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West Maitland, N.S.W.: E. Tipper, July 31, 1911

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THE AUSTRALIAN Bee Bulletin.

A MONTHLY JOURNAL, DEVOTED TO BEE-KEEPING.

Published by E. TIPPER, West Maitland.

culated in all the Australian Colonies, New Zealand, & Cape of Good Hope.

VOL. 20. No. 4.

JULY 31, 1911.

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A Monthly Journal devoted to Beekeeping.

Circulated throughout the Commonwealth of Australia,—New Zealand & Cape of Good Hope.

Published by : E. TIPPER, West Maitland, N.S.W. Aus.

Editor: W. ABRAM, Beecroft

MAITLAND, N.S.W.—JULY 31, 1911.

EDITORIAL.

During the thirty years of my domicile in this industry I have written many articles on bee-culture. At different times I have been told that it was unwise to give away free knowledge and experience, which it had cost a good deal to attain. I did not, however, fall in with that view. Others refrained from divulging their knowledge. The same applies to the present day. Hundreds of beekeepers are now devoting their time to beekeeping, but they keep their experiences hidden under the bushel. Would it not be more progressive if a general exchange of views took place? What debars it? Is it because beekeepers are not used to express their opinions in writing? Then just try and you will be surprised at the result. Do not fear contradiction because what is criticised evidently contains matters of importance and considered worthy of notice. It is up to every beekeeper to evolve and divulge new ideas, and the "A.B.B." is open to all. We, in Australia, have not much in common with other countries in flora and climate, thus our experiences are distinct and therefore of more value to us than copies from abroad. And as continuously new hands are starting at beekeeping, it must be evident that the experiences of others would greatly aid the industry, and much progress could

be made and good results accomplished. To help one another must be our motto.

In the "Daily Telegraph," July 15th, Mr. R. Patten, President of the "Farmers and Settlers," is reported saying: "The educated classes should rule the country." Beekeepers, be educated, then, or else be ruled by those who are. How does that strike you? Will you be ruled by others?

The silver wattle is already in full bloom in our district, and on a fine day the bees hum about in apparent happiness and glory. It is certainly very early in the season, and should be the forerunner of an early spring. Of late years spring has been rather late; therefore, the possibility is that now we may have an early one. A heavy thunderstorm passed on the 18th inst.—rather early in the season. But viding excessive heat in America and England, what can we expect but exceptional weather, too. It may be that the attempted discovery of the North and South Poles has caused the axles to be shifted out of their original position. In any case the season promises to be early and probably dry and hot in summer.

* * * *

The "Am. Bee Journal" reports as follows:—

Death of Mr. W. Z. Hutchinson,

May 30th, 1911.

Mr. Hutchinson was Editor of the "Review," but he ailed for some time past.

By his death all beekeepers lose a very great helper of the industry, but especially American beekeepers will greatly mourn his loss. Of all the bee journals I receive from all parts of the world the "Review always contained the best articles on the subject, and Mr. Hutchinson's editorials shone brilliantly with wise information and useful advice. In his last, May 1st, 1911, he says truly: "Happiness grows at our fireside." Further on it is stated that he went down town on a cold windy day and contracted bronchitis, but it was hoped that coming warm weather would see him on the road to recovery. Unfortunately, as so often happens, the call of duty and obligation proved the worse for him as others. Our sympathy is with Mrs. Hutchinson in her sad trouble, and we regret the untimely demise of such a valuable star in the origin of the bee industry.

Honey imported into England in the month of April, 1911, was £4,441, as reported by the statistical office. London. Local demand and prices remain nearly uniform for our honey; the demand, however, is good, and as next season promises pretty fair, it is hardly wise to keep it for an advance in price.

Formic acid in honey has been investigated by Dr. Reidenback, and he found that the more the honey was exposed to atmosphere the more formic acid it gained; and he concludes that the in itself in combination with air, formic acid. That is the origin of the sugars is the origin of the

25 pounds has been offered
past by the "Leipzig
the inventor of an
to enable food in-
pure from adul-
claim has been

s, finds that
bees must
as each

cob contains at an average about 60 single flowers, this means that about 3,750,000 nectaries. But as he investigated for pure sugar contents and the honey only contains about 75 per cent. pure sugar, the bees visit 2,750,000 single blossoms to collect one pound of honey.

Let me now cite the official program of the Imkerbund (Beekeepers' Union), the strongest in the world, to be held from August 4th to the 9th, in Constance (Konstanz).

Friday, 4th.—Work for the Judges. Committee Meeting of the Union.

Saturday, 5th.—Opening of the Exhibition; Concert; Committee Meeting; and in the evening, Banquet and Welcome.

Sunday, 6th.—9.30 a.m., Church; 10.30 a.m., Sight-seeing; 11.30 a.m., Refreshments; 2 p.m., Excursion per Boat.

Monday, 7th.—Addresses of Subjects and Discussion; 1 p.m., Dinner at 2/-; afterwards excursion to Wald house Jacob.

Tuesday, 8th.—Discussion of Subjects as on Monday; 2 p.m., Excursion per ship on the Rhine, thence per rail to Schaffhausen, return per rail.

Wednesday, 9th.—Sale of Honey; p.m., Close of the Exhibition.

When will Australia reach that point of efficiency? Never, I am beginning to think. It is true we have not the population that Germany has, but nevertheless, small as we are, there is not enough real spirit in us for such an undertaking.

Mr. T. C. Chadwick, Redlands, California, writes to "Gleanings": "That the mortality in bees is not less than 50 per cent., some apiaries going as high as 80 per cent. Many have died with quantities of stores."

[No cause for alarm!—Ed. "A.B.B."]
In Ontario, Canada, there are, according to J. L. Byer, seventeen foul-brood inspectors. What a fine country for foul

brood Canada must be! All Australia has not even one inspector; but New Zealand has, and yet we do seem to manage fairly well. If we had a score or so of inspectors, possibly we could boom better. What do you say, readers? As far as I am concerned, if there is no other disease than foul brood, I will soon be master of the situation; but there are other and more difficult diseases to combat, of which we know practically nothing. Just vide the exceptional loss in Canada. Now, in a case like this, what has a beekeeper to do? Nothing is known as to the origin nor the probable remedy. Why do not American scientists devote more time to instruct beekeepers how to avoid or cure diseases? Instead there are the manufactories of bee goods trying for all they are worth to belittle practical experience and results. Their papers are published to serve their own ends, and the initiated can see it sticking out by the yards. God help them that help themselves. At present it is all business and gain for No. 1. Preaching the gospel at the end is not a positive proof that the Saviour has pardoned us. Repentance thrice is the only way to everlasting life, if we mean to follow the Bible and believe, and how I wish that we would. There would be less disharmony, less discord, less strive to outdo your neighbour, a better feeling of brotherhood, a will to help the needful, to assist the inexperienced.

W. A., Ed.

* * * *

ADULT BEE DISEASE.

Extracts from Professor Dr. Enoch Zander's Book.

Translated by W. Abram, Beecroft.

(Continued from last issue).

THE PROOF OF NOSEMA APIS.

Ever since the publication of my investigations some beekeepers have blam-

ed the originator of the disease, who, through inattention, neglected something or other on their stand. When, for instance, someone lets his bees die of starvation, he attributes it to Nosema. Therefore it seems not only desirable but for the beekeeper necessary that he should understand the disease thoroughly.

The proof, however, whether Nosema or any other factor is the cause, is exceedingly difficult to prove, and in my estimation at present, by the beekeeper alone, not possible. When the intestines of sick bees become milky through the spores there, then the disease can be recognised without a microscope. With a microscope of 200-300 enlargement the spores can well be seen when placed between two glasses and examined by strong blended light.

The proof is more difficult when the two signs—the milky stomach and the spores—are absent. As explained before, there is a time in the development of the parasite in which spores are absent and the stomach has its natural appearance.

Original parasites which develop in the intestines can only be proved by scientific methods, because they appear slightly different from the wall cells. The arranging of a proper preporat requires days and even weeks. Thereto must be added that the development of the parasites after the death of the bee soon ceases; therefore dead as also live bees must be examined.

No less unsatisfactory is the excreta. In the advanced stage of the disease there are spores en mass to be found, but before these appear in the excreta there is a space of more or less time. Especially at the start of the infection are they absent. Also the examination of the stomach leads then, with dead bees at least, to no result. The absence of spores in the excreta is thus no proof that the disease is not there.

Lastly I must point out that the Nosema parasites cannot be cultivated like other

bacilli upon artificial preparations. They thrive only in the bee. Thereby arise fresh difficulties. It is impossible to work quite free, because I never know whether the bees, which I examine, were really healthy. One single sick bee amongst them may disturb the investigation.

F.—To Combat Nosema.

Not less important as to the knowledge and proof of the disease is it to combat against it. We are, however, yet far from carrying this out successfully. It may take years before marked improvements are obtainable, the more so because many beekeepers are in the ban of old traditions, etc., and are thus for new ideas with difficulty susceptible. Therefore, my exponing as to how to combat the disease should only be taken as advice, as it requires yet further tests and experiments.

The following appears of most importance: In all steps taken to check the disease, we must affirm that in this infectious disease there are different stages of one and the same disease. Experience confirms this. A cure, however, can **not** be effected by feeding sugar syrup. Nothing at all is gained thereby. We may prevent the soiling of the combs, but the disease is in no wise hindered. In contrast thereto the following facts are important:—

The once affected bees can never become healthy again, since their stomach gets thoroughly destroyed by the parasites. They succumb sooner or later, and the existence of the stock depends on the number of diseased bees. The larger the number the surer the decline of the stock; the fewer diseased; the more hope of its ultimate recovery.

To try and help badly affected stocks is useless. For such is burning them the only remedy. Our object must be to help and aid the slightly diseased, to aim for the rapid increase of the young.

This is possible by effective abolition of the infection material.

The removal of soiled combs is easily accomplished. Nosema sick colonies are, when conditions permit, brushed off their combs on to foundation or clean disinfected combs, and in order to assist the bees in their development crowd them together and by good feeding keep them warm. The honey from infected hives **dare not** be given to any other, unless it be thoroughly boiled. It is also advisable to unite sick with healthy colonies.

The empty hive is to be well cleaned and disinfected, and the combs are melted into wax by repeated boiling, in case they are not immediately burnt.

In general these operations are easily carried out. But in a place where Nosema once raged, it is by no means sufficient to renew the combs, because it is hard if not impossible to destroy the infection material outside the hives. Damp ground, decaying bees, etc., the spores retain long the capacity to develop anew if brought to suitable surroundings. After a year could I develop them with success? All diseased bees should be swept together and burnt and the ground near the stand be dug over.

Especially dangerous are the drinking places for bees in the open. In spring the bees have desire for water, which they try and find in all sorts of places. Drink apparatuses with standing water, in which the water cannot be constantly renewed, must be considered as places of infection. Dead bees lay oft en mass in these vessels. Therefore, it seems absolutely necessary that running water be provided, if possible, or at least to change the water every day. It is better to remove all such drinking arrangements in the case of an outbreak of Nosema, and then give them lukewarm water with an addition of salt in the hive, thereby preventing infection very considerably. It is further of advantage to shift the bees to another district.

Next to the removal of the infection-material is the introduction of healthy vigorous queens most desirable. It must be our object not only to get rid of the diseased bees, which are bound to die, but to replace these quickly and in increased number by healthy young bees. It is therefore recommended that queens of *Nosema* diseased stocks be replaced by strong ones as soon as possible. It has not yet been proved that the queen spreads the disease in the eggs she lays, but if that were the case, then there is all the more need for the change of queens.

These are the principal advices I can give to combat the disease, based upon investigations and experiments. I am well aware that the subject requires still further study in order to gain more accurate knowledge. But who knows the technical difficulties will be satisfied with the results thus far achieved.

Anon the foregoing the following are mentioned:—

ISLE OF WIGHT DISEASE.

There during the last few years a disease occurred and occasioned enormous loss in bees, which, in its appearance and progress resembles *Nosema apis*. According to Imms and Malden it is an intestinal disease. Large masses of pollen fill the after, which oppresses the other organs of the abdomen. An infection from clear culture of the discovered bacilli has not led to any satisfactory results, and thus it needs further investigation.

THE BRAZIL BEE PEST.

More or less large losses are yearly experienced by beekeepers there, but the cause of the disease is as yet unknown. Hundreds of stocks are yearly lost at some stands. But the losses are not every year equally severe. The bees die singly distributed around the stand or remain laying in large quantity before the hives. It is assumed that the cause is attributable to some poisonous nectar

gathered from plants. But the plants under suspicion, kindly forwarded by Mr. Schenk and by me examined, show no bad effect. Also bees sent by Mr. Schenk did not show *Nosema* spores.

PARALYSIS.

Under the above name is found described in the American bee literature a disease of the full grown bees, of the process of which nothing positive is known.

The above extracts are by no means the whole contents of the book, but only the main facts important to beekeepers, leaving out technical and scientific terms.

In connection therewith I may point out how very near the mark I have come years ago, vide my writings on the subject. From the first I was convinced that the trouble arose through a disease, and also that it appeared in different stages, just as now proved; and my erstwhile advices to remedy the matter are embodied in the treatise.

The hypotheses of scarcity of pollen, of unsuited honey, of deficient larval food, etc., are now disposed off as untenable. It will be well if all beekeepers recognise the value of Prof. Dr. Zander's information and advice. His tedious investigations have done the bee industry the greatest service. May he be enabled to continue his arduous work and discover a sure remedy for the dreaded evil.

By my allusion to the past I do not wish to convey the impression that the writings of others different from my views were so much waste paper; on the contrary these writings helped me to experiment on lines that otherwise might have been neglected or omitted altogether. As it is it enabled me to experiment and test the various phases and to come to the conclusions I did. Controversy is the means to bring right from wrong to light, so long as personalities are severely left alone, which, unfortunately, has not been always observed. But all is well that ends well.

Now let all beekeepers unite to eradicate the disease by the means at our disposal. Observe your bees carefully, note the first wrong and take remedial action ere too late. But prevention is better than the cure.

W. ABRAM.

COMB HONEY OR EXTRACTED HONEY.

Which Pays Best ?

In the "A.B.B." numerous articles have been published to show the proceedings of its production. American beekeepers have studied their interests and fostered the consume of comb honey to a greater extent than those in other countries. In Australia we have hardly touched the possibilities of comb honey production. I have for years done all I could to create a demand for section honey and now can dispose of thousands in a year. But I cannot produce them all and am often in want of many more. Living close to Sydney, the great consuming centre, I have better opportunity to find a market for this article than those living some hundreds of miles away, and beekeepers who go in for section honey will do well to communicate with me, and it will be to their advantage.

Let us now look into the matter from a business point of view. Extracted honey fetches about 2d. to 3d. per lb. wholesale, and at times it is difficult to get that price even. The advantage with extracted honey is, if it is ripe before extracting, it will keep for years without detriment, and from a season of plenty can be kept till there is a scarcity and better price. But this waiting suits only those who do not need cash immediately, which not all can afford.

Now, comb honey in sections is in demand at 6d. per lb. section. Well, then, which pays better? extracted honey or section honey. There is more need for

careful operation of section honey than extracted honey, but with proper management and provided a good honey flow is on, I think it pays to take a little more pains and produce section honey. With extracted honey there is the uncapping to be done, and this is not the cleanest job that everyone likes, so the work is not more excessive with sections. However, comb honey cannot safely be kept for more than one season, as it is apt to become watery on its surface and thus deteriorate in value; but as most beekeepers aim at a quick return for their products, I submit that comb honey is, after all, the poor man's asset. Extracted honey goes candied if kept any length of time, and has to be dissolved by heat; but comb honey cannot be treated in that way and therefore should be disposed of before the winter.

For those inexperienced in the production of comb honey, it may be of assistance to consider what size of sections to use. There are three sizes principally used. The ideal, 5 x 3½ in., the 4¼ x 4¼ in. bee way, and the 4¼ x 4¼ x 1½ in. for fence division. The ideal sections are also separated by the fence, while the bee way sections have plain thin separating boards between each row. These as the fences are required in order to get the sections built of straight uniform thickness. I fancy that the fence separators are best for the purpose. These and the fence separators are bought by the hundred or thousand, and the sections need only be moistened in the groove joints and tightly hammered together at the dovetailed ends. The fences are bought ready made for the size required and need only be inserted between each row of sections. But the sections must have either formation starters or whole sheets of foundation affixed in them before being put on the hive. For this purpose super foundation must be used, it is very thin and not so objectionable as thicker foundation. The

thinner the foundation is, if used in full sheets, the better for the consumer of the honey.

The foundation starters or full sheets, is fixed into position with melted wax, and to affix it into its proper place a block of wood just half the thickness of the section and easily fitting into the section is used with advantage. With some practice there is no harm to put the crates on a little before the flow is on, and then other crates can be inserted between or above the first, as required. The different sized sections require different crates and fittings, and the crates must be the same dimensions as the hive in width and length. In my opinion the eight-frame hive suits the purpose, unless the season is a very good one, when the ten-frame hive would be better. The crates and fittings can be used for years, but the sections look better if quite new.

When the crate is filled with honey and all sealed over, the sections are cleaned of propolis, etc., and stored in a dry room, until there is a sufficient quantity for disposal. Towards winter is the best time to sell, as practically very little honey is consumed during the summer months.

The above few hints may help the beginner and the one unused to the production of this article of section honey to know how to proceed.

W. ABRAM,

Beecroft.

STINGLESS BEE TO BE DEVELOPED.

Under this heading the following item is going the rounds of the daily press:

"The new beekeeping bureau of the Massachusetts Agricultural College has set itself the task of developing a bee that will not sting, and that at the same time will be twice or three times as industrious as the bee of to-day."

In an editorial of half a column the Chicago Record-Herald discusses the change, and counts as one of the advantages the fact that the barefoot boy trudging his way to school need no longer fear to step upon a bee. But losses from the change will not be lacking. "What fun will there be in picking a bee off a dandelion by its gaupy appendages if the element of danger—the ever imminent possibility of being stung—is removed. And what thrills possibly can come from hiding indifferent, plodding, stingless bees in teacher's dinner-pail?" And what chance will there be for glorying over the fact of hiving a swarm of bees in a brave and fearless manner if there is nothing to fear? And what will take the place of bee-stings for rheumatism?

The probability is that Dr. Gates and his able coadjutants will be as much surprised as any one to learn of the great changes under contemplation.—"Am. Bee Journal."

HANDLING BEES.

Advice to Beginners All Right.

By I. Hopkins.

The recommendation to "give a few puffs of smoke, then wait a couple of minutes for the bees to fill themselves with honey when you may handle them without being stung," and which Dr. Miller condemns in the following words: "That's the sort of foolish advice still too often given, even in books" (see "Gleanings" for Nov. 15, p. 4.), moves me to say that the Doctor is entirely wrong in condemning it, for the advice slightly modified is excellent, and the books containing such advice are to be commended.

Further on the Doctor says, "A practical beekeeper hasn't time to wait for any thing of the kind." True; but the advice is not intended for "practical" (experienced) beekeepers, but for begin-

ners, who may, for instance, have to transfer their bees from common boxes to frame hives, unaided, except by such instructions as they can obtain from text-books.

I have been present on many occasions when novices were undertaking their first transferring; and in order to give them assurance through the avoidance of stings, I have shown them, in the first instance, so far as is possible, that, by giving a few puffs of smoke and then waiting about one minute before giving the bees another puff, they can turn the box of bees upside down with safety, a few seconds later, and then transfer by drumming or in any other manner decided upon. The Doctor knows as well as any one that "bees filled with honey seldom volunteer an attack." Let a novice come out successfully from his first manipulation and he will, as a rule, go about the second one with all the confidence imaginable; and if he is made of good beekeeping stuff he will soon do as the Doctor or other "practical" beekeepers do.—"Gleanings."

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Victorian Apiarists' Association.

ANNUAL CONFERENCE.

The annual conference of the Victorian Apiarists' Association was held in the Board Room, Colonial Mutual Chambers, Collins Street, Melbourne, on Tuesday and Wednesday, June 20th and 21st. Mr. R. Beuhne, president, was in the chair; about forty members and delegates were present.

The President, in a few words, welcomed members and visitors, and invited all to take part in the business of the meeting.

The following paper was read:

PARALYSIS OR DYSENTERY OF BEES.

DR. W. BROWN,

Government Pathologist.

For a long time past beekeepers have been complaining of mortality amongst bees, and the complaints have been coupled with the assertion that the bees become paralysed before death supervenes. Further, they say that there has always been plenty of food in the hives, and that the mortality is greatest in spring and summer—that is at that time of the year when bee food most abounds.

Now, in investigating any disorder amongst bees, it is absolutely necessary to exhaust every possible means by which the disease might be caused, and, following out that plan, I propounded to myself certain questions.

After having propounded the questions I have endeavoured to furnish replies thereto:

- (1) Is the condition caused by pollen grains of a poisonous type?
- (2) Is it due to improper feeding?
- (3) Is it due to insufficiency of food material?

- (4) Is it due to weather conditions?
- (5) Has the protozoan known as the Nosema anything to do with it?
- (6) Is it an infectious disease?
- (7) Are the foraging bees the first to suffer?
- (8) It is confined principally to them?
- (9) Are the drones affected?
- (10) Do the brood show any signs of it?

Now, as regards No. 1 question, that is referring to poisonous pollen: Although poisonous plants might abound here and there, the number of districts affected and the fact that all hives in any given area are not involved, goes somewhat to disprove vollen poisoning. In any district all foraging bees would have equal chances of picking up poisonous pollen, and all hives then should suffer alike. Bees have picked up poisonous pollen, and the honey produced by them has caused serious results in human beings who have consumed it. Viewing what honey is, one can see how readily enough poison might be contaminated with its substance. Honey is secreted by the nectariferous glands of flowers, and it is collected by the working bees, who introduce it into the honey bag or crop. In the crop the honey undergoes certain chemical changes, and it is there rendered eminently suitable as a food for man. Poisonous narcotic properties may be imparted to honey by the plants from which it is derived. Xenophon in his history of the "Retreat of the Ten Thousand" (somewhere about 400 B.C.), says that the honey in the neighbourhood of Trebigoud produced a transient delirium in the soldiers who ate it, and the plant was one of the health family—*Azalea pontica*. In 1704, and again in 1833, it was noticed by travellers that the effects of the honey raised about Trebigoud was exactly as Xenophon described it. There are other instances of honey possessing poisonous properties and poisonous properties due to mineral contamination.

Honey collected by bees around an arsenical factory has been known to poison people. The honey on analysis was found impregnated with arsenic. The bees suffered no ill effects, and since arsenic is a poison to insects generally, this is difficult to understand.

Would honey dew cause it? Honey dew is a viscid saccharine exudation which is often noticed in summer on the leaves and stems of plants. It is usually, but not always, associated with aphides and other insects which feed on the juices of plants, and its flow is ascribed by some to their punctures; but the rupture of the tissues from any other cause, such as the state of the weather, seems also to produce it, and very warm dry weather seems to be necessary for the production in the sap of excess of sugar, and this is pressed out.

(2) Is it due to improper feeding? Bees well cared for and with plenty of proper food material have contracted the disorder. On examination, ample stores of honey and pollen have been found in the frames.

(3) Is it due to sufficiency of food? Bees with plenty of suitable food have contracted it.

(4) Is it due to weather conditions? The disease has appeared in genial seasons as well as in inclement seasons. It has occurred in cool as well as in hot summers.

(5) Has the protozoan known as *Nosema* anything to do with it? *Nosema* can be found in almost all hives and in hives supposed to be perfectly healthy I have found *Nosema*. *Nosema* has nothing to do with it. The *Nosema* seems to be a messmate of the bee.

(6) Is it an infectious disease? I think I shall be able to remove any doubts, if any such exist, regarding its infectious character. The disease makes its appearance in early spring and lasts through the summer. It may even continue throughout the whole year in a hive. On

taking out the digestive tract of a diseased bee the colon is usually found to be distended with dirty, brown material. Occasionally it is of a yellow colour. The contents are loose and watery and have a peculiar smell. In the excrement, exist pollen grains, particles of wax, waste matters, yeasts, moulds and bacteria. Yeasts, moulds, and certain kinds of bacteria are normally present in the intestines of bees. But we are going to deal with one that is not. The normal colour of the chyle stomach is of a pinky nature, but in the diseased bee it is of a dirty white or brown colour. In some cases enormous numbers of particular bacteria are present, and these bacteria we have been able to isolate. They are the specific casual agent of the disease. The alimentary tract of the bee is the habitat of various kinds of micro-organisms, and some are absolutely essential to the well-being of the bee. The normal bacteria are the following:—

- (1) Short rods which furnish non-liquefying greyish-white colonies on gelatine.
- (2) Long rods which furnish greyish-white non-liquefying colonies.
- (3) Long rods which furnish yellow Slowly-liquefying colonies on gelatine.
- (4) *Torulae* which furnish pink colonies on gelatine.
- (5) Yeasts.
- (6) Moulds.
- (7) *Nosema* organisms.

In ailing bees we isolated by culture and inoculation methods an organism which provokes the disease.

On 25th August, 1910, I received certain bees from Mr. Beuhne, and I microscopically examined the contents of their intestines, and also made cultures on special culture media. I used as culture media in these experiments ordinary gelatine, ordinary agar, beef broth, serum honey, serum honey and agar, gelatine honey and serum, gelatine and honey,

and honey. In this lot I examined 12 bees, 5 had *Nosema* organisms present, and the whole 12 had bacteria of some kind or another in greater or less quantity in the chyle division, and in the colon. All these bees had definite symptoms of bee paralysis, and there was present in all the cover slip preparations a stout short motile organism which could not but fail to attract attention from the number existing, and which I isolated from the other germs by the plate method. On 26th August, 1910, I inoculated a guinea pig and young rabbit with an impure culture in beef broth. In this culture were many of the stout murtile germs that attracted particular attention. The temperature of the inoculated animals rose, they became very sick, but eventually recovered. Note, the cultivation was a mixed one. On 26th August further bees arrived from Mr. Beuhne. About 40 per cent. had *Nosema* organisms, and all again had large numbers of bacteria of the type referred to in the chyle and colon. I made plate cultures to separate out the various germs, and on 9th September a guinea pig was inoculated from pure cultures of the suspected organism obtained from the bees sent. The temperature of the inoculated guinea pig rose, and it kept up for some days, and it died on the 17th, after eight days' illness. A rabbit inoculated on the 12th from the same culture died on the 16th (Sept.).

On 19th Sept. I received a hive of bees (supposed to be absolutely free from disease) in perfect health from Mr. Shanahan. I examined some of these bees and *Nosema* was found in them, but I could find no trace of the organism so often seen in bee paralytic cases. Before these bees settled down they had a great fight. Bees were seen attacking others and killing them. On 20th a lot of bees were taken from the hive and kept under separate glass vessels, kept covered except when observations were being taken.

Sugar syrup contaminated with pure cultures of the bacteria that killed the rabbit and guinea pig were fed to them. No. 1 series was fed with sugar syrup contaminated with cultures, so also were Nos. 2 and 3 series. No. 4 series was fed with pure sugar syrup. On 21st it was noticed that bees of Nos. 1, 2 and 3 series were paralysed. The bees of No. 4 series were still active. *Nosema* was found in some of the bees of No. 1 and 2 series, but, singular to say, none in No. 3 series. Some existed in No. 4 series.

Another experiment same date consisted in feeding bees with glucose contaminated with cultures of the germs obtained from the blood of the heart of the guinea pig that died after it was inoculated with the germs. Another lot was fed on pure glucose. Another lot was kept without food. All the bees in all the series—fed with food contaminated with the germs—became paralysed, and all died within two or three days. Those fed on pure sugar syrup and glucose survived, and were put back in the hive. Those to which no food was given became very weak and were put back in the hive after the second day. They were not paralysed. Some two or three of the bees fed on pure sugar syrup and glucose were examined for *Nosema*, but none were found in those examined. Further, cultivations were made from their excreta and no germs identical with those used in the inoculation experiments were detected. Guinea pigs inoculated with this excreta were unharmed. The microbes noticed were long motile and short motile rods, the usual inhabitants of bees' intestines, and yeasts and moulds were also present. On 30/9/10 more bees came from Mr. Beuhne, and plate cultures were made from the excreta of some of them. A guinea pig was inoculated with the excreta of these bees, and it died 24 hours later, and cultivations were made from its blood. On

17/10/10 more bees arrived from Mr. Beuhne. No Nosema was found. These bees had plenty of pollen in them. A guinea pig inoculated with excreta of these bees rose 1.2 degrees in six hours, but eventually recovered. On 18/10/10 further bees came to hand, but were dead on arrival. A guinea pig was inoculated with intestinal contents of some of the bees. It became very sick but recovered. On 30/11/10 more bees came from Mr. Beuhne. Some of them contained Nosema, and those that were examined had the micro-organism provocative of the disease in their bodies. (a) On 13/12/10 silkworms were fed with mulberry leaves contaminated with Nosema organisms. (b) Silkworms were fed with mulberry leaves contaminated with cultures of the bacteria that kills bees. On 19/12/10 (a) series all right; in (b) series some were very sluggish. On 20th, (a) series all right; but in (b) series some silkworms had commenced to die.

A small rabbit was inoculated with contents of intestines of dead silkworms, and it died 24 hours later. The organisms in its blood were identical with those that killed the silkworms. On 19/12/10 more bees arrived from Mr. Beuhne suffering from paralysis. Nosema existed in some of them. On 21/12/10 two rabbits were inoculated with contents of intestines of these bees, and they died 48 hours later. On 23/12/10 cultures were made from the blood of the dead rabbits and another small rabbit was inoculated with the blood of the dead rabbits, and it died 48 hours later. Cultures of the rabbits' blood showed the organisms that proved fatal in all the other cases.

No. 7 question: Are the foraging bees the first to suffer?

Mr. Beuhne, from his observations, is not able definitely to say whether the foraging bees are the first to suffer. If the foraging bees were the first to suffer it would indicate that the disease was

introduced from without. Among foraging bees the disease could be spread by flowers, such flowers having been previously visited by infected bees, and by contaminated water.

Nurse bees (not yet engaged in field work) and young bees have been found affected, and according to Mr. Beuhne young bees die without showing twitching of wings and distention of abdomen.

No. 8 question: Is the disease confined to foraging bees? has to be answered in the negative.

No. 9 question: Are the drones affected has to be answered in the affirmative. Drones are affected in hives in which the ailment has long been known to exist, and queens are also sometimes affected.

No. 10 question: Does the brood show any signs of the disease? is answered in the negative. The brood remains unaffected, and Mr. Beuhne says he has often given the brood from a paralytic colony to a healthy one, taking care not to shift a single adult bee along with it, and no symptoms of paralysis have ever appeared in the bees hatched from such brood.

Symptoms.—The first symptoms are a shiny appearance and listlessness, then sluggishness, their disinclination to move when touched, and then inability to fly supervenes. The wings are drooped. The disease from the fact that the bees are unable to fly has been called Bee Paralysis. In the course of the disease it is noticed that the abdomen is swollen, and that there is dysentery in a good many members of the hive, hence the disease is also known as Bee Dysentery. The affected bees dwindle away, and the disease has also been called Dwindling.

Treatment.—Do not get queens from affected hives for fear of introducing disease. Diseased foraging bees may go astray and introduce the disorder into healthy hives.

An affected hive, on shifting frames, should be disinfected.

To members of infected hive sulphate of iron should be given in a bee food 1 part in 700.

Mr. Beuhne says:

"I am of opinion that the disease is transmitted from bee to bee, but only when there is a predisposing constitutional weakness. The worst affected stock 'may' be cured by the introduction of a queen of a different strain, provided sufficient bees survive till the population of the hive is replaced with the progeny of the new queen. A change of queen effects a cure in three cases out of every four, and, strange to say, the queens of paralytic colonies when introduced to other hives rarely reproduce the disease in their new surroundings.

Bees affected with paralysis to a certain extent lose some of their instinct. They stray to neighbouring hives, and if these happen to be bees predisposed the disease will make its appearance.

Beauty bees, that is, bees bred for their pretty colouring, are much more subject to paralysis than the darker strains.

Combs, stores, and brood (without bees) from infected hives may be given to normal stocks without risk, but there are certain spots in an apiary upon which any colony placed there will develop paralysis, which would seem to point to the infection coming from the ground.

"I have for many years been trying to breed a strain of bees immune to paralysis, but as in commercial beekeeping, the mating of the sexes is even less under control than in a queen rearing apiary, the results achieved so far are very modest."

In answer to Mr. Beuhne: Bees do discriminate between flowers.

Mr. Beuhne: In bee paralysis the bees have a sprawling appearance and the wings stretched out. In dysentery the wings are close and the bees look sickly.

The dysentery referred to in Dr. Brown's paper is different. He tried feeding with sulphate of iron, 1-200, and bees refused it; he then tried 1-400, the bees took it after three or four days; the symptoms of paralysis disappeared, and he thought he had cured it. He thought he would examine the hives, and to his surprise there was not a live larva in the live. Dr. Brown suggested trying 1-1000, and he used that and saw no result; he then tried 1-700; he had two colonies affected, so he fed one and compared them. At present that fed colony shows no signs of paralysis, but the other one is still affected. His experience is paralysis eases off in the winter. Re getting queens from infected apiaries: test the bees for paralysis, and if they resist it breed from their queen. He has been trying to infect bees before queen rearing. He related an instance of where an apiary of healthy colonies arrived from a distance, and as soon as they arrived they developed paralysis. In East Gippsland where the bees came from there is no such disease, but when brought into his apiary fully thirty per cent. of bees had paralysis and yet his own bees were entirely free from it.

Dr. Brown: In infected districts animals and insects became immune, when, if fresh bees are brought into that diseased area they are immediately attacked. Animals, including insects, require an experience with disease to resist it.

Mr. Beuhne gave instances of where healthy colonies placed on certain stands each took the disease in a short time.

Mr. Cottman purchased a breeding queen and destroyed all workers caged with her. He had no sign of paralysis in the yard. He introduced the queen on three combs of brood and shortly started rearing queens from her; every daughter reared developed paralysis. This disease must have been in that queen. Next season there was less paralysis, the following season less, and he still has

her progeny in the yard and there is no sign of paralysis.

Dr. Brown: The disease probably bred out.

Mr. Morgan: Bees in the shade in winter suffer more than bees in the open. Colonies placed under trees in the same place previously occupied by paralysed bees always take the disease.

Mr. Bolton: Does the larvae take the disease

Dr. Brown: Mr. Beuhne says "no."

Mr. Beuhne: What has Dr. Brown done, and what does he suggest for experiments and in what line

Dr. Brown: Young bees are not infected as no organisms have been found. He suggested that young brood should be sent to him to test if any can be found.

A vote of thanks to Dr. Brown was carried and acknowledged.

Mr. Wignall (secretary) reported that during recess he had called at railway offices to arrange for the time of the deputation to the railway commissioners, and that the railway officer could not see that there was any occasion for the deputation—all that was necessary could be done by letter. The conference now considered the matter, and as no deputation would be received the following motion was carried:

"That the secretary be instructed to write to the commissioners of railways on matters that were to be brought before them by deputation."

(To be continued.)

CAN ACQUIRED CHARACTERISTICS BE TRANSMITTED THROUGH BREEDING?

A. L. Du PRAY.

Like a great many other beekeepers, I try to breed from my best stock; but colonies that are by far the best this year, I find very inferior next year. I have often had colonies that, early in the

season, seemed to promise great things. They were strong in bees, and had lots of brood, yet the season would pass along and they would give little or no surplus. I remember having such colonies, when, for some reason, I neglected to change their queens, and the next season they would be among the best colonies I would have.

Now, I can understand how, if I wanted fast horses, and had a mare that came from stock that had been bred for speed for many generations I might get something that would be superior to what I already had. I would train my mare with great care and skill, and when I had her at her best I would breed her to the best stud, one that had been carefully trained, and then I might get something even superior to either sire or dam. But these horses are domesticated, and by using skill and kindness we may develop all their inherited powers; and then, by breeding them, get the benefit of their inherited, as well as their acquired powers; in other words, they can, by careful training, acquire speed and then transmit both their inherited and their acquired powers.

Now I go to my bees; I find my best colonies are rustlers, and, of course, I will breed from them. They go out, and, perhaps, acquire; but then the thought comes to me, how are they going to transmit? Some one says, you will breed from the queen of that best colony. Then I am confronted with the fact that while she can or might transmit, she can not acquire. Those worker bees can go out, and by straining and reaching, they may even lengthen their tongues, but how can they transmit that long tongue reach? Now, my horse is domesticated, and subject to my will, so that by great care and kindness I can use my greater will in inducing him to develop his inherited powers to their very utmost; but when I go into my apiary, everything is different. I find the bees are not domesticated, and are not subject to my will. In fact, I

must work in accordance with their will. I can only use their natural instincts in trying to improve them and then I meet the difficulty above mentioned.

But some one says, they transmit their acquired powers, by the peculiar kind of food they feed the young. But that is what I don't know, and would like to know. It is a known fact that the queen can not go out and acquire skill in long reach. The drone might transmit but he can't acquire. He has no tools to work with, yet we expect him to transmit powers that he is not able to acquire.

Some have claimed that they have done something towards breeding out the swarming instinct. I'm running for extracted honey, using a 10-frame hive, and tiering up at the proper time. I have had less than five per cent. of my bees swarm, yet I know that those same bees, in small, poorly ventilated hives, would have done differently. So I take no credit for breeding out the natural propensity of the bees.

After all I have read and studied, and in the light of what experience I have had, I am almost forced to the conclusion that the honey bee is just the same as when Samson took surplus from the carcase of the lion. Yet, as I have said before, I do not know, but I would like to know.

Pro. E. F. Phillips, of the Apiarian Department at Washington, D.C., replies as follows:—

The interesting letter of Mr. DuPray which calls forth this reply is very suggestive, but his conception of breeding is probably not the correct one. Before taking up a discussion of the main points in his letter, it may be well to discuss a minor but important point which occurs in the letter. He complains that colonies which show up best in the early part of the year do not always come up to expectations later in the season, but may do well the next year. I do not know why this occurs in California, but in the East

it frequently happens that colonies very strong in the spring fill up their combs so full of honey that the queen is cramped for room. As a result this good breeding queen is unable to make a proper showing for herself when the surplus is taken off. The logical remedy for this condition is to give some surplus room early, where it is needed. This may not be the explanation for the condition that Mr. DuPray describes, but it is a point that is probably not fully realized by many Eastern beekeepers.

Mr. DuPray assumes that if he trains horses for speed that these animals will, therefore, transmit to their progeny their acquired ability for exceptional speed. This is probably not true. The ability to transmit to the offspring characters which are acquired during the life time of the parents is a much discussed question among investigators of these problems. Whether this has ever occurred it would be unwise to state, but it may be stated most positively that if it does occur, it is so seldom that most breeders never saw such a case. The usually accepted belief is that inherited characters are properties of the sex cells (eggs and spermatozoa), and that unless these characters are latent in the sex cells they are not manifested in the offspring. It is further held that the acquiring of a special character (e. g., speed) in one generation by the body of the animal does not influence the sex cells, and that therefore the acquired character is not inherited.

It is well known that horses are bred for speed and that marvellous results have been accomplished. This may appear as not harmonizing with the statements just made. However, it is more in keeping with the facts to assume that in this breeding work, those animals are selected as breeders which have shown speed and in which it may therefore be assumed that there exist sex cells having the latent speed characters. This assumption is not always correct and con-

sequently the breeding is not always successful. If two animals having such inheritable characters are crossed the result may be a still more speedy animal than either parent, since the character is accentuated by the combination. It is true that the animals used for breeding fast horses are usually trained for speed, but this is because the owners desire to utilize to the fullest extent the bodily (not sexual) characters of the individual and to use the results to test the probability of their sex cells having the desired characters.

It is believed and assumed that the sex cells are quite independent of the body cells. Mr. DuPray calls attention to the fact that a character acquired by the workers does not influence the queen. In the same way characters acquired by the body of an animal do not influence the sex cells. In bee breeding it would be necessary to choose as breeding queens those whose worker progeny showed the desired traits, on the assumption that those traits are inheritable. In the same way in horse breeding, that animal is chosen as a breeder whose body shows the desired traits on the assumption that these traits are latent in the sex cells and are therefore inheritable. Bee breeding is peculiar in that we must deal with the colony as a unit instead of with the individual. In his unit, the queen seems to represent the sex-cell container and the workers correspond to the body cells of the horse.

I am well aware that the views here expressed are not held by all practical breeders, but they are the consensus of opinion of the majority of scientific workers in this field. They are here given not as a personal opinion based on investigation, but to point out the attitude of those well informed in this field of labor.

Mr. DuPray further calls attention to the fact that when preventing swarming by manipulation he does not breed out the swarming impulse. This is quite true.

Breeding of bees has proven to be a problem that but few have had the courage to try to solve. Consequently we must try to do by manipulation the things that we possibly should do by breeding. 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. If we could but devise a method for control of mating, progress would be more rapid. The five-banded bee did not exist in the days of Samson's exploits with the Leo bar-frame hive, and it is probable that before as many centuries pass again some further changes in the bee may be seen.—"Review."

THE REARING AND MATING OF QUEENS ABOVE QUEEN EX- CLUDING HONEY BOARDS.

FRANK G. ODELL.

To have on hand two surplus queens, numerous cells in process of building, and a colony of bees pursuing all the activities of the brood-nest at the same time, is a convenience not to be despised by the progressive beekeeper. Your invitation in the January "Review" to discuss this topic seems to be addressed to me personally, as I have followed this plan very successfully.

Doolittle in "Scientific Queen Rearing" discusses that peculiarity of the bees which leads them to think themselves queenless when nursing brood over a queen-right colony with an excluder between the brood-nest and the super. He also details at some length the possibility of rearing queens by this method. The writer claims no originality for the use of a method which is generally known to queen breeders. Just what sort of physical, mental or psychological change comes over the bees to delude them into the notion that they are queenless under such conditions is one of the mysteries for future solution and not a topic for

present discussion. When the underlying principle which governs this strange departure from normal bee-life is understood, we will know more than we do now—and, possibly, something which will be greatly to our advantage.

It has always been my belief that the phenomena of Nature, and especially those of the hive, all have reasons for their manifestation; their belief leads to another, viz., that speculative investigation into the unaccountable things done by the bees is not to be despised.

Probably most beekeepers now that if frames containing eggs or unsealed brood are placed in an upper story over a queen excluding zinc, that the bees will not only go up and care for the brood, but will in many cases build queen cells on the frames in the upper story. Such cells appear to differ in no way from those built otherwise, and in my experience have produced good queens where they have been given proper protection from cold. While this plan is not feasible for rearing large numbers of queens commercially, it is so simple that it may be practised by the small beekeeper for the production of a limited number of queens.

First prepare the super, using a hive body with thin division boards at each side, making two, one-frame compartments. Cover the bottom of the centre portion with queen excluding zinc and the narrow side compartments with common window screen wire so that no bees can pass from these small upper compartments into the brood-nest below. At the back end of each small compartment, at the side of the hive, bore a quarter-inch flight hole and cover it with a wooden button of thin stuff which swings freely on a small nail. I prefer to make these "entrance closers" with a piece of excluding metal inserted so that passage is allowed for only one bee when the closer is properly placed. This prevents robbing. When turned a trifle more it closes

the entrance entirely and still permits some ventilation. These small entrance closing blocks are exceedingly handy for small nucleus boxes and a supply should be kept on hand.

The top of this queen-rearing super should be covered with enameled cloth cut in three pieces and tacked to the top of the partitions so that either section of the super may have the covering turned back and its contents examined without disturbing the others. This practically eliminates any necessity for the smoker or the veil, a great convenience in queen-rearing. More than two divisions can be made if desired, but we have found it best to maintain a cluster of five or six frames of brood in the centre where possible.

Preparing the Colony.

Inasmuch as a considerable quantity of brood is required for this operation it is best to prepare the colonies set apart for this purpose by making them two-story, or as nearly so as possible, and getting an abundance of brood. Brood may be taken from other colonies for this purpose and if it is desired to rear queens from the brood of any particular queen, these brood-frames may be used for that purpose, being careful, of course, to take no strange bees into the queen-rearing hive. This preliminary preparation is equally important for another purpose, viz., that of securing an abundance of young bees for cell feeding and incubation.

It should always be remembered that young bees are required in numbers for the best nourishment of queen-cells, and that good queens cannot be reared in colonies which are not so provided. Too much stress cannot be given to this highly important matter; queens cannot develop a strong physique and become prolific mothers unless they are well fed during infancy. For this reason queen cells, however started, should be nourished during the larval period of feeding

in strong colonies, and for the same reason, we prefer to have fix frames of brood with their compact and warm cluster of feeding bees in our queen-rearing super.

We prefer a telescope cover for the queen-rearing hive with plenty of wrappings in case of cool nights. We remember one spring when for two weeks we had to wrap our queen-rearing colonies in blankets during the month of May to save our cells from chill. "Swarthmore" laid great emphasis on this matter of keeping cell-building colonies warm, and while it requires some degree of fussing about, it pays in vigorous young queens

Stimulative Feeding.

It will be well to have a Doolittle feeder in the queen-rearing super, and as soon as operations are started feed lightly with a mixture of honey and syrup made from granulated sugar. This will be very necessary if honey is not coming in and if kept within bounds will do no harm at any time. If the brood frames are not fairly well supplied with pollen, substitutes must be provided for it; use rye meal or corn meal or wheat shorts; if these are placed in a barrel the bees cannot get at them and the bees will soon find all they want. This matter of stimulative feeding and pollen substitutes is a good thing on general principles and is worth practicing in any apiary.

Getting Cells Started.

We are now ready for some queen cells. Place the prepared super on a strong colony with at least four or five frames of brood containing eggs and young larvae in the centre division. Keep the lower story full of frames. Have the brood frames placed in the super clear of bees when they go in. This will insure that plenty of young bees will at once go aloft and begin their work of feeding. It will be best not to try to start cells until there are plenty of drones beginning to appear, which will be soon

after fruit bloom. If all goes well you will be likely to find a few nice cells started in the upper story within a few days.

When these cells are sealed over, select two frames each containing a cell and place one in each side compartment with a plentiful cluster of bees. Keep the flight hole closed for two days and then open it to the one bee space. This will get the bees to recognise these side compartments as their new home and they will use the flight hole without trouble. If more than one cell is on a frame the surplus may be removed and grafted on other frames of brood and used for starting nuclei with queenless bees. If you wish to continue the queen-rearing operation, after the cells have been sealed a week to remove the super-frames to the lower part of the hive and put some fresh frames of brood above to start a new lot of cells.

In due time the queens will hatch in the side compartments, fly out and be mated and begin their work of laying. They can then be removed and introduced elsewhere, or the entire nucleus can be removed and a new colony started. In case the queen only is removed the nucleus of bees should be at once placed below and the original operation continued so long as it is desired to rear queens.

Advantages of this Plan.

This system of rearing queens offers distinct advantages to the beekeeper who wishes to rear only a few queens. He needs little technical knowledge of the fine art of queen-rearing and no considerable amount of paraphernalia. The warmth of the colony below insures that the cells will be well incubated and the abundance of bees ensures that they will be well fed; the two principal things required to produce good queens, aside from parentage and mating.

The advantage of usually having a surplus queen or two on hand, in a nucleus, is a considerable item, and if increase is

desired the nuclei are ready. If increase is the chief consideration I should prefer to make the outside, or mating nuclei large enough to hold two frames each.

Another, and a marked advantage is, that it is not necessary to make a colony queenless in order to get cells started or incubated. The colony can be immediately restored to its normal condition by removing the super, and, apparently, the bees never realize how they have been hounded by their keeper.

The principal disadvantage lies in the loss of surplus honey, and it is impractical to try to get surplus while rearing queens. The spring crop of comb honey is usually lost so far as such colonies are concerned. However, if increase is desired, several colonies can be set apart for this purpose and the queens reared while the brood is being accumulated for the formation of nuclei.

On the whole, this plan is very simple and well worth the trying by any beekeeper who wishes to rear a few queens without any particular amount of new equipment.—“Review.”

ISLE OF WIGHT BEE DISEASE.

This mysterious disease has no immediate interest for American beekeepers only as they have a fellow feeling for beekeepers everywhere, but it may have a tremendous interest for them in the future. According to a report in the “Irish Bee Journal,” there can be little doubt the disease is of an infectious nature, and from the way it has spread it is almost too much to hope that it will never reach this country. Appearing in 1904, by 1908 it had succeeded in wiping out all the bees on the Isle of Wight, and in 1909 it had crossed the narrow channel and has since been found in several counties in England and 2 counties of Scotland.

Seemingly more fatal than foul brood, it bears little resemblance to that disease, for the adult bees are the ones that suffer, while the brood remains healthy. The field-bees are the first to suffer, and generally the disease is confined to them. There is first a disinclination to work, and gradually the power of flight is lost. The colon becomes enormously extended, which might happen to any bee when not allowed to fly so as to empty its intestines. There is, however, an unusual amount of undigested pollen in the colon, there being apparently an inability to digest the pollen grains, and the colon thus presents a bright yellow color, although sometimes dirty brown. What the microbe is that produces the disease, if a microbe it is, no one yet knows.

Let us hope it may take the disease a long time to cross the Ocean.—“Am. Bee Journal.”

W.G., Campbelltown, writes :—This season has been a splendid one for honey. I have taken over two tons of honey from my bees. Every one seems to have plenty of it who have bees. I have a strong force of bees. The Blue Martins have been troublesome this winter on the bees, I have shot scores of them. They all come about the bees waiting on the fence and on trees on a cold day, and as soon as a bee flies out there are about twenty birds after him, knocking them down on the fence and on trees and eating them; but as fast as they come I bring them all down with the gun. It is in the bush on the bloom where they get the most of them.

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