prevented from visiting the flowers, no seed is produced. It should be unnecessary to insist further upon the value of bees in the production of flowers, seed and fruit.

Some flowers produce more nectar than others and different qualities of honey resulting from different species of plants as has already been mentioned. Further, certain plants produce more pollen than others. From the point of view of the bee, the profuse production of pollen by such early-flowering plants as the willows, is a distinct advantage, as pollen is necessary for the rearing of brood.

List of Honey and Pollen Plants

For a number of years, observations have been made upon the honey and pollen producing plants and the times of the year at which they flower. The following is a short list of such plants giving the months in which they flower; the variability of the seasons and the climatic conditions renders the exact date of flowering of little real value. This calendar may be of

value to the beginner in indicating when he may expect the different honey flows, though he will soon learn the incidence of such periods. The more important honey producing flowers are indicated in capitals.

Manitoba Maple and Soft Maple..April
Willows (pollen producing)..April to May.
In British Columbia..February and April.
Dandelions.....April to May
GOOSEBERRY, CURRANT ....May.
APPLE, PLUM, CHERRY, PEACH And PEAR .....May.
British Columbia....April and May
Siberia Pea Tree (Caragana)....May
Lilac, Honeysuckle and Barberry..May
Juneberry or Service Berry (Amelanchier Canadensis) .....May.
Grape Vine .....May and June
Strawberries .....June
RASPBERRY, BLACKBERRY ..June
Wild Mustard ..... June
WHITE CLOVER (Trifolium repens) June and July.
ALSIKE CLOVER (Trifolium hybridum .....June and July
ALFALFA .....June and July.
BASSWOOD (Tilia americana)..July.
SWEET CLOVER or MELILOT (Melilotus albus).....July and August
Willow Herb .....July and August
BUCKWHEAT..August and September
GOLDEN ROD (solidago).....
..... August-October
Wild Asters (Aster)...August-October

The question is sometimes asked whether anything can be gained by planting nectar-producing flowers for the bees. Owing to the fact that bees forage over a wide area, it is impracticable to sow special crops for the bees, especially as there usually exists plenty of natural forage. Frequently, however, waste pieces of land may be advantageously sown with white clover, and in those regions where crocuses can be grown in the gardens or near to the apiary, they provide an appreciable amount of pollen in the spring when such food is of value.

THE CAUSE OF EUROPEAN FOUL BROOD

In his paper on bee diseases read before the National Bee-keepers' Association on October 14, 1908, Dr. G. F. White mentioned that he had encountered in his investigations of European foul brood a species of organisms of special interest. This he then referred to as **Bacillus "Y."** The individuals of this species were quite small, apparently non-spore-producing, and had so far failed to grow when sown on artificial media. The hope was entertained that it might subsequently prove to be the exciting cause of the disease. In a new bulletin, "The Cause of European Foul Brood," Dr. White describes his further and recent work upon this disease. His experiments show that neither Streptococcus apis nor Bacillus alvei is to be regarded as the organism producing the diseased condition of the brood. These species, in fact, do not always make their appearance in the early stages of the disease.

A further study of the organism referred to by Dr. White in his previous paper as "Bacillus Y" has revealed a large body of information respecting it, and the species will now be known as **Bacillus pluton.** Dr. White expresses the belief that sufficient evidence has now been obtained to justify the statement that this organism is the primary exciting cause of European foul brood.

Apart from its value as a contribution to bacteriological knowledge, the paper possesses much that is of great importance to the practical bee-keeper, and we feel that no apology is needed for reproducing it in part in these columns. The following descriptions may enable the watchful bee-keeper to detect the

disease in its very early stages and thus check it before it has had time to extend its ravages.

Symptoms Manifested by Larvæ Sick of European Foul Brood

The presence of disease can usually be detected in the experimental colony during the week that the feeding is begun. The first indication of it may be that only a portion of a larva is seen in a cell (fig. 1), the remaining portion having been removed by the bees. Aside from an observation of this kind the earliest indication one gets from the macroscopic (gross) examination is that sick larvæ are found among the uncapped brood. One should acquaint himself, therefore, with certain symptoms or signs manifested by sick larvæ during the course of the disease by which its presence can be diagnosed while the larvæ are still alive. Some of these will now be considered.

The length of time that a developing bee is sick of European foul brood is variable. It can be stated in a general way that the three days just preceding the time when a larva would ordinarily be capped is the most favorable period for making a diagnosis from the gross examination alone.

When healthy larvæ of the age represented in figures 2, 3, 4, and 5 are slightly magnified a peristalsislike motion of their bodies is easily seen, but larvæ of this same age when sick frequently exhibit a marked peristalsislike motion of their bodies which can be easily seen with the unaided eye. Sometimes the color of the larvæ assists in the selection of those that are diseased. If, instead of the glistening white or bluish-white appearance of healthy larvæ, one observes some that are more transparent (fig. 5), or that possess a very slight yellowish tint, frequently such larvæ are diseased. In the absence of the exaggerated peristalsislike movement, however, other tests should be applied, as the color symptom is at times deceptive.

Figures 6 and 7 represent older larvæ than the preceding. These have turned themselves in the cell so as to present a dorsal portion to the observer. The narrow and quite transparent area frequently seen along the dorsal median line of a larva serves often a useful purpose in the diagnosis of European foul brood. In a healthy larva (fig. 6) a pollen-colored intestinal mass is frequently plainly visible through this transparent dorsal area. Microscopically this mass is easily demonstrated to be largely pollen. If, however, upon inspection this intestinal mass appears white or yellowish white, the presence of European foul brood is almost certain. A modification of this simple inspection method may often be profitably used. This consists simply in turning the larva in the cell with a pair of forceps until the median dorsal line is exposed to the observer.

More frequently still, it will be found advantageous to remove the larva from the cell with the forceps. With a little care this can be done, leaving the larva intact. If the larva is diseased and the disease is sufficiently advanced, a whitish intestinal content can very often be plainly observed. In response to the muscular action of the larva this mass is frequently seen to be moved to and fro.

Figures 2 and 6 represent healthy larvæ, and at these ages the segments of the body are strongly marked off. Living larvæ at these ages, if suffering from European foul brood, frequently show these markings less distinctly as represented in figures 3, 4, and 7. This sign, too, may assist in the selection of larvæ that are suspected of being diseased.

The Value of Early Symptoms in the Diagnosis of European Foul Brood

These symptoms of European foul brood are some of the more important ones that are observed in sick larvæ or in those only recently dead. They are especially valuable in the study of the disease in the experimental colony. They have not been used by the apiarist for making a diagnosis. The symptoms of European foul brood that have been looked for by the bee-keeper for the most part are the evidences of disease which obtain as a result of the death of the brood. The post-mortem symptoms as manifested by the dead larvæ themselves have been the most positive evidences used by the bee-keeper in diagnosing the disease. It is hoped, however, that when they are well learned, the symptoms of European foul brood observed in living larvæ and in those very recently dead may prove of value in the apiary as well as in the experimental colony.

Practically all the later symptoms of

European foul brood have also been observed during the course of the disease in the experimental colony. This fact is used as evidence that the disease which was produced in the experimental colony was the same as that encountered in the apiary. Since the diseased material for making the inoculations has been received from various sources and the disease produced was apparently the same in every case, the conclusion that there is but one disease present in the condition which is being called European foul brood is, therefore, still further confirmed.

AGRICULTURAL ENTOMOLOGY

The Division of Entomology of the Dominion Experimental Farms has recently isued three bulletins on entomological subjects, all of them of practical interest to farmers. Bulletin 2 on the Honey Bee is a guide to Canadian apiculture by the Dominion Entomologist, Dr. Hewitt. Bulletin 3 on Cutworms and Army Worms gives the results of special researches by Mr. A. Gibson, Chief Assistant Entomologist. Bulletin 4 by Dr. Hewitt summarizes the progress of the study and control of Canadian insect pests from 1863 to the present day. Copies of these bulletins are obtainable on application to the Publications Branch of the Department of Agriculture, Ottawa.

THIS CANADA OF MINE

They sing of lands more beautiful,
  Away across the sea,
Where poets of the olden time
  Wooed at the Muse's knee;
When they sang of gods and maidens,
  In Parnassus' sunny clime,
But they never knew the beauty
  In this Canada of mine.

They never saw the mountains
  That the clouds of heaven kissed,
Above the dreamy forests
  In the autumn's purple mist,
Where the red man's shortened summer
  Oft is cradled so sublime,
In the arms of mother Nature,
  Of this Canada of mine.

Where the hills are shadow laden
  And the winds are flecked with gold,
While they whisper dreams of beauty
  That to us are never old.
For we hear the lutes of Heaven
  Softly trill about the pine,
When the autumn leaves are falling
  In this Canada of mine.

Golden red, and yellow laden,
  Rich with autumn's gilden sheen,
With a tint of heaven's halo,
  When the woods begin to preen,
And the wild sweet dream is painted
  With hand we deem Divine,
For it bears the brand of Heaven,
  In this Canada of mine.

"When the smoky, distant sunset
  Lifts the forest trees ablaze,"
Over crystal streams a winding,
  Through a sort of leafy maze,
Then I dream of heaven's purple,
  And the lands beyond the Rhine;
But the gods have left Parnassus
  For this Canada of mine.

Every shrub we have about us
  Bears a rainbow in its leaves;
And the envied coat of Joseph
  Seems to hang upon the trees.
While the rose may bloom in Britain,
  With her ship upon the Tyne,
We grow the rose of Sharon
  In this Canada of mine.

Wild and wayward in its beauty
  In the land we love so well,
And it covers hill and valley,
  Every hidden nook and dell.
Still they tell us of the heather,
  And they sing of Auld Lang Syne,
But the tree of life is blooming
  In this Canada of mine.

W. LEONARD.

Fruit Magazine.

WANTS TO SEE BOY SCOUTS

Duke of Connaught Will be Given Opportunity at C.N.E.

When the Duke of Connaught was in Toronto he evinced a deep interest in the Boy Scouts movement and expressed a desire to see a grand gathering of the khaki-clad kids. The answer was that they would be all at the Exhibition to meet him, and arrangements are being completed to make the review of Scouts there the greatest gathering of the kind Canada has ever seen.

PROBABLE EXPLANATIONS OF ERRORS AS TO THE EXCITING CAUSE OF EUROPEAN FOUL BROOD

Dy Dr. G. F. White.

(From Bulletin, "Cause of European Foul Brood," issued by U. S. Dept. of Agriculture.)

It is quite probable that others at different times have observed this new species, *Bacillus pluton*, but have failed to differentiate it from bacteria which were present and which appeared in the cultures made, leading them thus to erroneous statements concerning the disease and its exciting cause. For example, William R. Howard may have seen this organism microscopically in his so-called "black brood," but failed to differentiate it from some bacterium —*Bacillus milii or Bacillus alvei* —which he cultivated on artificial media. Burri may have seen it in the so-called "sour brood" and mistaken it for the "guntheri forms" which he observed in his cultures. Maassen mentions some difficulty experienced at times in obtaining *Strepto-coccus apis* from brood which on microscopic examination seemed to contain this bacterium. To explain this difficulty, he advanced the supposition that the Streptococcus was probably killed by acid produced by itself. The difficulty probably could be as well explained by supposing that Maassen failed to differentiate this parasite from the bacterium which he cultivated and described as *Streptococcus apis*.

Is There More Than One Disease in the Condition Known as European Foul Brood

The question now arises whether or not there is more than one disease in the condition now known as European foul brood. In Switzerland and in Germany there has been a tendency to diagnose the diseased brood in which *Bacillus alvei* is found as the foul brood of Cheshire and Cheyne and the diseased brood in which Streptococcus apis is found as "sour brood." From the facts at hand the writer is strongly inclined to believe that these two conditions are only the one disease, known in America as European foul brood Enough evidence has not yet been obtained, however, to speak with complete positiveness on this point.

As secondary invaders some of the species of bacteria mentioned in this paper may and probably do exert an influence on the course of the disease in the larva and in the colony. To what extent these bacteria modify the disease is yet to be determined. Should it be found that *Bacillus alvei* actually causes an infectious brood disease, then such disease should be called European foul brood, and the disease caused by *Bacillus pluton* would have to be differentiated from it.

Further details will not be given in this preliminary announcement but will be included in more technical papers which are being prepared.

Summary and Conclusion

The steps taken in the writer's endeavor to find the cause of European foul brood may be briefly summarized as follows:

(1) *Bacillus alvei*, which has been so generally spoken of as the cause of foul brood, was isolated from diseased brood, and pure cultures of the organism in both the vegetative and spore forms were repeatedly fed to colonies of

healthy bees with the result that foul brood was not produced in any instance. This fact cast a suspicion that *Bacillus alvei* was probably not the cause of a disease.

(2) By a study of many larvae in samples of European foul brood it was frequently found that there were larvae apparently dead of the disease that contained *Bacillus alvei* only in small numbers or not at all. This increased the suspicion that *Bacillus alvei* was not the exciting cause of the disorder.

(3) In 1907 the writer proved that by feeding pure cultures of *Bacillus larvae* to healthy bees American foul brood could be produced. This fact still further emphasized the doubt that was already entertained concerning the possibilities of *Bacillus alvei* in the etiology of European foul brood.

(4) By feeding diseased larvae to healthy colonies it was found that European foul brood could be artificially produced, showing that this disease, too, could be produced by feeding, and that the virus was contained in the diseased brood.

(5) The sick larvae of this disease thus artificially produced were frequently found, when examined to be free from *Bacillus alvei*. This evidence, too, was damaging to the theory that *Bacillus alvei* is the cause of a brood disease.

(6) *Bacillus alvei* in this way was tentatively eliminated from the list of possible exciting causes of European foul brood. In a quite similar manner the other bacteria—*Streptococcus apis*, *Bacillus mesentericus vulgaris*, *Bacillus orpheus*, *and Bacterium eurydice*—were likewise eliminated from the list.

(7) Considerable quantities of filtrate from aqueous suspensions of crushed larvae were fed to healthy colonies and in no instance was European foul brood produced. This eliminated tentatively the probability of there being an ultramicroscopic virus in European foul brood capable of producing the disease.

(8) *Bacillus pluton*, therefore, was the only factor that was not so eliminated from the list of possible exciting causes of the disease and became thus the probable exciting cause of European foul brood.

(9) When this organism was studied in larvae in which the disease could be suspected by inspection alone, one or more species of bacteria were sometimes found to be present also. These, when present, however, occurred in relatively small numbers.

(10) The disease was then studied in a still earlier stage; i. e., before its presence could be detected by gross examination of the larvae. This was done by cultures in part, but principally by fixing and sectioning larvae during the incubation period of the disease. This study demonstrated that in the production of the disease *Bacillus pluton* was the first invader of the healthy larvae.

It will be noticed, therefore, that in the determination of the primary exciting cause of European foul brood two objects were accomplished: (1) All the factors in the list of possible exciting causes of the disease were eliminated except the one organism *Bacillus pluton*, and (2) by the study of infected larvae soon

after the infection took place, this parasite was found to be the first invader.

As a conclusion, it is the belief of the writer that sufficient evidence has now been obtained to justify the statement that *Bacillus pluton* is the primary exciting cause of a brood disease.

This brood disease is now generally known in America as European foul brood. This opinion is rendered in accordance with views now generally accepted relative to the etiology of animal diseases.

There are, then, three principal brood diseases. Two of these—American foul brood, caused by *Bacillus larvae*, and European foul brood, caused by *Bacillus pluton*—are known as infectious. From these two diseases there must be differentiated the third one, an apparently noninfectious disorder, the so-called "pickled brood." Larvae dead of this latter disease are practically free from micro-organisms. The exciting cause of the disorder is not yet known.

SCIENTISTS AND IMPROVEMENT

The thanks of all bee-keepers are due to Dr. A. F. Bonney for the publication of a series of letters received by him from men of science on the general question of the "Improvement of the Bee." These letters, printed in the January and February issues of the Bee-Keepers' Review contain views which may be taken as summing up the general attitude of those who are in a position by reason of their expert knowledge of the subject, to understand the possibilities that reside in the matter of "improvement." We have extracted the following passages from those letters and arranged them in a way which will we believe, enable the reader to gain a clear conception of the problem.

Theoretically, almost anything biological is capable of alteration, but how such an idea might work out practically with regards to the bees is a puzzling question.—Prof. MacDougal, Carnegie Institute.

No organism is a perfect and complete type in the sense that it cannot be changed by selection and breeding.—Prof. W. E. Castle.

When we see what has been done in breeding five-banded Italians, we are forced to the conclusion that it is possible to change the bee by breeding.—Dr. E. F. Phillips.

The difficulty in improving the bee is entirely a technical one.—Prof. C. B. Davenport.

My little experience with the honey-bee leads me to believe that there is no inherent reason why it should not be capable of considerable modification through experimental breeding. I believe, however, that much headway cannot be made until it is possible accurately to control the mating of the queens and drones.—Prof. W. M. Wheeler.

The honey-bee, however, presents, perhaps, a more complicated problem than any of those yet studied by the genetic experts, owing to the fact that parthenogenesis is involved.

The manner in which mutations can be fixed and made permanent characters (in the case of other animals and insects) leads me to believe that similar work can be done with the honey-bee.

I fully believe that it is possible to get strains which will gather more honey than those we now have, and it seems within the realm of possibility that a non-swarming bee might make its appearance as a mutation.

To get bees which will maintain larger colonies seems to be the most difficult thing of all, but after having seen what Dr. Castle has accomplished with other animals at the Bussey Institution, I am inclined to think that nothing within reason is impossible in this line of work.

The information that I gained there relative to the methods of breeding led me to believe that it is possible to find out what characters in the honey-bee are transmitted according to the Mendelian scheme.

I will have to determine (i) what characters of the honey-bee are really Mendelian and (ii) will thereafter have to find out by experiment just how these characters act in inheritance.—Prof. Wilmon Newell.

MILLION IS IN SIGHT

Splendid Growth of Attendance at Canadian National Exhibition.

The attendance at the Canadian National Exhibition keeps jumping at the rate of nearly a hundred thousand a year. In 1909 it was 750,002; in 1910, 837,000; in 1911, 926,000. This year's bill of attractions is easily the best ever presented by a fair on this continent, and it goes without saying that the much-longed-for million mark will be reached at last.

BEE POISON IN THE SERVICE OF MEDICINE

Can a sting be dangerous to a healthy person? I must answer this with an emphatic "No." Danger can only come when by eating fruit with a bee on it you ge stung in the mouth. Then it is that the swelling of the mucus membrane of the throat and larynx may endanger life. As a rarity it may be mentioned that the sight can be lost from a direct sting in the cornea. What at most happens to a healthy man is an attack of fainting, as my father himself observed or heard of in several cases in Germany. It is against such occurences that beekeepers have to protect themselves. One must explain this condition as an idiosyncrasy with regard to bee poison. Such people, even after many stings, never reach immunity and always swell and feel the sting just as painfully as at first. Naturally, I will not deny that a man can die who is stung by many hundreds of bees, but such an instance is unknown. On the other hand, it is known that horses attacked by swarming bees do not recover. Yet there have been instances in which a few stings became dangerous, but even then only in the case of such persons and people suffering from bad heart trouble, chill or other degeneration of the system.

The Use of Bee Poison Against Rheumatism

The poison of rheumatism that by us today is so little understood, can affect nearly all parts of the body. But there are other diseases the symtoms of which are of like appearance to those of the real rheumatism but which are of quite different origin. In these other diseases, the first bee sting causes severe pain and violent swelling, often accompanied with symptoms of general poisoning. With rheumatism on the other hand, the swelling remained, and reaction did not take place, and it was only after a great quantity of bees—often thousands—that a sharp reaction accompanied by illness (qualmishness) and sometimes fainting occured. After this the patient improved, and with the appearance of the second reaction continuous and ever progressive improvement takes place. With the continuance of the cure, new swellings follow, sometimes more violent than in the first instance, till immunity against the bees is reached and at the same time also the complete healing of the rheumatism. On the strength of these striking facts proved by him in nearly 700 cases, my father concluded by the close relationship that exists between rheumatism and bee-poison, that the real rheumatism in all its forms can be lastingly cured by bee-poison.

It has been mentioned that with the immunity which came through the many stings, the swelling was absent. How does one distinguish, in the case of a similar illness to rheumatism, this immunity from the pathological? A direct distinction there certainly is not, but it was my father's opinion that a man who had an inborn or acquired immuuity generally was not subject to rheumatism and that a man who had a similar disease to rheumatism and who does not swell must always be treated as for real rheumatism. It would be very interesting to find out whether bee-keepers have made the same observations, or whether there are exceptions to the rule. It is known that the inborn or lasting immunity is very rare and may be lost at any time. Difficulty will step in in diagnosing on this account.

(Translated from the German by M. L. Newland.

EVERYTHING IN LIVE STOCK

As a live stock show, the Canadian National Exhibition in 1911 surpassed itself. Every stable and pen on the grounds was full to overflowing, and it was necessary to erect tents for the overflow. This year applications for stables are already being received at the Exhibition office, and it goes without saying that the display will only be limited by the accommodation.

ST. JOHN EXHIBITION, ST. JOHN, N.B., AUG. 31 TO SEPT. 7, 1912

PRIZE LIST—HONEY AND APIARY SUPPLIES

Entries Close on Thursday, August 1st, at 25 Cents Each Entry

Competition open to the world. All honey exhibited must be the production of the exhibitor.

Exhibitors selling honey during the exhibition (for which right a small fee will be charged) will not be allowed to make any removal from their regular exhibit, but may have a special supply on hand, from which their honey sold may be taken.

Exhibitors offering Comb Honey for sale will not be allowed to cut the sections, but must sell whole sections, put up securely in manila or pasteboard boxes or bags, and purchasers notified not to eat it in the building.

Exhibitors must not interfere with or attempt to influence the judges in the discharge of their duties.

A breach of these rules will forfeit any prize that may be awarded.

CLASS 70—HONEY AND BEE SUPPLIES

Sec.		1st	2nd	3rd
1	Best display of extracted granulated Honey in glass, not less than 50 lbs	$5 00	$2 50	$1 00
2	Best display of liquid extracted Honey, not less than 100 lbs., of which not less than 50 lbs. must be in glass, quality to be considered	10 00	5 00	2 00
3	Best 20 lbs. Clover Honey in comb, packed for shipping	3 00	2 00	1 00
4	Best 20 lbs Buckwheat Honey in comb	3 00	2 00	1 00
5	Best display of extracted liquid Buckwheat Honey, in glass, quality to be considered, not less than 20 lbs	2 00	1 00	....
6	Best display of extracted Clover Honey in glass, quality to be considered, not less than 20 lbs	2 00	1 00	....
7	Largest samples of extracted Honey from different flowers	2 00	1 00	50
8	Largest and best variety of uses to which Honey may be put, illustrated by individual samples of the different things into which it enters as a component; for example, say one or more samples each in canned fruits, cakes, pastry, meats, vinegars, etc.	6 00	4 00	2 00
9	Pure Beeswax, not less than 10 lbs	4 00	2 00	....
10	Latest and most useful queen nursery cage	2 00	1 00	....
11	Best foundation for brood chamber	2 00	1 00	....
12	Best foundation for sections	2 00	1 00	....
13	Best Apiarian supplies			Diploma
14	Best style and assortment of tins for retailing extracted honey			Diploma
15	Best style and assortment of glass for retailing extracted honey			Diploma
16	Best section super for top storey and system of manipulating, product to be exhibited in super as left by the bees			Diploma
17	Largest and neatest exhibit of the product of the apiary; can be the same as exhibited in other sections			Diploma
18	Largest and best display of honey-bearing plants, properly named and labelled			Diploma
19	Latest and most practical new invention for the apiarist			Diploma

CLASS 71—BEES

Sec.		1st	2nd	3rd
1	Best colony Italian bees in observation hive	$3 00	$2 00	$1 00
2	Best colony black bees in observation hives	1 00	75	50
3	Best colony, any other variety bees, in observation hives	1 00	75	50
4	Best exhibit of bees in embryo, showing the different stages of development, from the egg to mature bee	3 00	2 00	1 00
5	Exhibit of live queens in shipping cages with attendant bees	3 00	2 00	1 00
6	Best full colony of any pure race of bees in movable frame hive	2 00	1 00	50

SEPT. 7, 1912

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BEWARE OF FOUL BROOD

Brief Instructions for Treatment.

In a honey flow, in the evening, remove the colony from its stand and set in its place a clean disinfected hive containing clean frames with foundation starters. If the weather is very warm, place an empty hive under the one containing the starters for a few days, to give a good clustering place for the swarm. Cover the entrance with queen-excluding metal. Now shake the bees from the combs of the old hive into the new; but if any fresh nectar flies out in shaking it will be necessary to brush the bees. Get these combs immediately under cover, and clean up very carefully any honey that may be around, so robbers from healthy colonies cannot carry home disease.

When the diseased colonies are weak in bees, two or three should be put together into one clean hive so as to get a good-sized colony. In doing this diseased colonies must be united with their next-door neighbor and not carried to another part of the apiary.

All combs from the supers as well as from the brood-chambers of the diseased colonies must be either burned or melted and boiled thoroughly before the wax is fit to use again. The honey that is removed is entirely unfit for bee feed and should be buried deep enough to be out of the reach of any bees.

For fuller particulars in reference to Foul Brood see Bulletin No. 197, issued by the Ontario Dept. of Agriculture, which will be sent you on application to the Director, Fruit Branch, Parliament Buildings, Toronto.

When writing to advertisers, please mention the Canadian Bee Journal.

CANADIAN NATIONAL EXHIBITION, TORONTO, AUG. 24 TO SEPT. 9, 1912

HONEY AND APIARIAN PRODUCTS

Prize List

Entry Fee: 50 cents each entry

All exhibits in this department to be in place and arranged by Monday noon, August 26th.

All Exhibitors must be bonâ fide bee-keepers.

The prizes are awarded only for the quantity of honey specified in the various sections, and no two members of the same family will be awarded prizes in the same section.

Exhibitors must not change their exhibits after the judges have given their awards.

Exhibitors selling honey during the Exhibition will not be allowed to make any removal from their regular exhibit, but may have a special supply at hand from which the honey sold may be taken.

In the solicitation of customers no unseemly noise will be permitted.

Comb Honey must be exhibited in natural form, paper or any other trimming not allowed.

Exhibits in this department will be judged by points.

For lists and entry blanks write J. O. Orr, Manager, City Hall, Toronto.

CLASS 272

Sec.		1st	2nd	3rd	4th
1.	Best and most attractive display of 50 lbs. of extracted granulated Clover Honey, in glass, 50 points for quality, 50 points for display	$5	$4	$2	$1
2.	Best and most attractive display of 50 lbs. of extracted granulated Linden Honey, in glass, 50 points for quality, 50 points for display	5	4	2	1
3.	Best display of Clover, Linden, Buckwheat or Thistle, of 300 lbs. of liquid extracted Honey, not less than 150 lbs. must be in glass, quality to count 50 points, display 50 points	18	12	8	5
4.	Best 300 lbs. Clover, Linden, Buckwheat of Comb Honey, in sections, quality to count 50 points, display 50 points	20	15	10	6
5.	Best 24 sections of Comb Honey, any variety, quality to be considered, clean sections and best filled	6	4	3	2
6.	Best 100 lbs. of extracted liquid Linden Honey, in glass. Display to count	7	5	3	2
7.	Best 100 lbs. of extracted liquid Clover Honey, in glass. Display to count	7	5	3	2
8.	Best 100 lbs. of extracted liquid, A.O.V., in glass. Display to count	7	5	3	2
9.	Best display of 100 lbs. of extracted liquid Honey, any kind, display to count 80 points	7	5	3	..
10.	Best 20 lbs. of extracted liquid Clover Honey, in glass	4	3	2	1
11.	Best 20 lbs. of extracted liquid Linden Honey, in glass	4	3	2	1
12.	Best 20 lbs. of extracted liquid Buckwheat Honey, in glass	4	3	2	1
13.	Best display of 200 lbs. Comb and extract Honey suitable for a grocer's window or counter, space to be occupied not to exceed 6 feet square by 4 feet high	10	7	4	2
14.	Best and most attractive display of Beeswax, not less than 10 lbs.	4	3	2	1
15.	Best 10 lbs. Beeswax, soft, bright yellow wax to be given the preference	4	3	2	1
16.	Best exhibit of Italian Bees, with queen, in single comb observatory hive	7	5	3	..
17.	Best exhibit of any other variety, with queen, in single comb observatory hive	7	5	3	..
18.	To the Exhibitor making the best and most attractive display	15	10	5	..

The prize in Section 18 is given by the **Ontario Bee-keepers' Association.**

Entries close August 15th

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SIEGE OF DELHI

Greatest of Historical Spectacles at the C.N.E. This Year.

The Siege of Delhi will be the historic spectacle at the Canadian National Exhibition this year. There is no more terribly picturesque scene in English history than this sketch from the great Indian mutiny. The rich and varied costumes of the natives of different castes mingled with the uniforms of the English officers give to it color that cannot fail to delight the eye, while the tragic drama cannot fail to be of enthralling interest. Every detail is to receive the strictest attention to make this the greatest of the many historical spectacles that the Canadian National has become famous for.

Want and Exchange Column

Advertisements for this column will be received at the rate of 50 cents for 25 words, each additional word one cent. Payments strictly in advance, as the amounts are too small to permit of bookkeeping. Write copy of ad. on a separate sheet from any other matter, and on one side of the paper only. Say plainly how many times ad is to be inserted. Matter must reach us not later than the 23rd of each month.

WANTED

HIVES—Wanted, a few 10-frame Langstroth hives, in good condition, second-hand. Ham & Nott goods preferred. A. Crutcher, Bee-keeper, Burns, Ont.

WANTED TO BUY—Wax and Honey in any quantity. Bee-keepers' supplies for sale. Root's goods a specialty. F. W. Bell, 4 Cherrier St., Montreal.

WANTED—I would like to contract now for your this season's light honey, either comb or extracted. I can supply tins. Write me. G. A. Deadman, Brussels, Ont.

WANTED—Your order for untested, leather-colored Italian Queens. One 75c; 10 for $7. Select virgins, 10 for $4.50. N. E. France & Son, Platteville, Wis., U.S.A.

WANTED—To buy, Bees, Honey and Wax. Bee-keepers' supplies for sale, especially the A. I. Root Co.'s line of goods. Address F. W. Bell, 4 Cherrier St., Montreal, Que. tf

WANTED—Representative wanted in each locality to mail circulars for Cut-Rate Grocery Mail Order House. Few hours' spare time will easily earn $20 weekly. Any one can do the work. Outfit furnished free. Dominion Grocery Co., Windsor, Ont. tf

FOR SALE

FOR SALE—25 colonies of bees and outfit. A good locality here for keeping bees. George Ott, Arkona, Ont.

FOR SALE—A limited number of leather colored Italian Queens for sale. Warranted purely mated. $1.50 each. Geo. B. Howe, Black River, New York.

FOR SALE—Queens and half-pound packages. A good strain of 3-banded Italians for honey, now ready. Satisfaction guaranteed. W. D. Achord, Fitzpatrick, Ala., U.S.A.

BEES FOR SALE—Forty-five colonies Italians or their crosses, in 8-frame Langstroth hives. Good colonies and free from disease. Apply to Stephen McNeill, Conn P.O., Ont.

GOLDEN QUEEN BEES, ready to mail, at $1.00 each; six for $5.00. This stock has been favorably reported upon in black brood localities; also for foul brood. J. B. Case, Port Orange, Fla., U.S.A.

FOR SALE—Golden Italian Queens; tested $1.00, select tested $1.25, untested 70c each, dozen $8.00. After July 1st: Untested 60c each, dozen $7.00. Send for price list. D. T. Gaster, Rt. 2, Randleman, N.C., U.S.A.

FOR SALE—10,000 lbs fancy honey, light and dark amber, barrels and 60-lb cans, same as we use for bottle trade; dark amber, 10c. Exhibition White Wyandottes, $1.00 per set; baby chicks, 15 to 20c. Queens, $1.00. Todd Bros., Milltown, N.B.

ITALIAN QUEENS after May 1st. Robey, Alexander or Case strains. Untested, 75c; tested, $1.25 breeders, $3.00; Carniolan, Cyprian, Caucasian and Banats, untested, $1.00; tested, $1.50. Honey packages and supplies. W. C. Morris, Nepperhan Heights, Yonkers, N.Y., U.S.A.

ITALIAN QUEENS—3-banded, finest quality; raised in latitude 59°. Tested: June, $3.00; July, $2.50; August, $2.00. Breeders: June, $6.00; July, $5.00; August, $4.00. Rebate of 25 per cent. when purchased by the dozen. Alexander Lundgren, 12 Tomtebogatan, Stockholm, Sweden, Europe.