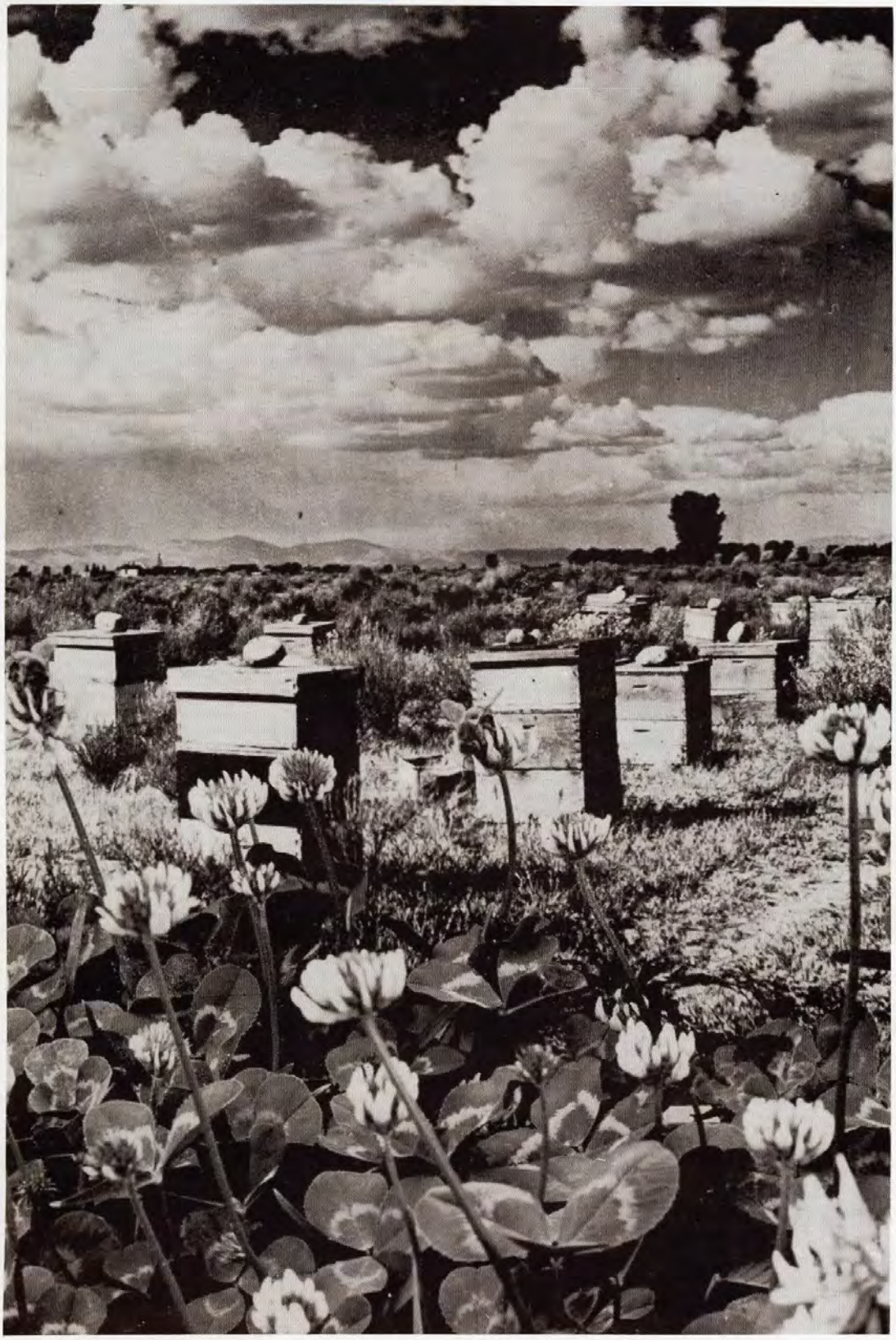
GLEANINGS IN BEE CULTURE



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Our cover this month: open, blue skies above an active desert apiary. Enjoy the summer dog days: harvest is coming!

NOTES FROM THE BEEYARD

by Mark Bruner

SOME THOUGHTS ON GOOD NEWS BAD NEWS AND A FEW THINGS THAT ARE NEITHER

I'll tell you folks, I don't have much truck with bad news these days. (Huck Finn always used the word "truck," and I assume he meant "patience" and not four-wheel drive). I've spent some very pleasant hours, this spring, planting a garden full of prime bee beloved herbs, and designing it to encircle a nice straw skep full of very active honeybees. Anyone who has futzed away the time in such a way will probably agree with me that such gentle activity is certainly superb therapy for all who come home, from a day at work, bristling with tension and snarls.

It's so easy to become a part of bad news. Just sit in the company of gloomy folks for awhile. For that matter, just listen to the news -- even in bee journals. The acarine mite (oops --- honey bee tracheal mite), is now in 16 states, with Wisconsin, Maine, Pennsylvania being the most recent places of discovery. There's a big rhubarb in North Dakota about the presence of mite infested bees there; arrests have been made, court orders given for removal or destruction, counter-court measures, and so on and so on and so on. Every day, the news from Washington relative to the future of honey price support changes. Imported honey keeps coming. The Africanized bee keeps winging northward. The varroa mite is on the horizon (figuratively speaking, you understand). That's enough to make any beekeeper stick his or her head in an extractor.

BUT...

all you need to do is compare. Things are truly bad only when there is no comparison to balance the rotten flapdoodle against.

Speaking just for me (and I'd be pleased to speak for any of the rest of you good folks), all ain't so bad with American beekeeping. My bees seem quite happy with their herb garden. I'm quite happy with them. Let's begin our world there, O.K?

Sometimes, it seems, the good things in life aren't heard over the din of the bad things. I don't think there are fewer good things, it's just that they aren't quite as loud or pushy as the bad. Take, for example, the quiet but exceptionally fruitful work of Ohio State University's Dr. Walter Rothenbuhler. On the eve of his retirement from a long and successful career in apiculture, comes a published research report, in the *Journal of Heredity*, featuring an explanation of development, under Dr. Rothenbuhler's direction, of a strain of bees genetically inclined toward significantly greater pollen collection. A quiet explosion. One doesn't have to use too much imagination to see the many potential benefits of this or similar genetic selection. All of this happened without trumpets and fanfare, but it happened: nourished by patience and, certainly, by a distinct hopefulness. I'll wager that Dr. Rothenbuhler, too, has enjoyed some quiet time in an herb garden.

Our domestic inability to market honey has constituted a primary sore spot for some time now. It was with great interest and appreciation, therefore, that I read "Determination of Consumer Preferences and Attitudes Toward Honey in The U.S. Market," by Sabry Shehata and Eric Mussen in the July, 1985 issue of *American Bee Journal*. Many of the conclusions could be anticipated: the need to educate a market in which some 30 percent seldom if ever used honey because they simply didn't think about it or knew an application for the product; the need to promote new uses for honey. All of that, no matter how commonly known, deserves to be repeated again and again until the message is taken to heart and acted upon. There were, additionally, many statistical summaries that surprised me. One was that creamed honey is known to only 6 percent of the U.S. population. Compare this to Canada where more than half of honey marketed is sold in creamed form. Obviously, the opportunity for marketing development in that regard is enormous.

I'd certainly be interested in articles, from readers, addressing this specific issue. With successful marketing of creamed honey, we might expect new container format with creativity in that regard spilling over into the conventional liquid-honey-in-the-queenline jar part of our overall marketing of honey. I am always amazed that more beekeepers are not experimenting with unusual shaped containers, plastic or glass, to create a "standout" effect on supermarket shelves populated with jars which, most of the time, look all the same. If a lack of education is part of the problem, then it stands to reason that the average honey consumer may chose as much on the basis of outwards appearance as from a knowlegeable selection of a certain floral source. I've recently seen bottles, shaped like miniature, flat anti-freeze containers. They've got a little handle, are light-weight plastic and have great surfaces for labels. As far as I know, no one has used them for honey, but they come in many sizes and would sure be noticeable in among a pile of plain old queenlines.

Another interesting conclusion of the report mentioned above was that 33 percent of those polled (in four major cities) as to why they didn't like honey, didn't like the taste. Here again, we might attribute at least some of this to not knowing that there are a wide variety of tastes avaialble from honey. But, there may be more to it than that. Suppose you tasted honey once and the world did not exactly move for you. You didn't especially like the taste, but it didn't flipflop your stomach, either. You probably would not go out of your way to buy more. What if, though, someone offered you *MOUNTAIN BLOSSOM HONEY WITH PECANS?*

Let me tell you more: *Mountain Blossom Honey With Pecans* comes in a clear glass jar shaped very much like a stout, round cosmetics jar. Its label is a beautiful, art-noveau type four color presentation featuring, not bees, but a woman with long flowing hair and gown, standing in a nest of tropical blossoms. I mean to tell you, folks, this is no slopped together hack job -- it's an innventive, clever and attractive approach to labeling and packaging. Someone's ad agency should get a bonus. But the best is yet to come: inside the jar, is delicious looking, light amber honey in which has been packed, to the brim, dozens of wonderfully shaped pecan halves. I've got the promotional photo up on my wall. I'd reproduce it in this essay, but without color it just isn't the same. I'll bet you, folks, that such an approach would sell another jar of honey even to someone who hasn't especially found a reason to jump up and down with joy about honey.

And now for "the rest of the story:" yep.....it's Mexican honey. But wait! Before you start stomping your feet, stop and think about everything that is suggested by this. First of all, I've wondered why honey importers haven't been doing this until now. If I was importing honey, I wouldn't try to hide the fact, I'd advertise it. I wouldn't say my honey was "Chinese" honey; I'd say it was *EXOTIC LOTUS BLOSSOM IN SPRING HONEY.* I'd then sell it for both regular consumer traffic and gourmet shoppers and, I'll wager, I'd get a significantly higher rate of return. Conversely, I've wondered why U.S. producers, rather than crabbing about imports, don't get off their duffs and do similarily creative things with: A.) how they label their honey, B.) how they pack their honey, C.) how they might play off patriotic sensitivities or local pride in selling their honey. I grant you, Naturasol, the parent company producing *Mountain Blossom Honey and Pecans* (plus a number of other exotic blends), has a few more bucks to promote their product, but I think that such a fact, when used as an excuse for not being creative, is pretty puny. In fact, are not many of our domestic producers in almond areas, pecan areas, walnut areas? See my point? If importers can do creative marketing combinations involving honey, so can domestic producers.

Just a couple of other notes, this month; and they're quiet, good news notes. T.M. Klein, of St. Charles, Michigan, let us know that his son, Dan, age 18, has been working in schools for three years promoting beekeeping. Mr. Klein sent us a list of Dan's schools which, unfortunately, arrived after our schoolroom contest had completed. We wanted to recognize Dan's work, though. Take good notice of this paragraph, everyone. Reread it. Dan is 18 years old. What he is doing for all of us is building a future for all beekeepers. We owe Dan our thanks, for in such quiet ways, good things flourish!

And, finally, our friend J. Iannuzzi, Ellicott City, MD, has helped us out by identifying one of the two folks kissing on page 370 of the July *GLEANINGS.* The man is Paul Kessen of Hamilton, Ohio. There's an article about him in the December, 1982 GBC. We appreciate the identification -- the two look so happy --- I'll bet their standing right next to their herb garden!

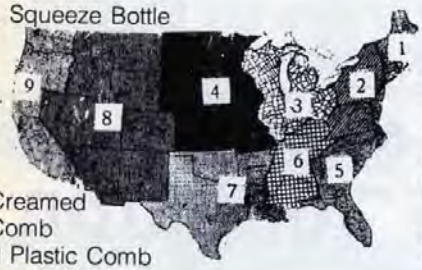
Continued on page 418

The Monthly Honey Report

Wholesale Extracted

Reporting Regions

Sales of extracted, unprocessed honey to Packers, F.O.B. Producer. Containers Exchanged	1	2	3	4	5	6	7	8	9
60 lbs. (per can) White	45.00	42.00	52.00	34.50	42.00	40.00	38.00	36.00	42.50
60 lbs. (per can) Amber	42.00	40.00	42.00	32.40	33.00	35.00	30.30	34.50	37.80
55 gal. drum (per lb.) White	.52	.55	.52	.59	.64	.55	.55	.60	.58
55 gal. drum (per lb.) Amber		.52	.42	.54	.53	.52	.50	.57	.54
Case lots — Wholesale									
1 lb. jar (case of 24)	28.50	24.00	23.75	20.40	25.00	24.00	25.00	25.40	25.20
2 lb. jar (case of 12)	27.50	24.00	22.75	20.16	26.20	24.00	21.50	25.24	
5 lb. jar (case of 6)	30.00	28.50	23.95	24.90	28.50	24.00	21.50	25.24	24.60
Retail Honey Prices									
½ lb.		.90	.90	.75	.99	.90	.90	.85	.90	.89
12 oz. Squeeze Bottle		1.50	1.25	1.29	1.09	1.25	1.35	1.35	1.29	1.19
1 lb.		1.50	1.40	1.35	1.19	1.50	1.55	1.52	1.50	1.40
2 lb.		2.70	2.60	2.45	2.50	2.50	2.60	3.00	3.19	
2½ lb.		3.75				3.55	3.25	3.50	3.59	
3 lb.		4.00	3.75	3.15	3.44	4.60	3.85	4.00	4.00	3.40
4 lb.		5.00	4.95		4.40	4.98	4.90	5.00	5.00	
5 lb.		6.00	6.00	5.25	5.50	5.75	5.80	5.90	5.90	5.25
1 lb. Creamed			1.75	1.45	1.40		1.39	1.50	1.55	1.40
1 lb. Comb		2.25	2.25	2.25		2.00	1.85	2.00	1.80	
Round Plastic Comb		1.50	1.75	1.85				1.75	1.65	1.75
Beeswax (Light)		1.35	1.35	1.10	1.40	1.25	1.25	1.17	1.15	1.50
Beeswax (Dark)		1.20	1.15	1.05	1.25	1.12	1.10	1.10	1.10	1.25
Pollination Fee (Ave: Per Colony)		28.50	20.00	27.50	15.00	20.00	21.00	27.00	18.00	25.00



REGION #1

Good rains in Connecticut in mid June may be the big help needed. to give us a large crop. Sales of native queens, nucs and packages have increased in the wake of the mite problem. High costs of production in this area may make queens much more costly now, but better production methods should in time bring prices down to a more reasonable price range. We cannot raise northern queens using only southern methods. We must develop new ways of doing things here. We will have to show the beekeepers that native queens in May will match April Southern queens. This one fact will be the key that opens the door to the local queen breeding. Also we will have to maintain our breeding program regardless of the mite problem. The Varroa mite is on its way and also the Africanized bee could come our way. We better have a good breeding program ready and ongoing as soon as possible. Our region is thickly populated. We cannot have nasty bees in New England. One way to encourage new breeders is to purchase queens from them. Test their stock under local conditions. Breeders have no idea what the market will be. They don't like to kill their left-over queens. On the other hand, they don't want to underproduce and not fill the demand. It takes about 30 days to get a good queen ready for sale. This is no longer a thing that might be. Queen production in this area has been going on in a small way for many years.

The good news is that Connecticut has a new regulation on the use of microencapsuladed methyl parathion. Its use is permitted from Jan. 1 to June 30 only. The restriction takes effect immediately. The problems of beekeepers was that the product was used on sweet corn in tassel. Corn in this area is not likely to tassel before June 30th. Its a great victory after five years of very hard work. The product is used on mostly corn and apples. Beekeepers asked applicators not to spray plants that bees were working. They would not police their own industry. With this regulation justice can finally be done.

REGION #2

Honey sales continued to be poor to fair in New York. Not much of a nectar flow during the month of June, bees seem to be maintaining with little or no surplus noted. Starting to get wasp nest eradication cakes, which is early.

June quite rainy in West Virginia. Bees storing surplus. Considerable foreign honey on sale at health food stores at cut rate. (Example: Canadian Honey 69¢).

Honey sales very slow in Tennessee. May was sunny, hot and dry, but bees did not store above average surplus. In fact on the low side. Very little swarming. June has been hot, wet to date.

REGION #3

Southern half of Illinois has had an excellent crop of water white honey thus far. Clover on the land reclaimation areas has been exceptional. Northern half of Illinois has been too dry with very little honey in the supers.

Bees in fine shape in Wisconsin. Scale hive 30% ahead of same time last year. Clover is in bloom. Some rain needed in some areas.

Early flow in Indiana was very good and colonies built up well. Clover flow began with good quality white honey coming in. Then came the rains and cool windy weather. With two straight weeks of this our total crop will be cut substantially. Late summer blows may help make up for our bad weather now but that remains to be seen. Sales picking up with the opening of the farm markets and U. Picks' but store sales only fair.

REGION #4

We've been feeding steadily for last three weeks in yards where dandelion was a failure or near failure. Some yards did great on dandelion. I have no explanation for the great variability. Basswood started bloom about a week early, but we had cool, cloudy and windy weather at first. We did our last feeding about five days ago and all of a sudden honey is flooding in from basswood. When there is no basswood, results are just so-so. If weather holds good colonies in basswood yards could do very well.

The prices quoted are being used by local producers — packers who report sales very dull. I have heard reports from other packers who are not using foreign bulk that sales are off about 40%. Our largest twin city packer is surviving by packing for the government. I can't imagine what will change the situation except for changes in government policy concerning foreign imports.

The season in North Dakota is one full week ahead of normal. Moisture is adequate. Weather has been cool, delaying the onset of substantial flows. Bees are very uneven, with many beekeepers still feeding late in June in hopes of making it back later in honey produced. State of North Dakota is trying to take a tough stand on mite infested hives moved into the state. Sunflower acreage planting is down. Interstate Seed Co. has publicly endorsed the use of *Pydrin* in sunflower pesticide spray which should dramatically improve spray losses.

Round plastic combs not readily available in Missouri.

Cool, windy, rainy weather seems to be slowing the bees down some in spite of what appears to be an abundant clover bloom. Honey sales picking up some with the growing season. Honey being made should be of good quality — mostly from sweet and white clovers.

REGION #5

Bees are standing still in North Carolina. No honey flows and most hives are eating their winter supers, if they made any this spring. It's about gone at this time. Never have I seen such a bad year in 56 years.

June was cool and wet through the third week and bees were only making a living. With heat and humidity, beginning the last week, a heavy clover flow started. Flow appeard to be widespread. Very little surplus had been gathered prior to clover flow but now prospects were much improved for a good season. Swarming was slight. Market was unimproved.

REGION #7

The flow is about over in East Central Oklahoma. The only thing that will be available from now is cotton or alfalfa.

The bees have done a real good job under the conditions that prevailed. Most colonies have about finished filling and sealing two intermediate supers. Honey seems to be of good quality and light in color.

Weather not too bad, in fact, about every time we needed moisture we get it but cloudy weather hangs on for several days. We got 1½" June 6th.

Honey sales are still slow. No labels stating country it came from.

The year has turned out to be better than hoped for in Texas. Some beekeepers reporting 150 lbs. per hive. Recent showers have extended this years blooming period for horsemint, mesquite and white brush. Honey supply in abundance. Sales are moderate to good. All beekeepers increased numbers of hives this year to help make up for last years losses. All beekeepers are concerned about honey loan program and African bee.

REGION #8

Honeyflow has taken off in full swing in Colorado areas. Colony strength poor in some localities due to poor build up weather and plant conditions. Grasshopper spray programs are causing some beekeepers problems. Retail sales are normal for this time of year. Some promotional sales. More blended imported and domestic honey — so labeled — showing up on grocer's shelves.

Montana has worst drought and worst soil moisture conditions since 1937. Some rain fell in the middle of June but not enough. Soil needs 4 to 6 inches of rain to bring it to normal. Spotty flow from yellow sweet clover but highway crews cut the clover. Beekeepers waiting for major flow from white sweet clover and praying for more rain along with the ranchers and farmers. There is hope for rain at the end of June, if not, many beekeepers will be in dire straits.

Good flows from mesquite and catclaw in Alabama. Mild seasonal weather during the last month. Honey sales are increasing slightly.

REGION #9

Extremely dry in Washington. Lots of hive having to be fed until end of June. The main flow should begin around mid-July from clover the thistle. May be too dry this year for much of a honey crop. Summer tourist season is here and honey sales are good.

REGION #9

Sage flow on Central Coast California was slightly light, better hives made 50 lbs. of honey. Some bee swarms still reported June 20th which is late for Coastal California. Avocado pollination is finished for the year. Avocado growers are happy with fruit set where bees were used. Avocado growers who did not use bes report mixed fruit set. Hives in Los Angeles area are active but honey crop reported low in Clarement (Eastern L.A.). Large wax sale reported at $4.00/lb.

Beekeeping Technology

By DR. JAMES TEW
The Agricultural Technical Institute
Wooster, Ohio 44691

A Bee Tree Story

Recently a sawmill operator contacted the Institute and asked if we wanted a large bee tree that had been brought in during the winter. Since a class was underway that would be interested in the demonstration, we accepted the project. (Photo 1) The tree was a large sugar maple (36″ in diameter) with a hollow core that housed the colony.

Photo 1

In order to make the tree manageable, it was cut approximately 2½ feet from the end. We guessed that would be most of the space the colony occupied. We were delightfully wrong. It was about twice the size we had guessed. We elected to try two techniques: (1) cut and tie comb into standard frames that would be placed in a standard hive and (2) place a hive body on top and "drum" the bees up into the new equipment.

Photo 2

The first thing to be done in transferring comb is to open the tree up to expose the natural combs.

Frames were made ready by tying cotton twine in a zig-zag pattern. The string passed around small nails tacked into the frame. One end of the string was attached to a common rubber band. The band was stretched to pass over the last nail. The elasticity of the rubber band pulled the twice taut around all nails. Yet the string could be quickly removed when required.

Photo 3

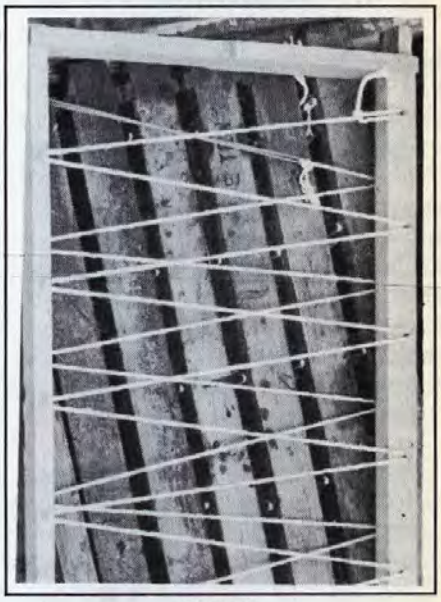


Photo 4

Photo 5

Comb containing brood was cut from the tree and placed in the prepared frames.

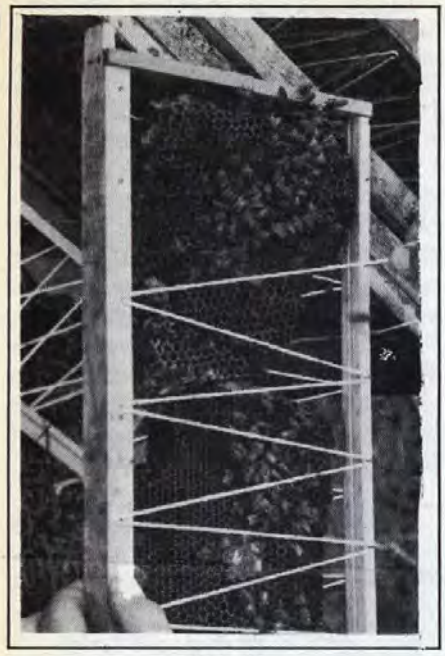


Photo 6

All the time cutting and positioning is occurring, we are looking for the queen. It was not necessary to find her, but it greatly improved chances for success if she could be found. Depending on the amount of brood present, 4-5 of the special frames were prepared.

Photo 7

The prepared frames were placed in a standard hive body. The remainder of the hive was filled with frames of drawn comb. The hive body was placed as near the original colony as possible and all other comb in the tree was removed from the area. We kept smoking and manipulating the bees until most of them accepted the new hive. It didn't take too long. The bees began to scent at the new hive entrance.

The hive needed extra feeding. After feeding, we gave the bees several days (2-3) to settle down after which time we quietly went into the hive to see if the queen had made the transition. If she did not, corrective action would have been taken. After a few months, depending on how well the special frames have been repaired, the frames were checked and replaced if necessary.

Photo 8

Drumming bees takes longer, but is not as disruptive. In our project, the other half of the tree was up-turned and a hive body containing a frame of open brood with other frames having dark comb was placed on top of the exposed cavity in the tree.

The tree was then rhythmically bumped to drive some of the bees up. Of course many of the bees stayed below. In our project, the queen was in the transferred comb colony. We gave the drummed tree a queen cell. The queen mated and began to lay in our hive body. At that point, we put a queen excluder under the hive to prevent the queen from moving down. As the brood emerged down below, they moved up and after a few months, the tree was reasonably free of bee activity.

Photo 9

Obviously, this is a time and labor consuming job. As with many other bee projects, the beekeeper does this for entertainment and not so much for monetary gain. When the procedures work as they did in this case, the effort can be very rewarding.□

Allergic Reactions And Primatene Mist

by CHARLES I. ABRAMSON Bekesy Lab 1993 East-West Rd. Honolulu, HI 96822

Recently Joann Olstrom *(Gleanings,* July, 1984) presented an entertaining and informative article about the relationship between shot-kits (i.e. Ana-Kit and Epi-Pen) and allergic reactions produced by bee stings. I would like to expand Olstrom's article by relaying to beekeepers and to individuals who suffer from allergic reactions, a suggestion by G. Sofio M.D. (Honolulu, Hawaii) that Primatene Mist (an inexpensive over the counter spray developed to relieve attacks of bronchial asthma) is also effective in relieving allergic reactions. Subsequent research has indicated that Primatene Mist as well as Bronkaid Mist have a number of advantages such as availability, low cost, ease of administration and speed of action, which indeed make them appropriate alternatives or supplements to shot-kits in emergency situations or in situations where shot-kits are not available or are undesirable.

The compound in Ana-Kit and Epi-Pen responsible for relieving symptoms of a severe allergic reaction is epinephrine. Epinephrine, the major compound in Primatene Mist and in Bronkaid Mist, is a neurotransmitter which stimulates noradrenegic receptors and produces dilation of the pupil, relaxation of the bronchials, drying of the nasal mucosa and increases in blood pressure. Epinephrine is effective in reducing allergic reactions because it is antagonistic to the effect of histamine which is present at high concentrations in bee venom. There is also some evidence which suggests bee venom liberates histamine by injuring skin cells. (Histamine is a neurotransmitter and is important in tissue growth and in the initiation and maintenance of tissue cells. It can be found highly concentrated in the skin, intestines and lungs.)

To be effective epinephrine must be administered quickly. This may be problematic if Ana-Kits are used because such kits require a series of well coordinated movements which may be difficult or impossible to perform quickly and efficiently against a background of wheezing, itching and in more serious cases involuntary urination or defecation. Epi-Pen eliminates the problems associated with a hypodermic syringe since it needs no assembly or preparation. Fear of self-injection or of being injected by untrained individuals is also minimized by housing the epinephrine within a concealed spring-activated needle which is pressed against the skin. Unfortunately the cost of Epi-Pen ($21.00) compared to Ana-Kits ($10.00) prohibits wide spread use. Primatene Mist however, is inexpensive ($6.00), uses no needles, and is easy to use as removing the top, aiming the nozzle toward an open

mouth and pressing the cap. Moreover, the threat of muscle damage caused by a careless injection is eliminated.

Although Primatene Mist is easier to use than shot-kits its major advantage lies in the rate the epinephrine is absorbed (i.e. speed of action). Within seconds during a severe allergic reaction the throat may swell nearly shut making breathing extremely difficult and mouth resuscitation almost impossible. If Ana-Kits or Epi-Pens are used during such an episode epinephrine must be injected intramuscularly (im). Drugs injected intramuscularly are absorbed by capillaries in the muscles and go through the venous system to the heart. Although im injections result in a even absorption of epinephrine the rate of absorption is slower than in other routes of administration. Just how slow depends on factors such as percentage of body fat and the type of agueous or inert oil base solution used to transport the epinephrine. Primatene Mist is actually better than shot-kits in situations where breathing is labored because epinephrine is administered not only quickly but precisely where it is needed.

In conclustion Primatene Mist is a non-prescription, low cost, easily available, and effective alternative or supplement to shot-kits. It can be carried unobtrusively among a beekeeper's paraphenalia and/or brought to events such as state fairs and school demonstrations — wherever emergencies may develop. Those interested in a detailed treatment of the various types of bee venom hypersensitivity as well as obtaining information on diagnosis and treatment are advised to consult an article by H.R.C. Riches *(Bee World* v. 63 1983).□

Research Review

By DR. ROGER A. MORSE
Department of Entomology
Comstock Hall
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Ithaca, NY 14853

The Influence of Pollen on Pesticide Sensitivity

The amount and quality of pollen ingested by honeybees during their first few days of life determines how sensitive they are to certain pesticides according to the paper listed below. Not all pollens are equal insofar as their protein content and food value are concerned. Some pollen, especially that from conifers, is essentially worthless for bees. Other pollens are high in nutritive value. At the same time older bees are more sensitive to pesticides than are young ones. Old bees that had helped to rear brood in the early spring were especially sensitive.

The reason for this higher poison sensitivity is that well fed bees are better able to break down or decompose materials that are toxic to them.

From a practical point of view these observations show that it is important to consider the age and physiological condition of the bees being used to test the toxicity of pesticides. Chemicals thought to be safe, because they were tested using well-fed, young summer bees, might cause some difficulty in the early spring or another time when the bees were stressed. From that point of view these experiments may explain some of the odd bee kills that have been noted when presumably safe materials were being used.

Generally speaking, the fact that honey bees feed on a variety of pollens, some with greater nutritional value than others, makes up for most deficiencies.

However, it has been noted that in some circumstances bees may feed on only one, or predominantly one pollen and this may lead to difficulty. In this regard honeybees are like other animals, including man; we all need a balanced diet to survive.

Reference

Wahl, O. and K. Ulm, Influence of pollen feeding and physiological condition on pesticide sensitivity of the honey bee *Apis mellifera* carnica. Oecologia 59: 106-28. 1983.

African Bees Having A Mating Advantage

In 1956, 26 queen honeybees from Africa were taken to Brazil for the purpose of improving Brazilian stock and honey production. Within not too many years the offspring from these bees overwhelmed the European bees that were present in Brazil and over a million colonies became Africanized. How such a small number of queens could be responsible for such a great change has been a biological mystery. A partial, if not the whole answer, lies in recently completed experiments done in Venezuela and the Bee Breeding and Stock Center in Louisiana. There is no question that, as the authors suggest, it appears that the African bees have a "mating advantage".

In a first experiment, an apiary was established in Venezuela consisting of ten colonies with Africanized and ten with European bees. It is not difficult to keep colonies of European honeybees in areas where there are Africanized bees provided the European colonies are requeened with European queens mated with European drones. In these tests this was done by importing queens from the United States. Drones that emerged in an incubator were marked and introduced into colonies of their own race. Observations revealed that the Africanized drones drifted to colonies with European bees in "vastly disproportionate numbers". More important, perhaps, is that Africanized bees that moved into colonies with European bees were accepted whereas colonies of Africanized bees "only rarely host drones from other colonies".

In tests conducted with European honeybees in Louisiana, it was found that when drones were added to colonies, it depressed the number of drones the colony would rear. From this experiment it was conducted that the migration of Africanized bees from one colony to another increased the number of Africanized drones in colonies of both races and reduced the number of drones colonies of European bees would rear. This gives the Africanized bees a clear mating advantage and suggests, at least in part, how Africanization of colonies of European honeybees came about so rapidly.

Reference

Rinderer, T.E., R.L. Hellmich II, R.G. Danka and A.M. Collins, Male reproductive parasitism: a factor in the Africanization of European honey-bee populations. Science 228: 1119-21. 1985.

Is Feeding Fumagillin Worthwhile?

Several researchers have reported that feeding fumagillin increases the life span of worker honeybees and as a result honey production. This drug is specific for the control of nosema disease, which is caused by a microscopic organism that invades and destroys cells in the gut of adult honeybees. The disease does not affect larvae of pupae. So far as I am aware routine feeding of this drug is not widely done. I note too, that those in the northern states and Canada claim that the drug is more helpful in their areas than do beekeepers in the south.

A new paper from Poland supports the thought that feeding fumagillin is worthwhile. Twenty-four colonies were divided into two groups n the spring.

Each group contained weak, medium and strong colonies. The first group received treated and the second untreated sugar syrup.

The treated group produced more brood (20%), the bees lived longer (20%), the colony populations were greater (40%) and there was increase in surplus honey production (58%). These data suggest that more beekeepers should investigate the worth of feeding fumigillin for the control of nosema disease.

Reference

Woyke, J., Increase in life-span, unit honey productivity and honey surplus with fumigillin treatment of honeybees. Journal of Apicultural Research 23:209-12. 1984.

Honey Tank

by ALBERT C. BELL 2857 Colton Blvd. Billings, Montana 59102

Clare D. Floyd told me to get a steel drum, add a honey gate, paint it with food safe epoxy and use it as a honey tank. Clare was Supervisor, Section of Apiary Inspecting, Minnesota State. This was some 25 years ago when I needed to improvise until the bees earned enough money to buy their own equipment.

I now have a manufactured stainless steel honey tank with the steel drum as a standby or overflow.

My first project was a 55 gallon drum converted into a honey tank. It served the purpose but it took the muscle of a stevedore to wrestle around. It was replaced with a 35 gallon drum, which was smaller, weighed less and was easier to maintain and fill with honey.

My tanks were made when steel drums could be reasonably produced. The epoxy paint, pipe connections and a honey gate were also obtained at a nominal price.

Clare later became Director of Plant Industry, State of Minnesota. He was devoted to state, national and international beekeeping. Clare and his wife were very active in honey queen promotion. Their daughter Leslie was 1964 American Beekeeping Federation Honey Queen.

Take a clean steel drum, add pipe fittings for a honey gate. Al Bell photo.

The honey tank formula is to take one steel drum with cover, paint it with food safe epoxy as well as the pipe fittings, let it dry and assemble. Add a honey strainer, fill with honey for bottling.

Some steel drums have a flat bottom so it may be necessary to tilt the tank to facilitate the honey flow towards the drain.

Paint it with food safe epoxy, add a honey gate, fill with honey and beging bottling. Al Bell Photo.

A Non-Cook's Pancake Recipe

by JAMES E. TEW The Agricultural Technical Institute Wooster, Ohio 44691

My mother made certain I could cook enough to stay alive — but not much more. To this day I can cook basic things well enough to make people angry, but not sick.

Years ago, I was struck by the fact that my family ate all kinds of syrups and sweet toppings, but almost no honey. That, I decided, was a disgrace.

I have historically been responsible for Sunday breakfast at our house. What better place as a testing ground for recipes requiring honey. My three daughters all like pancakes. That would be my test product.

Each Sunday morning I changed only one ingredient to control variance as much as possible. As I look back, some of the things I tried were probably illegal. I used baking soda instead of baking powder one time — bad move! Those pancakes are still in my backyard, and they're several years old now. I used olive oil for the shortening — interesting, but no real improvement. After years of testing, the following ritual has been developed.

1. Come to the kitchen in a foul mood. Mumble something about never having another Saturday night like that ever again. Try to find the kitchen light switch.

2. Open all the cabinet doors. At my house nothing goes back in the same place twice. I can stand in the middle of the kitchen and make a quick review of the required equipment in the open cabinets. About this point, go to the stairs and, in a fatherly voice, command my three-year-old (Erin) to bring the measuring spoons from her toy box. She probably won't.

3. In a pan (or bowl or whatever), put two cups of unsifted lumpy flour. Add about 3 teaspoons of baking powder, a touch of salt (not much, it's bad for the blood pressure), and about 3 tablespoons of wheat germ. Stir briskly, while humming the tune of your choice.

Put 1 or 2 eggs on top of the mx and add 2-6 tablespoons of honey (probably about 2½). Pour in ¾ cup of condensed milk. (Cook's note: We never have condensed milk, so just use 2% lowfat milk.)

The author in exile with a plate of his pancakes.

Briskly stir again. The resulting mix will be too thick. Add milk until you think it's not. (Cook's note: Thick cakes containing honey will brown too much before the center is done. Kids will not eat cakes with uncooked centers.)

Since this advanced recipe now contains no shortening at all, turn your cooking device to "incinerate" (about 410°F). Pour or dip batter onto the cooking area. The size of the pancake depends on the size of your spatula. If you have a small spatula, don't make large cakes—you can't turn them over. (Cook's note: Never attempt to flip cakes in the air as seen on television. That's not the real world.)

When the batter is poured on the cooking surface it should splatter and sputter in a friendly way. In 36 seconds, the batter should begin to generate big carbon dioxide bubbles. When the batter looks dry around the edges (50 seconds), flip the cakes.

If you started with a clean skillet and reached the required temperature, there's no problem. If either of the above criteria are not met, you are in serious trouble. Pancakes that stick in a dry skillet cannot be removed with anything known to man.

After the cake is flipped, allow it to cook 30 to 40 seconds on the other side. The cakes will not look the same on both sides. I don't know why. You select the side that looks better for serving purposes. Lay the cakes on a towel and fold the towel over on the cakes to keep them warm.

When eating, don't cover with butter and honey but rather put honey on one part of the plant and forget the butter. Dip the cake in honey and eat. That way, the cakes don't get mushy and you can enjoy the results of cooking (pancakes) and beekeeping (honey) efforts.

If everyone in the U.S. would make pancakes following my procedure, a family of four will use one pound of honey every five months. That means the per capita consumption will increase from .9 lbs./year to 2.5 lbs./year. That would eliminate the current honey surplus and have everyone eating better too. Enjoy.□

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Bee Talk

By RICHARD TAYLOR
Route 3
Trumansburg, N.Y. 14886

I want to talk about harvesting honey, that is, getting it off the hives. There are lots of ways of doing this, and I've tried all of them with the exception of chemical repellents. I don't know why I don't like the idea of chemical repellants. Maybe I'm too old and sets in my ways even to try them. I tried a bee blower for a few years, and rather like the thing. I could go to a distant yard and bring the honey home in one trip. But it was noisy and made a lot of smoke. One day it broke down half way through the job. Nothing serious, but it did disrupt my whole day. I finally sold it. I like to keep things simple, and it seemed like something I didn't really need. I went back to the old-fashioned bee escapes. This system works for me every time. They are cheap, last forever, and I can store them all in a little bag on the shelf in my shop. And they don't ever break down and need repair.

Inner covers are designed to hold a bee escape right in the center, but I don't use these for that purpose. The inner cover should stay right where it is, stuck onto the super with propolis. Don't pry it loose when you go to harvest honey. It serves to keep robber bees out when the escape device is in use. Use an escape screen rather than an inner cover. This is essentially the same thing, except that all or most of its surface is screen rather than wood. There are two reasons for using screens. One is that the bees vacate the sueprs twice as fast. I don't know why but they do. And the second is that the honey will keep warm and dry, even if it rains.

Some beekeepers suppose that if you use two or more escape devices in the escape screen then the bees will vacate the supers that much faster, but I have never found it to be so. One seems to work just as well, in my experience One thinks of the possibility of the escape device becoming obstructed by a dead drone, but I have never, in decades of using these things, had this happen. One word of caution: You must not put a bee escape under a super that has even the smallest patch of brood in it. The bees will not abandon the brood, and the escape device will, in that case, become clogged, by bees trying to pass back and forth in it. So if you find an escape device that has become plugged by dead bees, check the super, and you will almost certainly find brood in it.

The escape screen should have a rim around the edge on **both** sides. It will probably work with a rim only on the upper side, but it should have one on the bottom side too. If you don't have a rim on the upper side, then sometimes a comb of honey will end up right on top of the hole in the escape device, obstructing it.

Some beekeepers think they should leave the escapes in the hives for several days, maybe even a week, to give the bees plenty of time to leave the supers. This is a big mistake. Just one night is usually enough time, two nights at the most. The bees vacate the supers very quicky through these things. Several bad things can happen if you leave them in place too long. The bees are apt to discover, or create, a little opening, for instance, and rob the supers dry. It doesn't take them long, once they get going. And the little wire springs in the escape devices will become plugged up with propolis. And the escape screens will become covered with burr comb. So my practice is to put them on one day and take them off the second day later.

You've got to check the escape devices each time before you use them, to make sure they are not gummed up with wax or propolis. You can just peer in the end and tell at a glance. The plastic ones slip apart quite easily,and any wax or propolis can be scraped loose with a little knife. Or drop the escapes in alcohol overnight, to soften the propolis. Actually, if you don't leave these escapes on the hives too long, you can use them for years before they get gummed up.

Last year (*Gleanings*, Sept./'84) I described a simple escape screen which anyone can make up in a few minutes, and I had there a couple of snapshots of one. That produced an avalanche of inquiries, which went on for weeks afterwards. So I decided then that, at the appropriate time, I would say something more about this escape screen.

It seems to have been invented by John Musgrove, an outstanding beekeeper and inventor. He call it "The Down and Out" ventilated escape screen. The description is apt, because the escape devices are fitted into the corners in such a way that the bees have the choice of going down into the hive below, or right outside, through the edge of the escape device.

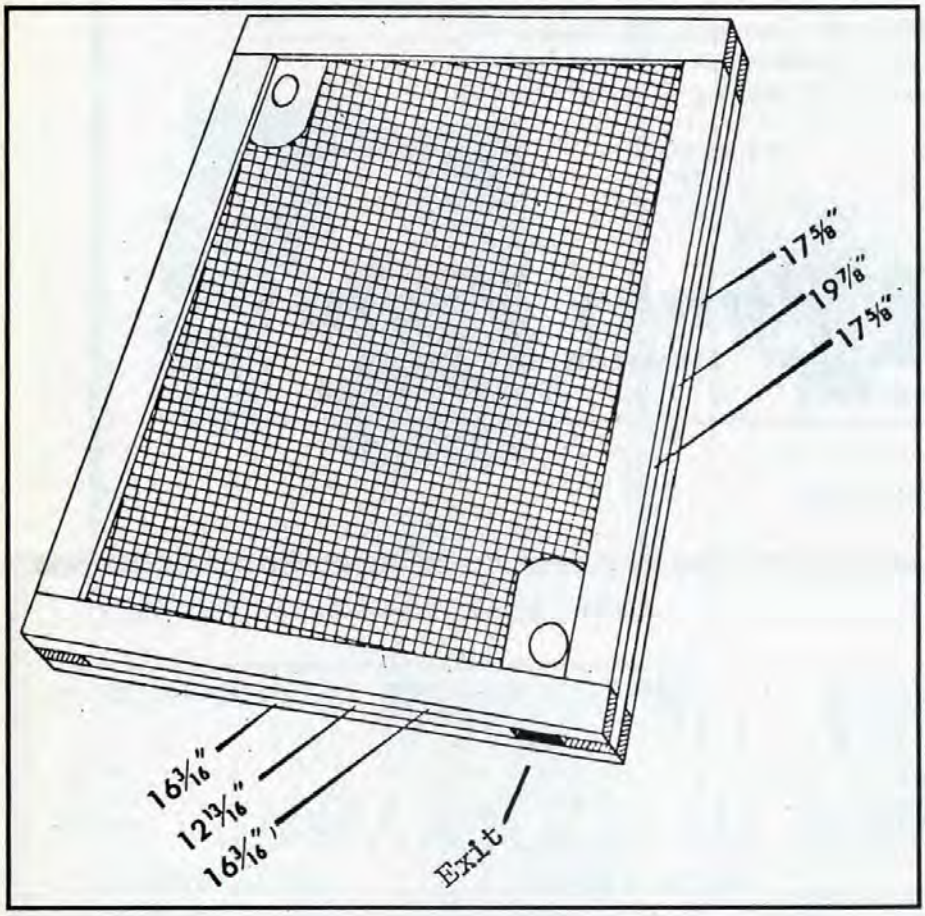
All you need to make one of these escape screens is twelve strips of wood cut to four different lengths and a piece of screen the size of an inner cover. That's all. And for tools you need a saw to cut the strips to the right lengths, tin snips to cut the screen, a tape measure, and hammer and nails. The screen should be eight-mesh, that is, eight squares per inch. It is a bit expensive, and not every hardware store will carry it, but it is stiff and strong and definitely preferable. But if you don't have that, you can use ordinary fly screen, which is sixteen-mesh. The only trouble with that is the screen boards will be flimsy and you have to use them with some care. But they will work okay, and the screen can be cut out with any pair of shears; no need for tin snips.

The construction of the escape screen is nicely illustrated on the accompanying diagram, supplied by the A.I. Root Company. The strips are a quarter inch thick, cut to the four lengths indicated, nailed together with the screen sandwiched between. The escape devices fit in the corners as shown.

The diagram is, however, misleading in two ways. The escape devices go **under** the screen, and not above it, as they appear to in the

Continued from previous page

diagram. And a neat round hole must be cut in each of the two corners of the screen, right above the hole in the escape device. The reason for that is obvious. The other thing about the diagram that might be misleading is that it appears to be made with a large mesh hardware cloth rather than a screen, but that should not confuse anyone. The escape devices are held in place in each corner by simply having one edge and one sandwiched between the strips, so they can be removed and reinserted with ease.



The "Down and Out" ventilated bee escape screen. The two-way escape devices are held in place in the corners, by pressing one edge between the wood strips of the frame. Note that the bees can exit from supers to outside the hive, through opening marked "exit", as well as into the hive below. Strips are ¼ thick. [Diagram supplied by courtesy of The A.I. Root Company, Medina, Ohio.]

It would be hard to imagine a simpler or more useful piece of equipment, and I can assure you it works beautifully. Even one who is, like me, not very handy with tools should be able to make up a dozen or more of these escape screens in an hour or two. Just cut up the strips and sort them by lengths, cut out the screens and make the little holes in each of the two corners, and nail them together. Or, if you are unclear about anything, buy one from a bee supply company and use it as a pattern or guide.

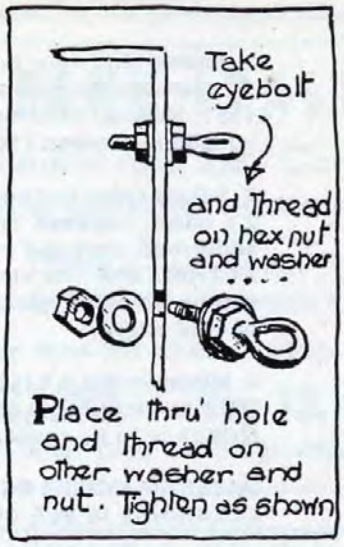
[Questions are welcomed. Please make them brief and to the point and enclose stamped self-addressed envelope.]

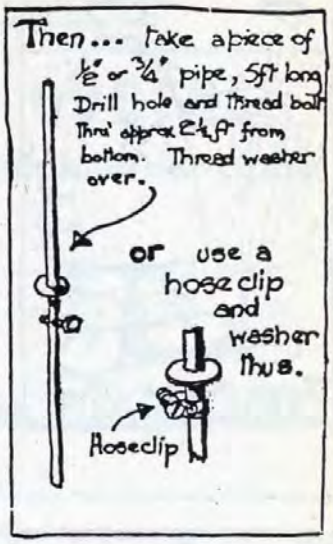
The Mulligan Single-Frame Extractor

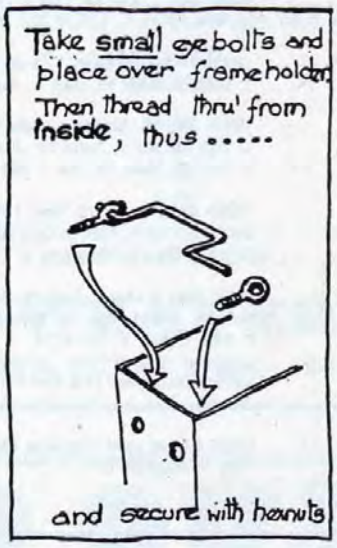
by RICHARD TAYLOR RD 3 Trumansburg, NY 14886

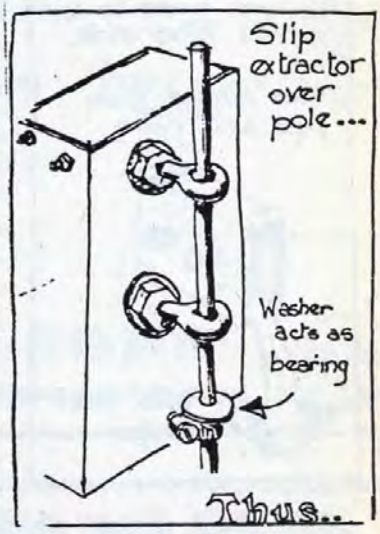
Beekeepers at the 1984 E.A.S. Convention in Rhode Island were highly entertained by the affable Mr. Joe Mulligan and his one-frame extractor. It is the ultimate in simplicity, and works like a charm, provided you don't have too many apiaries. Here is Mr. Mulligan's directions for making one. He recommends a stainless steel extractor box.

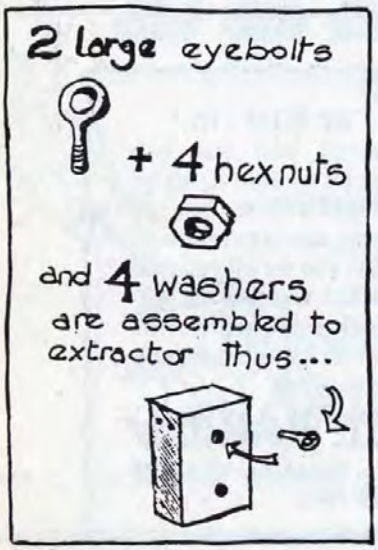
Mr. Mulligan and his extracting machine.

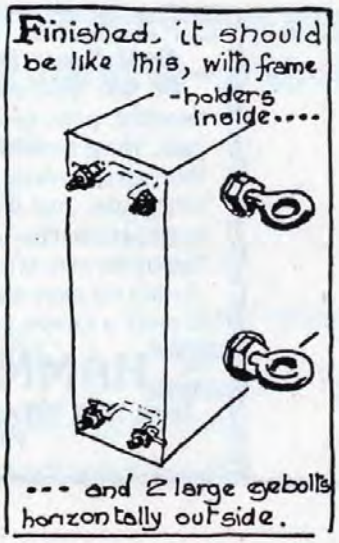


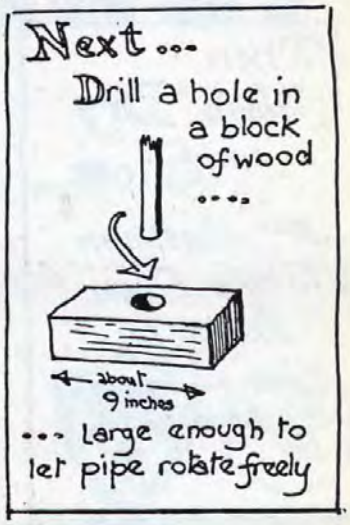












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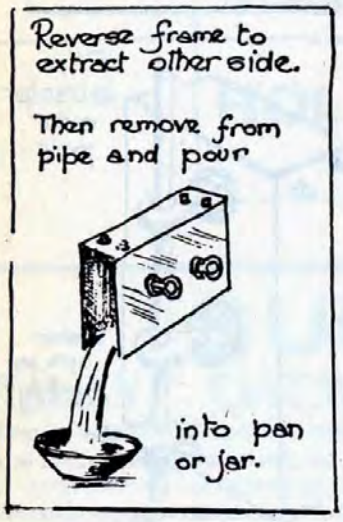

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Continued from page 395

2. Sealed bids must be RECEIVED at this office by August 31 1985. Mail to: Editor, GLEANINGS IN BEE CULTURE, Box 1151, Medina, Ohio 44258. Questions may be directed to telephone number 216-725-6677.

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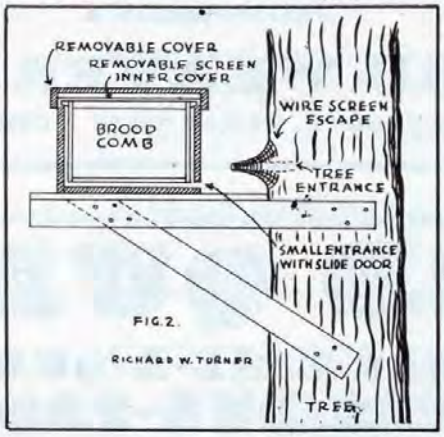

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Research Review Correction
July 1985

There is a problem with the Research Reviews printed in the June issue (page 310). You will note the authors were left off the second review. The authors should read:

Heath, L.A.F.
Occurence and distribution of chalkbrood disease of honeybees. Bee World 66:9-15. 1985

Editor's Note:
June 1985 Issue

In the *Gleanings Mailbox, June '85 issue, there was an address for the* **"Honey Pots"** article. This address was incorrect. The correct address is:

J.A. & S. Hill
Yeaveley House Farm
Yeaveley
Ashbourne DE6 2Dt
Derbyshire
TEL: GT. CUBLEY 254

Wintering The Honeybee Colony: Part III Factors and Strategies for Survival

by T.S.K. JOHANSSON and M.P. JOHANSSON
R.D. 1 Box 256A East Berne, NY 12059

Emergency Feeding

Colonies which have less than the equivalent of 3-4 full combs of honey (15-20 lbs.) should be fed, and the easiest method of doing so is to replace empty combs with combs of honey from disease-free colonies with an excess. Supers of honey for this purpose can be set aside in the autumn when the crop is harvested, but care must be taken to protect them from mice, moths, and robber bees. Be certain that the empty combs to be exchanged do not contain significant amounts of pollen.

Lack of sealed honey and quivering bees are symptoms of starvation, and the cells of the comb honey placed along side the cluster should be opened up with a fork first so the bees can get at the honey easily. Alternatively, an empty hive body can be placed on the hive with a comb of honey laid on the top bars over the cluster and covered with insulative material. If combs of honey are not available, other means of feeding must be used and the experience should persuade the novice to leave more generous stores for the next season[45].

Empty combs alongside of the cluster can be exchanged for combs filled with warm, thin syrup (equal volumes of sugar and water heated to 140°F). It is not easy to get syrup into the cells. A messy way is to lay the comb in a washtub and pour in syrup from a garden sprinkling can held high above the comb. A metal can, pail, or plastic container with many holes punched in the bottom can also be used. The bee supply houses now have machines, including one operated with a battery, that spray syrup into the cells.

An alternative is to hang the combs a tank or tight wooden box with an inlet at the bottom. A hose with a funnel at the end is attached to this inlet. The funnel is raised above the tank, and the syrup poured in slowly. As the syrup rises up around the combs, it will displace the air in the cells from the bottom row to the top row without entrapping air. The syrup is than allowed to run out of the tank (a gate could be used to speed up the emptying). The combs are placed in a super set on a drip board to continue draining. An old fashioned double wash tub with drains would be ideal[46]. D. Dixon warns spraying or submersing combs in syrup will spread disease spores if combs were used in diseased colonies. Plastic combs, or S. Fujiuara's combs made of plastic straw cuttings would be effective syrup-feeders[46].

Standard feeders can be used if the temperatures are such that the bees are not clustered. It is advantageous to leave wooden frame feeders in the hive year around as they are kept propolized by the bees, and do not warp and leak. Glass or metal feeders with insulative material around them can be placed in a feeder-board on the top bars over the cluster in an empty hive body. Feeders can also be set on a couple of sticks to allow the bees room to get at the holes in the bottom of the feeder. Changes in atmospheric pressure cause syrup to be pumped out. For this reason, it may be better to use several small jars rather than one large feeder. When temperatures permit, feeders made by cutting 1-5 gallon cans lengthwise can be placed on the frames, or the inner cover, with floats for the bees to stand on while they feed and ladders of screening, cheesecloth, or burlap to climb up on. Any sort of pan will do. Burlapsacks under poorly fitting covers will keep robber bees out[47].

Sugar syrup is very attractive to bees and must be taken not to have spills around the apiary that might intice robbing. Cushman recommended dry sugar feeding as used by Samuel Simmons in England[48]. It is ideal in regions where the humidity is high, or when bees can fly for water. It can be fed moist in a frame feeder, or poured dry over the tops of the frames along one side of the hive. A shelf can be made by inserting a 5" wide piece of foil or newspaper across the back between the upper and lower hive body. Sugar that spills into the brood cells will kill the larvae, and lump sugar placed over the top bars avoids this danger. Moist sugar can be wrapped in cheesecloth or waxed paper and placed on the frames with a slit in the form of an "X" on the underside to facilitate feeding by the bees. Sugar can also be poured on the inner cover or in and above the hive feeder such as Miller's or Brother Adam's, but where there is condensation of water in the hive the sugar will get very messy. Furthermore, the bees cannot carry the sugar down unless it is warm enough for them to break cluster and move around the hive. The need for water to dilute the sugar may cause them to fly out and freeze.

British and European beekeepers use sugar candy (fondant) for feeding, and Gates bulletin provided a recipe for soft candy such as Fuller and others were using[49]. The trick is to pour the mass into containers such as feeders or inner covers, before the mass hardens. It can be moistened and reworked with difficulty. British bee supply companies sell blocks of fondant candy for feeding bees. Some cookbooks have recipes for fondant, and there are books on candy making available at local libraries. A simple recipe appears in the USDA Handbook No. 335 (1980 rev):

"Mix one part sugar with one part water by weight and heat this mixture until it becomes the thickness of fudge (soft-ball stage). Pour the candy mix on waxed paper and allow to harden. Feed by placing the candy on the top bars directly over the brood nest and cluster".

(Continued from previous page)

Robert Thompson feeds candy which is made directly in the frame feeders:

Fill feeder with dry sugar within ¾" from the top; fill the feeder full with a syrup made of ½ cup water and ½ honey (disease free) heated until "good and hot" (160°F). If the syrup stands in the feeder, pour more dry sugar over it. The candy should harden in about two days[50]. This is a simple way to make candy and might also be used to make it in feeding rims to avoid the need for mixing and heating? But it seems advisable to use corn syrup (glucose) instead of the honey as the source of invert sugar to be certain honey from a diseased colony is not used inadvertently.

P.F. Thurber suggested Amstar Corporation send us a sample of their Amerfond fondant sugar made of 95% cane sugar bonded to 5% invert sugar (glucose and fructose as in honey). He and other western beekeepers have used a similar product manufactured by the C & H Sugar Company in San Francisco and fed dry. We made fondant by adding cold water to the Amerfond and wrapping it in wax paper to place on top of the frames where it could be inspected easily to determine when it needed replacement. We used four colonies that were short of stores to which we ordinarily would have given combs of honey from colonies with an excess. The colonies cleaned up the fondant readily, and the five pound sample was sufficient for four feedings. We also gave them a fifth feeding of fondant made the old fashioned way. The suggested list price of $28.50 (June 1984) for a 50 lb. bag makes fondant expensive, but it has the advantage that small quantities can be prepared easily as needed. For large quantities a machine such as a dough mixer would be required. According to Amstar, a viscosity of 88% remains fairly plastic and 84% is pourable. This range requires 6-7 pints of water per 50 lb. bag[51].

The usual method of cooking fondant is done with an eye on the thermometer to ensure the mass doesn't harden before it can be poured into feeding rims. Candy has also been made by heating granulated sugar for 30 minutes with lactic acid to hydrolyze the sugar to invert sugar, or without heat by using invertase enzyme[52]. "Ragus bee candy" in 7 lb. blocks available from E.H. Thorne in England is made of invert sugar produced by enzymes, and does not soften under damp conditions such as prevail in the hive. Hoffmann-La Roche manufactures crystalline fructose, but at 75 cents per pound (1978) it is not likely to be in demand by beekeepers.

The feeding of sguar candy may have originated in Canada. A "new" winter feeder was described in 1886 with shelves on which to spread candy as made by Frank Benton (the I.R. Good Candy made of honey and sugar). The feeder placed on top of a hive held 25 pounds of candy. It was anticipated that if the practice was adopted widely the candy would be produced and sold by the barrel. The assurance that by using these feeders the colonies "will not die from eating too much pollen" reflected one of the current theories to explain winter losses. An editorial the next year announced that Neighbor & Son of England had doubly improved the "Canadian feeder" by making a trough at each end. It was exhibited at the Colonial and Indian Exhibition. The Jones bee supply firm in Canada had improved theirs by using perforated metal to prevent bees from drowning in sugar syrup fed at the rate of 15 to 20 pounds in one night. It may be that this version was the fore-runner of the Miller and Adam feeder[53].

Pollen. It is difficult to believe that 100 years ago the troubles of wintering were blamed on the presence of pollen in the hive, but there were protests, including a letter from Sweden in 1885[54], from observant beekeepers who realized the absurdity of such a theory. Frank Benton expounded on the necessity for pollen to rear brood in January and February in his *Manual of Apiculture* (1896).

In the 1980's we have come to realize that colonies deteriorate during the winter for lack of sufficient pollen or nutritionally deficient pollen, with the loss of drone brood a symptom of deficiencies. The extended longevity of winter-bees is due to their consumption of pollen in the autumn, with concomitant enlargement of glands and fat bodies from which they synthesize food to feed brood in winter.

In a natural nest there is a band of pollen between brood cells and honey above them, but most pollen is stored at the sides and below the brood cells. Even in Maryland, Kelly recommended three hive bodies with 75 pounds of honey for wintering. At the close of the season the colony contracts the brood nest, and the lower story provides space for excess pollen. Any manipulation which disrupts this pattern, such as removing a hive body used for brood rearing, may reduce the amount of pollen available during the winter and early spring until fresh pollen is collected[55]. "Man does not have to be the bee's worst enemy, but he often is" (J. Holzberlein).

It is suggested that the equivalent of two frames (4-5 comb faces) of pollen (500 sq. in. or 10-15 lbs.) should be in place when the season is over. Inadequate vegetation in arid regions may require one pound of pollen to rear 4,500 bees. The pollen in 226 colonies in Wyoming ranged from 89 to 334 sq. in.[56]. Combs of only pollen cannot be stored away from the hive during the winter as they are likely to mildew if not covered with honey and sealed. Pollen ferments forming lactic acid to become the more nutritious "bee bread".

The idea of feeding bees has been around at least since 1655 when S. Hartlib suggested dry meal, and others followed with startling suggestions such as asses' milk[57]. James S. Black included these directions for using his Moth-proof Self-Swarming Bee Palace:

"Keep your Palaces in a comfortable place in winter; give your bees plenty of maple sugar, fine corn-meal mixed up with water in a dough form, a little molasses and salt over, and in the spring you will have strong, rich, and healthy swarms, and an early increase" (1860).

Benton observed that beekeepers in German heather districts fed "stampf honing" from crushed combs containing pollen making this an ideal feed

Thirty years ago the USDA undertook to find a substitute that would give beekeepers the option of feeding a pollen equivalent as needed. In 1956 a California pollinator indicated he would willingly pay $1 per pound for a substitute equal to pollen. Current recommendations can be obtained from Extension Apiculturists and USDA publications[59]. Substitutes must be fed before pollen is available from flowers: "Bees will however always prefer pollen" (A. Maurizio). If not placed adjacent to the brood nest, it will not be used until the brood nest expands to it.

Bees do eat substitute feed more readily with pollen added; then called a supplement. The danger for beekeepers who purchase pollen, rather than trapping their own, is the risk of importing disease. New Zealand beekeepers who fed samples of U.S. pollen substitute, supposedly without pollen content, were frustrated when their colonies came down with American foul brood and chalkbrood from spores contained in pollen that had been added after all[60]. It would have been better to have used the lipid purported to get bees eating enough substitute feed to rear as much brood as with pollen[61]. Emptor caveat!

Water. When brood rearing gets underway, water is needed to dilute honey and synthesize brood food. Colonies in the cold North may not be able to collect water outside the hive from November through March, but honey metabolized for heat produces water as a by-product. This metabolic water is available for physiological functions within the bee's body, and any excess released as water vapor within the cluster may be absorbed by the hydroscopic honey or is available to other bees.

Since cracks and openings are sealed with propolis, what air enters the hive is limited to the entrance. Some races such as Caucasians build curtains of propolis to reduce this further. These propensities ensure the colony can control the hive environment; fanning increases this minimal exchange to whatever level necessary. Colonies have been protected their combs from melting when the hive was afire! Bees have been observed to cluster against the entrance when cold winds blow, and permit air in as needed. Swarms in nests they built in a hive without frames were then placed in a glass box. When a fan was used to blow air on them, they withdrew to the most protected portion[62].

The coating of propolis on the walls of and top of the hive prevents moisture from penetrating the wood, and instead can humidify the air in the hive. Humidity in the brood nest is constant, but elsewhere there are variations with the highest relative humidtiy in the coolest part of the hive. In winter, the humidity is 1-2 mg/1 higher than the external air. Colonies could not maintain brood rearing when the relative humidity in a flight room fell below 25% at 34°C (93°F)[63].

Beekeepers feeding candy have placed a sheet of enamel cloth over the frames so that bees could collect the drops of water condensing on it. Bees fed 45% sugar syrup did not collect water even when the air in the hive was dry, but they did when fed 80% sugar (honey equals 80%). When bees must be fed sugar syrup in an emergency, they should be given a 50% solution.

Colonies wintered outdoors in temperate climates do not need to be fed water, but beekeepers have fed water to colonies in cellars and above ground repositories when the stress of low humidity increased hive and repository temperatures. Giving water calms them quickly. With the first flight in spring, bees will begin to collect water for diluting honey. It is important there be a source of water close to the apiary, especially if they are likely to annoy neighbors by collecting at livestock troughs, swimming pools, etc. In the Southwest United States, colonies require 40-70 gal per year[64].

Packing

Whether or not it is necessary to pack and/or wrap hives for successful wintering has been the subject of lively debates during the past century. With such varied climates and conditions throughout North America, it is difficult to make generalizations that will fit all situations. Apiculturists often recommend following the practices of successful beekeepers in the neighborhood, success being defined as having losses of 5% or less. Most United States beekeepers do not pack their hives, or they use a simple wrap of roofing felt[65].

The advantages of packing are apparently not sufficient to justify the trouble and expense for commercial beekeepers; beekeepers in Alberta accept a 50% loss as tolerable[66]. But they are in a unique region where a two pound package installed April 1st can be split to produce two large colonies by July and which may yield crops of 250 lbs. or more. Under such conditions, wintering techniques that reduce losses to zero would require tripling or quadrupling equipment for increase in order to control swarming. Holzberlein (Meeker, Colorado) winters only the best provisioned half of his colonies from which he averages three splits from each colony to produce a 50% increase if needed[67].

When colonies left unpacked by chance survive as well or better than packed hives, beekeepers have modified methods accordingly. Impassable roads prevented a Regina, Saskatchewan beekeeper from gassing his colonies as usual, to be replaced with packages in the spring. When he found that nine of the ten colonies buried in snow were in excellent condition, he began to overwinter his colonies with no preparation other than screening the entrance against mice; a windbreak of trees was already present. But he does not recommend others follow suit[68]. Colonies have even survived a severe winter without a cover on top of the hive[69].

Advantages. Although protection from prevailing winds is considered more effective, packing is an option where windbreaks are not possible[70]. There is a loss of 8°F for every five mile increase in wind velocity. Packing is also thought to be advantageous if the population is small and/or stores are minimal. But colonies that do survive with such serious deficiencies are not likely to be as productive in the next season as strong colonies. It is recommended that weak colonies be united to other colonies, or shaken from their combs to join other colonies. It would be prudent to check for disease before bumping combs about and dripping honey around the apiary, and also to take measures to prevent robbing. **Continued on next page**

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Packing may reduce honey consumption 11-18 lbs., but the objective of successful wintering is to have a strong colony in spring and not to save honey; large colonies consume the most honey. Adding additional insulation does not reduce the minimum quantity of honey (12½ lbs.) used during the winter period[71]. Colonies that were helped by packing in severe winters had half the stores (35-50 lbs.) considered optimal (100 lbs.) for northern locations[72/70]. Even the opponents of packing agree that on those occasions when temperatures fall quickly, insulation may delay the drop inside the hive and avoid some bees being left isolated outside the cluster[23/73].

Disadvantages. (1) Heavy packing creates a lag of 6-8 hours of warming by the sun compared to one or two hours in unpacked hives[74]. Cheshire considered the low thermal conductivity of wax, and the high capacity of honey to retain heat important to the bees' success in overwintering. The colony with excess stores may have an advantage if these help to moderate the fluctuation of temperature. The hive would have some warmth even without bees to the extent that the combs retained heat absorbed from the sun[75].

Should the lag prevent a long awaited opportunity for a flight to discharge accumulated feces, the bees might have problems with dysentery or Nosema. If prevented from moving to new combs of honey during a rare thaw, they might starve. Conversely, if insulation retards cooling down after overheating, the distress might cause bees to emerge, become chilled, and unable to return. It took 675 minutes for a cork-insulated hive to cool 75°F compared to 570 for straw, and 503 for a single-walled hive[76].

(2) Strong, well fed colonies (60 lbs. or more), protected against prevailing winds are considered as likely to survive without as those with insulation[74/73]. Haydak in Minnesota was convinced that packing was advantageous for wintering in the North. In two decades 38.8% of his unpacked colonies were lost (died, queenless, or weak) compared to 17.6% lightly packed and 14.2% heavily packed (15.9% combined). The unpacked colonies consumed 56 pounds of honey compared to 51 pounds for lightly packed and 50 pounds for heavily packed. T. Szabo found the lowest average consumption of outdoor colonies to be 39 pounds and the highest 71 pounds. Single colonies consumed as little as 22 pounds and as much as 86 pounds[77]. Unfortunately, Haydak did not report the weights of the colonies, nor the amount of stores except as "ample". It is therefore not possible to rule out the possibility that the packing did in fact fulfill the function of assisting a larger percentage of minimally provisioned colonies to make it through the winter. The 15.9% loss of packed colonies does seem high when compared to the author's loss of 18% of unpacked colonies (with 70+ lbs. of honey) in the unusually severe winter of 1969-70[78/30].

(3) Insulated colonies start brood rearing a few days earlier, but those without tend to catch up shortly after warmer weather arrives[74].

(4) Where mild winters predominate, as in Great Britain, Western Europe, and Northwest and Southeast United States, beekeepers are mostly concerned that ventilation is adequate to remove moisture. The tunnel required with packing reduces the movement of air.

(5) If in packing we perceive bees are requiring the same comforts as warm-blooded (homeothermic) humans, we misunderstand the fundamental difference of cold-blooded organisms (poikilothermic) such as insects whose metabolism is dependent upon the temperature of their environment. You can estimate the temperature without looking at the thermometer: crickets chirp slower on cool nights and faster on warm ones. To remove a rattlesnake from its cage, we reduced the risks of being bitten by placing the cage in a cold room overnight to lower its metabolism and slow down his ability to move. When he warmed up, he showed his resentment at having his "snakehood" so demeaned: his rattling was heard through the ventilators throughout the entire building for hours!

Individual bees are dependent upon the external temperature as other insects, but a colony of bees has the unique ability to maintain a minimum temperature of 44°F when temperatures fall sufficiently to cause them to form a cluster. Individual bees have lost the ability of other insects to hibernate through the winter, and can survive only as a member of the colony cluster. Cheshire credits W. Raitt with the often quoted maxim that "The best protection [packing] for bees is bees". There is considerable merit in this view.

If we insulate colonies with the object of keeping them warm to save them having to heat the hive by eating honey, we may, in fact, be working at odds with our intended purpose. Bees consume the least honey at 46°F[79] If the temperature rises above that, the bees become more active and consume more honey to produce the required energy. Water, carbon dioxide, and heat are by-products when honey is metabolized to obtain energy. Minute quantities of indigestable materials will also accumulate in the hind gut. The water evaporated by the excess heat as water vapor will carry off the carbon dioxide.

If too warm, clustering does not occur and stores may be exhausted before the spring nectar flow begins. In warm climates there is a good rationale for placing colonies in refrigerated repositories to reduce their metabolism and food requirements; thus increasing their longevity ("Keep cool man!").

When temperatures drop below 46°F, bees consume proportionately more honey but there is also proportionately more heat to evaporate the resulting water in the cluster. The bees in the middle of the cluster benefit from conduction of heat from the rest of the bees, so they require less honey to maintain their temperature. At the onset of brood rearing the temperature in the cluster center rises to at least 90°F required for brood survival. The attainment of this temperature, when external temperatures may be as low as -50°F, is possible because of the metabolism of each bee increases in response to the stimulus of brood; the thermal insulation of the outer shell of the cluster maintains a minimal heat loss. To assist the cluster in retaining

heat, it would be necessary to apply insulation directly against the bees. Insulation on the walls of the hive is no more useful than in the wall of an unheated house; the water pipes still freeze. The radiation and conduction of heat from the 44°F cluster does not noticeably warm up the icy cold honey, wax, and wood of the hive interior.

The increased consumption of honey during brood rearing does make the colony more vulnerable to problems arising from the by-products that accumulate in the cluster. If necessary, fanning will exchange fresh air from outside the hive to remove excess carbon dioxide and moisture. The critical factor is whether the colony will have the good luck of a thaw for a cleansing flight.

Packing cases. Packing box hives in barrels with straw was an old French method for wintering. W.W. Cary (associated with Langstroth) suggested a box 6" larger in all dimensions than the hive, packing it with dry leaves, and providing an opening for ventilation and bee flight[80]. Even then (1861) these were considered too expensive to use on a large scale. But the idea continued to attract interest, and boards, straw, and tubes were listed in an 1875 bee supply catalog for $1.00.

Herrod-Hampsell asserted that packing cases originated in England rather than the United States, observing the similarity of the double-walled W.B.C. hive which some considered an expensive, complicated toy[81]. The quadruple case with a sliding roof, introduced by I. Bartlett of Michigan, was adopted in Sweden as an outer case for four hives the year around[82]. Packing with quilts, etc. was done with very little labor. Cases for a single or pair of hives were also used. Such cases have been displaced in favor of more portable insultated hives. Demuth used a box holding 7-8 frames on end which was placed inside the hive, and the remaining space filled with leaves[82]. This system was credited to Benton and Quinby earlier.

When the quadruple case was recommended by Phillips and Demuth in their 1918 USDA Bulletin 1012, beekeepers tried the "Government case" and reported some of the problems in the bee journals: drifting, losses of colonies with entrances facing prevailing winds, and delayed spring build-up. By 1940 it was apparent that the benefits did not offset the expense or labor, and its use was generally abandoned[83]. □

Next Month: More on Wrapping and Top Insulation of hives.

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Gleanings Mail Box

Peace Corps Thanks *Gleanings'* Readers

Dear Editor:

My husband, Jim and I just completed our first year here with the Peace Corps. Much of our time was spend learning Arabic, studying the Moslem culture and getting to know our work site in El Haouaria. We feel "settled in" now and have seriously started our beekeeping education program

Our major goal is to increase the number of hives in our area by introducing the "modern" hive, teaching management technqiues and identifying and controlling disease. The major cause of bee losses appears to be starvation. Since honey is very expensive here (about $3.50 a pound) beekeepers rob **all** the honey from the hive and since feeding bees is virtually unheard of, the bees starve. Needless to say we urge feeding programs and have been demonstrating with our own small apiary.

A pile of "djebahs" — woven, straw hives used by many beekeepes in Tunisia.

The Varroa mite was brought into Tunisia about 10 years ago; it is now in nearly every colony. We treat with a camphor, thymol, menthol mixture twice a year to keep the mite population down. Strong colonies keep the mite damage to a minimum.

About 60% of the bees here are housed in traditional "djebahs". These are straw tubes 3½ feet long and 8½ inches in diameter. Northern beekeepers make their "djebahs" from bark from the cork oak trees. These hives are too small for producing a strong colony and swarming is frequent. Honey is harvested once a year from these "djebahs" and brood comb is often destroyed in the harvesting. We have yet to find a way to feed these traditional hives or treat them for diseases. Beekeepers cover them up with straw and plastic to protect them from the sun so they are also great hiding places for snakes and lizards.

There is no system here to save wax so the wax moth eats well. Most wax is thrown on the ground and destroyed so our demonstrations with the wax press have been a real education for most folks. We've taught many people how to heat the wax and strain it through burlap to clean it up and save it for wax foundation. Thanks again to all of you who sent wax in response to our letter in the January, *"Gleanings"*.

Despite the problems, Tunisia is a great place for beekeeping. The main nectar sources are orange blossoms, rosemary, thyme, eucalyptus, prickly pear cactus and Alexander clover. The main pollen sources are thistles, astors, almonds and date palms. It's the first time we've ever seen bright purple pollen (from the thistles)! The Mediterranean climate is moderate with winter temperatures about 40°F and July and August sometimes getting up to 110°F. Winters are rainy and summers very dry. Spring here is a favorite time with all the wild flowers in bloom, hot sunny days and cool balmy evenings.

The best honey season is from March to mid-June with another smaller harvest in October to mid-December. We've noticed pollen being brought in year-round. We've built

Jim Alner starting a smoker with cow dung.

our apiary up to six strong hives from the one weak one we obtained in September 1984. We've been doing a lot of feeding because of all the splits and also because sugar here is very cheap (about 12 cents a pound). We expect a harvest of 20 kilos per hive this spring. There will be no problem getting rid of our crop as all our neighbors have been asking for honey sin ce we moved into town.

Life here is very pleasant. The people are generous and friendly making our work a pleasure. The slow pace of life and the family oriented community made us feel right at home. Tunisia is a varied country with the beautiful forests in the north and the Sahara Desert taking its' toll on the southern tip. Miles of sandy beaches cover the coast so there's no lack of places to explore on our days off.

Thanks to *"Gleanings"* which ran the Peace Corps ad that got us where we are today.

Judith Alner
P.T.T.
8045 El Haouaria
Tunisia
N. Africa

Infant Botulism

Dear Editor:

I do not wish to beat a dead horse, but after perusing several recent articles by Mr. Mraz, I feel compelled to offer my two cents worth in the ongoing controversey regarding honey and infant botulism.

I, too, feel honey offers many benefits and would like to see its use promoted. I am concerned though that the unsubstantiated claims Mr. Mraz continues to make will be recognized by the majority of the public for what they are and will serve to make more skeptics than converts.

For starters, I refer to the March *Gleanings,* in which Mr. Mraz notes that at one time honey had the approval of the AMA for infant feeding. At one time, blood letting was an accepted practice for a variety of ailments. The point is, as newer knowledge comes to the fore, recommendations change. So with honey and infant feeding. Because it once carried the AMA seal of approval does not necessarily mean that it is still the best alternative for feeding infants.

Mr. Mraz questions using commercial formula for feeding infants due to their corn syrup content. Yes, corn syrup can and probably does contain botulism spores as can all raw agricultural products. The difference is in the way such commercial formulae are processed. They are sterilized, not merely pasteurized, at a temperature and for a length of time sufficient to kill botulism spores. Were honey to be treated thusly, there would be significant changes in its color, taste, and physical properties, and is therefore not a practical method for eliminating the spores present in honey.

As reported in *Gleanings* in October 1984, from 1976 to the first half of 1984, there have been 442 reported cases of infant botulism in the U.S. with an estimated annual incidence of 259 cases. According to the Los Angeles County Health Department, in about 40% of the cases in the spring of 1984, honey was implicated as the probable cause. Hence, it is a very real concern, not to be lightly dismissed as Mr. Mraz would suggest.

Commercial formulae offer a safe and effective alternative to breastfeeding which is the feeding method of choice according to the AMA. It is not entirely without risk, but the worst case scenario of mental and physical retardation, and even death to which Mr. Mraz refers result from misuse of such formulae and not from a lack of "protective elements" as suggested. Yes, it is true Mother Nature does have millions of years of experience in feeding infants. That is why cows feed their young cow's milk, horse's feed their young horse's milk and humans feed their infants human's milk. I know of no species that feeds their young milk from another species and honey, except man. Mother Nature must have a reason.

Having spent the last two years in the Republic of the Philippines, I can catagorically state that, contrary to Mr. Mraz's assertions otherwise, imported commercial infant formulae are available in the public markets and grocery stores. I can only speculate as to where Mr. Mraz got his (mis) information. The Philippine government sponsors a campaign promoting breastfeeding. This is not due to any inherent problem with commercial formulae, rather with problems with sanitation and water supply which makes preparation and feeding of formula in an aseptic manner difficult or impossible. In addition, in a country where the average annual per capita income is about $750, breast feeding is much cheaper.

The income level has led to other problems with formulae used in third-world countries which again are not inherent problems with the formulae. In an effort to save money, it is common practice to dilute formulae. When this is done, malnutrition results. In spite of supposed "protective factors", honey-milk formulae likewise diluted would have the same result.

In the May 1985 *Gleanings,* Mr. Mraz claims that is is his opinion that honey will cure botulism! and he goes on to suggest that a high school student use this most toxic substance known to man to attempt to prove it for the sake of a term paper. This demonstrates a fundamental lack of understanding of the basics of pathology, physiology, toxicity, and the mechanism of action of the botulism toxin.

As I stated earlier, I do not begrudge honey the plaudits for which it is deserving. And, as others, I suspect that it is deserving of far more credit than it receives. But in order to maintain credibility, research must be well reasoned, well designed, well done, and result in reproducable conclusions. It is only with some very real, objective data that the vast majority of people will be convinced of the true merits of honey. I think it would be very unwise to push ahead with recommendations for the use of honey in infant formulae, in defiance of the AMA. While it is true that there are risks associated with the use of vaccines, antibiotics, and the like as pointed out by Mr. Teller, in the March 1985 *Gleanings,* there is a major difference in that, as Mr. Teller points out, they have been shown, scientificaly, objectively, and unquestionably to be of "tremendous good to the vast majority of people." No such irrefutable evidence for the claims made by Mr. Mraz is currently available, and until it is, discretion should be the better part of virtue. Unsubstantiated, uninformed and utterly absurd claims as the the benefits of honey in an otherwise well respected bee journal can only serve to cast promoters of honey's benefits in the same light as the charlatans who once touted all manner of elixers and cure-alls at carnival sideshows.

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INCREASE NOTICE

Having been zinged by the U.S. postal increases and by boosts in both the cost of printing labor and printing material, we are forced to raise GBC subscription to $10.75 per year and $20.90 for two years. Association discounts for both one and two year subscriptions remain at 25 percent. Foreign rates will be $3.95 additional per year.

Cire Perdue — The Lost Wax Process

by KATHY & ROGER HULTGREN 155 Lovell Road Holden, Mass. 01520

Since human beginning, we have attempted to capture experiences through some means of art. The cave dwellers chose painting as their medium form and the scenes on the cave walls provide a looking glass into the past. As civilization and techniques advanced the use of stone and bronze came into being. The earliest statues in bronze were created from thin sheets which were shaped while still hot. This technique only allowed simple forms to evolve until the Samian artists Rockos's and Theodoros's discovery of casting bronze.

Historical Background

Cire perdue is the French technical term universially applied to the lost wax process. Many individuals have erroneously thought this method of casting was once utilized, abandoned and the process lost through antiquity. However, lost wax casting has been employed for over 6,000 years and is still used in some form today. Pieces casted in this technique can be found in all the ancient cultures. Mention of this particular process is made in the Bible (I Kings) when Solomon summoned a bronze craftsman to create a replica of the Lord's Temple. As early as 1122 B.C. a treatise was written in China during the Chou dynasty describing the procedure of casting bronze. The technique did not advance until the sixth century B.C. when the Greek's focused their art work on the glorification of man. Until this time, the bronze pieces were small and cast solid. The Chinese cultures created their bronze pieces in ceremonial vessels while the Indian and Egyptian pieces were cast in the images of their gods. The Greeks interest in larger cast pieces required them to develop a procedure of casting bronze items with hollow centers. Lost wax casting continued to be practiced until the Dark Ages (400AD-1100AD). At this time the western world ceased to practice the arts for all techniques were forbidden and forgotten. The eastern cultures, however, continued to cast in the lost wax method. With the crusades, the trade routes reopened and the Renaissance Age provided

MONGOLIAN YOUTH — This bronze and jade statue was created by means of the lost wax process in the third & fourth century B.C. during the Chou dynasty. The statue portrays a young attendant, perhaps a bird trainer, who served at the court in late Chou times. His clothes and facial features suggest he was a native of a northern border area in China. This statue is on display at the Museum of Fine Arts, Boston, Massachusetts.

the stimulus for the revival of the arts. The lost wax method, which had been practiced in the Middle East, returned to Europe through it's port cities such as Venice.

The Process

The primitive way to casting bronze resulted in solid cast pieces. Initially, a wax figure is designed in all detail with an opening at the top which is designated a gate and an opening at the base which is labeled a vent. A thick layer of liquid clay is applied to the entire figure including the gate and vent. The mold is heated by fire until the clay hardens and the inside wax is burned out. The wax which escapes through the vent is lost forever. This is where the term "lost wax" originated. Air replaces the wax inside the mold. The bronze is melted and the molten metal poured through the gate into the vacant cavity while the existing air is forced out the vent. The figure is then cooled completely before the clay is chipped away. What emerges is a rough bronze casting which requires smoothing and the removal of the gate and vent by means of a hammer or chisel.

The next phase in bronze casting was devising a method in order to have a thin wall of metal. Thinness is important in large castings for the thinner the wall of metal the less the metal shrinks as it cools and the closer the reproduction is to the original wax figure. The Roman bronze craftsmen were able to achieve walls as thin as 1/16 to 1/8 of an inch in thickness. This is far more impressive when one realizes that since the time of Renaissance wall thicknesses have ranged from 3/16 to 3/4 of an inch. To achieve the thinness of the bronze a clay and firebrick figure is designed and covered with a thin wax layer. All the figure's details are created through the beeswax. This in turn is covered with another layer of clay and heated by fire until the outer clay layer is hard and the inner wax layer is melted and burned out. Molted bronze is then poured into the vacant hollow area and allowed to cool. The outer clay layer is chipped away to reveal the bronze cast. Working from the bottom of the cast's base the innermost clay core is then removed. The resultant is a thin hollow bronze cast.

With modern technology the art of casting advanced to a new plateau where numerous reproductions could be produced from the original piece without destroying the wax model. After designing the desired figure, it is encased in a rubber material to create two halves which are called an inner negative. In turn, this inner negative is encased with plaster which creates a two half mother mold called a couche. The couche provides support for the negative which is extremely flexible in nature. Once the couche and the inner negative are completed the original wax model is removed. The inner negative half is placed inside it appropriate couch half and sprayed or painted with silicon which permits the

final piece to be easily removed. Each negative half is painted with a wax mixture of paraffin, gum resin and beeswax. The couche halves are then clamped together and are prepared to receive the final wax composition which consists of ½-¾ beeswax with the remainder being paraffin, gum resin and non-drying oil

The wax mixture is then poured into the opening of the couche and allowed to harden to its desired thickness. The age old rule of thumb is "wherever there was wax there will be bronze". The remaining liquid wax is then slushed around inside the couche to insure that all areas are wax coated. With care, the mold is then drained off of any liquid wax and cold water is introduced into the resulting cavity. The coldness of the water aids in the wax cooling rapidly and is then discarded within a few minutes. The mold continues to cool for two days before a fire resistant clay is introduced to the existing cavity. The couche is then opened and the inner negative is removed revealing a wax figure with a clay core. This figure is then coated with an outer material called dental investment which is surrounded with fireclay to create an outer mold. To harden the clay and burn out the wax a wood fire is utilized. In the resulting cavity, molten bronze is poured and allowed to harden. The outer clay mold and inner clay core and then removed as described in the above process. Any remaining openings are filled with bronze and polished to a smooth surface.

Conclusion

In addition to casting bronze statues, the lost wax method has been employed in the making of jewelery. As early as 1200 A.D. this process was used in the Americas by the Incas. Historians have concluded this based upon the intricate designs of the Inca's jewelery which could not have been crafted by other means.

Ninety percent of today's bronze sculptures utilize some form of the lost wax process. The same procedure is followed by modern jewelery craftsmen. When a brooch, pendant, earrings or ring require extreme delicate intricate designs the manufacturer or craftsmen turn to this age old process.

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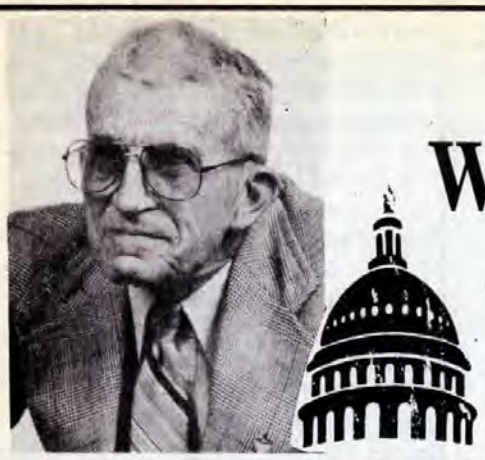
National Archaeological Museum, Athens, Greece.

From the American Beekeeping Federations' Executive Committee (above photo), comes the announcement that the 1986 convention is set for January 18-25 at the Hyatt regency in Phoenix, AZ. Included will be a one-day symposium on Africanized bees and parasitic bee mites, plus a tour of the Tucson USDA bee lab. Honey show rules are now available from ABF, 13637 N.W., 39th Ave., Gainesville, FL 32606, as is other convention information.



The Washington Scene

By GLENN GIBSON,

Minco, Oklahoma 73059

During a recent trip to Washington (June 17) I learned that a majority of the members in the Senate and House Committees on Agriculture plan to leave the honey program as is. Good News — thanks to the efforts of many beekeepers. However, please remember that is only an indication of what will happen if we continue to work. Survival of our program means at least a dozen testy steps before we can breath easily. BEEKEEPER'S THIS IS NOT A TIME TO BECOME COMPLACENT.

GAO AUDITS HONEY PROGRAM

Our mettle may be given an acid test soon when the General Accounting Office, GAO, releases an audit critical of the honey program and the Department of Agriculture's administration of it. I have learned that they will recommend the program be phased out. During the past several months a number of our members have been interviewed by GAO field personnel. So—the news of the audit is not surprising.

As members know, I am deeply concerned about any study of any phase of our industry's operations by an agency of the Government because very little good sound information is available to them. The only studies that I can recall that treated us fairly was the International Trade Commission investigation of trade problems in 1976. Each report or study seems to add confusion to the pollination story. Since GAO personnel wil use a great deal of information from the Economic Research Service, USDA, I feel that the audit wil fuzzify our story.

One of our congressional friends gave me a copy of a release from GAO that had been distributed among some members of the House Committee on Agriculture. My suspicions about fuzziness are justified. The following 3 paragraphs are sure off-base:

> "GAO USDA does not have a good method to assure the honey offered for the program is produced by the farmer. There is also no known test to detect the addition of high fractose corn starch to the honey. Up to 30% can be added without changing the taste."
>
> "A check with ASCS revealed that they have checked on some suspected cases of fraud but have not be able to prove imported or diluted honey has entered the program. They suspect there may be some program fraud but do not think it is significant."
>
> "The leading honey producing states are California, North Dakota and South Dakota. Honey production has increased from 13,000 colonies to 300,000 colonies in North Dakota within the last few years. GAO, indicated the increase has been to take advantage of the high price support and the natural flora that makes honey production profitable in that area rather than a need for additional bees to pollinate crops."

I discussed the audit with a host of our friends in Congress and was advised to meet with GAO officials. A meeting was finally arranged with two of the staff who would be responsible for the publication Friday morning June 21. They would not tell me very much about the contents of the audit, but the meeting gave me an opportunity to express our deep concern about the credibility of their information from the Economic Research Service, USDA.

On June 24th one of our friends called and read the tentative rough draft of the audit over the phone. Published in its present form may mean big trouble.

I have advised a number of our congressional contacts about the misinformation in the three paragraphs. GAO will receive some inquiries from congressional offices on the matter. Whether the GAO will change the tone of the audit will not be known until the report is issued.

The Congress is under no mandate to follow the recommendations. If we do what we should, the report may be no more than a minor irritation.

Our Political Clout

Hard core committee members from 20 states have done a nice job with their congressional delegations. The number of supporters in both Houses is increasing with each passing month. Continuous letter-writing seems to do the trick. There are still some critical congressmen who haven't received mail from beekeepers. Also, a number have received only one letter. Generally the one letter is forgotten unless we call by the office and advise the congressman about his nice constituent beekeepers. I haven't heard from a "towel thrower" in weeks, but pessimistic comment continues to come. All comment is welcome.

Please Do This

* Write your congressman and ask for a copy of the GAO audit when it is available (Even though the report is not available, please make the request now.)

* Promote some local publicity.

* Keep in touch with us.

* * * * * * * * * * *

Testing Your Beekeeping Knowledge

by CLARENCE H. COLLISON Extension Entomologist, The Pennsylvania State University, University Park, PA 16802

Honeybees are best known for the delicious honey they produce and for their valuable service to agriculture through their pollination activities. There are several other useful products associated with colonies that are not nearly as well known. Included in this list would be wax, propolis, pollen, royal jelly, and venom. Please answer the following questions to find out how well you understand the characteristics of each and factors that regulate the production or collection of these materials.

The first 8 questions are true or false. Place a T in front on the statement if entirely true and an F if any part of the statement is incorrect. (Each question is worth 1 point.)

1.___ Pure bee venom is currently being used to desensitize individuals who are hypersensitive to bee stings.

2.___ Most honey bee venom is produced after the worker is 15 days old.

3.___ Propolis is a resinous exudate from the bark or buds of various trees.

4.___ Royal jelly is produced by the worker's mandibular glands.

5.___ Upon reaching the hive both pollen and propolis loads in the corbiculae (pollen baskets) are removed by hive bees.

6.___ The secretion of beeswax is derived from the portion of the worker's diet.

7.___ Royal jelly is fed to queens throughout their life and to early worker and queen larvae but not to young drone larvae.

8.___ Propolis collection is affected by weather conditions and time of year and day.

Multiple Choice Questions (1 point each)

9.___ The major chemical component of honey bee venom is:
A) apamine; B) mellitin;
C) mast cell degranulating peptide;
D) phospholipase A2; E)hyaluronidase

10.__ Which one of the following metals will discolor beeswax during the rendering process:
A) Aluminum; B) Stainless Steel; C) Iron;
D) Pure tin; E) Nickel

11.__ The component in royal jelly that exhibits antibiotic activity against many bacteria and fungi:
A) nucleic acids; B) vitamins;
10-hydroxydecanoic acid; D) vitamin D;
E) vitamin C

12.__ Major chemical component of royal jelly is:
A) water; B) proteins; C) fats;
D) minerals; E) vitamins

13. What is slumgum? (1 point)

14. Beeswax is colorless when it is secreted by honey bees. List three contaminants that add color to wax within the hive. (Question is worth 3 points)

16. List three factors that regulate the most amount of pollen collected by a honey bee colony. (Questions is worth 3 points)

See Answers In Next Column

ANSWERS TO TESTING YOUR BEEKEEPING KNOWLEDGE

1. True In the United States, the Food and Drug Administration in 1979 approved pure venoms for desensitizing persons allergic to stings. Pure venom is a much more effective desensitizer than the whole body extracts (ground-up bodies of stinging insects) that were commonly used in the past. Venom from 20 to 30 insects are needed to desensitize a human being, and the same amount each succeeding year to maintain protection.

2. False A newly emerged bee has very little venom, but the amount gradually accumulates with age until a maximum amount is reached by 12 to 15 days of age. After the age of guard bees is reached (ca. 18 days), no additional venom is produced.

3. True Bees collecting propolis obtain it from drops of resin on the bark and buds of various trees. Sources include pine, alders, and poplars.

4. False Royal jelly is secreted by the hypopharyngeal glands of worker honey bees normally 5 to 15 days of age.

5. False When a propolis forager returns home it goes to a part of the nest where propolis is needed and waits for a cementing bee to remove the propolis from its pollen baskets. Pollen-gatherers deposit their loads directly into storage cells.

6. False Beeswax is synthesized from the sugars of honey and nectar eaten by the bees. Bees fed with sugar produce a wax identical with that produced from honey.

7. False Royal jelly is fed to queens throughout their larval and adult lives and also to young worker and drone larvae. Differences in the composition and quantity of royal jelly fed to larvae originating from a fertilized egg are believed to be responsible for queen and worker differentiation.

8. True Honey bees prefer to collect propolis on warm days in sunny places. Foraging for propolis takes place chiefly between 10:00 a.m. and 3:30 p.m. In Europe, most propolis is collected in August, September, and October.

9. B — mellitin

10. C — iron

11. C — 10-hydroxydecanoic acid

12. A — water

13. Slumgum is the refuse from melted combs after all or part of the wax is removed.

14. Large quantities of venom are easily collected from honey bee colonies. An electrically charged grid with a thin synthetic material (nylon, parchment, taffeta, or clear plastic food wrap) stretched over it is placed underneath the brood chamber of the colony. Bees that alight on the device receive a slight shock and thereupon sting the material, leaving venom on its underside and on the glass plate beneath it. Since most of the workers stinging in this way retain their stinger, the colony is not damaged by the treatment.

Continued on page 444

Establishing Pollination Standards For Crop Pollination

Report by: EAS Pollination Standards Committee ROBERT WELLEMEYER, Rt. 1, Box 532, Washington VA 22745

Introduction

The role of insects in the pollination of most of our cultivated crops is vital. Those knowledgeable of the pollinating process in plants recognize this fact while other regard it as a natural phenomenon that requires no effort from man. More research is needed regarding plant pollination and the use of honeybees and other pollinators to achieve maximum production. However, information already available is not being fully utilized to improve yields and quality of many kinds of crops.

Society must take measures to maintain a viable honeybee industry, and protect other insect pollinators from the adverse conditions that may exist. Recent advances in agricultural chemistry have increased yields to record levels, yet the use of these chemicals has had a severe impact on honeybees and other insect pollinators. Pesticides applied to control destructive pests are often equally hazardous to honeybees and other pollinators. In addition, intensive monoculture practices have disrupted the natural diversity of plants needed to furnish adequate nectar and pollen for bees as well as nesting sites.

Developments such as these pose serious questions concerning the future of apiculture. How can commercial beekeepers stay in business facing such adversities. Without at least some material reward for efforts, will hobbyists maintain an interest in beekeeping? Hobbyists have assured the presence and even distribution of honeybees in our agricultural environment with very little compensation for themselves. What effect will this have onour agroecosystem if this source of bees disappears? We must keep the small, but vitally important, bee industry viable through organization and a better understanding of the role insects play in plant pollination and in our total environment.

Beekeeping And Its Relation To Pollination

While the need for bees has increased, the total number of colonies has decreased. Bees are no longer found on every farm. Colonies are now located in the suburbs operated by hobbyists or concentrated in one area by a large scale commercial beekeeper. This situation disrupts the even distribution of pollinators across the country and has even created serious deficiencies in some areas. Lack of an adequate supply of bees is made up of beekeepers renting colonies to growers. At times rental fees

are no greater than those of 30 years ago. Several reasons can be cited for the low fees. There is no organized use of bees for pollination. Beekeepers often set their own "price", such as an exchange for an apiary location or favorable consideration when pesticides are applied near bees. In addition, higher prices leave more room for other beekeepers to undercut prices and move into a "territory".

Unfortunately lower pollination fees may encourage unscrupulous practices by beekeepers who try to make up their fee elsewhere. Colonies may not contain the necessary population of worker bees for maximum pollination, not enough colonies may be provided or the colonies may not be properly distributed throughout the crop to be pollinated.

The market potential for more **properly managed** colonies for pollination is great. However, beekeepers must be assured their colonies will not be damaged by pesticides. They must be able to collect an adequate fee to cover the extra expenses and labor of moving bees into overstocked areas. Beekeepers are usually in no position to bargain for these considerations. This points out the necessity for beekeepers to unite so that an organized pollination service can be formulated. It should be staffed by experts who are aware of the problems of both the beekeeper and grower and can be capable of bargaining fairly for both.

The Ideal Pollinating Colony — What Growers Expect —

The size of hive does not necessarily indicate the strength of colony within it. Some ideas of colony strength can be obtained by watching the flight activity of the bees at the entrance. A constant, uniform activity of dozens of bees on bright, warm days at the entrance is an indication of a populous hive. However, it should be noted that the ideal colony condition for one crop may not be ideal for another crop. Generally where pollen collection is desired, the colony should be populous and expanding.

An expanding colony may be defined as having half or more of its brood in egg or larval stages. Unsealed brood requires pollen, thus stimulating pollen collection by adult bees.

A populous colony may be defined as having a blanket of bees immediately

covering the top of every frame after being opened. The cluster of bees should cover at least 4-6 frames of brood within a hive body.

Colony Strength & Price Rates

Beekeepers should manage their colonies so that they provide growers with the necessary pollination service agreed upon. By doing so, beekeepers will be in a better position to command pollination fees based upon consideration of maximum pollination service to the grower, rather than on a can of honey.

Sell the service of your bees rather than paying for a possible honey location!

Populous colonies supply more bees to the field and their bees tend to fly at lower temperatures than bees in weaker colonies. Sheesley and Poduska (1970) showed that colonies with eight or more frames covered on both sides with bees collected more than 2.5 times as much pollen as colonies with only four or five frames covered with bees, and more than four times as much pollen as colonies with only three frames covered with bees. Using their data, a proposed price/frame for colony strength may be established.

By using the following scale beekeepers would have an incentive to unite weak colonies or otherwise provide stronger ones.

Cluster Size[1]	Frames w/Brood	Sealed Brood	Proposed Comparative Cost
		Square inches	Dollars
2	1	100	$ 5.00
4	2	200	11.50
6	3	300	18.00
8	4	400	24.50
10	5	500	28.50
12	6	600	31.50
14	7	700	35.00
16	8	800	38.50
18	9	900	42.50
20	10	1,000	45.50

[1]Frames of bees

These prices may fluctuate in relation to other cost considerations, such as, length of time crop will be in bloom, distance must be hauled to crop, relative danger of pesticide damages while bees are on crop location, time of bloom in relation to major honey flows in the area, method of payment (cash discounts) and how and where bees will be distributed in the crop.

Conclusion

As stated earlier, pollination fees should be set in consideration of maximum pollination service to the grower rather than on the price of a honey location. Cut-rate prices will benefit no one. Beekeepers must be adequately compensated for their services if they are to stay in business. If not, they will abandon the pollination business, whereupon the grower suffers. Independent pollination contractors who can determine adequate fees and appropriate strength and number of colonies for the crop and then enforce these standards would benefit both groups.□

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CHALKBROOD

by Harry Morris Rt. 1, Box 106 Barneveld, NY 13304

ABSTRACT

Heat treatment of combs is an effective cure for other diseases but it is questionable whether heat treatment is effective against chalkbrood. It is possible that each spring colonies are re-infected with chalkbrood by water carriers that obtain water from the ground as the snow melts. Repeated treatments (consisting of dirtying up the hive) forces the bees to discard all chalkbrood mummies during a short period.

Chalkbrood is likely the most widespread bee disease in the United States because so many colonies are affected. Most beekeepers regard chalkbrood as more of a nuisance than a disease, but more winter loss can be traced to chalkbrood than most beekeepers realize. I do not claim a cure but I am able to hold chalkbrood in check and that is what this article is about.

Personal Experience Background

A colony with a mild chalkbrood infection all summer will, over a period of two or three years, become weakened and eventually become heavily infected with chalkbrood. A heavy chalkbrood infection may not cause a winter loss the first year, but will likely be the major contributing factor to a winter loss the second year. In such a case, the actual winter loss is likely due to a decreased bee population going into winter and a low percentage of young bees going into winter, all of which stem from chalkbrood.

Chalkbrood can appear under conditions where there is no apparent disease. Five frame nucs made in the spring from colonies with no apparent chalkbrood most often show signs of chalkbrood during their buildup. The chalkbrood infection disappears when the nuc overcomes the shock of a depleted bee population. In some years the chalkbrood infection is noticeably worse than others but it is always present in starting nucs.

Chalkbrood is a fungus that affects bee larva. It is therefore quite logical that since bees spend as much time outside the hive as possible to gather food, it is also likely that bees carry many fungi, molds, etc. on their body or carry water that is contaminated. The weak are more susceptible to succumbing to these life-threatening, foreign life forms. The inside of the brood area is warm and moist which is ideal conditions for growths of molds and funguses. We should feel fortunate that bees have been able to cope with such survival obstacles for these millions of years.

A queen that in her old age permits the bee population to diminish makes the colony susceptible to disease. If such a colony contracts chalkbrood, it is doomed and is not likely a fresh, high quality queen can reverse this trend prior to winter without human help. In this case, the source of the problem was the genetics that prevented optimum timing for supercedure.

In the case of nucs contracting chalkbrood, the problem was the lack of bees of all ages that started the nuc. The young queens are heavy layers and there were not sufficient nurse bees to adequately care for the brood the queens produced. The open larva that lacked adequate food, became weak and were thus susceptible to chalkbrood.

I do not like a heavy laying queen that has a tendency to expand a brood area beyond what the nurse bees can adequately care for. Such a queen can be the reason for weak, disease susceptible brood. Such a situation is more apparent prior to the first spring pollen by observing the size of worker bees. Small bees very early in the spring are not due to old comb; it is due to genetics. As spring progresses and pollen and nectar become abundant, the size of the workers from such a queen become larger. A good queen maintains a very compact brood area prior to fresh, spring food. In addition to that, a good queen adjusts egg production proportional to fresh food availability and could stop rearing completely during a prolonged, summer nectar drought.

Conditions For The Experiment

Our winters always exceed -20°F (-25°C) and I have experienced -47°F (-50°C). The killing freeze occurs between September 5 and October 10. Fresh pollen is available on 30 March plus 3 days.

Top covers (telescoping) are elevated $^{3}/_{8}$" (9.5 mm) with a block of wood at each corner to provide top ventilation.

Honey production colonies are reserved exclusively for honey production. These colonies are not harmed by taking brood or bees, and honey production colonies remain honey producers for as long as they remain strong. A photo is provided to illustrate the strength of a full-strength, honey-production colony in mid-summer. So many bees are hanging out in the photo because the honeyflow terminated abruptly and the hive was full of honey.

I have between 30 and 35 full strength colonies and I over-winter strong nucs. My incidence of chalkbrood during the test was 20%. In the year of the experiment, I had three colonies that had what I consider bad chalkbrood infestations. Two of

Continued from previous page

the three colonies were past honey production colonies with old queens that were failing. The third colony started from a spring nuc. The nuc queen was an excessive layer and was retained for observation. The nuc colony went into winter with a large, bee population and retained all the honey they had produced their first year for winter stores. This excessive laying queen colony was the only colony that required spring feeding the following spring to survive.

Colonies are supered with extracted frames of honey with sorted frames with pollen. I super on the bottom board, which elevates one super to the honey area each time a hivebody is placed on the bottom board. Honey is removed from the top and stored in the comb in my honey room. When honey is needed for sale, frames of granulated honey are placed in a hot room for roughly 30 hours, at which time the liquified honey is extracted hot. Every hivebody that comes off the honey production colonies receives this heat treatment. I attribute my complete lack of disease (excluding chalkbrood) to this heat treatment of combs. My complete lack of disease has been verified by the New York state bee inspector. Obviously, heat treatment of combs is not a cure for chalkbrood. The practice of heat treating combs has been in constant use for seven years.

Methods

All three colonies were manipulated to remove excess honey (a normal practice for all colonies). The colonies are treated for chalkbrood while in two hivebodies.

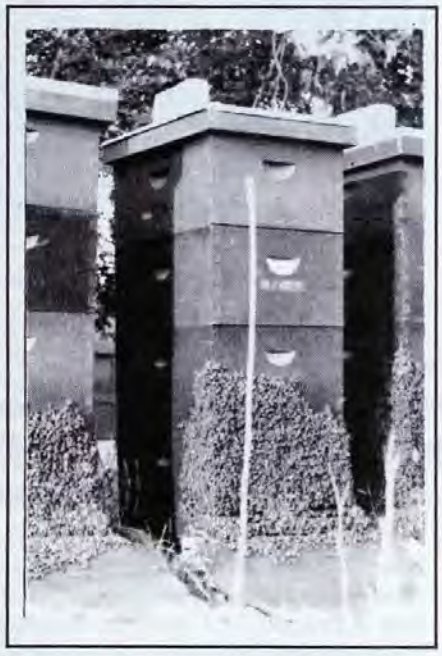
Terramycin (in manufacturer's recommended quantities) mixed with confectioner's sugar was used to dust the colonies. One heaping teaspoon of the Terramycin mixture was used for each of the two hivebodies. The mixture was placed in the palm of the hand and the two hands rubbed together over the frame, top bars to spread the mixture evenly over all ten frames. This procedure was repeated every four days for a total of four treatments. I dissassembled the colony prior to each treatment to check the number of chalkbrood mummies on the bottom board.

Results

Shortly after the four treatments, all three colonies were free of any sign of chalkbrood infection for the remainder of that year. The two honey production colonies did not have chalkbrood the following spring. The over productive queen colony had the same level of chalkbrood the next spring as it did the previous spring.

Conclusions

It is a well-known fact that Terramycin is not effective against mold or fungus. The only thing the Terrimycin and confectioner's sugar mixture did was dirty up the hive and force the bees to clean up. I suspect that had I used dry, baked soil to dust the hive, I would have had the same results.



The three colonies in the test were the only colonies that received the Terramycin treatment so a strong colony can fuction normally with a light, spring, chalkbrood infection. In the strong colonies, the chalkbrood disappeared naturally when the honey flow started. It is not the honey flow that stopped the chalkbrood in this case, but the large population of young bees that could care for the brood and also have time to keep the hive clean.

Prior to fresh, spring pollen, colonies are in a stress condition in the process of building up to strength. In their stress condition, the colony may not have had the labor force to clean the hive as they should to retard chalkbrood.

If there were any other diseases that were lingering in the hive ready to break out in their weakened condition, I feel that Terramycin took care of that potential problem and helped the three colonies build up to strong, healthy colonies. For this reason, I would recommend using Terramycin rather than some other substance to dirty up the hive.

The overproductive queen colony was not lacking bees when heavily infected with chalkbrood, but the two honey production colonies had started a population depletion when they received their first Terramycin treatment. All three colonies started using their upswing from the time of the first treatment so I assume that the Terramycin did not harm the open brood.

This year (1985) is evidently not a good year for chalkbrood because there is only one colony that shows any sign of chalkbrood (the strong colony with the overproductive queen). The spring of 1985 was cold and damp when the snow was melting so the bees could not fly.

Heat treatment of combs eliminated other diseases because as hard as the bee inspector tried, there was not a single suspect, diseased cell in any colony. In the past (15 years ago), I had been troubled with EFB, AFB and sacbrood, but today none of the diseases exist in my bees.

In the spring, as soon as the snow starts to leave the ground, field bees are observed in the sparse patches of grass. I feel that the fungus that causes chalkbrood could be obtained from the wet ground. Water carrying bees could be the source of spring chalkbrood. Chalkbrood is not apparent until about 40 days after the winter snow cover starts to melt. I suspect a reinfection of chalkbrood every spring by water carriers is possible.

No chalkbrood is apparent during winter. Dead bees are removed from full strength colonies about the time the overwintered snow starts to melt and there are no chalkbrood mummies at that time of year. Large colonies start

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Lima Beans

by DEWEY M. CARON University of Delaware Newark, Delaware 19717-1303

There is a serious nectar dearth period in July and August in most of the mid-Atlantic states. Bee colonies use resources stored from earlier sources. Soybeans can provide a crop for beekeepers when certain varieties are grown and alfalfa can yield nectar when it is permitted to bloom. Buckwheat is another nectar yielder when grown at higher elevations but its acreage has been steadily declining. For some beekeepers on the Delmarva peninsula, lima bean is a possible nectar source available to bee colonies.

Lima beans bloom during the summer dearth period. Bloom date depends on planting date but fields usually start in mid or late July and bloom extends through August into September. The lima bloom is cream colored. They are the typical legume-type flower with anthers and stigma held in a twisted keel. When a bee lands on a flower, it opens the flower and the bee can reach the nectar secreted at the base of the corolla. Flowers open early in the morning and never close. They usually last for a day.

Lima beans grow best where there is a long growing season of high but not excessive temperature. Commerically limas are of the bush variety, growing to about two feet high and having determinate-type bloom. In the home garden, limas are frequently pole-type and of indeterminate bloom.

Lima beans are grown commercially in the mid-Atlantic states (primarily on Delmarva) on the east coast and in California on the west coast. In the east, lima's are one of the several cash truck crops grown on small fields. Some fields are planted to winter wheat or other small grains or another of the cash crops such as sweet corn, tomatoes, peas, spinach, etc. which are harvested in June and then lima's planted to be harvested in September or October.

Honey bee colonies adjacent to a Delmarva lima bean field.

The average yield for lima beans are about 1500 lbs./acre. Plant breeders in California and USDA breeders are attempting to develop varieties that are more drought resistant and better yielders. Some growers irrigate lima's by trickle irrigation or overhead systems. Yields in excess of 2000 lbs./acre are feasible. The acreage on both coasts fluctuates some but remains relatively constant.

Lima As A Honey Crop

In the middle 1940's, George Abrams moved bee colonies to monitor lima bean honey flow conditions in the state of Marylnd. This included moving colonies during late July and August in the years 1943 through 1947. The lima honey flow averaged 34.4 pounds. Nineteen-forty-five was a year of failure attributed to excessive rain fall and the inability of growers to cultivate fields so that weeds were a major competitor. Elimination of 1945 elevates the four year average to 46.7 pounds. Only one of 14 apiaries failed to produce a crop in any of those years. In one season, bees were moved to an early planting and then to a later planting of lima beans. Lima beans are presently considered a worthwhile honey crop and several Maryland and Delaware beekeepers move colonies to sites adjacent to grower fields.

Pollination of Lima Beans

The lima bean flower is capable of self-pollination but cross pollination can and does occur. One researcher found a 30% yield increase when honey bees were present in lima fields. When beans are grown within cages, an insect pollinator increases the yield when compared to cages without bees or open pollination plots. Most bean breeders feel they can grow varieties adjacent to each other with little concern for cross pollination. Of all the beans, limas seem to be more attractive to honey bees. In small plots, bumblebees, carpenter bees and numerous wild bees actively forage for pollen and nectar.

The exact benefit from bee pollination is not known. Our studies in Maryland comparing caged plots to open plots, resulted in a better yield with bees but the increase was not significantly greater. We conclude that bees are of benefit to lima beans but they are not necessary. Lima bean growers often provide apiary sites adjacent to their field, but it is not necessary to provide supplementary pollination. The benefit to honey bees in nectar yield is considerable and two or more supers of light, mild, slightly bean-tasting honey is usually reliable. The honey granulates very rapidly and it must be extracted without delay.

IPM in Limas

One of the greatest difficulties for beekeepers in securing lima bean honey has been the loss of bees to pesticides. Lima bean was one of the first crops included in extensive Integrated Pest Management (IPM) studies. Maryland and Delaware started IPM investigation on lima beans in 1973. With IPM, insect scouts go into lima bean fields beginning in early August and systematically examine fields for insect pests such as the corn earworm. Based on what pests and how many insects are found using our sampling techniques, a decision is made as to the necessity for insecticide spray application. With IPM, pesticide sprays during bloom have been reduced. Not all growers participate in IPM programs but overall the amount of pesticide used has decreased. It is safer for beekeepers and bees in limas today.□

Obituaries

Raymond Lee Layne, 84, 123 Adams Street, Berea, Kentucky 40403, died the 9th of June at the Berea Hospital.

He was a retired teacher. Col. Layne, as he was affectionately called, was an active labor leader in Kentucky Beekeeping for the past three decades and was given many awards. He is best remembered as the former editor of the state beekeeping newsletter, *The Kentucky Bee Line,* and the local newsletter, *The Bluegrass bee.*

NEWS and EVENTS

ALABAMA

The Central Alabama Beekeepers Association will host the Alabama Beekeepers Association's annual convention, August 2-3, at the Madison Hotel, Montgomery, Alabama. For reservations call: (205) 264-2231; in Alabama toll free: (800) 356-1744.

Registration begins at 8:30 A.M. August 2nd. An interesting and helpful program is being planned. For futher information contact President Tommy Shanks or Secretary Bonnie Shanks at 288-3493.

WEST VIRGINIA
Honey Festival

The fifth annual West Virginia Honey Festival will be held at Parkersburg City Park on September 28th and 29th, 1985. The Festival has grown very fast, with the estimated attendance at last year's Festival being 15,000 and 20,000 persons.

Honey is one of the largest agricultural products in the State of West Virginia. Through the West Virginia Honey Festival, we promote the use and sale of honey by educating the public of its value nutritionally and also as an industry that can be pursued on a small scale for personal use by the producer or for a cash producing crop, thereby stimulating the economy of the state.

Our out-of-town participation has increased with the growth of the Festival, which of course, will stimulate the economy of the area during the Festival, through the tourist industry.

Also, the "West Virginia Honey Princess" pageant will again be presented. Chosen from candidates from throughout the state, some little miss between the ages of 10 and 12 will wear the crown for the coming year.

Another highlight will be the "American Honey Queen", who will be in our area throughout the week preceding and during the Festival to promote honey, its uses and benefits.

In cooperation with the Fort Neal Kiwanis Club, we are contracting with the Florida Boys, a nationally known gospel singing group from Pensacola, Florida, to conduct two concerts during the Festival. In addition to this, we hope to present concerts at intervals throughout the Festival. These concerts are to be presented free of charge. To accomplish this, we are offering to all businesss and individuals the opportunity of advertising through our program booklet.

We will distribute the program booklet, free of charge, at every Festival-related function leading up to the Festival. These programs will not only be distributed locally, but statewide as well.

The West Virginia Honey Festival is sponsored by the City of Parkersburg and the West Virginia Beekeepers Association, with the cooperation of the West Virginia Department of Agriculture, and other local and statewide agencies and organizations.

For more information write:

West Virginia Honey Festival
P.O. Box 2149
Parkersburg, WV 26101

West Virginia Beekeepers Association

West Virginia Beekeepers Association President, L.H. Campbell invites readers to attend their fall meeting September 13-14, 1985 at Canaan Valley State Park, Davis, West Virginia. Along with a fine group of speakers covering topics ranging from beekeeping subjects to "The Old Country" and a slide presentation on Nicaragua, there will be a Honey Show competition, Junior Beekeeping Contest, workshops on honey judging, pollen judging and candlemaking, a field trip to a local beeyard and election of officers. All of this plus a Friday evening chicken Bar-B-Que held at the ski trail makes an exciting agenda. Reservations and additional information may be obtained from the Secretary, Mary C. Topp, 11 Highland Park, Wheeling, WV 26003.

MONTANA
Honey Exhibit

Eastern Montana Beekeepers Association in conjunction with Yellowstone Fairtime Exhibition will have a competitive exhibit for honey cooking and honey. The Honey Show will be held August 10-17, 1985, at Yellowstone County Fairgrounds, Billings, Montana.

Premium list can be obtained from Yellowstone Fairtime Exhibition, P.O. Box 1302, Billings, Montana 59103.

Contact:

Albert G. Bell
2857 Colton Blvd.
Billings, Montana 59102
Phone: (406) 656-4806

FLORIDA
1985 Beekeepers Institute Highlights

4-H Camp, Ocala, Sponsored by Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida.

Program

AUGUST 16th

1:00 p.m. — Check in at Camp Ocala

7:30 p.m. — Tracheal Mite Biology and Detection Workshop, Tom Sanford and Karen Thel, Department of Entomology and Nematology, University of Florida.

OR

"Bees and Honey," the first three of six half-hour video tape programs on beginning beekeeping.

AUGUST 17th

9:05 a.m. — Regulations concerning beekeeping and Florida Bee Inspection—Chief Apiarist, Division of Plant Industry, State of Florida.

9:20 a.m. — The Florida State Beekeepers Association and its Activities.

9:45 a.m. — The Honey Research, Promotion and Information Act, Frank Robinson, Sec.-Treas. American Beekeeping Federation.

9:50 a.m. — Introduction of the Honey Bee — Alan Bolten, Department of Zoology, University of Florida.

11:00 a.m. — Beekeeping in Florida: Timing and Technique — Tom Sanford, Extension Apiculturist, University of Florida.

1:00 p.m. — Open-hive demonstrations. Topics to include: Making splits, Uniting colonies, Supering colonies, Moving bees, Diagnosing diseases, Feeding colonies, Collecting pollen.

7:30 p.m. — Nosema Biology and Detection — Alan Bolten, Dept. of Zoology, Univ. of Florida.

OR

"Bees and Honey", concluding set of half-hour programs on beginning beekeeping.

August 18th

9:30 a.m. — Profitability in Beekeeping — Tom Sanford, Extension Apiculturist, Univ. of Florida.

OR

Concurrent session outside for those with questions — Alan Bolten, Dept. of Zoology, Univ. of Florida.

4-H Camp Ocala is located west of highway 19, inside scenic Ocala National Forest, north of Umatilla, Florida, and south of highway 40, phone: 904-759-2288. This is a camp! As such camping conditions prevail. Those planning to attend the Beekeepers Institute should bring with them comfortable clothing, PILLOWS, SHEETS, BLANKETS, TOWELS and other necessary items. Meals are cafeterial style, and participants will be asked to help clean up. Sleeping quarters will be assigned upon registering; they are air conditioned, have eight bunk beds in a room and are segregated according to sex. Waterfront activities are limited to only when a licensed water safety instructor is on duty.

Registration for the Beekeepers Institute is $50.00 per person. This includes two nights lodging and six meals (dinner on Friday through lunch on Sunday). Those registering for one day will be charged $25.00 to cover insurance and meals only. PRE-REGISTRATION IS A MUST TO RESERVE SPACE; A LATE CHARGE OF $5.00 PER PERSON WILL BE ASSESSED AFTER AUGUST 1, 1985.

DO NOT SEND CASH. Make checks payable to Florida Cooperative Extension Service. Mail to Beekeepers Institute, 202 Newell Hall, University of Florida, Gainesville, FL 32611. NO REFUNDS WILL BE MADE FOR CANCELLATIONS.

MISSOURI
Eastern Missouri Beekeeper of the Year for 1984

The Eastern Missouri Beekeepers Association recently named Curt Dennis as The Beekeeper of the Year for 1984. Mr. Dennis has been a beekeeper for 11 years and operates over 40 colonies. Mr. Dennis has served as Vice President, program chairman, and President for the past three years. Mr. Dennis's main contribution has been the teaching of the beginners beekeeping course during the winter months.

American Beekeeping Federation 4-H Essay Winner For 1985

In spite of a very difficult topic, 27 essays were submitted for the 1985 4-H Essay Contest.

After much deliberation, the judges named Matthew Winston Beasly, 13 years old, of Glennville, Georgia as the first place winner. Matthew has received a $250.00 cash prize for his efforts.

The second place winner of the $100.00 cash prize was Brad Campbel of Warsaw, MO; and Jayne Wright of Oakdale, LA, received $50.00 at the third place winner.

The other 24 state winners each received a copy of the *"ABC & XYZ of Bee Culture"*, compliments of the American Beekeeping Federation.

The 1986 contest will look at the future from a slightly different viewpoint:

"A WORLD WITHOUT HONEY BEES"

The essayists are urged to consider the many threats and problems honey bees and beekeepers face today and think about how different life would be **without** the Honey Bee! (Should provide for some very interesting essays!)

CALIFORNIA
Busy Bees Stir Up Attractive Exhibit at 58th Los Angeles County Fair

Busy bees creating exotic honey flavors including sage, avocado and citrus honey will be on display in the Agricultural Pavilion at the 58th Los Angeles County Fair in Pomona, California, September 12-29.

This is an opportunity for commercial exhibitors and hobbyists to display their bees' honey and beeswax, said Roy K. Davis, bees and honey department coordinator.

Competitive divisions include bees, honey and wax and feature exhibits. Beeswax, an important by-product of bees' work, has high commercial value for the production of perfumes, hair removers, cosmetics, crayons, candles, polishes and bullet lubricants. Samples of beeswax and beeswax novelties and products will be on display in the exhibit during the entire run of the 18-day fair.

California leads the nation in honey production and consumption, Davis said. Many prize-winning specimens of these un unusual honeys will be on exhibit along with chunk, creamed, comb and crystallized honey.

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CHALKBROOD
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brood rearing in early January. They had two months of brood rearing before the bottom boards were cleaned by me, so if there was any mid-winter chalkbrood I would have seen it when I cleaned the bottom board with a long stick.

For three years I shipped three to five pound packages of bees in early December and January airfreight to California. I did not observe chalkbrood mummies on the bottom board of these nuc boxes after the bees were packaged. From these two examples, I assume there is no chalkbrood present in the hives in mid-winter.

During the test, the apparent cure for chalkbrood was not due to the medication. Apparently there is a level of hive filth the bees will tolerate and by repeated dusting of the hive with the Terramycin mixture, I exceeded this level of tolerance. Their dislike of such treatment was reflected in their ill temper. The trend to not touch chalkbrood mummies in the comb was reversed and by removing all the chalkbrood mummies during the short period of the Terramycin treatment, the chalkbrood infection was removed.

The colony with the excessive laying queen was the most susceptible to disease. I have been breeding from a closed population for 17 years and I have been breeding away from an excessive laying queen, primarily because such queens do not know when to stop laying after the fall killing freeze and their bees do not go into winter dormancy (a loose cluster) like a bee bred specifically for a northern climate.

For the last five years, I have also been breeding for a bee that maintains a very clean bottom board. Since I have no disease (other than chalkbrood) to work with, breeding for a breed that is exceptionally clean is the only thing I can do genetically. I feel confident that this cleanliness trait will be effective against chalkbrood. I have a few colonies that shine a bottom board, so there is a sign of potential success with a clean breed. Naturally, when a colony contracts chalkbrood, that eliminates that colony from the breeder list.

Most of our mountain lakes in New York State are void of fish because of acid rain. Our soil (in my area) is also too acid for clover to yield nectar. Molds and fungi prosper in an acid condition (as opposed to a sweet soil condition), so it is not surprising that chalkbrood is prevalent and it is not likely the trend for increased chalkbrood will be reversed.

Suggestions

The best time for observing the presence of chalkbrood mummies at the entrance is in the morning prior to the bees flying.

Colonies with heavy chalkbrood infections were likely first weakened for causes other than chalkbrood. In my case, it is likely queen failure but it could be another disease. The colony should be requeened but not requeened until the other diseases are under control. The old queen can carry AFB spores on her abdomen and contaminate cells she inserts her abdomen in. If the new queen is introduced prematurely, the new queen could also become contaminated with AFB spores.

Start treatment for chalkbrood as early in the spring as it is noticed. If it is too cold or too early to manipulate colonies, dust the frames of the top hivebody without disassembling the hive. Manipulating frames in a colony while they are in the build-up, stress condition could result in the loss of a queen.□

NEWS & EVENTS
Continued from previous page

Admission for adults is $6.00, $3.00 for children, ages six through 12, and free for youngsters through the age of five. Senior citizens (62 years of age and over) can enjoy the Fair for $5, Monday through Friday. Price includes entrance to all entertainment, exhibits and the horse races. Gates to the Fair open at 10 a.m., Monday through Friday, and at 9 a.m. on weekends.

The Fair is located 30 miles east of downtown Los Angeles on the San Bernardino Freeway (Interstate 10) off the Ganesha or Garey Ave. exits.

NEW YORK

The Fingers Lakes Beekeepers Club will meet Sunday, Aug. 18th at the house of Richard Taylor, 12 mi. north of Ithica Rt. 89. Topics: roadside marketing and examination of veteran beekeepers for certificates.

A Tall Tale

by GLEN GIBSON Minco, Oklahoma 73059

Donald Cox's bit of nostalgia that appeared in the July 1985 issue of *Gleanings* deserves some comment. I really did enjoy the story, but I feel that he might have embellished the story here and there. On the other hand I am inclined to think that the story is authentic because it would be difficult to give that much detail about rivers, signs, locations, etc. without a factual base.

Anyway, the story reminded me of things from the past (even before prohibition). Never mind specific years (you will calculate my age). Bee meetings in those days were a bit different. Naturally the subjects were different and the interest of the attendees was higher. Arguments were fierce (sometimes settled with fists), but anger was short-lived because bee meetings weren't held very often if at all. We always had some form of entertainment by one or more of the members. Some good—some boring.

I remember one skit very well — rolling a cigarette in one hand. This was no simple task, but the masters of this art had a good reason for the trick. Remember, this was a period before tailormade cigarettes became popular in the country and a number of our citizens packed six-guns and knew how to use them. A gunman worth his salt or our attention smoked Bull Durham and learned to roll cigarettes with one hand so that his gun hand would be free at all times. Pa tried to learn the trick but to no avail. Neither did any of my family learn the art of packing six-guns. Anyway attending beekeepers enjoyed the act. World War I, prohibition and other big events changed our habits — gunmen lost glamour, tailor-made cigarettes became popular, and the bootlegger, became a part of every community.

Bee meetings addressed the problems of adulterated honey and foulbrood mostly. Some members received magazines and showed their expertise during deliberations. Then, as nowadays, committees were appointed, but all activities were limited since money was bit scarce.

Our family owned nearly 100 swarms (some in Box hives until we bought some really up-to-date equipment from Root and Dadant). Grandpa kept a few bees during his lifetime. Pa wasn't too interested in the bees, but felt they were good for the younguns. Farming was our main livelihood. Buying the modern extractor and the little old dinky Ford truck was a great event. Using cantankerous mules to haul bees and honey created some problems.

Back to the bee meetings: The Pidds (A clan with each member owning a few swarms), Braynes and the Brilliants were leaders in our local bee association. Stu Pidd usually held the presidency since his family could vote him in. P. Brayne was the trouble maker. We never did learn what the "P" stood for, but rumor had it that it was short for "Pizzmo". He got a black eye at one of the meetings. Thereafter he was called Black Eyed P. Brayne. Iam Brilliant moved into the community from back East. We assumed that he taught at a University but this fact was never established. According to Pa these three know-it-alls were the most entertaining of the meeting.

The years have passed. I remember I couldn't wait to get out such a backward community of fogies. After graduating from high school, I promised myself never to become associated with a honey bee. The irony of this is that I did get into the bee business and guess where my bee outfit is located today? In Southwest Oklahoma where I was born and raised.□

Author's Note: Sorry, but the last two sentences are the only ones that can be verified.

REMOVING Workers From Queen Cages

by LAWRENCE O. HORN R.R. 1 Box 585A Bridgton, ME 04009

As an amateur beekeeper I have long been frustrated by the task of removing the workers from a queen cage before placing it in a hive. After trying to separate the workers from the queen using pins I then moved on to trying to utilize the wire hook method but the workers refused to leave their queen. Once after trying several other variations I opened the top of the cage and tried to shake out the workers. This too was a complete failure for my new $6.00 queen took flight, never to be seen again. After some hard thought on the problem and a little bit of tinkering I came up with a simple inexpensive solution.

I cut the top off a 10″ x 16″ cardboard box and stapled 3/8″ x 3/4″ pine strips around the top. To the pine strips I then stapled some aluminum screen. Next I cut out two 3″ holes on one side of the box about 2″ from the center. The only item I had to purchase was a pair of inexpensive rubber gloves. To the gloves I stapled 1″ wide strips of duct tape around the entire cuff of the glove.

The gloves were then taped in place inside the 3″ holes. The last step was to cut a 4″ x 4″ hatch on the opposite

Continued on page 448

QUESTIONS & ANSWERS

Q. The honey I extracted at the end of July last year seemed slightly fermented a few months later. Should I have heated it when I extracted it? **Bernard Lockstampfor, Newport News, VA**

A. Heating honey to 140°F. right after extracting it will usually prevent fermentation, but I do not recommend it. The honey is never quite as good after heating, nor is this usually necessary in order to prevent fermentation. Honey will absorb moisture while it is still in the combs, and thus be vulnerable to fermentation. Therefore supers should be kept in a warm dry environment from the time they are taken from the hives, and then extracted in a dry place.

— Richard Taylor

Q. I run ten colonies for cut comb honey, but find it very time consuming to clean up the frames after the honey is cut from them. What is the best way to clean them? **Larry Waller, Marshall, IL**

A. Stack the supers and sticky frames in your yard and let the bees lick them dry. This takes very little time, and they get every trace of honey. Some say this risks spread of disease, but this has certainly not been true in my many decades of experience. Alternatively, you might consider raising round section comb honey, which is much faster and easier and involves almost no clean up.

— Richard Taylor

Q. Comb honey sells here for about $2.50 per pound while extract honey sells for about $1.90. Would it be feasible, then, to feed one's own extracted honey to strong colonies in the summer so the bees could convert it to comb honey? **James Gibbens, Clocolan, South Africa**

A. That would be a losing proposition even if there were no work involved. Not all the extracted honey would get converted to comb honey. In addition, you would need to thin the honey first, risking fermentation, and it would be a lot of work for nothing.

— Richard Taylor

Q. Why do all the articles on the two-queen system say to combine the queens for the winter? **Terry Farrell, Arlington, VA**

A. Because what you have otherwise is not a two-queen colony, but two colonies, one on top of the other, at least one is apt to perish for want of stores. Better to get them down to one good colony, with plenty of stores, then split them into a two-queen unit in the spring. The purpose of the extra queen is to get a huge amount of brood before the flow. No purose is served by having the extra queen through winter.

— Richard Taylor

Q. How do you store comb honey? You have written that you freeze it to kill wax moth larvae, but one book I read says never to freeze comb honey. **James E. Wolfe, Yukon, OK**

A. The advice you read, never to freeze comb honey, is certainly wrong, but also the advice, which I sometimes see in authoritative publications, that granulation can be retarded and wax worm damage prevented by freezing comb honey, is also wrong. Honey, unlike water and most other liquids, does not freeze, if by that is meant, to turn solid simply as a result of low temperature. So now let's get it straight, once for all.

If comb honey is reduced to zero (0°F), as is easily done in almost any home freezer, then this destroys, not just wax moth larvae, but ALL stages of wax moth, including eggs. It also retards, and sometimes entirely prevents, granulation for longer periods of time, even a year or more, and does not damage the honey in any way. Such freezer storage should be begun before any granulation has started, however. The worst temperature for honey storage, unless you are trying to make it granulate, is in the fifties (50°F

— Richard Taylor

Q. How does once become a "Master Beekeeper"? Is there such a title as "Novice Beekeeper," Intermediate Beekeeper," etc.? **Marshall Slotterbach, Sellersville, PA**

A. I got the title "Master Beekeeper" simply by instructing the lady who took my order for a rubber stamp to insert that expression after my name. A more respectable way to earn the title is to join the Eastern Apicultural Society, attend one of its three-day meetings in August of each year, and take the offical examination.

— Richard Taylor

TESTING
Continued from page 433

15. Propolis, pollen, and cocoon fragments. The longer a comb is used for the rearing of brood, the darker it becomes. Each inhabitant of a cell leaves behind the larval feces and the cocoon.

16. The collection of pollen is greatly influenced by the needs of the colony. Provided their are adequate honey stores in the colony, as the **amount of brood** increases, the proportion of the foragers that collect pollen and the amount of pollen collected also increases. Although brood of all stages stimulates pollen collection, the larval stage is particularly effective. The **smell of brood** alone and **contact with bees tending the brood** are also partly responsible for foragers collecting pollen. Irrespective of the presence of brood, the **queen** also induces pollen collection. The amount of pollen collected is also influenced by the **size of pollen stores** already present.

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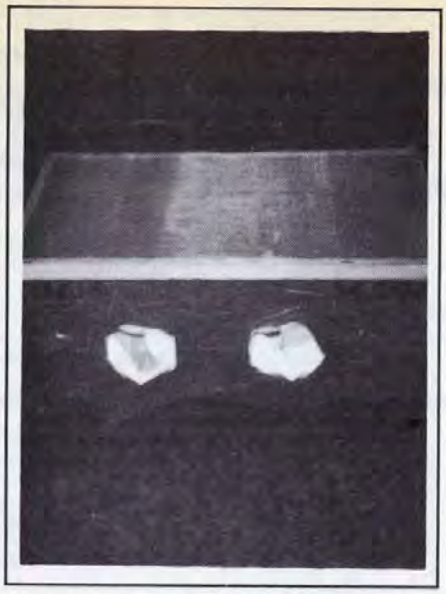
WORKERS
Continued from page 443

side from the gloves. The entire construction took 20 minutes and cost $2.50.

The queen cage was then placed inside the box, closed the hatch and then powdered my hands. After slipping into the gloves I opened the top of the queen cage and gently shook out the workers and queen, then replaced the lone queen back into her cage. The entire operation took three minutes and was remarkably simple.



To make the queen and workers more visible inside the box I taped a piece of white paper to the bottom of the box before stapeling on the screen.□

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