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West Maitland, N.S.W.: E. Tipper, September 30, 1907

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THE AUSTRALIAN Bee Bulletin.

A MONTHLY JOURNAL, DEVOTED TO BEE-KEEPING.
Edited and Published by E. TIPPER, West Maitland; Apiary, Willow Tree, N.S.W
Circulated in all the Australian Colonies, New Zealand, & Cape of Good Hope.

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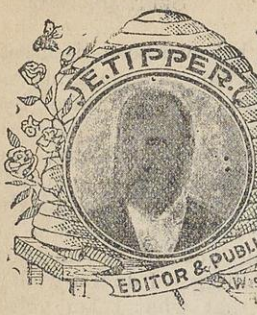

THE AUSTRALIAN BEE BULLETIN.

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

MAITLAND, N.S.W.—SEPT. 30, 1907.

NOTWITHSTANDING the dry weather we are now experiencing, we fancy there will be a fair flow of honey this season.

In one town where we had made a rule never to hawk our honey from house to house, and to deal with storekeepers only, and where in a neighbouring town 60lb. tins of honey have been getting 15/- per tin by auction, we were told our price was too high, as 60lb. tins were offered for far less. The question to our mind has been was the storekeeper telling us a deliberate commercial (?) falsehood? Or, were there unprincipled and thoughtless beekeepers, who did not care what price their honey brought so long as they got it off their hands? At any rate if we cannot get the price we want for our honey we will keep it. For some weeks past the prevalence of influenza has placed honey in greater demand.

R.S., Parkes.—We have had no spring here to speak of as yet, and summer weather has set in; the prospects for a good honey season are not bright. A feature of the last autumn was the unusually large amount of propolis gathered by the bees here, although the winter was very mild; spaces in unfinished combs being filled in with thich junks of it.

The Ripening and Maturing of Honey.

AN IMPORTANT SUBJECT TO BEEKEEPERS.

On the second day of the Waikato Winter Show, Mr. I. Hopkins, Government apiarist, delivered the following interesting address to the members of Waikato Beekeepers' Association at Hamilton:—

The subject of the short address I am about to give has been set down as the "Ripening of Honey," but I think a more appropriate title will be the "Maturing of Honey," as this will include everything that should be done to have our honey in the very best form for placing on the market, and I know you will agree with me that this should be our aim, for the better our product is the larger will be the demand for it.

PERCENTAGE OF WATER IN HONEY.—All honey, whether it is what we term ripe or unripe, contains more or less water. In its ripe condition it contains the least. According to the authorities I have looked up, it may range between 12 and 23 per cent. On page 286 of "Thorp's Dictionary of Applied Chemistry,' the maximum, minimum, and average amount of moisture in 25 varieties of honey examined are given as follows:—Maximum, 23.26 per cent.; mimimum, 12.43 per cent.; and the average of the whole, 19.3 per cent. You, as practical beekeepers, will readily understand under what conditions we get

the most moisture, that is, when honey is being stored in close, damp weather, or, in other words, when there is much moisture in the atmosphere; and, as a matter of course, we get the least in dry weather. You are also aware that honey containing an excess of moisture is bound, sooner or later to ferment. Now, just where that excess commences I confess I do not know, and, so far as my investigations have gone—and I have looked up many authorities—I have not yet seen anything more definite than that stated, that honey usually contains from 12 to 23 per cent. of moisture. This is a matter best decided in a chemist's laboratory, being beyond the accomplishment of the average beekeeper, and need not trouble us, as we can get at all we want to know in this connection by very simple means, as I shall point out directly.

Importance of Maturing Honey.—It is of vital importance to the individual beekeeper, and to the industry generally, that all honey should be well matured or ripened before it is placed on the market, so that there may be no risk whatever of its fermenting afterward. In order that you may thoroughly realise this, I may tell you that in the course of my travels I have come across quite a number of samples in a state of fermentation, some of them with the owner's names on the labels. These packages had been placed on the market, and, of course, had to be condemned. Those brands, you may depend, would be tabooed in that district or market ever afterward. We now come to the method of maturing honey, the principal feature of which is to make certain that our product does not contain an excess of moisture. As I said just now, the average beekeeper cannot, by direct means, find this out; but by testing our honey for its specific gravity we shall be able to ascertain what we want to learn, and this is a very simple matter, as I shall explain shortly. What has seemed extraordinary to me is, that, considering its great importance, nothing, to my knowledge, has ever been discussed of a practical nature on the maturing of honey in any of the bee literature that has come under my notice. I have all the standard works on bee culture, and have read all the principal bee journals for the past thirty years, but beyond the mere statements that honey should be ripe before being put up for market, there has been nothing. I do not wish it to be understood that what I am going say is to be taken as the last word on the subject—far from it, for it will take a considerable time yet before we have arrived at that stage. My aim is to get our associations and practical beekeepers generally interested in the matter, so that they may assist me in making tests, that we may eventually arrive at some trustworthy knowledge of the matter, instead of working, as we are now doing, in the dark, or by rule-of-thumb.

Ripening Honey Inside and Outside Hive.—I care not whether we follow the practice of leaving the honey in the hive until it is all capped over before extracting, or extract it before this stage and ripen afterward; we still need some means of clarifying it and testing it for its ripeness, as the case may be. For myself, I am convinced, and prepared to risk my reputation, upon it, that honey can be as well ripened outside the hive as within it, and that it is only a mechanical process in either case—the getting rid of the surplus moisture by evaporation. I am very pleased to be able to state that I carried out this method of ripening honey outside the hive on a large scale twenty-four years ago (at Matamata, in 1883), and that my first experiment was with ten tons, and with complete success. The enormous saving that this method means over that of ripening the honey inside the hive, in the way of extra material, time, labor, the control of swarming, and the larger crop of honey, can readily be estimated by practical bee farmers. I am also pleased that such men as Alexander,

Professor Cook, and T. W. Cowan, proprietor of "The British Bee Journal," advocate the same method.

NEED OF SHALLOW MATURING TANKS.—The absolute requirement in any case for the proper maturing of honey is a shallow tank, in which it should remain for a time after extracting, while the atmosphere around it should be warm and dry. In this way the surplus moisture will evaporate, and the fine particles of pollen and wax, that it is impossible to catch in the strainers, and also the air bubbles (that within themselves may contain moist air) may rise to the surface in the form of scum and be taken off. In this way, and I believe in this way only, can we properly mature our honey and get it into the best form for market. It has been urged by two beekeepers I was discussing the matter with some few days ago, who were using deep cylinder tanks, that the ripe honey, being heaviest, sank to the bottom, and the moisture is forced to the top. This sounds very well in theory, but is not correct in practice, as can be readily proved by mixing honey and water together, when they will not entirely separate afterward. Air bubbles and foreign substances that run into the tank with the honey cannot possibly rise to the surface through a deep body of it, and the same applies to much of the moisture; hence, in many cases it is run off into the marketing packages in an unmatured condition, with the result that, even where there happens to be no excess of moisture, a nasty scum rises to the surface in the tins, which is not at all enticing to the purchaser.

DEPTH OF TANKS.—As to the best depth for tanks, opinions may differ, but my own is that they should not exceed 24 inches; but I prefer them 20 inches, and as big as you like superficially. Probably some of you may remember Mr. Alexander, in one of his articles, when speaking of the depth of his tanks, considered they were too deep. They were 36in., and he intended reducing them to 32in., so he is not in favour of deep tanks.

TESTING HONEY FOR ITS RIPENESS.—To come to the matter of testing honey for its ripeness: I spoke to you a short time ago about testing it for its specific gravity, that is, to find out its weight as compared with water. You will fully understand the matter when I explain the experiments I have just been carrying out in a series of tests with various samples of honey obtained by myself in retail packages from different merchants in Auckland and Waikato, specimens of which are here before you. So long as the instrument is correct, there is no more certain method of testing for ripeness than by the hydrometer, an instrument which you are all, no doubt, more or less familiar with, and which is most simple in its use.

AUTHORITIES ON THE SPECIFIC GRAVITY.—The different authorities I have looked up very largely in the figures given as to the specific gravity of honey For instance, in the "British Bee Journal" for 1885 (December), the editor, in reply to a correspondent, gives figures ranging all the way from 1.261 to 1.450, obtained from various works, but gives it as his opinion that 1.350 would be a conventional standard for ripe honey, although he remarks that clover honey, in a dry season, is found to be 1.370. "Thorpe's Dictionary of Applied Chemistry," page 287, gives the specific gravity as from 1.439 to 1.448; while "Encyclopædia Britannica" gives it as 1.410, so you see there is a big difference, and therefore we get very little assistance for our purpose from these figures; consequently we must rely chiefly upon our own observations. With regard to the tests I have made, I went through the twenty samples very carefully indeed, some with a Twaddell's and some with a Fletcher's hydrometer, after testing them together and finding them alike. The readings varied, the lowest registering 1.350 and the highest 1.430. It was very noticeable that the better the honey the greater the

specific gravity. The average of the eleven samples that went 1.400 and upwards was 1.410 10-12ths, and most of them were firm and dry, while those below were more or less moist, although all were granulated—one, at 1.385, had just started fermentation. The conclusions I have arrived at over the tests are, that all those registering 1.410 and upwards were thoroughly ripe, and would keep for any length of time under ordinary conditions. Those between 1.400 and 1.410, if not so ripe, would keep for a long time; but all those registering below 1.400 seemed to me to be doubtful in this respect. I shall keep specimens of each as you see them for testing by time. Now, what I wish you all to do is to obtain the apparatus yourselves, that is, each individual, and try for yourselves, so that you may learn to know for a certainty when your honey is ripe, and not depend upon guesswork. The appliances, hydrometer glass, and thermometer, only cost about 7/6 in all, so that they are within the reach of all of you; at all events the matter is one of so much importance that if they cost six times as much you ought to have them. Be sure also when making tests to record them all for future reference, or they will be of very little use to you. Make tests of the honey directly it is extracted, and on each day afterward. A set of instruments will be kept at the state apiaries, where tests may be made by any beekeeper.

Heating Honey-House at Night.—Before concluding, it may be well to mention a suggestion that was made to me the other day by your president and Mr. Hutchison, and one that I entirely agree with, that is, that some means should be adopted for heating the honey-room at night in changeable weather while the honey is maturing. Sometimes the nights are exceptionally cold, and starts the honey granulating prematurely, and means should be taken to prevent this. Some one of the modern kerosene stoves would be very suitable for this purpose, and would cost very little indeed for up-keep.

Testing for Making Vinegar and Mead.—I should also like to draw your attention to another use for the hydrometer. In the making of vinegar, mead, etc., out of the washings of cappings, broken honeycombs, etc., we are told usually to test the strength by the floating of a new-laid egg, or sound potato, which is another rule-of-thumb business. The right proportions of honey and water to make vinegar is 1¼lbs. of honey to each gallon of water. In this test glass I have put them in that proportion, and you see the hydrometer gives the specific gravity as 1 040, so that, knowing this, you can easily make correct tests of any washings you may have without there being any guesswork about it. The right proportions for making mead are 4lbs. honey to the gallon of water, so that by mixing half a pound of honey in a pint of water you will have the correct proportions for ascertaining the specific gravity for mead.

A number of questions were asked and answered by the lecturer.—"The New Zealand Farmer Stock and Station Journal."

Reason, as of Bees and Men.

C. W. DAYTON.

It would not be the good part of wisdom to think that, because the question as to whether bees think or reason has been examined and discussed by a few leading apiarists that the matter is decided and settled. The foremost philosophers of our day admit, after a generation of discussion, that the matter has been advanced no farther than supposition or hypotheses as to whether man himself has reason. The only approach to satisfactory settlement is that man possesses self-consciousness, or, intellectual consciousness of self. There are many high authorities that hold that the self-consciousness of man is the same kind as in

the lower animals, differing only in degree. There have been innumerable arguments brought up, but when examined from different points of view have always been knocked topsy-turvy. The field in which to win fame in this branch of the philosophical world is, therefore, as broad as ever.

Nor need importations from Germany or other favoured climes deter us from making a local effort. German people freely admit that merchandise sent here and sold at fancy prices would be scorned to be used at all back in Germany. We know, all too well, that articles made to be sold are never so perfect as when intended for home consumption. Even our bees which were obtained fifty years ago, and that we confidently expected to improve and develop, are still being imported from the same locality as the early importations. What has discussion developed in the matter, if it has not incited action? Beginners have stood still and waited, or perchance risked their savings for high heralded improvements whose commotion was in the coming and the going.

Man may be self-conscious of other animals and their acts, but man can never be self-conscious for other animals. Consequently man can only compare the actions which may be conscious to other animals with those actions which are conscious to himself. If the actions are identical then it can be calculated that the causes which excite the actions are also identical, and are performed through the same method of reasoning

To determine or contemplate the consciousness of bees in comb-building is equivalent to exercising consciousness for them, or in their stead. Man cannot exercise consciousness in actions he could not perform himself. Man may be conscious as to when or where man desires combs to be built, but the bees' consciousness may be at variance; and the consciousness of the bees may be in accord with nature. Self-consciousness is not transferable, except by a change brought about by artificial actions, and then it is not consciousness. It is a faulty course of procedure, that may admit of toleration but not of actuation. Below are some examples I deem as applicable in the case.

In the November issue I mentioned having some nuclei in the house to introduce queens by the hatching-brood plan. It was so cold weather that some unsealed brood in the out-edges of the combs became chilled. Hold this fact for use later.

Case No. 1—There are many Mexican hornets here. There was a dish of honey on the table which the hornets found. They find such things sooner than honey bees. After the hornets had helped themselves for two or three days (four hornets) I set the dish outside to be cleaned off by bees. When the bees had gotten a good start I set the dish back in its former place, and the hornets and six or seven bees continued to carry the honey away, coming in at the door and going out at the window escape.

I noticed that every time a hornet returned for a load it first went around and smelled of every honey bee on the dish before taking a load of honey. I connected these actions with other actions I have seen out of doors about the bee hives, so I daubed a bee with honey so it could not go home. The next hornet attacked this bee, and other hornets also as they came, but the bee fought and got free. Then another bee was daubed, and that was tackled by hornets the same as the other. Thoughts preceded acts. One of the dead larvæ was brought and a small amount of its su' stance was smeared on the backs of the two bees. When a hornet returned it attacked a bee in rough and tumble manner, and other hornets soon joined in and pounced on both bees as soon as they came. They clipped off legs, wings, heads and stings, and then cut the bees up and carried them home (as a substitute for pollen) leaving the dish well strewn with gore.

When the hornets returned they examined the honey bees as usual, and then began to load up with honey. As the

other honey bees returned they began to smell about the plate in a suspicious manner. Suspicions increased rapidly into threatening movements. The more they saw the hornets the more exasperated they acted. They refused to load up until the hornets had been driven off the dish. They became anxious to fight, and the hornets were attacked if they ventured to touch the honey. Toward fall hornets always begin their work of robbery and depredation about the hives, butchering every crippled bee they catch out alone. Good Italians notice this, and will not allow them about the entrances, and will follow and attack them on the ground. They are more than a match for a hornet when they go out for "game." In the above case I believe they would not load up until the hornets were away for fear of being killed.

Case No. 2—I said that the brood was chilled. It was not so much because of the cold weather as because it was difficult to get much hatching brood in a comb at that season, as there was not much breeding going on, and I was obliged to use more combs to get the requisite amount.

When the nuclei were set out of doors robbers poured into the hive containing the chilled brood, but none of the other nucleus hives. I looked into the hive to see how the others were treated. There was not the least bit of fighting and the robbers were helping themselves to the cells of honey even amongst the cluster of young bees. The hive was returned to the house again. The next day it was again set out of doors. I left the vicinity for about thirty minutes, and when I returned there were about 200 robbers getting busy. This time when I looked in the young bees were running here and there in a frantic manner and grabbing and pulling at every robber they could reach. The robbers seemed to pay but little attention to the young bees, but nosed along until they got to a cell of honey, where they continued to load up, often with two or three young bees endeavouring to pull them away. The bees of the hive were whitish yet, and could not offer much resistance.

Now I believe the reason they did not fight on the first day was because they did not know what robbing was, but after the first fracas and they made the discovery that their honey had been daubed about, and cells lowered and films disordered, they began to get "learning," "Education.'

Robbers were bound to get at those combs containing chilled brood, so they were exchanged for fresh combs of brood. This immediately ended the robbing in that hive. I placed one of these combs in the upper story of each of three other colonies. Robbers continued for days to smell and pull at the cracks between the covers and supers of each colony where the combs of chilled brood were put in. And the hives and supers were very close fitting. But no robbers went near the entrance. No robbers went on the side where the entrance was. Each colony had a thrifty young queen, I attribute as the cause of this. If the bees of the hive saw robbers they were obliged to come out and look on the rear of their hive. The entrance consisted of a single one-inch auger-hole. In less than a week each colony closed the entrance with propolis so that only one bee at a time could pass. The propolis was put on in the shape of a cone, with the small end turned towards the entrance of the hive. No other colony in the apiary has contrived any such barrier, although about 200 colonies have three inch-wide holes open. There is some philosophy in the shape of the cones and all of the three colonies philosophised alike. The cones provided the widest range of vision, combined with the greatest protection to an individual bee standing in the opening. A robber could be seen as it traversed the length of the cone. It was like a man poking a gun over a parapet. It reminded me of General Jackson at New Orleans.

They were obliged to come out of the hive and go around it in order to see the robbers. Then go back with the memory of robbers, and the realisation of the results of robbing, and then go about devising means for more complete protection, as well as to gather the material for its construction. —"American Beekeeper."

Comb-Building and Obtaining Surplus-Honey Cheaply.

I previously mentioned this point—a small colony just getting started with bees to cover well one to 3 combs and brood in proportion, will put up more honey (that is, gather, store and consume) than a like number of bees under other conditions. When the young are hatching fast, and there is a good proportion of nurses and comb-builders, it is astonishing how much they will build, and how well they do it.

Suppose you have started with a 1-frame nucleus. First, put the one frame at the side of the hive, and next to this put a drone-comb, or one mostly drone. Such a colony will not use the drone-comb for anything but honey-storage, and if they begin to get crowded they will put almost every bit of honey in the drone-cells and fill the worker-comb with brood from end to end. When the colony can use more space, move the brood from the hive side and put in a frame with a starter; this gives the hive side, which is straight, for one guide, and the face of the comb next to it, having been next to the hive side, will be as straight as a board, for it was lined by a board; there they will build as good a comb as if foundation were used.

But you may object to having them build next to the outer wall, as being too cold; in a few cases that may be a valid objection, but you can get exactly the same results by using a dummy or follower board, putting the drone next to the hive side, and the brood-comb between it and the dummy.

As fast as the comb is built in the first frame given, it will be used by the queen, and it won't be many days until it is full, when it should be moved from the old one and a starter put between it and the old one, and also at the same time one put between the new one and the dummy; these two will be built about as quickly as the first one. And right here is the time that another drone-comb may be put on the inside next to the dummy, the presence of drone-comb will encourage the building of worker-comb If you do not have dummies to use just let a drone-comb serve in its place; I often use a comb instead of a dummy.

We have now given the colony 3 starters, and with a young, vigorous queen you can depend upon 99/100 of the comb in them being worker, if you have followed the plan outlined. At this time, if there has been free gathering of nectar, the drone-comb should be full of honey, and now two more frames may be given, this time putting them as near the center as may be, and they may put both together and between the 2 nicest, straightest sheets of brood. Note this fact: A sheet of brood to build comb next to is better than a board, every time; it is a warm place, and where the nurses are doing much business; there the fewest bees necessary to the work can build.

Note also that a sheet of brood will remain just as straight as when you find it until the brood hatches from it, or until they cease to breed in it and put honey therein. Always, in any colony, when you want to have a comb built, put the starter next to or between sheets of brood; if between store-combs, and nectar is coming freely enough to cause the combs to be promptly filled, there is always a tendency to lengthen the cells out into the space in which the new comb is to be built, until it is too narrow to build even deep enough cells to rear brood in. I have often seen full sheets of foundation made into very thin combs with a very thick one on either side, and

have seen even the two adjoining combs with cells so lengthened that they cut out entirely the new comb at places. Yes, the best possible place to build new combs is between sheets of brood.

By the things pointed out in the last paragraph, you will see that conditions may make very different results; where you can get a good comb built one time you may not the next. I have indicated the plan that will meet nearly every possible condition, so that even the man of very limited experience may succeed, and such work is the finest kind of education for the beginner—it is a whole lot better than paying out money for foundation. As one gains experience, and his judgment is sharpened, he can vary from the rule because he will know when to do, or not to do, this or that. It would make this description very long and tedious to go into all the details to explain minutely the effect of variations in temperature, honey-flow, changing proportion of fielders to nurses, etc.

Now when the colony has built 4 or 5 new combs, you have just about reached the limit; after that the queen will begin to want drone-comb to lay in. Whenever a colony has reached the time they are about to occupy the entire 7 to 10 combs, they instinctively prepare for increase by the rearing of drones, but up to the time they have occupied about 6 combs it is worker-comb they want and will build. With old queens they will build less, and other conditions affect results, too.—R. C. Aikin in "American Bee Journal."

Bees and Their Queen.

Some time ago, an eminent writer, Dr. Buttel Reepen, of Germany, had a curiosity to find out to what extent the bees worship or love their queen. Among his experiments, he put in a box the queen and about one hundred bees with a little food. Two days later the bees began to show signs of weakness. After two more days only four workers were alive, the queen was yet as sound as ever. A little later only one worker was left, and while she was barely able to stand she presented the queen with the last drop of honey she had in her honey sac. One hour later she was dead but the queen did not seem to suffer yet—L'Apiculteur.

Dr. Hamlyn Harris, of Toowoomba, Queensland, writes us that the article on Apis Dorsata, on page 106, August issue, was his writing, which he wrote to the "British Bee Journal," from information he obtained some years ago at considerable inconvenience. We wish to give our readers all possible bee knowledge we can, and also the source from which obtained.

Experiences with Bees.

By W. Reid, Sen.

The following is taken from the "Western Post" of August 22, 1907: When quite a lad under 14 I placed my first swarm of black bees in a box. At that time (1862) there were plenty of black bees, known now as German, in trees. At that time we knew of no other. We called them English bees. How I admired their white combs and sought out their nests! I have since secured many hundreds, and found this race to differ more than any others known to me. I noted that some of the black bees had what I thought a wonderful lot of honey —sometimes 60lbs., other times just a few pounds. What a lot of difference, and the bees side by side! I could give no reason. There was another point that very much interested me, viz., the sting. I found that whilst one lot of bees were as harmles as flies, others were ready to sting their own shadows. They stung the axe-handle and chips as they flew from the axe. I thought there must be two kinds. As years rolled on I found that in the older countries beekeepers went to their hives late in the autumn and felt their weight. All the heavy ones were selected out and all those not containing enough honey to feed them through the winter. This done, a hole was dug in the ground and a quantity of sulphur placed in the pit. Each hive was placed over burning sulphur, and the bees fell into the fire below and died This was the heartless, cruel method used in those days. It was not possible for the black bees to improve. Some 10 years or more passed away, when Rev. Mr. Langstroth visited a foreign land and brought back a brand new method. The bar-frame hive, soon followed by the honey extractor, next the three-banded Italian bees, which were reported as wonderful honey bees, and as harmless as flies. Soon a report got about that those pretty Italians had a terrible disease known as foul brood. I was just about to purchase an Italian queen; this blocked me. Yet another trouble—the bee moth—which soon cleared about 90 per cent of our poor old black bees. This is, perhaps, the first attempt at improving the black race of bees, and I must admit it was rather a rough one. The bee moth cleared off all the weakly and careless hives, and the better ones fought the moth. In 1892 I bought my first Italian queen—a three-banded one—and soon found that it was a waste of time fussing with my old friends the blacks. The three-banded Italians gave me more honey and were easier to manage. I was told the Italians did not sting so much. I soon found this wrong. I could not see any improvement in this way. Like the blacks, I could at times handle some of them with ease, but others would sting anything and everything. This I also found: The Italians remained quiet on their combs, while the blacks would rush about and fall on the ground. I noticed, too, if the blacks had just a slight cross of Italian in them they were champion stingers. Those with just a slight cross of Italian in them were just a slightly better honey bee, but they *could* sting. I often wondered if the honey was worth the suffering these crossbreds, commonly called hybrids, could inflict. I found that an Italian queen mated with a black drone sometimes produced excellent workers. Although this sometimes happened, these crosses did not average good. I also noted that when there was abundance of bloom close at hand there was not such a marked difference between the German race and the Italians. The Italians appeared stronger and gathered more honey from a longer distance. I found that the Italians were more profitable than the blacks, so gave the latter up. In 1894 the pretty Golden Italians came into favor. As I was always trying to improve my bees I tried one of Doolittle's Golden Italian queens, and I liked them better than the three-banded ones. I found that the Golden Italians excelled in the following way over the three-banded: They did not

swarm (no trouble in that way), they did not carry pollen into the upper storeys, and better workers there could not be. They were also pleasing to the eye. Here I had gained two important points. I had lost two. I found the Golden Italian queens were short livers, and it was necessary to re-queen my hives every year. This meant extra trouble. Another loss was that my Golden Italians were very slow in the spring. My queens did not commence to lay until well into October—they were, at least, three weeks later than the three-banded Italians—yet I decided to stick to the Goldens. The three-banded Italians used to vex me. Sometimes, just as they commenced to store honey in the upper storeys, out would roll a swarm of bees. The Goldens would not do this. This my pretty Goldens would sometimes do: They would fill nearly every cell in the lower box before completing the top storey. This meant no room for brood. Now, I had been reading about several races of bees. The Cyprian was said to be the record honey bee. This I tried to obtain in Australia, but failed, and eventualy obtained an imported one, followed by two more imported. What had I read? Doolittle and several others had written that the Cyprians were the worst stingers of all the races—were simply unbearable. This was not very encouraging. But I was of opinion that by careful selection this stinging could be bred out. Why not? I would try. My imported queen arrived from America from an apiary of 200 hives. If they were as bad as reported, why did our friends on the other side of the water keep them in such numbers? I was anxious to raise some queens. I did so, and mated them with my pretty Golden drones. I found that the workers from my imported queen would allow me to handle them at mid-day without smoker or veil, so would the cross with the Golden Italians. Some of the crosses looked like pure Italians and others like pure Cyprians. I had an idea that if I could mate a few of my Golden queens with Cyprian drones I would have some pretty bees. I was successful with some 20 or more, and they were, I think, the prettiest bees I ever saw. Of course the drones were pure Goldens like the queens. I had gained one point—beauty. As stingers they were outrageous, every hive of this cross, but no worse than some blacks and some Italians I had seen. I I decided to give this cross up. I was successful in raising 34 pure Cyprians, enough to prove them, and to find them to be the easiest of all the bees I had yet tried. Although they filled their hives quickly with bees, then honey, they did not attempt to swarm. The Cyprians filled their combs in the lower box in the centre of the hive with the brood from the lower bar to the top bar of my L frames, using the outer combs for pollen and honey. They entered the top box freely and filled the narrow frames with honey. Never did I see bees that pleased me so well. I could handle them at mid-day with my shirt sleeves turned up, and without smoker or veil. I noted that in autumn the Cyprians always reserve cells in the centre of the lower box in their hives. This probably accounts for their good wintering qualities. I do not know why, but the Cyprians raise more drones than any race I have worked. Like the queens they are very long-lived, and the drones remain all the winter. Like other bees the Cyprians kill their drones when honey is scarce. When I had a mixed lot of bees I always found more honey in the Cyprian hives than in the others. I note in Mr. Doolittle's book, page 152, he complains of the Cyprians stinging, and I think it possible he may have had Golden Italian queens mated with Cyprian drones. He states smoke did no good. I have found with the strain of Cyprians I now have, even in crosses, they readily answer to smoke. I do not say with Doolittle in his book, page 149, that the 'coming bee is here.' No! I believe bees will improve for years to come. Long-tongued red

clover bees, a new breed brought out by I. A. Root, I tried for one summer and found them very like a cross between three-banded Italians and Cyprians. I believe they are hardy like Cyprians, breed up quickly, and are champion stingers. As soon as they begin to fill their hives with honey they prepare to swarm, and raise an unusual number of drones. I would rather Italians than this breed, and very much prefer the Cyprians to any other race. 'Will those bees sting?' is often asked. My answer is: Any bees will sting if they are any good. If a race of honey bees were found profitable to work and stingless, every schoolboy, or nearly so, in the country could keep bees. We can protect ourselves against be-stings by wearing a veil and gloves. I cannot name for certain the worst race to sting, but I believe the black Germans, with a little of the Italian blood in them, are.

FORMING NUCLEI.

When one wants to make a nucleus colony, and get about so many bees in a hive to stay, that is not so easy if the work be done in one yard. Then much depends upon whether a queen or queen-cell be taken with the nucleus. If a cell it also makes a difference whether it be ripe, or one not so far advanced. A cell that is so far advanced that the queen is moving about in it, and about to proceed to cut out, the bees will stick by it much better than a less-developed one. Then there is the question of the number of very young bees. Young will stay where old ones will not. I try to select combs with a large number of very young bees on it, and also take the brood that is to be with the nucleus of that well-ripened, and many bees hatching and about to hatch, and then shake in about twice as many bees as desired. If you have a colony that has young queens just hatching, you have one of the very best conditions for making nuclei; such a colony can be divided into from four to eight if they have much brood and bees. They seem to stay by their hatching queen; but care must be taken to have them remain in the hive until they are aware that they have a queen. Sometimes when put into a new (strange) hive they may rush out before they realize that a queen is with them. They will act very much as a swarm that has been hived without the queen; the knowledge that a queen is with them goes far to making them contented. In this matter full sacs also do much to help.—C. Aikin in *American Bee Journal.*

FEEDING BACK.

Doolittle in *Gleanings* says:—I used a common four-quart milk-pan for a feeder, using a float of very thin wood with a lot of holes bored through it. Over this float was thrown a piece of cheese-cloth, which allowed the bees to go on top of the feed, with no danger of drowning. If this feeder was put on top of the sections, a few pieces of sections were set up against the side of the pan, so that the bees could run up on them; or the cheese-cloth was cut large enough so that the corners hung down and touched the sections which the pan rested on.

How did you keep the outside bees from this feed?

By setting an empty super over the sections, and putting the cover to the hive over this empty super.

How did you fill these feeders the second time when the bees were in them?

I took off the cover, and with the smoker I drove the bees off one edge of the cheese-cloth, when that edge was raised up the feed poured in at that side and the float would be raised by the poured-in feed together with the cheese-cloth and bees which were on it, till the amount I wanted in the pan was given when the side I had raised was put back where it belonged and the cover put on again.

When you fed at the bottom, how did you do that?

I took the back cleat off the bottom-board of the hive, and this same cleat off another bottom-board, when this was put up, back to back, and level with the bottom-board of the hive the colony stood on, when an empty super was set on this last-prepared bottom-board and a cover in top of that. This left an entrance the whole width of the hive under the back of the same, and into this empty super, into which the bees could come for the feed as soon as the pan of feed was placed therein. As I said before this seemed the most natural way for the bees to take and carry the feed; but as far as I could see there was very little difference in the results, and very little difference in regard to the amount of labour that had to be performed.

Did you feed the honey as it came from the extractor?

No. The honey must be thinned to about the consisteney of nectar as it comes from the fields to secure the best results. If the feed is too thick the bees will gorge themselves till they become sluggish, and the work goes on slowly. With thin feed the bees carry, and evaporate it very nearly the same as they do nectar from the fields, though you are to do the feeding at night, so as to insure against robbing.

HOW TO FIND THE QUEEN?

To know if there is a queen in the hive, inspect the combs, and if no eggs or small larvæ are found in the bottom of the cells at this season of the year, you can reasonably expect that they are queenless, while, if the eggs are few and scattered about in different cells without regularity, the queen is unprolific.

To be absolutely sure that a colony is queenless, take a frame of comb having eggs and a little larvæ in it and put it in the centre of the supposed queenless colony, leaving it there for 3 or 4 days. If queenless, queen-cells will be formed over some of the little larvæ, while, if no such cells are started, rest assured that the bees have something they are cherishing as a queen, which makes it unsafe to try to introduce another until the thing they are cherishing is disposed of. To find such a queen carefully look over this frame of brood, for in 9 cases out of 10 she will be on this frame. In fact, if I wish to find any queen that is not laying, I always put a frame of young brood into the hive containing such, leaving the hive further undisturbed for 3 or 4 hours, when, upon opening it again, this frame of brood is immediately lifted out, when in 9 cases out of 10, anything which the bees are keeping as a queen (and said queen is not laying) will be found on this frame of brood. This is the way to find out whether a colony has a queen. The started queen-cells will tell us that the colony is absolutely queenless, and if no cells are started, whatever they have and are keeping as a queen, can be found on this frame of brood we have given.

To the accustomed eye of the practical apiarist, prolific queens are easily found, especially if the bees are of the Italian race, but a virgin queen, or an apology for a queen, is often hard to find by an expert, and was, to me, a very worrying affair until I learned this "giving of brood trick."

In all of these operations, when looking for queens, the operator should always stand with the back to the sun, so that the eyes may be in the shade while the rays of the sun strike the bees and the "face" side of the comb when, if the eyes are at all sharp at queen-hunting, she will be quickly seen. No person can expect to find a queen readily with the sun shining in his or her eyes, when the face side of the comb on which we expect the queen will be in the shade; yet I have seen many would-be beekeepers looking for queens in just that way, and wondering why they could not find them. If the directions here given are followed out it should not be a great job to find any queen, whether furtile or unfertile.—Doolittle *American Bee Journal.*

POLLEN.

I have a large and very enthusiastic class in botany at the present time. It numbers 32, and for the past days they have been studying pollen It is a very fascinating subject for study. They find that the pollen grains differ very much in form and markings. Indeed, we can almost always tell what flowers the bees have visited by simply looking at the pollen grains. In some cases the form of the pollen is beautiful indeed Nor is it alone in form that the pollen is attractive. The students find that the color is quite as attractive, and worthy of attention. They find that yellow is by far the common color, but the yellow varies all the way from a very light yellow or straw color even to the darkest yellow, and from that to orange, often nearly red. Brown comes next to order; and dark pollen, almost black at times, is not wanting. The opposite color, or white, is sometimes met with among the plants of the snap-dragon family (*Scrophulariaceoe*). This is the figwort family, and has many very famous honey-plants, as the figwort of Ohio and the East. They also find green and bright-blue pollen. These are rare, but are beautiful ornaments as they hug the pollen-baskets of the hind legs of the bees. The gilias are very common here, and very beautiful. Many of these have the blue pollen, and we often find the bee getting pollen and honey from the gilias at the same time. These flowers are scattered too much to be of the best service; but I feel sure that we get much benefit from them. I gave this subject to the pupils to investigate, and I asked them how they found out what they reported, and the answer was that they could see the color in the anthers of the flowers; that often they could shake the pollen on to white paper so as to determine the color; but best of all was to get the bees to help them. They find all the colors of pollen mentioned above on the legs of the bees, snugly packed away in the corbicula.—Professor Cook in "Gleanings."

Scissors for Queen-Clipping.

For this purpose a pair of ordinary pocket scissors has been commended. These may be carried in the pocket safely the year round, their blunt points allowing them to be carried in trousers' pocket when the heat forbids the wearing of coat or vest.

Signs of Swarming.

Entire dependence can not be placed upon any outside signs. Look inside; if no queen-cells are started, the bees have not yet taken under advisement the matter of swarming. If the cells are started you may expect the bees to swarm with the old queen about the time the first queen-cell is sealed. If a second swarm issues, you may expect it in the neighborhood of 8 days after the first swarm. If a second swarm does not issue within 15 days after the first, you need not watch any longer for it.

CAPPINGS.

Several weeks ago a Mr. and Mrs. Clarence Carney furnished a new home they had built in Belmont Heights, California but having paid the rent on another house, remained in the latter until to-day, when they delivered up the keys and started off with visions of a happy time in their own home. When they unlocked the front door they were startled by thousands of busy honey-bees swarming in every nook and corner of the house, which were so angry at the intrusion that they literally drove Mr. and Mrs. Carney from the house by a combined assult. "Mrs. Carney sat on the doorstep and laughed, while her husband made a trip to town for brimstone, which he threw, burning, into the house, but with little effect, and Mr. and Mrs. Carney will sleep down town to-night and seek to allay numerous severe stings received in the day's encounter."—Extracted.

In one of the American large colleges in San Francisco named Berkley. Prof. C. W. Woodworth, the head of the entomogical department, was going to tell his class "how doth the busy bee." But the hour was not a sunshiny one—a day just after a long, wet spell. Live bees were required to elucidate the subject—I was going to remark, to *enliven* the subject, and that was about the way of it anyway. Well, the bees did not wake up to the fact that they were to be real good bees for this auspicious and educative occasion; they were required to step about a bit lively. They could kind of number them. A happy idea seemed to strike the dignified Professor; he would put some "ginger" into the observation-hive full of bees. So the hive was placed near a stove in the lecture-room. The class was assembled, and as a merry hum passed through the lads and misses at the fount of knowledge, another hum started up in the hive. The bees began to wake up; they began to step about pretty likely; in fact, they became very animated. They got out of the hive; they were no respecters of persons; the Professor and students, it was rumored, were attacked by the bees with ginger in them. There was a hot time in the class-room. The "co-eds" screamed; the male stndents would have fought, but there was no general to lead 'em in the fray. The bees were getting the best of the assemblage when Ralph Benton (the papers got his name as Button) was called in to bring order out of choas, and did. So great is the name of "Benton" in the "Land of Berkley," as former Gov. Pardee used to write it in one of his parodies when he was a student at that University. Benton met the bees and smote 'em wing and sting, and no lance, sword, javelin, nor sting had he. But the bees made the children scream and scamper "to see a bee at school."—*American Paper.*

A Dr. Kuhlmann has made some unique studies of bees. The pith of a paper by him was the "Rhythm of Daily Activity in Bees," and results from watching marked bees for a season, 20 minutes per hour 24 hours day.—work was done not only with the worker-bees, but also with the queen and the drones. The results are not in accord with the proverbial "busy bee" theory. If the Doctor is right, the bee, individually, works but a very small portion of the day. The busy appearance of the hive is due to a little work by a great number rather than from much work by a few.

If the super is supplied with "bait" sections—which means from 4 to 12 sections partly filled with comb left over from the season previous—you will find that such baits will be pretty well filled with honey within a week, and the comb foundation in the rest well under way. It is then time to put on another super. And where shall this next super be placed? Under or over the one already in the hive? Ten years ago I should have answered, as did nearly every one then, and the majority of bee-keepers do so to-day, put this next super under by raising the first one up and putting the last super between the one the bees are working in and the hive. But after a practice of 10 years' trying the matter both ways, I now say put this empty super, except starters in the sections, *over* every time. In fact, for the past 4 years I have always put the empty super over the one the bees are at work in with the most gratifying results, as I not only secure larger yields of section honey in this way but the sections are universally better filled.—*Doolittle.*

In olden times any change in the family, as the death of their keeper, was told to the bees, says Praktischer Wegweiser, and when a man entered matrimony he must introduce his young wife to the bees, and hence probably arose the maiden name "Emma" for the old German name Emma is the high German of "Imme," as the bees were called at that time. Many girls of present time named Emma may not know they actually bear the name of our busy little honey-gatherers.—In the *American Bee Keeper.*

Mr. Doolittle in *American Bee Journal* says:—Some seem to think that bees never feed a queen or another bee unless they are in a measure forced to do so; but this is a mistake. I have seen bees feeding these inmates of queen-cells at many times during the past 35 years. I first saw it being done in 1871, and saw the same thing during the summer of 1906, and during many of the summers intervening. In 1871 I was immensely interested, as this was my first experience, in the matter. In 1906, I observed more closely than ever before, for the reason that a prominent bee-keeper said that the queen almost laid hold of a worker-bee in order that she might be fed, and that all of the present notions regarding the bees feeding one another, and especially the queen, were only fossil ideas drifting down through the centuries. I found, as my memory served me of other observations, that all the queen had to do while in her cell was just to push out her tongue through this slit or hole in the same, when there were bees ready to feed her. Yea, they seemed anxious to do this, for no sooner would the tongue protrude than one, two and often three bees would be there to caress it and offer food. And these young queens when thus cared for are growing strong almost, if not quite, as rapidly as is the one having her liberty so that it is nothing strange that our questioner's queens which were kept in their cells five or six days after they should have emerged, were so they could fly as soon as he cut the cells open. Some years ago, I had a queen laying in three days from the time she emerged from her cell. It happened in this way: A colony lost its queen, casting a swarm with a virgin queen, and while they were hanging on the limb I opened the hive to cut the queen-cells preparatory to returning them. Upon looking the hive over I found only one cell besides the one the queen emerged from, and as I had the frame having it on in my hands a beautiful young queen came forth from this cell. I at once took the frame, bees and all, together with two more, and formed a nucleus with them, and in just three days I found the queen laying. At that time I thought I had found something extra along the line of smart queens, but a few years afterward I had nearly the same thing again with a queen which I knew had been held in the cell for at least five days. A queen that is thus held in her cell grows old as fast as do those which queen-breeders keep in nursery cages, and it is nothing worthy of comment for introduced nursery-caged queens five or six days old to be laying three or four days later. A queen emerging from her cell at maturity is a weak, white, downy thing, very much different from the strong, ready-to-fly queens we always have with queens held in their cells till they have been quahking for two or three days.

In any process of uniting the presence of robber-bees is one of the worst things that can happen; and, perhaps, the very next worst thing is empty sacs. When a flow is on, and the day is far enough advanced that both fielders and nurses are loaded with nectar, and particularly the old bees and fielders, they can be put together in almost any way that comes handy; but if the sacs are not full they should be made to fill, and the less fielding and the more scarce nectar is the more pains should be used to get them all full. If there is but little or no unsealed stores, a good way is to take, say 1 to 3 or 4 tablespoonfuls of honey or sugar and make some sweetened water thin like fresh nectar, and with this thoroughly sprinkle them. The directions used to say, put peppermint or something in to scent the bees alike, but that is altogether unnecessary; it is of far more importance to get the sacs full—full bees do not attack anything, neither man nor each other. A podded abdomen can do little in combat; stuffed bees seem to think of nothing but to get to where they can unload and by the time that is done the odour and acquaintance is completed.

C. Aikin.—In American Bee Journal

Questioner: "Is it a good plan to keep the queen in the hive by perforated zinc, so as not to lose her by swarming?" Lecturer: "The plan is perfect if you wish your bees to be suffocated." Questioner (ruefully): "That's just what happened to mine."

At an American Beekeepers Convention one man said his bees got honey from buck-wheat six miles away. Another man said. "One time I was out, on a lake 6 miles across. There was an island, and while out there upon that island bees lit upon my shoulder and excited my curiosity. There was no bee-tree on the island, and I went across to the other side and found bees there working, and they went clear across that 6 mile lake to some hives on the other side. They had one chance to alight if they chose to, in their flight. upon this island; but they certainly were working across the lake six miles from home." Another said "I read somewhere that an engineer in his cab saw a bee quite close up to his engine when they were going at a rate of 60 miles an hour, and the bee kept up with the train If that is true it throws some light on the flight of the bee."

The main thing, about the golden bees is the looks. They are beautiful bees, and there is a great pleasure in looking at them. As to the real value, there are golden queens and golden queens. Some are good and some are very poor.

That bees will travel farther in one direction than in another is caused by several things. The direction of the wind, its velosity, the shape of the ground (whether plains or hills), the amount of obstacles, timber, streams, houses, etc,; and, lastly, the number of honey-plants along the way to the distant pasture.

Nurse bees, during the care of the brood, consume more than the brood itself, says Dr. Bruennich (*Leipz. Bzgt.*,) a large population with a small brood-nest.

Superceding queens in spring is a loss. Generally better pinch the head of any spring-reared queen.

Old Ideas About Bees:—In olden days it was considered unlucky to purchase bees, and many of them would not on any account accept any coin or coins in exchange. A species of barter, however, seemed to prevail, and some other commodity was graciously accepted in lieu of a swarm or hive of bees. Carrying bees over running water was of old considered to militate against their future well-being; so, instead, long journeys were undertaken in order that this "feat" might be avoided.—*Exchange.*

Being myself very susceptible to bee-stings, I have had occasion to note that stings inflicted in the height of the season are far more painful than those received in the early spring. Whether the new honey is responsible for the activity of the poison glands I connot say, but the formic acid is evidently produced for the double purpose of defending the bees' stores and helping to preserve them and may, for aught we know, be used directly by the bees themselves for application to outrid brood. The development of vital force above referred to enables the bees to withstand the disease themselves, and the access of energy encourages them to clear out foul brood material from the combs to the outside of hive, where after some hours' exposure to direct sunlight bacilli and spores are destroyed, this benefical effect being due to the action of the ultra-violet rays on the oxygen of the air resulting in the formation of peroxide of hydrogen - a powerful disinfectant - and not to the heat of the sun. A factor which probably aids the bees in their work as scavengers is the greater rapidity with which the dead larvæ dry up in warm, dry weather, such dried-up masses being more readily removed than sticky, ropy materal. During a rapid honey-flow the bees will clear out as many cells as possible to make room for the incoming honey.

VEGETABLE PHYSIOLOGY AND HONEY.

BY PROF. A. J. COOK.

It is a good thing that we have such a good weather service. We may never know how much the weather has to do with success in the various affairs of life. We know how bad weather interferes oftentimes, with the fun we had planned at a picnic, may be keeping us at home altogether. We know how a lack of winter rains will surely cut off the honey crop in the arid regions, and severe drouths as surely foretell failure I remember in the late '80's how we had three years in succession with no honey at all, and without doubt the drouth was the cause, as we have never had such a failure in all the previous years of my bee-keeping from 1870 on to these three very dry years. We know that sap is to the plant what blood is to us. Sap, like blood, not only carries all the nourishment to the needy cells, but it is the food. We know that water is the most important part of the blood and of sap as well. We see, then, that growth secretion—yea, the very life of the plant is dependent on water, and we no longer wonder that the plant so soon wilts, withers and dies when the water is withheld. Life and cell-nourishment are more important than is fruiting. But nectar secretion is connected with fruiting, and we should expect that when there is a shortage of water, the life would be kept up, at the expense of fruit, and so we no longer wonder that the trees fail to secrete nectar—may fail to bloom at all, when the ground at the roots dries up. We used to think, that we were sure of a honey-year when we had plenty of timely rains. But the two years just past make us change our views, and so we need to consider another urgent need of every vigorous plant. The roots of the plants take from the soil the water, and in solution in this the needed mineral elements. These are carried from cell to cell in the sapwood, to the leaves as crude sap. The leaves may be said to form the manufactory of the plant. We see, then, why one reason plants rest in the winter—that is, deciduous plants—they have no leaves. The leaves take carbon dioxide from the air, and by use of this and water, they form sugar, starch and most the vegetable products. But there is one indispensable condition to vegetable work or nutrition. There must be light and heat. At night the plant ceases work for the most part, as it has not the necessary light. We know how pale and sickly a plant looks under a board. It is without light. The green part of twigs and leaves—the chlorophyll, as it is called—can form only in the light, and without chlorophyll the plant is unable to do its work. Warmth is also necessary to the best work and growth of all plants. Cold, then, stops the functional activity of plants just as surely as it does of animals. In case there is too little warmth, the plant may live and make meager growth, but it will not secrete nectar, and may not even bloom. Thus we may easily explain why these cold seasons preclude the existence of nectar in the flowers, and of honey in the hive. In case the cold is very pronounced it even shuts the bees in the hives, and they do not go forth to gather what they would seek in vain when the weather is cold and inclement. There is one more point that is not so important to the exclusive bee-keeper, but is of exceeding moment to the fruit-grower. I refer to the fact that many of our most important fruit-trees and vegetables are sterile to their own pollen. Thus though they will bloom, they will not fruit unless they are cross-pollinated. They will therefore fail utterly, to fruit, unless they are cross pollinated. All flower-loving insects will aid in doing this necessary work. But where we have massed our trees as we have in our orchards, the bees are required to effect this work as there are not enough of other nectar-loving insects to do it. Thus we see why we are likely to have a meager crop of fruit in such years as this has been. The cold keeps the bees in the hive, and so cross-polli-

nation is not effected. Even if the bees do go forth, there is no nectar to attract them to the flowers and so there is still a lack of cross-pollination, and as surely a shortage in the yield of fruit. It is plain to be seen that the fruit-grower just as much as the bee-keeper is dependent upon the warmth, the rains, and the bees for the best success.—*American Bee Journal.*

Bee-Keeping in Africa.

Pretoria, Transvaal, South Africa,
May 11th, 1907.

In April issue of the " American Bee-Keeper" under the heading Bee Culture in Africa, we notice a letter from Mr. F. W. Drummond a bee-keeper in Natal.

In this letter he states that the bee-keeping industry is not worth bothering about, that he has spent £20 on bees and hives, which amount he has given up as a bad debt.

The reason is because he had 21 sections of honey well filled, after placing them in American cartoons with his name printed on each, he could not get more than two cents per section.

Now two cents mean in British currency a penny each per section, which is simply absurb and ridiculous.

The writer having spent several years in various parts of Natal knows the market value is 24 cents or one shilling per section.

In Pretoria, nearly 500 miles inland from the Natal sea coast, honey in sections 4 1-4x4 1-4x1 7-8 is sold for 36 cents per section

In proof of this we enclose a market receipt from which you will see that we bought at 1/6 and for the same we get 2/- and for well-filled sections 2/6. A cash slip we also enclose showing two sections sold for five shillings. *American Bee-Keeper.*

THE BEE'S ANTENNAE—POLLEN COLOR.

BY PROF. A. J. COOK, in *American Bee Journal.*

All insects have the large compound eyes, which are made up of thousands of simple eyes in many cases. Each of these simple eyes is quite complex, being made up of several parts, much as we find them in our own eyes. They often have three simple eyes—or ocelli, as they are called which are well marked in all bees. Thus we would expect that bees would see well and would use these eyes in their quest for nectar, pollen, and whatever they seek as they leave their hives. We have reason to believe, however, that bees are not so much guided by vision as we should expect. We know when we move the hives slightly how the bees will come down to the old place for days. They seem to be guided by sense of direction, or habit, and not by direct vision I have another case that seems to show that their vision, rather than sense of direction, guides in some cases, but that it is often at fault. I once lived in a house exactly like my neighbour's though the trees surrounding each were quite different. When I would put honey on my back porch for the bees my neighbor was annoyed by swarms of bees on his similar and similarly placed back porch. The bees were obviously fooled, and returned to the wrong house. Our company and that of our neighbour, often made the same mistake. I have no doubt but bees see well, and use their eyes to their great advantage, yet in the hive where they do much work they can not be thus guided, as the interior of the hive is totally dark. I must doubt, however, if bees do use the sense much in the quest for nectar of flowers or other sweets Many insects like bees, ants, wasps, moths, etc., have very delicately sensitive organs of smell. The scent organs are the antennæ. Wherever we find the antennæ - the horn-like organs appended to the head—well developed, we may be sure that the sense

of smell is pronounced. Male moths, drone and worker bees, many beetles and ants, have such antennæ. In all such cases we may be sure that the insects have need in their functional activities to detect odors, that it may be, in some cases, are entirely unperceived by us. We have one large silk moth here, that when a female comes forth from her cocoon, though the room may be closed all but a slight lift of one window, males often enter to the number of 50 or 100. I have known of just such curious entrances to rooms twice in my life. I have known of one case where a swarm of the male moths were flying outside about the closed windows of a room, when, upon examination, it was found that a female had emerged from the cocoon inside. It is authentically reported that in one case males of these moths came down a chimney through a stove, and into the room from a stove-damper, when a female had just come forth from its cocoon in the room. If we approach close to these moths we smell the peculiar odor, but we must get close. Think how wonderfully sensitive the nose (?) of the male moths must be to detect this outside the room with all the windows closed. The queen bee flies out to mate. It is well that she be not away long. The drones have a marvellous development of the olfactory sense, and so are able to find the queen very quickly. We all know how quickly the queen mates, and how short the time after she goes forth when she returns bearing the signs of having met the drone In the case of bees, the drone has much the best antennal development of all the bees, though the workers are not poor in this peculiarity. Now I think we know how the bees find the nectar. The nectar has a very attractive perfume. We have smelt it here about the splendid orange orchards which have made all outdoors deliciously fragrant the past few weeks. The worker-bees perceive this odor, and so hie themselves to the fields that they may gather the tiny nectar-drop which they transform to honey. Our answer then to B. is, that bees are guided to the harvest by odor mainly, and find some aid doubtless by sight. It is probable that sense of direction is no small aid to them in returning to their homes after procuring their load of nectar. A word as to the structure of this smelling apparatus! It consists of very numerous microscopic pits, each with a peg at its bottom. Both pit and peg are surfaced with a delicate membrane. The more sensitive the sense of smell the more of these pits and pegs. Of course, it is necessary that the antennæ should be kept clean. Bees will, of necessity, get the antennæ dusted with pollen. Ants and wasps will get the dust of the earth on their organs of smell. The antennæ cleaners on the front legs of all hymenopterous insects are admirably adapted for this purpose. I know of nothing neater or more admirable in the whole round of animal anatomy than these antennæ-cleaners. At some future time I will explain how they work.

AFTER WINTER.

We had an almost total failure of honey during January and February, and as a consequence the bees bred very little, though they had honey in the hives; but in March a change took place and bloodwood bloom secreted honey well. This put new life into the bees, they began breeding more extensively, and continued into May. When fixing them up for winter they were not so strong as usual, so I took the combs full of honey from the brood chamber for extracting, and I wintered them on no more combs than absolutely necessary to keep them snug and warm. As the bees were young they were able to live into spring. This is an important point; old bees may die before any hatch in spring, but the young ones live. Hardly a dead bee did I see on the ground in front of the hives all the winter. Looking through them at end of August I found them in splendid condition, they must

have started breeding more than a month ago, as there were lots of young bees hatched, also some drones. But they had consumed more honey than in other winters, still there was plenty left. I did not enlarge their spaces except where necessary, and this was good, as the weather turned exceptionally cold for the time of the season, which also affected my start at queen-rearing. During the fine and warm weather honey came in from fruit trees, iron bark and native scrub, the cold spell stopped it, but it is now aflow again.

We had rain for nearly three months, but the bees do not seem to suffer, on the contrary they seem to thrive better when it is too wet. There are plenty of buds showing, and if rain comes in time the prospect for a good season is assured.

Paralysis.

This dreaded disease seems to be playing the disappearing trick, judging by the fact that no reports of its ravages appear in the papers, nor have I had any correspondence regarding same. But there is a report from the Isle of Wight in your issue, page 112, and from the description it is quite clear that it is the same disease we had here. The investigations there are quite in accord with mine of many years ago. Some did content that a scarcity of nitrogenous food was the cause. I reputed this because I had ample proof to the contrary—my adversaries were mistaken. The intestines of diseased bees are full of baccilli. Some stocks, as a whole, resist the baccilli better than others, as do some few bees in stock; but once the disease gets a firm footing, very few stocks remain immune. Prevention is the best cure, total destruction of the first-affected stocks the next, to prevent the disease spreading. A remedy may yet be discovered, but scarcity of pollen is not the cause.

W. ABRAM.

Italian Bee Farm,
Beecroft, near Sydney.

Top Entrances.

During the last two seasons, Mr. Devguchelle has tried putting the entrance above the brood-nest. There was no increase in surplus for the reason that in both years there was no surplus to be had. These two years are the worst he had during his beekeeping life. When a child, he assisted once in the taking up of a bee tree. The hole in the tree was quite large and an enormous quantity of honey was secured. The opening or entrance was at the top and to dislodge the bees a hole was made at the bottom and enough smoking through it, drove the bees out at the top. The remembrance of that tree with the flight hole above the honey largely contributed to induce him to try putting the entrance above the brood nest. He tried it on twenty-two colonies, the entrance was placed immediately below the top bars of the frames, so as not to interfere with the rabbets supporting them. The bees began the brood near and immediately below the entrance. The colonies with the entrance above seemed to have raised a little more brood than the others The bottom of the hives were perfectly clean. In the fall the colonies with the entrance above put their provisions on the back of the combs, preferably on the upper part, the cluster remaining near the entrance.

A very unexpected thing appeared. There was considerably less mortality during the winter in the hives with the entrance above, or at least a much less number of dead bees found on the alighting board. An examination of a few showed that the bottoms were clean and that the dead had not been left inside as might be suspected.—L'Apiculteur in "American Beekeeper."

To test wax write on a cake with ink. If the writing is clean so is the wax. If irregular, the ink bunching in little drops, some sort of fat is present, says a German paper. *Gleanings* says it is not reliable.

The First and Foremost Modern Bee Farm in Australia.

"The Bee Farm,"
Briagolong,
Sept. 20th, 1907.

The Editor "A.B.B.,"

Dear Sir,—I should be sorry to ask you for space for any reply to Mr. Abram's irrevelant ramble, but since he has not even the manliness to admit his defeat now that his pretentions have been utterly demolished, I will go a step further, and say that his pretention to being the great model, on which Australian bee practice is founded, rests on just as flimsy a foundation as its defunct brother rested upon. For, bearing in mind carefully, *this 1st fact*, viz., that all of the real Australian pioneers, followed the American methods; and then bearing in mind with the same care, *this 2nd fact*, that these same methods are followed, almost exclusively here to-day, and have been all along, while the clumsy Berlipsch devices, which Mr. Abram sought so eagerly to introduce, have been universally rejected, we get a clear indication of the comparative influence of the earlier pioneers on the one hand, and of Mr. Abram, on the other hand, and very few people will fail to see that the success of Australian bee culture is about as much due to Mr. Abram's teaching and example, as it is due to the adoption of his hive. The fact is Mr. Abram arrived in Australia at exactly the right time—*for himself*—that is to say, just when the work of the real pioneers was attracting a large amount of interest, and a large number of people, were beginning to give the subject serious attention.

But to suppose that his setting up a shop for the sale of his bees and bee gear—at the happy moment—and proclaiming himself "the great Bee Master," constituted him the founder of Australian bee culture, is absurd. But the most deplorable feature of the case is his persistence in claiming what has been proved beyond doubt or question to belong to others, and most assuredly not to him.

I am,
Yours faithfully,
E. GARRETT.

More than one Queen in a Hive.

Mr. Alexander, with his almost continuous honey-flow, can place as many queens in one hive as he chooses, and this I found I could do also, so long as there is some sort of honey-flow or a prospect of one; but when you get into a locality where the flow drops from a heavy one to nothing, all in one day, as I did, he will find that all except one and in most cases all the queens will be killed. To illustrate: In running on the two-queen system, and in using excluders to keep the queens below, I found very frequently when brood was raised above the excluder, that they would build queen-cells during the flow. Oftentimes these escaped my notice, and in due time I would have laying queens both above and below the excluder. Such colonies, with more than one laying queen, never make any attempt at swarming; in fact, they act as though they did not know how to work fast enough. They roll in the honey as long as there is a flow, with a vim seen only in such colonies; but when the honey flow drops we generally find all queens dead in such hives in three days. In fact at such a time anything from a two-frame nucleus to a two-frame hive or more is liable to have its queen dead at the entrance, within three days from the close of the flow. Nor is it poor ones that receive such treatment, for I find it to be my very best and most prolific queens that go. It is almost impossible to get such a colony to receive a queen of any description for about ten days, and in some cases I have to wait even longer. Where the flow is continuous many things can be accomplished that can not be where there is not.—*Gleanings.*

CAPPINGS.

Dr. Miller says in *Gleanings* :—If running for extracted honey I would, in general, have one more opening than the number of stories in use—the regular entrance, and an opening at the top of each story. Each year, for years, I have had one or more piles thus ventilated, and none has ever yet swarmed. Many years ago I learned from Adam Grimm to have an opening for ventilation at the top of the brood-chamber at the back end when running for comb honey. I gave it up because it interfered with the finishing of sections near such openings. But I have gone back to it again, believing that such disadvantage is overbalanced by the gain in ventilation. You can't make me believe that it isn't easier for the bees to have one hole for the air to go out, and another for it to come in, than to make the air go both ways in the same hole.

Gleanings says :—There are quite a number now who advocate the use of more than one entrance.

A writer in *American Bee Journal* recommends rice bobbinet for bee-veils. It is so much stiffer than other kinds, and stays stiff. After making the veil with an elastic band for the hat, and one in the lower hem, I stitch about 6 inches of broad elastic on the latter at the back. Opposite the underarm it has a loop at the end of tape. After drawing the broad elastic forward, the loop is slipped over a button stitched on the front lower hem. It is so easy to fix, and the veil is held in place.

I run my bee-yard without making any effort to prevent first swarms, except to give plenty of breeding-room before the flow, and plenty of super-room afterwards. I have had 15 or 20 swarms from about 100 colonies. I work many ways to prevent after-swarms. One of the most successful is to put the swarming colony on another stand. If set close beside the swarm now on the old stand, I have the choice either to unite the bees of the old colony to the swarm later, or, if young queens are wanted, nuclei can be made by dividing the combs, giving each nucleus a comb with one or more queen cells on it. I have reared quite a number of young queens in this way this season. I have practiced in a small way cutting all of the queen-cells but one out of the combs of swarming colonies None thus treated have sent out second swarms. C. Beirns, in *American Bee Journal*

In increasing your apiary don't make the mistake of trying to go too fast and then being caught in the fall with a lot of weaklings that will die in winter.

Dr. C. C. Miller says :—"Shook swarming" is bad English that has, I am sorry to say, grown into quite common use in place of "shaken swarms" or "shake swarming." Perhaps a more appropriate name would be one used in Germany, "anticipatory swarming." A little before you think a colony will swarm you take the matter into your own hands, and take away from the colony all its frames of brood, putting them elsewhere with only enough bees to be sure the brood will not chill. That leaves, as you will see, on the old stand, the same as a swarm with the old queen, only it will be stronger than the natural swarm would have been.

If honey is only slightly fermented, there will be no danger whatever in using it for spring feeding. When preparing for use, thin the honey down, by adding hot water, to the consistence of ordinary syrup, and let it come to the boiling-point stirring frequently ; then remove the scum from surface, and use in the ordinary way.—*Exchange.*

The "Irish Bee Journal" of July says :—There may have been heavier rainfalls in May and June before this, but we have no recollection of such watery persistence since bee-keeping was started here so long ago as 1885. Rain set in on May 28th, and continued steadily every day, and sometimes all day, up to June

27th. There have not been in this district during twenty-three days, two consecutive hours in which bees could venture out of doors. That is bad enough ; but it is not the whole of it, for in May, with a total rainfall of 3.46 inches and eighteen wet days, the average maximum temperature was only 51 degrees and the average minimum was 42.21. degrees.

Of the bee disease that is so destructive in the Isle of Wight, the "Irish Bee Journal" says; —The symptoms are that even on a fine summer's day the bees in hundreds, and even in thousands, will be seen crawling upon the ground unable to fly, and when examined and dissected they are filled with an excess of yellow pollen and water which they appear to be unable to take wing and evacuate. This yellow matter so affects their system that it even colours the sting yellow instead of white, and when one is stung, the stain left upon the flesh is yellow, like yellow jaundice. When a colony is affected it often will so rapidly lose its population that the outside of the brood nest will become chilled, and bees be found dead in the very act of crawling their way out of the cells for the first time.

The death of the bees seems to be brought about finally by blood-poisoning, partly by the accumulation of toxins derived from the congested mass of waste material in the colon, and to some extent by the imperfect oxygenation of the tissues, owing to the pressure exerted on the abdominal air-sacs. The demand for nitrogenous food seems to be one of the most marked characters of the disease, but why the demand should arise is a question which it is not possible at present to answer. As an experiment it might be worth while to supply liquid nitrogenous food and to remove the greater part of the pollen from the combs in water.

REMEDIES TRIED BY BEEKEEPERS: — Numerous remedies have been tried by different beekeepers. The most successful case appears to be that adopted by a Shanklin keeper, who has successfully brought hives over from last year by feeding with cane-sugar, and up to the present they seem to be perfectly healthy. Others, however, have tried the remedy without any success. Several bee-keepers have tried re-queening, but only eventually to lose their stock. Importation of new swarms from the mainland has not been attended with any success. Syrup medicated with naphthol beta, izal, and with sulphur have all been experimented with, and also alcohol. Dusting with sulphur has also been tried, and also dusting and medicated feeding combined. No permanent success has attended any of these measures.

Now is the time to study your queens. Note the weak and strong hives, and how they get on. As a rule, with us, it is the black queens are most inclined to swarm. Get them exchanged! An American writer says: —When I have a queen or a half a dozen queens that I want to keep, I put them on top of the frames of a colony and leave them there 2 or 3 days. If I want to introduce one of those queens I hunt out the old queen, pinch her head off and turn one of the others free. If I wanted the old queen free in the hive day after to-morrow, having introduced one to-day, I would take that old queen out, put her into a cage and turn another one free, and in a very little while the queen in the cage is out on the combs laying, and the bees never know they have been queenless. They have no feeling of resentment towards those queens in the cage any more than they have to the one free on the combs. They are just as friendly with any one of the 5 queens on top of the frames as the one in the hive laying eggs, and they take one just as well as another. What is the use of killing the queen and having them start queen-cells, which they will in 48 hours, and take the chances of their killing the queens? When they start cells they are antagonistic to any queen, even their own queen.