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A MONTHLY JOURNAL, DEVOTED TO BEE-KEEPING.

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The past year in Europe, generally bad for honey.

Mr. Penberthy writes us his take this year has been 10 tons of honey.

In the Transvaal, apiculture is systematically taught in the public schools.

The question seems settled that bees transfer eggs from worker to queen cells.

The value of honey imported into the United Kingdom during the month of October, 1906, was £3,215.

From a number of 3,185 stocks in Ireland, England, Wales and Scotland, the average of honey was 46 lbs.

At a recent Confectioners and Allied Trades Exhibition in London over 500 jars of excellent honey was staged.

The approach of real winter should find all colonies reduced to the brood chamber, well-covered and entrances contracted.

The annual visit of the Blue Martin is now on among our bees, many, not only drones, but other bees falling victims to the voracious visitor.

In Switzerland the looking glass is said to be much used in detaining swarms, and with success. We should think spraying with water would be more effective.

An English beekeeper has discarded wiring brood frames, as he found that where the wire ran a number of cells

were never bred in, and therefore he lost many young bees.

Seemingly droughts are not uncommon in England. A writer in the "British Bee Journal" says in September issue:—"The first necessity at present is a supply of water in districts such as my own, where drought has prevailed for some six or seven weeks. Every pond and water course is dried up and I find it as necessary to supply water to the bees as in the spring and early summer months." The part of England the writer alludes to is Newbury.

Mr. W. L. Davey, editor of the *Fruit World*, makes the following sensible remarks about Australian honey:—"Regarding the quality of Australian honey, I think the trouble is it is too superior to the English honey in every particular. The trouble is, that the man who has always been used to a 'bread and milk' diet, would think a 'nice beef steak' rather strong and peculiar food; and that's my comparison of English and Australian honey." We have on previous occasions said, if once Australian honey was patronised by leading members of English society, it would become as popular as any kind of honey.

THE BEE INDUSTRY IN NEW SOUTH WALES.

It is not so many decades since it was prophesied that this State, from the great plains to the eastern seaboard would become in the Mosaic sense of the term, "a land flowing with milk and honey." That prophesy does not appear to be drawing near to its fulfilment. Nay, as time goes on, and the woodman's axe is plied to the root of the trees, it seems that the prophet did not look sufficiently far ahead, otherwise, he would have said a land flowing with milk, but the flowing of the honey would be spasmodic or at most cease. Such would be the reflections of those perusing the figures published concerning the Bee industry from the

year 1897 to that of 1906, inclusive. The oscillation in the number of productive hives and the yield of honey has fluctuated in the same ratio. In 1897 there were returned in this State 41,900 hives of bees of which 9,343 were said to be unproductive. The 32,557 productive hives produced 1,378,039 lb. of honey, an average of 42.3 lb per hive. The following year (1898) there was an increase of 5,460 productive hives, and the unproductive hives increased by 12,843, much above the ratio of the preceding year. This increase of 5,460 hives, as would be expected, gathered in an increased yield of 498,680 lb. of honey; but the average yield per hive was greater than the previous year by an average of 7.1 lb. From 1897 to 1899 there was a steady increase in the number of productive hives and in the honey yield. In the last-named year (1899) productive hives increased to 51,681 and the production of honey was nearly 3,000,000 lb. From 1899 to the present year there has been a gradual decline, if we except 1905, in the number of productive hives. Thus, in this year, which ended on the 31st of last March, we have only an increased 4,032 hives above that of ten years ago, but the average yield of honey increased by 8lb. per hive. This increased production of an average of 8lb. per hive is due to one of two causes: either to the season, or to the increased knowledge in the methods of manipulating the hives, most likely the latter.

BEESWAX.—In 1897 the production of beeswax was 31,842 lb., and ten years later it was 39,620 lb., being an increase of 7,778 lb. only.

In the years 1899 and 1905, when the honey yield was, practically speaking, equal, the wax produced in the later year was 5,706 lb. in excess of that of the former; but a quantity of wax comes into the market that is not the product of the beehive, but is obtained from the wild bees in the bush. Most of our settlers save every particle of beeswax for market purposes, knowing, as they do, its value. The honey that is obtained from the same

source is used for domestic purposes, and therefore it does not find its way into the market. Not so the wax. Then, again, the non-productive hives, although they do not produce honey, yield up their empty combs, frequently, to be rendered into wax.

In 1902 the quantity of honey produced was 2,259,177 lb, and five years later (to the 31st March, 1906) the product was 1,841,236 lb, being a decrease of 417,941 lb. The average yield during the past five years was 2,217,331 lb.

The season ending 31st March last, the quantity of honey produced was 1,841,236 lb, being 376,095 lb below the quinquennial average.

The best season during the past ten years that this State has seen for the production of honey was in 1899, when 51,681 hives produced 2,974,830 lb of honey, and last year was about equal to it when 53,043 hives produced 3,023,468 lb.

There are thousands of pounds of honey that is produced by persons, other than professional beekeepers, that never finds its way into the Statistician's calculations.

The quinquennial (1902-1906) average of honey per hive was 51.2 lb, and the average wholesale price in the Sydney market during the same period was a little over 2½d, equalling about 10s per hive. Add to this the average value of the wax per hive during the same period each hive producing a little over 1 lb, valued at about 1s 1d per lb, wholesale price.

In 1900 the total imports of honey into this State was 128,263 lb, valued at £1,818, and the imports for last year (1905) were 201,415 lb, and valued at £1,942. The increase in weight being 73,152 lb, and in value £124.

In 1900 this State exported 97,460 lb of honey, at a value of £872, and last year (1905) the export was 180,774 lb, valued at £1,701, an increase in weight of 83,314 lb, and in value of £829. The export of honey nearly doubled itself in five years.

The average wholesale price of honey in 1900 was 2½d, and five years later had increased only ¼d per lb.

The quantity of beeswax produced in 1902 was 51,735 lb, and last season 39,620 a decrease of 12,115 lb. The average yield per year for the past five years was 47,352 lb. Therefore, last season's yield was 7,732 lb below the quinquennial average.

During the last five years the wholesale price of wax has varied from 1s 0½d to 1s 1½d per lb.

In 1900 beeswax was imported into this State to the extent of 4,739 lb, valued at £218, but the importation gradually increased, till in 1905, the quantity imported was 13,625 lb, valued at £703 being 8,886 lb in weight, and £485 in value, over and above the year 1900 importation.

Notwithstanding the quantity of beeswax imported in the past five years, the State was largely exporting during the same period. In 1900 we exported 51,857 lb, which brought £2,597 in to the country; and five years later (1905) the export was 59,613 lb, valued at £3,407. I am not in a position to give the import and export of wax year by year for the period named above; but taking a reasonable average, we have sent out of this State not less than 55,785 lb year by year, which has returned annually about £6,000.

During the period dealt with, in both honey and wax, the harvest has been exceedingly fluctuating, oscillating from about £1,250,000 to £3,000,000, and of course wax has fluctuated proportionately. The bee industry has not gone on in leaps and bounds. The returns published no doubt are very reliable as far as they go. There are hundreds of persons in the outskirts of towns and in the country who keep a few colonies of bees for their own domestic use that are never noted in any public return, and this kind of beekeeping is what I have always advocated—"Bee-keeping as an adjunctive rural industry."

This state will take many years to become a great honey-producing country. The clearing of the bush and timber country largely destroys the hopes of professional beekeepers. The indigenous honey-bearing flora that is destroyed is not replaced by exotics of equal value to the bees. Then again, bush fires and dry seasons are drawbacks that cause bee-keeping to remain almost at a standstill. One of the latest reports that has come to me concerning the destruction of bees, holds the ever-increasing "bunny" as a responsible party. From the Director of Agriculture I have learned that Mr. Wangman, a settler at Pilliga scrub, assured him that the bees are disappearing in that district, consequent on their feeding on phosphorus rabbit baits, which are distributed uncovered, and persons are consequently losing a good deal of their income. So much as £60 per annum has been lost by one person. The material in phosphorus rabbit bait that would attract the bees is the pollard. When the pollen from flowers is scarce, I have known bees to work in a horse's feed-bin gathering up the bran dust as a substitute for pollen. Pea-flour is the best substitute for pollen.—Albert Gale in *Agricultural Gazette* of New South Wales.

CORRESPONDENCE.

W. D., South Woodburn:—We are having a splendid flow of honey this season. Wishing you a successful new year.

M. E. I., Dubbo, January 1907:—Over 2 years ago to the present time I have had very bad times, heat waves, bush fires and long spells of dry weather nearly settles the bees and me too, but now I have come to 200 swarms again. Good honey flow, beautiful honey. I feel in better heart. I really love the bees I have been working among them so long.

P. V., Brushy Hill, Scone, Jan 4: I have been a subscriber to your paper for many years, but I must ask you to discontinue sending it as I have sold my property and bees and am leaving by the N.D.L. liner Barbarossa for Germany. It is unavoidable. I have been in Australia nearly 14 years and it is with great regret I am leaving it. Wishing you every success.

D. G. T., Temple Court, Murrurundi:—Weather very hot here. Apple trees out in bloom but very little honey in the boxes. My bees are nearly all dead, having been going down for the last three years. Very few people have bees here now, one time when the "Bee Fever" was at its height honey was sent away in ton lots to Sydney, now there is little or none produced here.

Mr. W. Abram, Beecroft.,—I received your post card advising arrival of queen. She is from No 8 imported queen, fertilized in November, and her progeny is pure, but not as yellow as I used to have them before from my own stock. Of course, I cannot say what the qualities will be, as she was reared in a nucleus, but as a rule all queens from No 8 queen turn out good honey gatherers. If she does not turn out well, per chance, I will send you another and from another queen. We have had very dry, and mostly very windy weather of late, and the honey flow has been very meagre, which checked the bees in breeding and building but now they commence on blue gum, and green box is to follow shortly. Mrs. Abram seems a bit improved in health after several changes to different places, but the trouble is not yet over.

THOUGHTS BY-THE-WAY.

BY G. COLBOURNE.

In rearing queens it is always best to have the queen cells started in fairly strong colonies, and it is all the better to have the cells completed in full colonies. The queen is the chief factor in the colony, and no pains should be spared in

rearing them. Some use small 3-frame nucleus, such are not strong enough to raise long-lived, prolific queens.

.....

The best way to prevent robbing is to never encourage it, never allow small pieces of homey-comb to lie around to bait the bees. A good plan is to have a "Doolittle" wax extractor right in the apiary, then throw every last bit of comb into it, and let "old sol" turn it into marketable wax. Never leave a colony exposed when there is the slightest likelihood of the bees starting to rob.

.....

Have any of my readers tried cutting candied honey into cakes, and wrapping it in paraffine paper for retailing at the stores? If any have done so, please stand up and tell us all about it! How does it sell, and all about it!

.....

Ernest Root says in the Nov. 15th *Gleanings* "that he believes that the Government should require the recombining of all apiaries." This appears to me like a yankee trick to try and get more trade in comb foundation; of course he gives as his reason that there is a possibility of combs harbouring disease germs. Is such a fact? It seems to me that the inside of the cells of old combs are as well polished as those of new. Has any one noticed that foul brood starts more readily in old combs than in new? Will some one stand up and tell, we don't want "think so's," but facts.

.....

In producing extracted honey it is best to allow it to remain in the hives until nearly every cell is capped over, so as to guard against having unripe honey placed on the market. There is no honey so nice as that which has been well ripened in the hive, the bees can do a far better job at it than we can. I know that it means a lot more work uncapping it, but then we are well paid for the extra work in the resulting wax from the cappings.

It is better to have at least two full depth supers to each colony so that the bees may have abundant room to store the raw nectar, otherwise there will be a loss of honey whilst the bees are capping it over.

.....

A really good hive tool is made by beating out one end of an old worn out flat file. If the end is beat out well it will cut off all burr combs on the top of the frames, and is as handy as anything else for prying frames or other hive bodies apart.

.....

Is it possible, by selection, to rear a race of bees that will live just a little longer than the average bee of to-day? I do not see what is to hinder. Say we breed from a queen who shows remarkable strength in her third year, or from a queen 4 or 5 years old; would it be unreasonable to expect her progeny to be extra long lived? If we could only add a very few days to the life of each bee see what an item it would be in a heavy honey flow.

BEE LICE.

Mr. W. Daley, South Woodburn writes us:—Am enclosing a paper cutting about bee lice. I would like to have your opinion about it, also to see it published in "Bee Bulletin."

Says the Grafton "Argus":—"Mr. John Pollock, of Wingham, has diagnosed an apparent disease, which has been fatal to bees, as bee lice. They are, he asserts, in the same proportion, as to size, as the parasites that attack other animals; and are therefore, invisible to the naked eye. When they once get into the hive they are more fatal than either foul brood or bee paralysis, driving the unfortunate bees out of the hive to the last one, by night or by day, when they perish. Mr. Pollock is investigating this trouble with the view of discovering a remedy."

In reply to above communication received from Mr. Daley, we print the following from the authorities quoted:—

Mr. Isaac Hopkins, in his *Bee Manual*, says: "My attention was called to an

insect found in great numbers in Hokianga, New Zealand, which were said to resemble cheese mites. Since then I have examined under a microscope, several lots of pollen taken from combs that had been stowed away for winter, and in each case I discovered these mites. Professor Cook says: 'The bee mite is very small, hardly more than five millimeters (one fiftieth of an inch) long. The female is slightly larger than the male, and somewhat transparent. The color is black, though the legs and more transparent areas of the female appear yellowish.' Those I examined were of a greyish color, and semi-transparent, the full grown insect possessing eight legs, and some having long bristly looking hairs scattered over their bodies."

Mr. Hopkins recommends shifting the bees into clean hives, and washing the bottom boards with a solution of carbolic acid.

The Rev. J. G. Digges, in the *Irish Bee Guide*, says:—"Parasites — The Blind Louse (*Braula cacer*)—A red louse, sometimes found upon the bodies of queens and workers. These generally are more numerous upon queens, and are very worrying. More common in warm climates, they have been known to destroy whole colonies in Italy, where it is not uncommon for stocks, affected in this way, to forsake their hives. The lice may sometimes be picked off the bodies of queens. A little tobacco smoke will cause them to drop on the floor boards, when they can be swept into a vessel and destroyed. The Pollen Mite is often found in pollen cells in weak colonies, not actually harmful to the bees, strong stocks quickly clear them out of their hives"

A. I. Root, in "A.B.C. of Bee Culture" says: "The only parasite we have ever seen is the *Braula*, or Italian bee louse, and we have never seen them except on bees just imported from Italy. I feel safe in saying no fear may be anticipated from them, if the bees are kept in strong

colonies, and in clean tight hives, with no old refuse and rubbish accumulating about them."

EXHIBITING FIRST HIVE OF BEES. 1882.

W. ABRAHAM.

A quarter of a century has passed since I exhibited the first bees in Australia. This happened at Parramatta, where a show was held on January 26th. 1882. As I had shortly before started the first modern bee farm in Australia the show committee induced me to exhibit, as they considered it a great novelty; but no prize was offered. I accepted their request and brought a hive of bees the night before to the show pavilion in the Park, I left the entrance of the hive open to allow the bees to fly the next day, as the weather was very hot. I was very busy then making new hives and so did not go to the show till about one p. m. on the 26th. On arriving there what do you think I found? Why, the bees had all cleared out, leaving brood in all stages and honey behind. Nobody seemed to have noticed them swarming out, so I had nothing to guide me. The loss of that queen meant a good deal to me, as she was one of the Italians I had brought out with me. Therefore, I tried to find that swarm, if possible. I looked all over the many big and little oak trees, etc, round about, but no swarm anywhere. Now some little distance away stood the old government house, with a flower garden in front. I now went to the house and asked permission to look over the garden for my bees; the request was willingly granted. I looked around and lo! on a small scrub is the clustered swarm. Can the readers appreciate my joy at finding them? I shall never forget it. I fetched the hive and quickly shook them into it, having a number of the inhabitants of G. H. as admiring witnesses, as they had never seen bees handled so nicely. Soon all the bees were in the hive, then I closed the

entrance and took it back to the show. Here, a crowd soon gathered around, and continued all the afternoon. My friend, the late Mr. S MacDonnell, of Sydney, came up during the afternoon and explained to the many eager inquirers all about the new bees, the new hive, and the system of modern beekeeping. I could not then speak very well English. The hive was well adapted for the purpose of showing, as when the back was removed a glass frame enclosed the bees, but permitted the newly built combs, brood and bees to be well observed. Excepting the unpleasantness of the bees, desertion my first experience of showing bees in Australia proved most encouraging to me as it was evidently very interesting to a large number of visitors. Henceforth I was known as the great beekeeper, and interested parties from near and far visited my bee farm and adopting my style of management. Thus modern bee culture became established during the space of twenty five years, and I have done what lay in my power ever since to aid its progress.

SAGACIOUSNESS OF WASPS.

INTERESTING INCIDENT IN WASP-LIFE.

On a certain day about the middle of August last, after I had been extracting honey, I left some wet combs in a small room of my house, which is not much used. The door remained ajar long enough to allow some thirty or forty wasps to gain admittance; but immediately this was discovered both window and door were tightly and further ingress or egress rendered impossible. Next day I visited the room with destruction and annihilation in my mind, but did not complete my task of slaying right and left, because my attention was drawn to a wasp gnawing a blotting-pad; and soon after I saw another at work, with its mandibles on the wall-paper. Although it is well known that wasps make their nests of a soft paper-like substance, I marvelled to see them collecting material when it was impossible

to carry it to their homes. In a short time my interest was still further increased with the discovery that on the window blind the busy little workers had laid the foundations of a house of thier own. It seemed to me that the exposure during two cold nights had caused some casualties, making the number of workers few; nevertheless they were willing and skilful and blotting-paper was plentiful close at hand. All the remaining wasps kept hard at work until a small shelter was formed, which added to their comfort at night; and with apparently increased vigour next day the work was continued, another gallery was raised and another, until their house appear to be complete. It is about the size and shape of half a lemon, beautifully built of disintegrated white blotting-paper, the flat side being attached to the hanging part of the blind and the top fixed to the roller above.

There are only about half a dozen wasps left, but they seem to be perfectly happy and fly about the room, when the sun shines, in a very impertinent manner, eat the food provided for them, and retire within the portals of their warm castle at night.—*British Bee Journal.*

A Question to Mr. Abram.

Briarolong, Gippsland, Vic.,

Editor A.B.B.

Dear Sir,—Could I ask Mr. Abram through the "Bee Bulletin" if he will kindly explain the following, viz.—

Why—if food has nothing to do with it—one half of an apiary shifted a few miles, will do well, while the remaining half almost disappears, but yet, produces more honey than the prosperous ones, and in a second instance, the bees which were shifted, declined while those remaining increased, and kept normal. The weather in both instances being exactly the same in both places?

E. GARRATT.

PRICES OF HONEY.

Melbourne Australasian.—Honey, prime clear lines, up to 3d; congealed and inferior lots, dull of sale. Beeswax in good demand, 1/2 to 1/3 per lb.

Melbourne Leader.—HONEY.—Retailers are not operating with anything like freedom, and the market is dull. Prime clear garden lots are selling at 3d., but large quantities of medium to good grade are reaching consignees, and for these grades the rate ruling range from 2d to 2½d. Beeswax.—There is a shortage of wax of the better qualities, really prime being almost unobtainable, buyers offering up to 1/3. Medium to good is obtainable at from 1/1 upwards.

S. M. Herald.—Honey, at present dull, choice extracted up to 3d, medium 2d to 2½d, inferior 1½d per lb. Beeswax.—Demand good, 1/1 to 1/2 per lb.

Maitland Mercury.—Honey, 2d to 2½d. per lb. Small tins 2/3 to 2/6.

HONEY.—

The market is over-stocked at present and sales are very slow. This is caused through the hot weather, and owing to the lower price of butter. The highest price for choice quality is 3d per lb. Medium lines from 2d to 2½d. Dark and inferior from 1½d per lb.

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HONEY VINEGAR.

Ordinarily the process of vinegar-making consists of two distinct steps. In the first, sugar in some form is by fermentation changed into alcohol. In the second, this alcohol is by a somewhat similar fermentation changed into acetic acid. The alcoholic fermentation must always precede the acetic, and should be allowed to become complete before the acetic fermentation begins. They may be carried on together, but it is usually at the expense of both time and quality, as the presence of acetic acid in even a small quantity greatly retards the alcoholic fermentation and sometimes a degenerative fermentation sets in and spoils the entire product.

Accordingly, your barrel should be one that has never contained vinegar. A whisky or wine barrel is good. If it is necessary to use a vinegar-barrel it should be scalded out very thoroughly before it is used. For a small quantity of vinegar a jug or jar is all right.

Next comes the question of the proper strength of the mixture to be made into vinegar. While this may vary considerably I think the best results will be obtained when there is not less than a pound and a quarter or more than a pound and a half to the gallon of water. If you have the honey in bulk, simply measure your water and add the proper amount of honey or *vice versa*. Usually, though, the bee-keeper will want to use the rinsings of cans or the honey soaked from cappings, etc., and for this some means of testing the strength of the solution must be used. A hydrometer is best and most convenient for this. One made for the purpose can be bought for about fifty cents. A photographic hydrometer can be had for half this. Any hydrometer will do, but you may need to test it by a solution of known strength, as they are graduated differently for different purposes. Mine was made for testing silver solutions, and on it a pound of honey to the gallon registers 20 degrees on the scale; and a pound and a half, which is the strength I prefer, 30

degrees, which makes it easy to judge of the amount of honey or water that must be added to make the solution the right strength. You can make a hydrometer of a homeopathic vial, or any tall bottle, corked and weighed so that it will stand upright in the solution. Mark with a file where it stands in a solution of known strength. Or make a ball of beeswax with a small piece of lead imbedded, so that it will just float in a solution of the right strength. Or you can use a fresh egg, which should float, or show a spot not larger than a dime above the surface. I have always used rain water, and this is usually recommended.

Put your barrel in a place where a temperature of as near 80 degrees as possible will be maintained. If the place is too hot, alcohol is wasted; but if too cool, fermentation is retarded.

Never add fresh solution to vinegar partly made. I think this is a very common cause of poor success. If you want to make additions to your vinegar stock, keep them by themselves until they have passed through the alcoholic fermentation.

For the alcoholic fermentation a barrel with one head out is best; if a closed barrel is used, there should be a hole in each end, and the barrel should not be quite full. All openings, of course, must be covered with cheese cloth or very fine screen, to keep out insects and yet admit as much air as possible. If fermentation does not begin promptly, add about a quarter of a cake of yeast, softened in warm water, to a barrel of stock. When the alcoholic fermentation is finished, which should be in from two to six weeks, you can use your old vinegar-barrel to good advantage. Or it will be well to add a few gallons of good vinegar, containing a little mother if you have it. Usually this is not necessary, but it hastens matters and insures good results. Give it plenty of air, keep it as nearly as possible at the right temperature, and you should have good vinegar inside of a year. When the vinegar is strong enough, pour

it off from the mother and bung it up tightly, otherwise a degenerative fermentation may set in that will spoil the vinegar entirely.—*Exchange.*

POLLEN.

Do the old bees eat any of the pollen they gather, or do they feed it all to the young bees?"

"Pollen is gathered for the young bees or, as I suppose you mean by 'young bees,' bees in the larval form. Old bees do not eat pollen. By old bees I mean bees after they have emerged from their cells, no matter whether they have been out of the cells an hour or forty days."

But how can the larval bees eat pollen unless the old bees feed it to them?

They can not."

Then the old bees must eat it, or at least a part of it when they feed the larvæ.

Not necessarily. I am not a chemist (have many times wished I were), so can not explain matters to you except in my homespun style; but, as I understand it, a certain amount of pollen, honey, and water, is taken by the nurse bee and partially digested, or in some way formed, into chyle by this nurse bee, something after the plan the dove or pigeon takes wheat and turns it into the milk the young pigeon is fed on while it is in the nest; and this chyle is fed to the larval bees by these nurse bees, pollen being used only for this purpose of chyle or chyme, in a more or less modified form, to suit the age of the larvæ.

Then you think that old bees can not exist on pollen when there is no honey in the hive?

I not only so think, but *know* that they can not.

On what is that knowledge based?

Through experiments in giving colonies which I did not care to save, combs of pollen with a very little honey in them, enough to last a day or two, and in every case the bees starved to death as the honey was all consumed.

Then you would not believe what some people say, that bees die in winter if they have no pollen to eat with the honey?

No. There is a little difference between the way of treating pollen by the bees. The larger part of the pollen which comes into the hive is packed in the cells, and the mouths of the cells left open until the pollen is used for brooding purposes, this being nearly always the case during the first half of the breeding season each year. But pollen intended for rearing the first brood during February, March, and April of the next year, in this locality, after being stored in the cells till they are from half to three-fourths full, is covered with honey, and the honey sealed over, the same as if no pollen were under it; and thus this pollen is preserved in good condition till it is wanted for early spring use, at which time there is no pollen to be had from the fields. This is the bee-bread that our fathers and mothers of the forties, fifties, and sixties used to tell us (then children) about."

Then you think that I can safely tell my friends that old bees never eat pollen.

"Yes. And yet I am led to believe there are exceptional times during the spring of the year when colonies are kept from starvation, for a day or two, by pollen in the chyle form."

"How is that?"

"We have times when the bees gather just enough nectar, after all the old honey is used up, to keep brood-rearing going on nicely, and yet not enough to store much in the combs. At such a time, after all the honey in the hive (together with pollen and water) has been taken for chyle, and a few days of storm have occurred, so the bees are just on the verge of starvation, this chyle is fed by the nurse bees to those bees out of the cells, and this, together with the juices that they can obtain out of the brood, will carry the colony a day or two longer, so they do not die of starvation, if a good day comes before the chyle is all used up which is in the stomachs of the nurse bees. If the weather continues bad too long, then

they must all die, as no chyle can be prepared from pollen and water, no matter how abundant, without the honey to mix with it."—*Doolittle in Gleanings.*

INTERESTING EXTRACTS.

(From a Treatise "Concerning the Right Use and Ordering of Bees.")

By Edmund Southern, Gent., A. D. 1593.

"I remember once there was a gentleman, a very friend of mine, which had good store of bees, unto whom the parson (who yet liveth, and I feare is one of Martin Malapert's house), came and demanded tythe bees. 'Tythe bees!' quoth the gentleman, 'I never yet payd any, neither is it the custom in this parish, and I am loth to be the first that shall bring it up, and yet I am very willing to pay my due; honey, money, and wax you shall have, with all my heart; but bees cannot be told, therefore how shall I pay them?' 'Told, or not told,' quoth the parson, 'or due or not due, I will have the tenth swarme, and you were best bring them home to my house.' 'Why, then, I might deceive you,' quoth the gentleman, 'and bring you a casting or an after swarme for a whole swarme.' 'Well, quoth he, 'honey, money, and wax shall make amends for that.' 'But you can never have profit of those bees if they be castlings,' quoth the gentleman, 'which I bring you.' It is no matter for that,' quoth the parson, 'this is neighbourly you.' 'Which shall be done,' quoth the gentleman. It fortun'd within two daies the gentleman had a great swarme, which he put into a hive, and towards night carried them home to the parson's house; the parson, with his wife and familie, he found at supper in a faire hall; the gentleman saluted them, and told the parson he had brought him some Bees. 'Imary,' quoth the parson, 'this is neighbourly done; I pray you carry them in my garden.' 'Nay, by troth,' quoth the gentleman, 'I will leave them even here.' With that he gave the hive a knock against the ground, and all the

Bees fell out. Some stung the parson, some stung his wife, and some his children and family; and out they ran as fast as they could into a chamber, and well was he who could make shift for himself leaving their meate upon the table in the hall. The gentleman went home, carrying his emptie hive with him. On the next morning the Bees were found in a quickset hedge by a poore man, who since ha'h had good profit of them, and is yet living. Within foure daies after the gentleman was cited to appear before the ordinary, who, when he came, demanded why he had used the parson after that manner? 'Why, Sir,' quoth the gentleman, 'I have not misused him, to my knowledge.' 'No!' quoth the parson, 'did not you make your Bees sting me and all my folks?' 'Not I,' quoth the gentleman; 'but you would needes have a swarme of Bees, the which I brought you home, according to your own request, and left in your hall, and since I saw them not.' 'I but,' quoth the ordinary, 'why did you not let them alone in the hive?' 'So I would,' quoth the gentleman, 'if they had been in my own garden.' 'Why did you not let the parson have the hive?' quoth the ordinary 'I could not spare it,' quoth the gentleman, 'for I bought my hive in the market, and I am sure, as covetous as he is, he can have no tythe of that. I buy in the market according to English laws; but I did by his Bees as he willed me, and as I have done by all his other tythes, which I have ever left in his hall, and so I did these; and yet there was no Bees ever demanded for tythes in our parish till now; and besides, the statutes for tythes in this case provided, is on my side; but honey, money, and wax he shall have with a good will.' 'And that is not much amiss,' quoth the ordinary. So noting the circumstances of every case, gave sentence that both of them should stand to their own charges. So they were contented, and afterwards became friends, and if they do not well, I pray God we may.'
The British Bee Journal.

Building up Weak Colonies in Early Spring.

Pick out and mark all your weak colonies, also your strong ones, marking an equal number of each; then all weak colonies that have a patch of brood in one comb about as large as your hand; Set all such on top of a strong colony with a queen-excluder between, closing up entrances to the weak colony except through the excluder. Then there are those that are very weak that have only a queen, and perhaps not more than a handful of bees with no brood. Fix these last named in this way: Go to the strong colony you wish to set them over, and get a frame of brood with its adhering bees, being sure not to take their queen; then put the queen of the weak colony on this comb with the strange bees, and put it into the weak hive; leave them in this way about half a day, then set then on top of a strong colony where you got the brood with a queen-excluder between. Do all this with a little smoke, and avoid exciting the strong colony in any way. If a cool day, and the bees are not flying, I usually leave the strong colony uncovered, except with the excluder, for a few hours before setting on the weak colony. The whole thing should be done as quietly as possible, so that neither colony hardly realises that it has been touched. When the weak colony has been given some brood, and put on top in this careful and still manner, hardly one queen in a hundred will be lost, and in about 30 days each hive will be crowded with bees and maturing brood. Then when you wish to separate them, set the strongest colony on a new stand and give it also some of the bees from the hive that is left on the old stand, as a few of the working force will return to the old location, especially if they are black bees or degenerate Italians.

In every case that has come to my notice where this method has been reported a failure it has been by one of two causes—either from lack of brood of

a weak colony to hold the queen and her few bees in the upper hive, or by smoking the strong colony so that, as soon as the weak one was set on top, the bees from below would rush up and sting everything above. Therefore avoid using smoke or doing anything that will excite the strong colony.

If done in a careful manner the bees in the lower hive never seem to realize that any strangers have been put above them, and they will all work in harmony together.—Alexander in GLEANINGS.

Why Drone Comb is Built.

Mr. Atwater in the AMERICAN BEE-KEEPER asks why "in an extra good season, with extra strong forced swarms with queens less than a year old mostly drone comb is built."

The question is suggestive of much interesting speculation. If I should answer it in conformity with general belief I should attribute the bees' action to their wisdom or reasoning powers, but I will not dismiss it in that off-hand way. I have never been able to get convincing evidence that bees reason, on the contrary I am strongly of the opinion that they are little, if any more than reflex machines. We find that bees build several sorts of cells, namely, worker, drone or "store," queen and "accommodation," or "transition" cells. These are classed according to common custom, but more properly we should combine queen cells with "accommodation" cells, and so have but three sorts. As "accommodation" cells are but the result of extraneous forces acting upon the normal construction process we may, for the purpose of this article at least, consider honey bees' comb as of but two sorts of cells, "worker" and "drone."

Worker comb is the first type built by a normal swarm, and forms the greater per cent. of all comb in a colony. The cause of the shape of the worker cell, hexagonal, has been explained by various writers and need not be repeated here

further than to say that each building bee tends to construct a cylindrical cell.

Drone comb we find is built under any of the following conditions: after the first rush of comb building by a swarm has spent itself, hence the drone cells around the edges of the combs, and those combs at the outside of the cluster (i.e. the last built); in a colony having a failing queen; in a queenless colony; during an excessive honey flow; and during high temperature coupled with great humidity.

Obviously some general condition must exist within the colony under each of the above-mentioned states. What is it?

A normal swarm clusters very compactly. Each comb builder is closely crowded by other comb builders, each is forced to work in a small radius, resulting in the construction of a cylinder of small diameter, i.e., the worker cell size. Do not misconstrue this into meaning that a single bee builds a complete cell. Each bee works subject to a certain external pressure, and no matter what cell it works at it is circumscribed in its labours by that pressure. This close clustering may be called the normal or prevailing clustering.

When drone comb is being built we find that the clustering is less compact and that consequently each builder is subject to less pressure, and hence works in a wider radius. This radius is limited by the size of the bee. The comb builder, as we observe her within a glass hive, moves frequently and appears to work in a most desultory way, but we there see her freed from the normal pressure of the cluster. Under all of the conditions mentioned above as being productive of drone comb we find loose clustering, the cause thereof differing in the different cases, but the result is the same. It is not necessary to analyse them here, for any observant person can go directly to the bees and see.

The bee is a graving tool mounted on jointed levers. According as these levers have free or circumscribed movements does the graver, the mandibles, describe

a greater or lesser arc, producing drone or worker comb.

The cause being known, it is up to the bee master to so manipulate the bees as to secure the result he desires. — *American Beekeeper*.

Caring for the Comb Honey.

It is imperative that honey be kept in a dry atmosphere, and it be kept in a pure atmosphere. It is not enough that one of these conditions be present; both are necessary for the well-keeping of honey at all exposed. Few honeys there are but will improve in weight and flavor if kept where the air is pure and sweet, and where the humidity is always low.

Too much stress has been laid on keeping honey in a warm place, resulting in making warmth rather than dryness responsible for good results. Warmth in itself is of no value at all in improving the flavor of honey. Honey, that is comb-honey, always improves in the cold months of the year; months when the humidity is low, but months when we often get our zero weather. Honey is more than likely to lose its quality during the hottest months of the year, but months when the humidity is often excessive. It is thus important that we get to the root of the matter, and understand that dryness and not warmth is the essential in the proper keeping of honey.

Yet it is true that warmth helps. Why is this? Permit me to explain. Air has a great affinity for water taking it up at all temperatures, but not equally fast at all temperatures. Air at zero degrees will take up but little water, while air at 100 degrees will take up a great deal. Warm air may be dry air while the same air with an equal amount of water in it will be wet if allowed to cool. At all temperatures there is a maximum capacity for water vapor, and when that capacity is satisfied the air has a humidity of 100 per cent, or has reached its dew-point. It will then give over moisture to colder objects.

Since warm air has a greater capacity for moisture it usually has a drying tendency. Hence it is that honey kept in a warm room tends to improve, for generally the cause for the warmth of this room brings about a condition of warm air with low humidity, but if perchance the warmth of this room is attained at the expense of this low humidity, and the warm air is humid air, then look out for the honey.

To return to the oil-stove. This oil-stove had no chimney opening out-doors as does a stove to burn wood. All the products of combustion, when this oil-stove was burning, simply poured out into the room. Suppose that the stove consumes a gallon of oil in heating the room. In doing this it will throw off into the air one and one-half gallons of water, probably more. The air will be temporarily drier because the extra warmth will raise its capacity for water, but as soon as this warmth is lost the air is damper than it was before the stove was started up.

Never, never, undertake to warm up the honey-room by means of an oil-stove. Not only is the air caused to become more moist, but there will inevitably escape into the room gases which will taint the honey seriously, even to the extent of rendering it so unpalatable that most people would prefer to go without honey rather than to eat it.

The honey-room may be heated with an ordinary stove, but if properly arranged this is seldom necessary. Let the room be so situated that its walls will generally be warmer than the outside air. A sun exposure without shade, will give this result. Almost as good results will follow if the room is adjacent to another room in which there is usually a fire. A room adjacent to, but not opening into, the kitchen which is warmed by the cook-range is excellent. This room should open out of doors by a screened window, a window into which only dry winds would normally enter,

usually to the west. This window should be closed if a rainstorm should come from the dry quarter. Under these conditions there might be—would almost surely be, days when the honey would go back slightly, but the majority of days would carry it further forward than would the poor days take it back, so that ultimately it will improve. An experience covering over a score of years warrants my making this statement.

Under conditions such as were brought about by the oil-stove, the honey and other objects in the room would in the nature of things cool more rapidly than the air. The warm air would then be cooled by the objects in the room, and the honey would collect a dew exactly as does an object out on the ground at night. But under the conditions which prevail in the room whose walls are warmer than the outside air, far different things would happen. The cooler air would then come against the warmer honey, and would take moisture from it rather than give moisture to it.

Too much cannot be said in favour of putting out only honey that tastes good. We may think up all sorts of schemes for getting people to use more honey, and for enlarging the market for honey, but after all there is only one which is at the head. Sell honey that you enjoy eating yourself. — *American Beekeeper*.

A Little Beautiful Language.

Thus writes an English clergyman in the "British Bee Journal":

As a hobby, I have found beekeeping interesting beyond measure—leisure time has been profitably filled in; pleasant recreation provided; and—shall I say it?—I have tasted the "sweet honeycomb," and know it is "good," fit even, as Ovid teaches in Philemon and Baucis, for gracing the table of the Gods! Then our own dear St. Francis loved to hold converse with and feed his brothers the birds. For, sings Longfellow:—

"Around Assissi's convent gate,
The birds, God's poor who cannot wait,
From moor and mere and darksome wood
Came flocking for their dole of food."

And Tennyson did well to say, "Sweet St. Francis of Assissi, would that he were here again!" Then, also, our wonderful St. Anthony preached to the fishes. So, following such noble examples, I love my little bees; and if it be true that we can find "sermons in stones," much more can we find lessons in the tireless activity and motherly government of our "colonies"—lessons fit for statesmen, which, if learned, we should not be troubled by problems of the unemployed or by education nightmares.

CAPPINGS.

Natural swarming does nothing toward renewing or superseding a queen, and that there is just as good a chance for the renewal of a queen if a colony never swarms."—*American Bee Journal*.

VALUE OF BEE PAPERS.—L. H. Scholl, in the *American Bee Journal*, remarks: I am a great lover of bees, to say nothing of the dollar-and-cent. side of the question, but if I had to keep bees without reading the bee papers, I believe I would give them up.

SOUTH AFRICA.—A writer from Rhodesia says: As soon as our farmers realise the splendid chances they have in this direction, there is little doubt that Rhodesia will produce enough first quality honey to not only supply the whole of South Africa, but also to capture a share of the home market, at present supplied almost entirely by America.

The Southwestern Ohio and the Hamilton County Beekeepers Association has requested all the railroads leading into Cincinnati not to cut the sweet clover, because of its value as a forage for bees. The big roads are complying with this

request, with the result that the amount of sweet-clover honey for the beekeepers along the said roads has been materially increased thereby.

ALGERIA.—Under French rule, is a good field for beekeeping. The number of beekeepers, according to the census of 1902, is as follows: Europeans keeping bees, 915, with 9289 hives. There are 24,000 native beekeepers with 163,279 hives. Algeria reports about 170,000 lbs of wax per annum. Both the native Arabs and the Jews are said to be fond of honey, which may in some measure account for the athletic build and fine physique of these people.—*Gleanings*.

I prefer a brush made of fresh weeds or grass when I can get it. There are many varieties that make good brushes. Select something that is not too stiff, short, or stubby; do not use too large a bunch, and do not try to brush the bees with the end of the brush. Pick out something that is slender and pliable, and brush the bees with the side of the bunch, not the end. A brush of this kind, used in this way, does not irritate the bees nearly as much as many of the brushes in common use. One of the best features of this kind of brush is that you can throw it away and get another whenever it becomes daubed with honey, or otherwise unsuited for the best work.—*Gleanings*.

AGE OF LARVÆ.—Dr. E. F. Phillips, government expert, has given us in *Gleanings* the following data for ascertaining the ages of larvæ: When just hatched it lies curved in the bottom of the cell, a straight line from head to tail being a little more than one-fifth as long as the diameter of the cell. At one day old it is still in the form of a semi-circle, but has grown so that the line from head to tail is a little more than one-third the diameter of cell. At two days old, it lies head touching tail, forming a complete circle whose diameter is nearly a half the diameter of the cell. At three days old, it occupies five-sevenths of cell

diameter. At four days old, it fills the entire diameter of the cell.

A writer in the "British Bee Journal" says;—"I notice complaints from divers correspondents in your pages about the low prices at which honey is sometimes offered, and again complaints that no market can be found for the surplus secured. And then I reflect upon the fact that the best energies of a large number of beekeepers are devoted to the work of increasing the number of those who are honey-producers, and I conclude that the two things bear the relation of cause and effect. The keener the competition for customers, the smaller the profit made. The more our English honey is driven by over-production into competition with the foreign supply, the lower must the price become. If some of our numerous "experts" did more to popularise the use of honey as an article of food it would be a benefit to both consumer and producer.

PIPING OF QUEENS.—Dr. C. C. Miller, in *Gleanings*, objects to the term "piping" as applied to the cry of young queens anxious to escape from their cells. Piping, he says is from the free, and "quahking" by the imprisoned virgins. We prefer "piping" to describe generally the act of both, the manner and tone in each case being different, even as the sound of similar pipes differently located will vary. If "piping" be a term allowable in the case of a free queen, we hold it to be applicable to the cry of an imprisoned queen, coming to us muffled by reason of the waxen encasement. "Early in the morning, or in the afternoon when the bees are still, her shrill piping may be distinctly heard, and also the muffled piping answers of the royal nymphs who, still imprisoned in their cells are conscious of impending danger."—Irish Bee Guide. And here a protest against "quahking," which is not a correct description of the sound. Let us not set our singing virgin queens on the same musical plane with the common or garden or farm-yard duck!

As ants seem not to be accounted a serious enemy of bees, I was at first disposed to look upon the matter with some degree of indifference, but I bethought myself of an investigation. An examination revealed the fact that not only had the ants left the bees paralysed with hunger and fear, but, not content with rilling them of their stores, were feeding upon them bodily, as attested by heads and bits of wings deposited in the lids and corners of the hives. On account of the number of ant-harboured cavities in the old trees of the orchard in which my little apiary is located, it was found impracticable to destroy the ants in their nests. The experiment was made of pouring kerosene about the hives, but this proved of no avail. Finally the invaders were circumvented by mounting the hives on improvised scaffolds with spikes for legs, each spike being immersed in a tin-can lid kept filled with kerosene and water. After the nuclei became strong enough to defend themselves they were again set down on their brick foundations.—*Exchange*.

An English writer says: In your issue of the *British Bee Journal* of the 14th inst., we notice an advertisement by a clergyman offering "this season's pure Oxfordshire extracted honey" at the price of 5½d per lb.; and we wonder whether it has occurred to this rev. gentleman—who probably keeps bees simply and solely for amusement—that in selling honey of this description, at this time of year, at such a low price, he is contributing towards a state of things which tend ultimately to take the bread out of the mouths of poor men who rely upon their bees to help providing them and their families with the necessities of life?

[Now, in reference to the above matter, we feel bound to say many beekeepers in our own district are selling their honey at 12/6 the 60lb. tin—the very best box honey. They could just as easily get 15/-. The flow this year is not a good one. It will very soon be all in the varior stores, who will make their money on it, profits that the beekeeper should reap, and could do so by a little waiting and firmness.—Ed.]

NON-SWARMING HIVES.

There are some excellent articles appearing in Hutchinson's "Beekeepers Review" occasionally.

We copy the following by L. A. Aspinwall, which we think must cause a lot of thinking among beekeepers:—

How many of our profound and carefully executed plans, involving years of labor and study, have fallen far short of our high ideals. The United States Patent Office records show this to be true in the inventive world. Only about one invention in every hundred patented, proves to be a practical success. And how about the thousands of failures so flagrant that no patent was sought for? My proposition to construct artificial brood combs as long ago as 1888; with the view of preventing the tendency of bees to swarm, was in the providential working of things disposed of long ago. Although a success as brood combs, they failed to accomplish the end for which I designed them.

It may, as a matter of history, be well to state briefly the theory I entertained relative thereto. The construction of artificial comb, of course, made the size of cells, (worker or drone) optional. This being in mind, also, that drones were a factor governing the increase of colonies, it would seem as if their elimination might keep in abeyance the tendency to swarm. Accordingly, combs, were made in which the bees reared worker progeny exclusively. Thus far the combs were a success—I having had as many as six or seven colonies occupying and rearing brood in them for years—one colony having occupied them seven years before I decided to abandon them for those built by the bees.

The elimination of drones, doubtless, retarded the swarming impulse, yet, like a queenless colony with only a few drone eggs, which attempts the rearing of a queen, they will, when in a crowded condition, although devoid of drones, finally make preparations for swarming. But above all was the tendency of drones

from other colonies to enter these hives.

Drones, unlike worker bees, are liable to enter hives in the vicinity of those in which they were reared. This contingency restores the normal condition to colonies having no drone comb, thus counteracting the influence which would result from using worker cells exclusively. Thus the theory was disposed of.

Inasmuch as unlimited room outside the brood apartment will not prevent swarming, the writer concluded to expand the brood nest, without increasing the brood area. This, as the outcome of having made wooden combs, was to construct them without a septum or base. In other words they were open at both ends; which left cells which could not be filled with honey. These were introduced between, and alternated with, the regular combs of the hive, thus expanding the colony without increasing the area of brood cells. This departure greatly reduced the crowded condition, and greatly retarded swarming; and was the first evidence to my mind that swarming could positively be controlled. However, these perforated dummies were a barrier to the queen in her passage from comb to comb. As a result, the queen would frequently be found occupying but three or four combs, in which case the colony would endeavor to supersede her, and swarming would be the result.

To overcome this objection, these perforated dummies were made in three divisions, separated by a $\frac{3}{8}$ -inch space running horizontally from end to end. The result of this change was another step in advance. However, after two or three seasons' experimenting with dummies, which were made of different depths and thicknesses, but little gain was made. Following these experiments, was a radical change. That suggested to the mind of the writer was the substitution of *slatted* frames for the *perforated* ones. These gave the queen absolute freedom in her passage from comb to comb at any point desired. The first of these slatted frames were made one-half inch in thickness, and

with a result that retarded swarming in all colonies, and prevented, perhaps, a quarter of them from swarming. Believing in the ultimate success of such slatted frames, an additional thickness was decided upon the following season, and three-quarters of an inch was established for the experiment that season. While the results were more favorable, it was evident that an increase in thickness was requisite; so one inch was adopted, which have still better results. For the following season one inch and a half was decided upon, together with a few about one inch and a quarter. The results of these were favorable to the greatest width, one inch and a half being the same spacing as natural combs. However, fully one half of the colonies swarmed during an excessive honey flow.

As a further means of overcoming the tendency, dummies were placed at the sides of the hives, in addition to alternatin^g them with the brood combs. Still the result was not satisfactory; frequently as many as half the colonies would swarm.

The reader cannot but realize the great difficulties and expense attendant upon producing inventions. These changes were made to fit from forty to fifty colonies annually. And, to add to the difficulty, but one experiment of the whole can be made in a year. To test it upon a few would not afford a proper average for correct results.

Noticing the tendency of bees to enter supers more freely where the passage-way happened to be directly above the space between the combs, also, that more honey was stored above such direct communication, suggested the making of wider passages to the storage apartment. This was tried upon two or three colonies, with a marked degree of success. These wider passages naturally called for slatted dummies in lieu of the ordinary separators, which were widened from time to time, until one inch and a half was reached. At present, however, the one inch size is being used; and I consider them nearly perfect for the purpose designed,

namely, that with freer passages to the supers, the tendency to swarm became, perhaps, 50 per cent. less than with supers having narrow passages.

After the season's experimenting, the writer entertained no further doubt as to the ultimate success, than he did with the potato planter, up to within one or two years of its completion. The workings of most colonies in the yard were so favourable to the perfect result, that no further doubts could be entertained. Still, there would be one or two swarms to every ten colonies, even with ample storage room.

Let us note, in this connection, that any or all appliances, however perfect, will fail if the storage room is insufficient.

As a further means of preventing the tendency to swarm, and, also to facilitate handling the frames, similar slatted spaces were introduced at the ends of each brood comb. These afforded still more bee space, also better ventilation, and prevented the sun's rays from striking directly upon the ends to which the combs are attached. It was also noticeable that the bees, upon entering the hive during a honey flow, would do so mostly at one side or end of the entrance. With closed end frames the colony became more or less crowded at that side of the hive—the slatted ends most thoroughly relieved that tendency, in addition to affording better ventilation; also, keeping the sun's rays from increasing the heat of the colony, as already stated.

At this juncture, with wider passage ways to the supers, a corresponding evil presented itself. The wider communication made, as it were, the two apartments nearly as one, which naturally invited the storage of pollen in the sections; whole supers of beautiful white honey being rendered unsalable thereby. Knowing that drone cells were not used by the bees for the storage of pollen, the use of drone cell foundation suggested itself as being the only remedy. One thousand sections were tried upon my strongest colonies during the season of 1905 with most satisfactory results. Not more than

three or four sections having two or three cells containing a little pollen near the bottom. The result was so satisfactory that I decided upon using drone cell foundation as far as was practicable. A small corresponding objection appeared with the exclusive use of the drone cell foundation. A few colonies refused to do satisfactory work with supers entirely filled with it. The increased length of the slatted-end brood frames afforded additional super room, by allowing longer section holders which accommodated five sections instead of four as previously used. By using worker cell foundation in the end sections, a still further advance was made. It gave the colony both kinds of comb to build just what every normal colony persists in doing. The result was that the worker cell foundation was filled as rapidly as that for drones, notwithstanding it was at the ends and corners of the supers. Furthermore, with all this advance, not a single cell contained pollen or drone brood. This gave really more satisfactory results than was expected, and will enable the honey producer to have better filled supers. So much for the reason of 1906.

In the meantime, the writer discovered upward of ten or twelve years ago, that pollen in the brood combs was a very strong factor in inducing swarming; and, however perfect the device to prevent swarming may be, clogging the brood nest with it would in most instances induce swarming. This necessitated, at the time of introducing the dummies between the brood combs, a removal of such as were well filled with pollen leaving only such as contained but little or none. This being carefully done at the beginning of the honey flow, resulted satisfactorily. Still, with an *intense* honey flow, and a consequent yield of pollen, it became necessary to remove the outside comb of the strongest colonies, at the end of two or three weeks of white clover yield. Such combs are usually solid with pollen. Let us note that colonies which do not swarm are possessed with double the working force, and for which reason,

about double the amount of pollen is stored, unless working on linden. The reader will also note that swarming in such an event is the only relief that can be afforded the colony—outside of human agency.

Let us carefully consider how beautifully Nature, through the instinctive workings of the colony, brings this about. With the brood area almost completely clogged with pollen, a condition is reached not unlike that of a failing queen, when royal cells are begun, which results in swarming. After swarming, this excess of pollen is partly consumed by the unsealed brood in various stages requiring food. This period followed by twenty-one days more before the young queen's progeny matures will practically reduce the supply of pollen in the hive. We now see how Nature in the economy of the hive brings about a perfect balance in her workings, and we, to meet Nature in this respect, must remove the excess of pollen whenever it becomes necessary.

The past season, with drone cell foundation in the centre, and worker at the ends of the holders in each super, accomplished wonders—even more than was at first expected by its use, namely, the better filling of the supers, together with the superior quality of honey in drone cells.

In view of having lengthened the brood frames by the addition of slats at each end, I concluded to test their utility in that, perhaps, the removal of pollen might be avoided, and swarming restrained until the main flow had passed. Although but little hope for success was entertained still it was deemed best to make the test, using most of the colonies in the yard. Accordingly, the pollen clogged combs were removed from but a few colonies.

It also suggested itself to the writer that in connection with the slatted end brood frames, narrower dummies *might* be used; and, accordingly, one-inch thickness was made for the past summer's use, instead of one-inch and a half, the standard thickness. This change together with

allowing the pollen to clog the brood nest, resulted in ten colonies swarming, out of the thirty. But the test was a necessity in order to prove the value of additional length in the brood frames, which included the slatted ends and longer dummies. Even if swarming could be prevented without the removal of the excess of pollen; the clogging of the brood area would be a detriment to the colony, and cause it to dwindle, for lack of brood. While I expected results unsatisfactory, I had no means of reaching, short of an experiment in the extreme (as this was), a correct understanding with positive proof as to the workings of a colony overstocked with pollen. Previous to this season, and since the discovery of pollen being a strong factor in introducing swarming, I have not allowed it to clog the colonies of my yard; hence, the great advance made towards perfecting the non-swarmers.

Notwithstanding the disturbance caused by this experiment, by which colonies were thrown out of their working condition of non-swarmers, one hundred sections per colony were produced this season—taking into consideration the imperfect control, including the poor season, one cannot but come to realize the wonderful advantages of a non-swarming hive. There has been sufficient evidence, according to my judgment, that with perfect control, even the past inferior season, one hundred and twenty-five sections per colony could have been produced.

WANNON DISTRICT HONEY FLOW.

"LEADER'S" DUNKELD CORRESPONDENT.

Honey is coming in very rapidly and large quantities are being taken. Some of the apiarists on the Glenelg blue blocks are taking from 1 to 3 tons of honey per week. Yellow box is in full bloom, and there is also a quantity of ironbark in bloom. Red gum is rather later than usual but is well budded, and will yield large quantities this season. It is estimated

that this season's honey flow on the blue rocks will double all previous records.

This area is now recognised as the best honey producing part of the State, both for quantity and quality.

It is understood that the Minister of Lands will pay a visit to the blue blocks during the coming summer to inquire the timber reservation question.

Most of the apiarists are building on their bee sites, and some extensive honey treating plants have been brought into the district. One apiarist in the district drives the honey extractor, honey ripener and wax extractor with a steam engine. This particular apiary consists of over 500 colonies of bees, and employs up to a dozen men. The price of honey is still at about 3½d., which is considered satisfactory.

One apiarist on the blue blocks section lost about 60 hives, the bees being drowned in the recent floods.

In this matter of comb building I have again and again run up against a wall. Unless my observations have been too loosely tabulated, I find that bees build more drone comb with young queens than with old queens. Only this very day I was cutting out comb honey from these hives, and I found that there was less worker comb in the hives containing the younger queens. One fine old queen is in her fifth year. She never led out a swarm, and she rarely lays eggs in drone cells. Her bees build a great deal of worker comb back of the excluder zinc. Right here, though it is apart from my subject somewhat, I would venture to say that in these large hives I have found that queens under two years of age are much worse for drone laying than are two and three-year olds. A queen in her second year filling all available drone comb with brood, while many a queen in her third season leaves vacant drone comb right in the midst of the brood nest. Explain this, if you can.—Allan Latham in "American Beekeeper."

DAIRYING.

MILKING MACHINES.

As to the future of milking machines, the following, by a writer in the *Melbourne Leader* may give a good clue:—

"After sixteen months' experience of the Gillies improvement I am thoroughly satisfied in every respect with the result. All my cows came in again this season in splendid order, not a trace of injury showing on any of the teats. Anyone is a liberty to come and examine them, and they will find them all in a nice, soft, natural condition, and in every respect equal to carefully hand milked cows. My herd is at present averaging close on $3\frac{1}{2}$ gallons per head, and as instancing the excellent work done by the machines, I might mention that we can milk 20 cows per hour with each machine without effort. To test the capacity of the machines, I tried a milking this week, and with three hands and three machines we put through 60 cows in 53 minutes, getting 124 gallons of milk from the 60 cows in the time stated."

WATER CONTENT IN BUTTER.

Experiments made by the Wisconsin station show that working the butter immediately after washing, slightly increases the water content of the butter over that obtained when the granular butter is allowed to drain about half an hour before working. They also prove that allowing the granular butter to stand in water for some time increases the water content of the butter as compared with working immediately after washing, and that increasing the amount of churning in the wash water does not always increase the water content of the butter.

In one case butter which received eight revolutions in the wash water contained about 20 per cent more water than that which received only six revolutions. In all the other cases, eight churnings, the

water content of the butter was nearly the same even when the granular butter received from four to forty revolutions in the wash water. Nine out of twelve trials indicate that the water content in butter is increased by washing the butter with warm water, but the other three trials point in the opposite direction.

UDDER INJURIES.

Cows with large udders frequently get their teats injured, and when an animal is in full milk treatment is particularly difficult. An expert discussing torn teats writes: "It is well nigh impossible to successfully treat a hole in the teat of the cow when she is being milked twice a day. Much, however, depends upon the nature of the injury, and the size of the opening into the teat. In some cases the milk tube is called for to draw the milk during the healing of the teat. When it can be used place a strip of adhesive or surgeon strip round the whole teat, so as to close the wound and hold in apposition until the wound heals. This is the best treatment I am familiar with."

CHURNING.

Keep the cream warm until it is properly soured, which is indicated by its becoming thicker and with a pleasant, though sour, taste. Do not allow the cream to become over-ripe, so that it whey off. Churn just soon as it was ripe enough. Do not fill the churn more than half-full, stop churning when the granulates are the size of kernels of wheat, draw off the buttermilk, wash with cold water, about the temperature of the buttermilk, salt, partially work, allow to stand for a couple of hours or more in the churn itself or in the butter tub and re-work until the salt is thoroughly mixed with the butter. Then see to the packing.

DEHORNING CALVES.

Is much easier, to say nothing of being more humane, to dehorn calves when they are young, preferably before they

are a week old. Clip the hair away from the bottom, take a stick of caustic potash, wrapped in some material to protect the fingers, moisten one end with water, and rub gently over the button until the skin becomes slightly raw and smarta a little. In a few days a scab will form, which will soon disappear, and if the work is properly done, will leave the calf without horns. One application is usually enough, but in case the horns start again the application can be repeated. Care should be taken that none of the caustic potash runs down over the hair, to injure the eyes and skin. In case the horns break through the skin before the caustic is applied, it will probably be necessary to use a knife to cut off the button, after which a little caustic potash can be rubbed over the exposed surface. There are a number of chemical preparations which give good results, but they are costly. Caustic potash, on the other hand, is cheap and effective.

CAPPINGS.

In the matter of re-queening an American writer says: Not only do certain beekeepers not requeen every second or third year, but they do not requeen at all, leaving the matter entirely to the bees themselves. Their argument is, that so long as a queen is doing good work, her age should not be a reproach against her; and that when she begins to fail on account of age the bees will be prompt to supersede her. Some of those who leave the matter of superseding to the bees themselves—but by no means the majority of them—make a practice of replacing a queen whenever she shows herself inefficient, or in any way objectionable; and this may occur in the first as well as the second year. If this practice be followed, and if it be considered that in general a queen will be superseded by the bees as soon as two or three years old, it may be a question whether there be anything better for the majority of beekeepers. One argument of no small weight in the case is, that it is a very

much easier thing to let the bees have charge of the matter; indeed so much easier that one should feel sure of a considerable gain to warrant the extra labour involved in rearing and introducing so many queens every year, or every two years.

How many eyes has a honey-bee? The worker has three single and two compound eyes, each of the compound eyes being made up of a number of facets; but really each facet is a separate eye. Cowan says: "There is great variation in the number of facets in the compound eyes of bees. In the worker the lowest is given as 3,500, whereas we have ourselves found as many as 5,000." Drones have more than either queen or worker.

In Germany quite a business is made in the fall of selling bees from which their combs and honey have been taken ("naked colonies," they call them) and these bees are then fed up for winter.

A writer in the "British Bee Journal" says: I am very pleased to see that there are still some beekeepers who do not introduce foreign queens because they are prettily marked. I am sure our good old English bees are far superior. If new blood is wanted in an apiary, why not buy an English queen from some other district?

Speaking of Bee Paralysis, a writer in the "British Bee Journal" says:—I attributed the cause at the time to the hives being over heated. When the disease broke out and during the whole of the time it continued, I noticed that all the sealed honey was wet and sweating. As the bees decreased in numbers I took the uncovered combs away and melted them down for wax. The honey in them had a sour smell and taste, but the smell was especially noticeable. Indeed, so long as there was any of the old honey left in the hives the trouble kept on; but as soon as it was cleared out the disease disappeared and I have never seen any trace of it in my hives since. All the stocks managed to recover their strength again by the

end of the season. I wonder if any of your readers have noticed the "sweaty" or damp appearance of combs when the disease was present?

Introducing Queens by the long caging process is, I believe a mistake. I have recently introduced 40 queen with the loss of only one queen—and that was a very populous colony of hybrids. During the day I hunted up the old queens, and, as fast as they were removed, the new queens were caged (alone) in the hives in cylindrical wire cloth cages and left until dark, when they were all released by putting soft candy in the ends of the cages and allowing the bees to eat out the candy. My brother says he has been introducing queens all summer exactly the same way, except that he allows the bees to release the new queen at once—simply hunts up and removes the old queen, and puts the new one caged with the opening of the cage stopped with candy or broken comb honey. He has not had a loss. I think it is a mistake to allow a colony to start queen cells before releasing the queen. If the new queen is released soon after the removal of the old one, I doubt if the bees scarcely realize the change. They don't have time to miss the old one, to really know that she has gone, and when they find the new one, they may think she is their own mother.—*W. Z. Hutchison.*

The "British Bee Journal" records the death after a protracted illness, of that eminent scientist and beekeeper, Pastor Emeritus Paul Schonfeld, at the ripe age of 85. He was born in 1821 in Sulau, Lower Silesia, and after studying theology in Breslau, was appointed pastor in Teutschel where he remained for forty-two years, until his retirement in 1889, when he removed to Lieguity. Schonfeld commenced beekeeping with a log hive, and taking a scientific interest in the pursuit, very soon became a bee master. He studied particularly the anatomy and physiology of the bee, and we are indebted to him for what we now know about brood-food and Royal jelly. He was the first to discover the true use of

the stomach mouth, and to demonstrate how the bee is able to collect nectar and to use it either as food for herself or for the brood. He also showed that brood-food, which was supposed by Schiemens and others to consist entirely of a secretion produced by glands, is really elaborated in the chyle-stomach of the bee, although a secretion from the glands may also be added. The prolongation into the chyle-stomach he demonstrated came into use when this chyle-food had to be ejected for the use of the larvæ.

PAINTING HIVES.—First have all hives perfectly dry and clean; prime with yellow ochre and raw linseed oil. Be sure to fill all nail-marks and cracks; let this priming dry, say three or four weeks before putting on second coat, which should be strictly pure white lead and raw linseed oil. Be sure to let this dry thoroughly, at least 15 or 20 days, when it will in good weather be ready for the third coat; add a little zinc to the lead and use boiled oil, rub out thin. The other two coats should be rubbed out thin also. If you follow the above your paint will not peel off in a short time, as lots of bee-hives now do. They will have a nice gloss, and be thoroughly cemented to the wood. You can add the colouring as desired.—*Exchange.*

THE MOST SUCCESSFUL BENTON QUEEN CAGE FOR MAILING QUEENS.—The candy must be made right, not too soft or too hard. The candy-hole must be thoroughly coated with beeswax or paraffine; then when candy is pressed into place it must be covered with a sheet of thin wax or foundation. A plain wooden cover completes the equipment. This is nailed down perfectly tight, without any wire cloth between it and the cage proper. There is absolutely no ventilation save a few awl-holes piercing the end compartment of the cage, all the rest of the cage being practically air-tight. When cool or cold the bees will cluster in the centre hole; when warm or hot, in the end hole—the only one ventilated.—*Gleaning.*

Comb honey is a thing of beauty. It is delicious, attractive and tempting. It is a rich, nourishing food, and besides, makes a beautiful decoration for the table at meal time, and is sure to be admired when present. It has a beauty of its own that it fails to lose by contrast on the most richly set table; and what can be found better to decorate any table, even the most richly set, than a honey comb—a specimen of the handiwork of the little bee—whose delicate waxen cells are filled with pearly deliciousness or golden richness and overlaid with delicate white cappings.—Exchange.

Australia is to have another rival in her London meat trade in Siberia. In West Siberia alone there are 8,500,000 sheep, the bulk of which are reared and fattened for export. The Siberian Railway Department has promised the farmers favorable terms for transport. The machinery for conducting a large export trade to England already exists.

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