Bee Culture

JANUARY 1995

INSIDE

Janu

Honey Bee Emergencies, pg 51

COLUMNS

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FEATURES

INNER COVER

I wanted to make some slides of *Varroa* mites recently, so I headed for a hive I knew was infested. I scooped a hundred or so bees off a frame – we had a delicious warm spell in mid-November – into a quart jar. After spraying a shot of ether inside the jar and rolling it around there were a dozen or so mites clinging to the side. Bingo!

I dumped the bees out and carefully removed the mites, placing them on a tan sheet of paper on top of the hive. Since dead mites don't move I took my time getting the shot ready. I got it set up just so, stood back, pressed the cable button and nothing happened. The film was advanced, the focus was perfect . and nothing happened when I pushed the button that's supposed to make it go click.

I did everything I could think of there in the field, and nothing worked. A large, dark cloud went over just then, and a cold wind blew through the clearing. A chill went down my back. My camera was broken. I was lost. Panic set in. My camera was broken!

Let me explain a bit about this camera, and perhaps you'll understand my panic. We go back a long way, my camera and me. She's my first. I grew up (photographically speaking) with this little baby. She's a Fujica MPF 105X. Not fancy, mind you. There's no automatic dodads. It's completely manual which is why I like it, actually. It has limits, certainly. It goes only to a max of 700 shutter speed, and can handle only up to 3200 film speed. I still use the original 50 mm lens that she came with, and a 80/200 macro-telephoto I got at the same time. These give me almost everything I need to do almost everything I do. A practical, down-to-earth working camera.

She's been a trusted friend all these years – over 15 I think. It turns out Fujica decided they weren't doing as well in the camera business as they were in the film business and let the camera end go. I don't know when they did that, but you can't buy extra lenses or attachments anymore, except at used camera stores. In fact, most camera store people don't know Fujica once made cameras, let alone have spare parts for them. I know, I've looked. You can of course buy very expensive adapters to make attachments work for other models, but I never have. It's the purist in me.

So when my camera quit I just knew it was over. I knew there wouldn't be parts anywhere to fix it. I had this terrible empty feeling. It was the end. Suddenly over, in a beeyard, with no warning.

It wasn't always that way though. Which leads this meandering story to something about bees, since this is a magazine about that subject.

I hadn't owned that camera very long, hadn't even gotten her broken in yet when we had our first near tragedy. I was traveling through downtown Milwaukee with three five-gallon pails of honey on my way to a delivery. They were sitting on the front edge of the folded-down back seat in the station wagon I was driving, all their lids secure but one.

I was cruising about 50 m.p.h. or so when some idiot ran a red light right in front of me. I stood on the brake trying to avoid the car and barely, just barely managed to miss the back-end of that errant traveler. But those three pails in the back of the car dutifully obeyed that law of physics regarding bodies in motion and not just tipped over, but slammed over in unison.

My vehicle didn't have a flat floor in the back, but rather the maker had provided 'wells' for added leg room.

Continued on Page 43

Round About Ways To Say What I Mean.

Reader Assistance

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We encourage letters to the editor on any subject whether appearing in the magazine or not. Direct your letters to: Editor, P.O. Box 706, Medina, OH 44258. We reserve the right to edit letters for content and length, but will avoid this if possible.

Coming Soon

Lots to do in February this year, besides sit by the fire and stay warm and dry. Our Observation Hive series is really heating up – with Starting and Maintaining up next, watching bee behavior in March, brood and the queen in April, foraging in May, house cleaning and guarding in June, and six more after that. This is the best series we've ever seen, and if you've *EVER* worked an observation hive you'll want to check every one of these out.

How about banking queens? We've all had one or two or nine extra queens sometime, and what do you do with them, really? Next month we'll get you on the right track so you can save, and use those extras this season.

Mark Winston has more on feral colonies, but these are a bit different than those he talks about this month – don't miss this one.

But there's certainly more in February. Like hunting for new outlets for your honey, some you probably hadn't thought about before. Or, more on removing bees from buildings – increasingly popular, and needed, by citizens; or, a wonderful way to catch swarms (not yours, of course, since they *NEVER* do that), but those you stumble across, quick and easy; or, a piece by the 'Old Timer' from the wilds of British Columbia; or Well, the list goes on. Don't miss even one of these, next month in *Bee Culture*.

Make plans now for EAS '95, the Year of the Hive, July 31 - Aug. 4 in Wooster, OH. Two short courses, a half-day Apitherapy Workshop, outdoor afternoon workshops with bees, tours, BBQ, Banquet, child care. Call for details or free (on loan) promotional video, Kim Flottum (216) 725-6677 (D) or (216) 722-2021 (E).

A. Rinder
530 W. Mill St.
Medina, OH 44256

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The Editor
P.O. Box 706
Medina, OH 44256

MAILBOX

Easier Way

I would like to amplify on Richard Taylor's September and October issue.

"Is there any way to requeen without finding and killing the old queen?"

Maybe because I am not a fast queen finder even after 47 years I have developed my own time saving method of requeening.

I may make up a nuc (nucleus) of five frames with at least two frames of capped brood, a frame of honey, a frame of pollen and a drawn empty frame. I put the queen cage between the two frames of brood and adhering bees. If you leave the nuc in the same yard the older field bees will go back to the parent hive so I try to get my brood (with adhering bees) from another yard.

When the queen is laying well and I like her brood pattern, I build her up to a 10-frame hive holding nine frames. When well-established, I unite it with the hive to be requeened by using a full sheet of newspaper, making a couple of small holes. In this way the colony has a common odor and does not fight. The two queens get together and fight and the best queen wins, usually the new and top one.

Another method is using a double screen and making the nuc out of the hive to be requeened and putting it above the parent hive. This saves one bottom board and one top in equipment.

You can use this method to have a double queen hive and unite them 40-45 days before the end of the honey flow.

Be sure to have adequate supers because you should have a power house. One time I got 150 lbs. when the yard average was 30 lbs.

In this system the biggest overite is not supplying enough supers.

I should like to share some of my wintering experiences of beekeeping in NE. One year we had over 10 days below zero. I lost all my single hive body hives and only one double hive. This broke a lot of us from sucking eggs as the old saying goes. I lost 75% of my hives and many lost even more.

I went to the slip-on plastic-coated corrugated paper black winter covers. I used the loose pack black plastic and put it over the inner cover that had a hole in it and a notch went in the back. The hive was tilted lower at the front. I experienced the moisture coming out of the hive and condensing on the inside of the sides of the winter cover and harmlessly running down the outside of the hive on to the ground.

We figured we saved about 15# of honey on the overwintering costs plus a stronger hive.

I also found that if I cut a hole near the top front of the winter cover and had my double screen with the queen and bee entrance on the bottom the bees used the top entrance a lot more and were much stronger.

This gives a drier, warmer beehive and usually results in earlier and stronger hives.

When I start a new yard I like to put down a 10' wide strip of 6mm black plastic and set the hives in the middle part. This makes for a warmer hive and drier honey. In the summer the double screen has a 1/2" or so block under the high side to facilitate the more rapid removal of heat and moist air from drying honey. It also frees bees from fanning air up one side of the hive and down the other and out the front.

I feel the freed bees either save on honey (energy) or go out and gather more. When you get over 71 years try to do things easier.

James Hagenmeyer
Madisonville, TN

Likes ARS-Y-C-1

As yet, I have not seen a report from beekeepers on the ARS-Y-C-1 honey bees. This spring I bought 12 ARS queens. I introduced them into colonies that needed queens. Some I made from splits etc., but none were put into full colonies. My goal was to let them build up and store enough honey for winter.

I am a full-time carpenter living in Washington state, so this is a hobby side-line. I moved these bees to a mostly isolated little valley so the strain could remain basically pure if any superseded. I have a job and other yards so my visits are hopefully every two weeks in the summer. For the bees, my visits might have been a little longer.

About the middle of July, when things are supposed to slow down a little, I drove up to the gate to look at the bees. From the gate it looked like a bunch of old men with dark beards – all of them were hanging out like beards. My first thought was swarms. However, only one swarmed. Most of my supers were used up by then, but I did have some shallow cut comb honey supers which I got ready and put on along with other supers I could find.

Behind the bees, across the Nooksack river, was a mountainside of fireweed already in bloom. Within several weeks, the comb honey supers were filled wall to wall. The outside frames finished and sealed too. The fireweed honey pure is clear white. The white combs were the prettiest I have ever seen.

My wife and I packed comb with fireweed liquid honey around it in 12 oz. jelly jars. Our price to the stores was $2.00 a jar and $4.00 for a quart. One of the stores charged $6.70 a quart. A customer bought seven or eight quarts in Washington and then called back from Denver, CO wanting more.

The swarm filled a deep hive body super. I took it off and put on

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another since they had already filled a deep and western before they swarmed. The ARS-Y-C-1 queens introduced well with the bees being gentle. They build up fast into large colonies making beautiful white cappings for comb honey. Their extracting combs are thick – they know how to make honey.

It is November, the winter clusters are reduced but decent sized enough to do a good pollinating job. The hives are packed with honey for winter. I am very pleased. I treated with Apistan-no menthol.

Thanks to all the people who made this letter of thanks and appreciation possible.

Richard Litten
Bellingham, WA

Advice For *Everybody*

The American honey producing industry's efforts to pursue a dumping case against imports of honey from China deserves some comment from our organization.

The International Honey Exporters Organization (IHEO) membership is made up of major honey exporters from around the world, including China. If a dumping case against China is won by American producers and prices in the United States increase as predicted by the supporters of this action, then the majority of IHEO members would stand to benefit from the results through higher sale prices to the United States. If the majority of the membership of IHEO believed this to be true, you would not be reading this now.

The fact is that all this will result in is chaos in the international honey market, perhaps resulting in higher prices, perhaps lower, or perhaps wild price swings between both extremes.

The members of IHEO have years of experience in the international honey market and many could be considered the foremost experts on the subject. Nevertheless, I doubt that any could accurately predict the effect on the market if a dumping case was won. If they could, and believed that the result would be higher prices, then you would begin receiving thousands of dollars in support from Argentina, Mexico and Canada any day now. But you won't.

In the world market, Canadian honey typically sells for more than Argentine and Australian, which sell for more than Mexican, which sells for more than Chinese. In the United States the domestic prices are sometimes linked to the price of these imported honeys, and sometimes have nothing to do with them. Right now you seem to be at the "nothing to do with them" stage. Argentine, Canadian, Mexican, Australian and Chinese prices are up, and in many cases the honey is just not available. In the United States prices are down. Why?

Very good question. As I said, the international honey market is difficult to predict and sometimes to understand. But through all of this there are some indicators that can explain why USA honey prices are depressed.

1993 was one of the largest honey crops in recent memory. This put an additional 50 million pounds of domestic honey on a market that was not prepared for it. The previous ITC investigation disrupted, in part, the orderly marketing of the 1993 crop, as many producers waited for the outcome of the case in hopes of higher prices. In early 1993 imports were up, but not to unmanageable levels. Later in the year, fear of the outcome of the ITC investigation, combined with portions of the domestic crop being held back, fueled increased imports. Imports of Argentine honey almost doubled in the first four months of 1994 from the same period in 1993.

So what can be done to increase prices?

In general American honey is a better quality than Chinese, so why should it be sold for similar or even lower prices. (But) We hear many complaints about the way American producers handle their honey, here are a few:

1. Drums – Don't pack your honey into a drum that should have been sent to a dump five years ago. Poor quality drums are difficult to handle and often leak. Leakage is not simply a matter of lost honey, but also cleanup cost. And don't fill the drum to the top. You might save a dollar by doing so, but the packer will lose $10 in honey and spend more trying to clean up the mess when the honey expands.

2. Moisture – If you produce honey that's 17% moisture, great. Leave it that way. Don't run it through some kind of system to get the moisture up to 18%. The bacteria you are adding from the water won't go over too well with a packer or one of his clients.

3. Cleanliness – If a packer wanted a couple pounds of bees he could order packages. If he wants wax he'll buy it. Why not add something in your system to strain these out, or let the honey settle longer.

4. Relations – Producer/packer relations in the United States seem to be at an all time low. The packer is, after all, your customer and should be treated accordingly. You might be surprised when you find out that respect is a two-way street. After all, a packer needs honey to pack and if he doesn't have any, he doesn't have much of a business.

5. Spot sales/Forward contracts – Most packers contract some portion of their requirements in advance and make up the balance of their requirements with spot purchases. Few American beekeepers sell honey for delivery six months from now, so packers have no choice but to cover their contracted positions with imported honey. Instead of calling up a packer and trying to sell your honey for delivery within the next three days, why not try selling it for delivery three or four months down the road. You might find that you can even get a slightly better price than the current price for delivery next week. The only way that this can work though, is if you deliver the honey regardless of what happens to the price. If the price goes up, too bad for you, if it goes down, you made a good decision. The important thing is to make a decision you are comfortable with and to live with it.

So, if you correct some of these problems will you be able to sell

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ur honey consistently for more han the value of imported honey? Maybe, maybe not. But you would at least be one step closer.

Wayne Rumball
President - IHEO
Montreal, Quebec

Looking For Gold

Can you please help us locate Golden Bees. We have heard that they are very domestic and easy to get along with – not aggressive.

We would like to know if anyone has some so that we can get a start to raise them. Thank you.

Larry Waddelow
733 S. - 1100 E. Box 93
Greentown, IN 46936

Looking . . .

Our names are Petar and Vioare Sekesan. We are husband and wife and are both beekeepers from Yugolavia. We own about 100 e families. Part of them are with o queens. We are making beehives and are working in Langstroth and Fararove systems. We live temporarily in the U.S. now.

We'd like to know more about your experience in beekeeping and especially to get a periodical or a book about these two systems: Langstroth and Fararove, and a video cassette or a book about the transportation of beehives.

Also, we are interested, if it is possible, to work a few weeks on a bee farm or in a company, so we can learn more about it.

We'd like to get in touch with some beekeepers or companies. We're looking for some stores where we could get tools for apiculture (especially a press for hand-made honey combs).

Petar Sekesan
59-40 69th Ave.
Ridgewood, NY 11385

Losing Battle?

No matter how worthy their ause, beekeepers will be pouring money down a rat hole if they engage attorneys to fight the importation of honey from China. This is the age of free trade, and even as I write this the President is in Asia seeking ways to increase it. Ours is a consumer-driven economy, and that means, the lowest price, from whatever source. No agency of government is going to rule in favor of American beekeepers on this issue, and any lawyer taking money from us to fight it would know in advance that he would lose, although he wouldn't say so. And even if the flow of honey from China were stopped somehow, which is a very big "if," other countries, like Argentina, are waiting to fill the gap. Fellow beekeepers: Don't waste your money. There is no winning this one.

Richard Taylor
Interlaken, NY

Possoms & Badgers?

The name of our group is *The Possum Breeders Association*. We were founded in California in 1988. We now have infiltrated many beekeeping organizations as well as universities and government institutions.

Our preamble is:

Don't take yourself too seriously.

Be inspired by those who do. Think of the perfect rebuttal two days after the argument is finished.

By all reports your organization (The Wisconsin Honey Producers) operates under similar principles. Through infiltration of your organization, we understand your conventions are most enjoyable, your members are quite friendly, your membership is increasing, and so are your auction receipts. It's on this last point that we would like to dwell. It's come to our attention that one of our members was subjected to severe humiliation as well as financial hardship at one of your fund-raisers.

It appears that during a temporary memory lapse suffered at an establishment serving refreshments our member left clothing behind. Said clothing was consequently offered for sale at your auction. Our member has suffered at your hands and this cannot go unanswered.

We in turn have removed from the state of Wisconsin an item of value to you. We will return this item only when *we* feel full retribution has been attained.

In closing, remember we are everywhere. So if you want to see

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your banner again, think before you act. You will hear from us soon.

Prehensiley yours;
The Possum Breeders Association

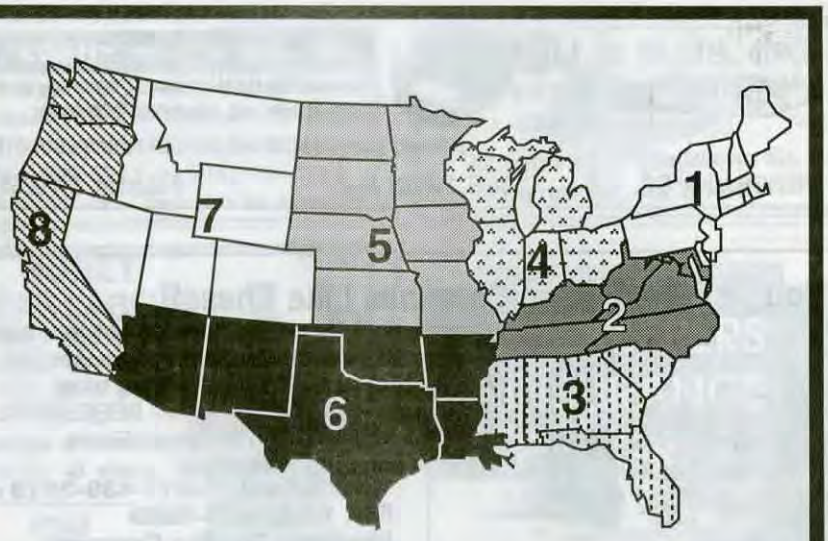
We encourage letters to the Editor about any subject or topic, whether appearing here previously or not. Our Mailbox is a sounding board for new ideas, a forum for discussion and a Billboard for opinions. Send your contributions by regular mail, Fax at 216-725-5624 or E-Mail at BCULTURE@AOL.COM.

JANUARY Honey Report

January 1, 1995

REPORT FEATURES

Prices shown are averages from many reporters living in a region, and reflect that region's general price structure. The Range Column lists highest and lowest prices received across all regions, from all reporters.



	Reporting Regions								Summary		History	
	1	2	3	4	5	6	7	8			Last	Last
Extracted honey sold bulk to Packers or Processors									Range	Avg.	Month	Yr.
Wholesale Bulk												
60# Light	39.33	42.08	39.32	38.75	39.32	31.63	42.00	41.30	20.00-56.00	41.95	43.00	43.22
60# Amber	37.55	41.13	35.30	40.07	35.30	28.08	40.00	36.90	15.00-51.00	39.89	40.76	41.09
55 gal. Light	0.54	0.56	0.61	0.52	0.55	0.45	0.53	0.62	0.35-0.90	0.57	0.58	.560
55 gal. Amber	0.48	0.50	0.54	0.46	0.54	0.44	0.50	0.54	0.32-0.78	0.51	0.53	.512
Wholesale - Case Lots												
1/2# 24's	21.81	25.29	25.43	17.71	25.43	20.25	22.50	19.73	17.71-36.00	22.59	22.92	20.98
1# 24's	29.46	30.62	30.84	30.33	31.05	31.03	31.40	29.07	24.00-37.90	30.61	29.74	30.98
2# 12's	27.51	28.39	28.47	28.27	29.36	27.15	29.30	30.50	23.00-33.60	28.81	29.17	28.72
12 oz. Plas. 24's	25.73	28.39	27.92	25.28	29.70	25.00	27.50	24.40	19.20-37.90	26.65	28.13	27.18
5# 6's	28.31	30.00	28.02	31.45	26.31	28.02	28.50	29.15	18.00-35.50	30.55	31.27	29.59
Retail Honey Prices												
1/2#	1.53	1.94	2.00	1.19	1.23	1.29	1.15	1.15	1.08-3.50	1.53	1.45	1.21
12 oz. Plastic	1.60	1.76	2.50	1.52	1.38	1.58	1.65	1.49	1.19-2.50	1.65	1.70	1.60
1 lb. Glass	1.81	1.99	2.50	1.75	1.80	1.81	1.85	1.74	1.39-2.50	1.87	1.93	1.79
2 lb. Glass	3.14	3.29	3.50	3.17	2.86	3.16	2.98	3.47	2.59-4.00	3.26	3.36	3.16
3 lb. Glass	4.13	4.70	4.50	3.88	3.85	3.82	4.35	4.71	3.50-5.50	4.35	4.47	4.29
4 lb. Glass	5.15	5.85	5.50	5.50	6.15	5.34	5.15	6.25	4.39-6.49	5.60	5.75	5.77
5 lb. Glass	6.64	7.22	6.50	6.78	7.49	5.97	6.10	6.41	5.89-8.95	6.94	7.07	6.50
1# Cream	2.25	2.48	2.54	1.92	1.94	2.85	2.10	1.97	1.77-3.50	2.35	2.50	2.52
1# Comb	3.07	2.63	2.75	2.88	2.97	3.75	3.75	3.75	2.50-4.50	3.23	3.16	3.31
Round Plastic	2.82	2.95	3.08	2.89	3.08	3.55	3.08	3.36	1.70-4.50	3.05	3.04	2.78
Wax (Light)	1.55	1.25	1.80	1.60	1.35	1.28	1.35	1.46	0.85-3.50	1.57	1.65	1.61
Wax (Dark)	1.27	1.12	1.50	1.48	1.52	0.83	1.15	1.25	0.50-2.75	1.30	1.31	1.23
Poll. Fee/Col.	28.50	22.50	30.00	32.50	32.50	12.50	35.00	33.67	12.50-55.00	30.00	30.69	31.50

MARKET SHARE

We surveyed our reporters this month to get some basic marketing information from their regions. We asked what size jars sell the best for them, the worst and what doesn't sell at all. We asked if they used a 'local honey' label, or not and whether their sales were being influenced by competitors from far away or large producer/packers nearby. The results give a somewhat good look at what works, and what doesn't.

Region 1

Prices only steady to dropping a bit, which is atypical for this region this time of year. Retail prices strongest. 1 lb. glass most popular, and very large and very small containers sell the least. Local labels not used widely, and large packers not having major affect on prices in most areas.

Region 2

Prices steady to increasing a bit as demand builds seasonally. Larger sizes most popular in this region, with the quart jar very popular. But 1 lb. glass and plastic also sell well. Comb honey and 5 lb. jars don't seem to move well, but cut comb does. Local labels popular but competition is stiff in large markets with distant producer/packers.

Region 3

Prices steady and demand steady with little seasonal change. Strong competition from outside packers at the large retail level has kept prices lower than anticipated. Smaller containers do well here, but at farm stand level large sell well. Local labels help sales.

Region 4

Prices steady to increasing just a bit, but only a little and slowly. Medium to small (1 lb. to 2-1/2 lb.) jars best sellers in this region, with large sizes generally slower, if at all. Comb honey a mixed bag. Large producer/packer competition *very* evident in this region, with shelf space a premium.

Region 5

Prices increasing this month, probably due to seasonal demand, but competition from large producer/packers very stiff here, too. Also, competition between producers for lowest prices evident so it's producer vs. producer and packer vs. packer – only the consumer wins. Medium to large sizes do best here 1 lb. to 5 lb., with smaller versions a bit slower, but quarts also popular.

Region 6

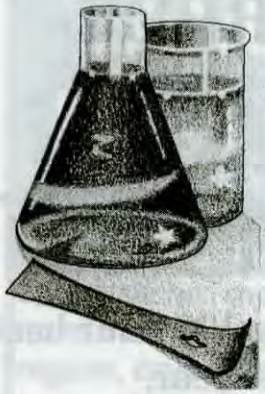
Prices down and heading lower at all levels for almost all sizes. Foreign and distant producer/packer competition exceptionally strong, keeping prices low and profits marginal. Medium to large containers generally sell best, but smaller sizes do well in more urban areas.

Region 7

Prices steady but with increasing demand they should be going up, but aren't – competition by large producer/packers is strong here, but smaller outfits have similar problems. Small to medium sizes do well with comb honey popular here.

Region 8

Prices steady to increasing a bit. Popular sizes vary with the part of the region you're in. Urban – small; rural – large; generally. Plastic doesn't do as well as glass in smaller markets, better in competitive markets. Local labels help, some, and compeition between large producer/packers *very* keen here.



RESEARCH REVIEW

roger morse cornell university ithaca ny

"We've let bees with every disease except *American foulbrood die (or live) – why not foulbrood?"*

Honey bees in colonies infected with American foulbrood are sometimes resistant or tolerant of the disease the bacteria cause. To date, the behavior associated with this resistance has taken three different forms. In one, the house bees cleaned the dead larvae, pupae and their remains from the comb. This is not an easy task since the scales (the dried, dead pupae) cling strongly to the cell walls. The second behavior observed was that the bees tore down the cells with dead material to the comb midrib and then rebuilt the cells. In the third behavior, the bees removed all of the comb with infected material and rebuilt it.

The technique used to study American foulbrood resistance is to cut out a piece of comb about two inches square from a healthy hive. A piece of comb containing at least 75 dead larvae and pupae is inserted into this space. One then watches the inserted comb over a given period of time and determines what the bees do. Of course, this same technique may be used to study resistance to several bee diseases.

What I report above is not new. It comes from research conducted at Iowa State University in 1936 and 1937 These studies excited a number of people and, as a result, there was a special appropriation for the U.S. Department of Agriculture to undertake further studies. Steve Taber has written recently in this magazine about this technique, which he has also used successfully.

Foulbrood, that is, rotting, bad-smelling, obviously diseased honey bee larvae and pupae were known to the Greeks over two thousand years ago. We learn from reading the bee journals from around the turn of the last century that foulbrood disease was a problem for beekeepers. However, the fact is that American and European foulbroods were not distinguished until they were investigated by G.F. White, a graduate student at Cornell (White, 1906). In the preface to White's published thesis, E. F. Phillips, who was in charge of the USDA research program, used the terms European foulbrood and American foulbrood for the first time (White, 1906). Phillips made note of the fact that the names were not descriptive of where the diseases were found but only that each was "the place in which the diseases were first investigated in a thoroughly scientific manner." White was subsequently hired by the U.S. Department of Agriculture and wrote a series of USDA bulletins on bee diseases.

So what happened to this American foulbrood research program? It was obviously lost, but why? The answer is complex but not impossible to learn. First, by the late 1930s, it had been demonstrated in several states that American foulbrood could be kept at tolerable levels through a good apiary inspection program that involved searching out and destroying infected colonies. Many states found infection levels of six to 10 percent in the 1920s, but by the late 1930s, that had been reduced to about one percent, which most beekeepers found was a great improvement. However, looking back, I also remember talk among inspectors about the fact that one would sometimes find a colony where only one or a few cells of American foulbrood could be found. If these cells were opened, the disease would sometimes disappear. In other words, perhaps it was not necessary to destroy entire colonies, as they would have cured themselves.

A second fact to consider is that World War II brought many agricultural research projects to a halt and this, apparently, included American foulbrood studies. And then, in 1944, it was reported that sulfa drugs could be used to suppress American foulbrood. Sulfa was far from perfect and was especially objectionable because of its persistence and long life. However, it was soon found that Terramycin is also effective in bee disease control. I think almost all commercial beekeepers use Terramycin today to control both American and European foulbrood.

At this point I raise two questions: (1) How did we come to burn colonies of bees infected with the bacteria that cause American foulbrood as a control technique? Looking back, which is always easy to do, I think it was a bad decision. (2) How did beekeepers cope with American foulbrood prior to the time it and European foulbrood were differentiated? I suggest that honey bees had some natural tolerance to both diseases, and while the diseases may have been distructive, this was probably truer in some races than in others.

Conclusion: There are seven major diseases affecting honey bees we must face almost every day. They are, in order of importance: *Varroa* disease, tracheal mite disease, American foulbrood, European foulbrood, chalkbrood, nosema and sacbrood. In instances of sacbrood, nosema, European foulbrood, chalkbrood and tracheal mite, we have allowed the more susceptible bees to die. We are

aware that bees resistant to all diseases exist. I believe we should spend more time studying American foulbrood and testing presumably resistant lines. BC

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?DO YOU KNOW?

More On Bee Behavior

clarence collison

Whether you keep bees for pleasure or profit, one quickly realizes honey bees are truly fascinating insects. In many instances, honey bees are very predictable, whereas in other situations, we cannot explain why the bees behave in a particular way. The explanation of the activities and behavior of bees is not simple. As we increase our understanding of the factors and conditions that affect honey bee behavior, we should become more in tune with nature and better managers of our colonies.

How familiar are you with bee behavior? Please take a few minutes and answer the following questions to determine how well you understand this important topic.

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

1. ___ Feeding sugar syrup to honey bee colonies increases the amount of pollen they collect.
2. ___ Colonies provided with abundant amounts of drone comb in the spring will produce significantly more drone brood than colonies in which the amount of drone comb is limited.
3. ___ Queen honey bees normally go on their mating flights in the morning.
4. ___ Each honey bee has a tendency to express different behaviors according to its genetic profile.
5. ___ Brood care by nurse bees has two distinct phases. A nurse bee initially secretes royal jelly and feeds young larvae, and as she ages she switches to feeding nectar, diluted honey and pollen to older larvae.
6. ___ Adult honey bees exhibit learning.
7. ___ Honey bees can detect and orient to the earth's magnetic field.
8. ___ Honey bee workers forage for food according to their own needs.
9. ___ The defensive behavior of a colony increases when there is a nectar dearth and when a colony becomes queenless.
10. ___ Nurse bees will provide better care for worker brood than for drone brood if rearing conditions are marginal.
11. ___ Worker bees of the same colony share a common, distinctive colony odor which is different from that of other colonies.
12. ___ Foraging honey bees that have found the entrance to their hive after being temporarily disoriented release 2-Heptanone.
13. ___ The intensity of the defensive behavior of honey bees is highly dependent on external environmental factors.
14. ___ Alerted or stinging workers release alarm pheromones, especially isopentyl acetate, that elicit colonial defense.
15. ___ Individual bees are capable of doing a rather wide variety of tasks regardless of their age.
16. ___ A bee that is begging for food attempts to thrust its tongue between the mouthparts of another bee, and a bee that is offering food opens its mandibles and moves its still-folded tongue slightly downward and forward from its position of rest.
17. ___ In the fall, when a colony expels the drones, the queen's egg-laying activity is drastically reduced or ceases altogether.
18. ___ In the North, shortly after the winter solstice, the queen begins laying fertilized eggs.

Multiple Choice Questions (1 point each)

19. ___ Honey bees can see all of the following colors except:
    - A. Green
    - B. Blue
    - C. Ultraviolet
    - D. Red
    - E. Yellow
20. ___ Chemoreceptors associated with taste and smell are located on the:
    - A. Mandibles
    - B. Tarsi
    - C. Front Legs
    - D. Proboscis
    - E. Antennae
21. When a queen is stationary on a comb, she is surrounded by a circle of attendants known as the queen's court or retinue. Describe the behavior of the workers making up the court toward their queen (2 points).
22. Name two instances when mated queens leave the hive (2 points).
23. _____ Form of foraging behavior in which bees from one hive collect the nectar and honey stores from another colony (1 point).

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CREATE YOUR OWN SUCCESS

andrew matheson

PICK UP ALMOST ANY BEEKEEPing magazine these days, and you don't feel too cheerful. Cheap honey, decreasing prices, more disease problems - it's no wonder many beekeepers aren't delirious with joy.

The costs of being a beekeeper aren't going down either - labor, woodenware, sugar, it's all getting more expensive - so with honey prices dropping, the "cost-price squeeze" (as economists so delicately put it) becomes more like a bear hug.

What's a beekeeper to do? Some are hanging on for dear life and hoping the light at the end of the tunnel isn't really a train coming the other way. Like Mr. Micawber in the Dickens story, they've been waiting "in case anything turned up." That's an easy option, but it doesn't pay the bills.

Others are working on politicians, hoping that those in power will see the light and either raise tariffs or put up some other barriers to stem the flow of imported honey. That's something individuals can't do, and actions like this show the importance of well-managed beekeeping organizations that are widely supported by the industry they serve. Of course, even if governments do lend some protection to their honey industries, the steps they take probably won't be big enough or fast enough to protect a lot of beekeepers.

Something might well come along to help you, and the optimism of working or hoping for that day certainly isn't wrong. But even if it does, whatever comes will help you only to survive. If you really want to win at this thing called beekeeping, you have to create your own success.

Is it only U.S. beekeepers facing this challenge? Is it only beekeepers in North America who have to compete with cheaper imported honey, or who, in other ways, have an ongoing battle with shrinking margins (the cost-price squeeze - there's that phrase again)?

No, in quite a few places around the globe - in both importing and exporting countries beekeepers are finding times to be tough. In Europe, for instance, beekeepers are worried enough about the state of their industry to have taken to the streets. Last January, over 3,000 of them from the twelve member states of the European Union marched outside a meeting of the Union's ministers of agriculture in Brussels.

The protest wasn't only, or even mainly, about imported honey. The beekeepers wanted recognition of the important pollinating work of bees, reclassification of honey production from industry to agriculture and an end to the artificially high price of sugar in Europe. They also drew attention to the proposed lowering of tariffs on honey coming into the EU and the general lack of government support for the beekeeping industry.

Local honey producers in Europe also suffered a blow recently when a court decision stated that packers of imported honey no longer had to declare the fact on the label. Imported honey no longer has to be identified as such, so the euphemistic description "product of more than one country" will soon be a thing of the past.

HOW ARE BEEKEEPERS RESPONDing to the challenges facing them? Beekeepers everywhere are having to adapt if they're to have any hope of surviving. Not everyone's succeeding, of course, but there are some inspiring examples of what can be done to survive, and even thrive, in a difficult climate.

There are a lot of things within the grasp of even backyard beekeepers. Add the special characteristics of your honey to the label; it's produced in this county, or that county, or even on the grounds of this or that historic house. Never sell "honey." Your customers can always go to a supermarket and buy a jar of ordinary, bland product if that's what they want. You probably can't, and certainly don't want to compete with them in that game. Sell honey of a particular floral type if you honestly can, or produce honey of another type: wildflower, unheated, native forest, or whatever. Use an attractive label and lovingly pack your honey in a sound and appealing container.

You'd think that beekeepers in Germany would have a pretty tough time. That country is the biggest honey importer in the world, and although much of that honey is re-exported (and therein lies a tale), still 80% of the nation's consumption is satisfied with imports. What have the beekeepers done? Look at what a recent European Commission report said about them. "In Germany, 75% of output is sold directly by the bee farmer to the consumer or retailer. By promotional campaigns and advertising, the national beekeepers' association has created a quality image for German honey in a market dominated by imported honey. In addition to strict quality control of its members' products, the association organizes honey marketing in a standard presentation, with a label which carries a printed control number so that the producer of any pot of honey sold on the market can be traced at any time."

Too organized? Wouldn't work anywhere else? Maybe. Maybe not. But there are some good principles there, like an emphasis on quality and on beekeepers working together against their common competitors. It must work, too, as some specialty honeys sell for over $8.00/lb.

On a larger scale, beekeepers are fighting back too. Innovative beekeepers are developing whole business plans based on creating markets for novel products. And this is not just for the big boys - I know sole-trader beekeepers who are putting effort (and money) into carefully thought-out plans, contracting for

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food technology and market research services where needed. The opportunities are enormous, and there is still plenty of potential for businesses in high-wage economies to compete in the world market.

When is honey not really honey? When it's a fruit and honey spread. To get around tariff barriers, exporters in one country began to put honey spreads into an Asian country, and now this product has become a valuable export item in its own right - with a higher unit value than bulk honey.

Most wine consumers have ordered by color and descriptions like dry, medium or sweet for a long time. We all know about the increased value that can be gained by selling honey by floral type, but now this is going further in some markets with honeys being described using wine terminology for taste and bouquet - varietal honeys for the connoisseur rather than a sweet spread for the supermarket buyer.

Niche marketing is a phrase we hear, but to see it in action is impressive. In the words of an exporter from one country who sells high-value packs to Japan, "I'm a niche marketer, but I don't *find* niches. I *make* a gap and fill it." Honey producers and packers in that country more than doubled their sales to Japan in the first half of 1994 compared with the same period the year before, in the face of a declining market, in a nation which is currently buying 90% of its imported honey from China.

And what about "organic" honey? One approach might be to scoff - "How can honey be free of every residue? My bees forage all over the place." Or, "Of course my honey's organic, all honey is, you know!" But the market for these products – organic, biodynamic – call them what you will, is growing. And as with many other things, standards are increasing. More and more, you will need to be certified by a recognized authority before you can attach terms like "organic" to your products. The rewards are there, such as for the beekeepers I know who have achieved Biogro certification and can ship honey halfway around the world to high-value markets.

Don't belittle the industrial market as just a place to dump your low-quality honey. Opportunities are opening up there, too. Honey powder is finding favor among food manufacturers, as it's less messy than liquid honey and saves on freight bills, too. Honey confectionery is big in some European countries.

The whole issue of quality certification is hitting the honey industry. You'll already have heard some of the jargon: ISO9002, TQM, quality circles, third party accreditation. But whatever system is used, the issue is here to stay, and beekeepers will have to come to grips with it and get involved. The Australian honey industry is investing in an industry-wide, quality assurance system, affecting legislation, beekeeper practices and the way packers operate. Closer to home, a number of industry groups in the U.S. have joined together to set up the "Honey Quality Assurance Program," aiming to ensure the purity of every container of honey sold in the country. Quality assurance works to improve the product, directly through the systems and disciplines it brings and indirectly through the change in mindset for the players involved.

Okay, QA is fine, but does it put money in the bank? What about the beekeeper/packer who has achieved ISO9002 certification and finds it a door-opener to bigger and more lucrative markets in Asia? What about the royal jelly supplier in a developed country who has QA systems in place and can compete with the flood of low-cost royal jelly around? His buyers want the assurance that these systems bring and aren't worried about the price.

IT'S NOT ONLY OUR PRODUCTS THAT give us opportunities for adding value. We can generate more income from the services beekeepers can provide, especially pollination. The demand for pollination is rising in some areas - crops that need pollination services (such as almonds) are increasing in area, and growers are often more aware of the need to manage pollination properly (they have their cost-price squeeze, too).

So there are opportunities for beekeepers, but there are threats too. You've heard a lot about growers using other bees for pollination, and in some places they are even switching to artificial pollination systems (such as for kiwifruit pollination in New Zealand). Why do growers want these alternatives? Are these methods actually doing a better job than honey bees would do? In some cases they are, but in other cases the answer is no. The key word is service.

Contractors providing pollination with other bees or with artificial methods are usually geared to providing a total service package, with pollination assessments, impressive technology, grower education and professional appearance of their staff and products. What do growers get from honey bee pollination beekeepers? Many are doing a great job, providing pre-pollination visits, prompt delivery of quality colonies, independent colony assessments, backup service - even using independently-audited quality assurance systems.

Others don't do such a good job. At the bottom of the scale are contractors who have no relationship with the grower outside pollination time and provide late delivery, poor colonies and scruffy hives, trucks and staff. It's also not very professional for the client to get an earful about how times are tough and how *Varroa* means they might not be able to get as many colonies next year. Think that will create fertile ground for a price increase? No, it's more likely to push your clients into the hands of your competitors, and remember, the competition isn't only other beekeepers.

IF YOU'RE LOOKING FOR EXAMPLES OF adding value to products, don't forget to look outside your own industry. What about the wine producer who targets young, professional Japanese women with high disposable incomes? Those women are relieved to be able to buy locally the obligatory gifts associated with an overseas trip to avoid lugging presents all around the world. What about the farmer in an isolated country facing an uncertain future with the loss of his processing company? He now exports to a niche market, a buyer who buys only from him in exchange for an exclusive sales contract and an understanding that he will not use growth-promoting hormones. Vulnerable? Sure, but it's nice to see his fillet steak selling at over $25 a pound in a Munich food emporium. Now the farmer has diversified into growing grapes, and his

gold-medal-winning wines sell in the same market as part of a "beef and burgundy" package. Look and learn. Be imaginative, but also work by sensible and sound business plans.

QUALITY IS AN INDIVIDUAL GOAL, but it is also a collective one for the industry. Support your industry associations when they are pushing locally-produced honey and take PRIDE in your own products. Join in their efforts to implement quality assurance programs.

Beekeepers have to support research projects too, especially as science budgets are being cut. It's no coincidence that beekeepers who support product and market research are found in countries with success stories to tell about innovative products and imaginative market development.

There are all sorts of areas needing research backup. For instance, it was two U.S. scientists who reported recently that "although the U.S. ranks third in the world in honey production, much of its honey cannot be verified for consumer consumption or effectively exported because it lacks pollen and chemical statistical data. This almost total lack of information about U.S. honey types makes the United States unique among the major honey-producing countries of the world."

How can beekeepers put all their products into quality markets - won't that mean they're victims of their own success? Yes and no. No, because beekeepers are competing against other sweeteners and other pollinators before they are competing against other beekeepers. Yes, but of course not all producers are going to be willing, or able, to market their wares in a way to give them maximum value. By definition the top 10 or 20% of spaces can be inhabited only by the select few.

But I am convinced that the way to success and profitability for beekeepers who aren't in low wage economies is to add as much value as possible to the goods and services they produce.

In tough times some beekeepers will fail, some will survive and only a few will prosper. It's up to you which category you put yourself into. And remember, quality is a journey, not a destination. BC

Andrew Matheson is the Director of the International Bee Research Association in Cardiff, England.

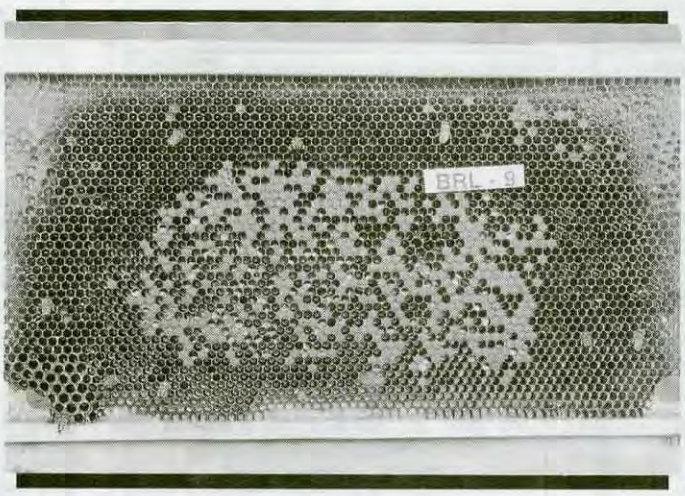
WHAT'S THIS ABOUT PARASITIC MITE SYNDROME

"We're looking at viruses as at least being involved in this . . . but viruses are tough to detect."

The disease diagnosis staff at the USDA Bee Lab in Beltsville, MD have recently stumbled upon a problem that even their expertise has had trouble deciphering.

Samples sent to the lab have shown all manner of problems. However, none of them seem to be the sole causal agent for the death of the colony the sample was taken from.

If you take a cursory look at the photo you can see things that "look like" chalkbrood, sacbrood, American and European Foulbrood. In every case that comes in 'looking' like this, however, one feature is consistent – *Varroa* mites. And, in 28% of the samples tracheal mites are also present.



There are "sometimes" symptoms from the hive that cause even more confusion: low adult populations, crawling adult bees, supercedure, scales, shot brood, cannibalism, reduced honey production.

But each of these can "sometimes" be explained by other causes. Low adult populations are caused by a myriad of reasons, most easily determined; crawling adults can result from tracheal mite infestations, pesticides or certain viruses; queen supercedure comes from old queens, nosema, injury or tracheal mites; scales from AFB or EFB. Cannibalism can occur in the spring when a nectar flow suddenly ceases and there's not enough food to feed brood or even high populations of wax moth. And low honey production, like reduced adult populations, can be caused by any of a hundred reasons.

The symptoms aren't always present, tracheal mites aren't always present, and the scales aren't typical – they're easily removed from the cells, range in color from yellow to black, but have no disease bacteria present.

But the common denominator remains the presence of *Varroa* mites. They have been found on larva (normally they're only on pupa), they are on scales and sometimes even in empty cells in the samples sent in.

Treating affected colonies has helped, but for reasons not completely understood. AFB and EFB are easily controlled by terramycin, but AFB and EFB aren't present. But treating with terra helps, whether in sugar syrup or grease patties. Even feeding sugar syrup helps, and applying fluvalinate strips to control *Varroa* reduces symptoms, too.

"It's all very confusing, and we don't have all the answers," said Dr. H. Shimanuki at the November meeting of the Empire State Honey Producers.

"We're looking at viruses as at least being involved in this," Shimanuki said. "But viruses are tough to detect. There's only four English speaking labs in the world that can diagnose viruses, and no one of those can diagnose all known bee viruses," he added.

"If viruses are part of the problem, we haven't been able to find infected mites," Shimanuki said. "And by controlling mites we still have seen this syndrome occur. It is still very confusing. And we don't know if different races of bees, or different stocks of bees are reacting differently. We suspect the syndrome has been found in the 48 states, but haven't had it confirmed yet. We're still looking for connections between symptoms and causes, and beekeepers are the first line of research. If you see these symptoms let us know, so we can find out exactly what Parasitic Mite Syndrome really is." BC

BOTH GOOD, AND BAD

Feral Bees

mark winston

Recently, I began doing some reading on a subject I call "nature thought" to provide background for a project I'm involved in. This literature is vast and extraordinarily dense and convoluted, but it examines some important issues, such as whether humans are part of nature or separate from it, and our possible relationships toward the rest of the earth's inhabitants. Discussions on humans and nature go back to the Old Testament and beyond, but the issues haven't changed much in the last 5,000 years. Basically, we humans have spent much of our recorded history trying to decide whether we are stewards or dominators of nature. As stewards, we have attempted to foster the natural world and maintain it, but as dominators, we have used plants, animals and even entire ecosystems for our own human benefit. There is little doubt that the dominator philosophy is winning, in spite of an increasingly strong and active environmental movement. In a world of almost six billion people, the pastoral idea of stewardship is simply overwhelmed by the food and resource imperatives of a voracious human population.

Nevertheless, the resilience of the natural world to maintain itself in a feral state still astounds me, and this is especially true for the partly-domesticated honey bee. Compare honey bees to other domesticated species, such as cows. There is no such thing as a feral cow, and cows have been so highly selected and domesticated for our needs that the ancestral cow would be almost unrecognizable. Indeed, if all humans disappeared today, most, if not all, cattle would die in a world where food and shelter were not supplied, diseases not treated and predators abundant. In contrast, there are still feral honey bees, and they don't depend on humans for their survival. Our disappearance from earth might have the opposite effect, with feral honey bee colonies increasing and thriving in our absence.

However, feral and domesticated honey bees are quite different from each other in many ways, with each being subjected to different selective forces that have molded the divergent characteristics of the feral and managed populations. The recent Africanized bee invasion into the New World has forced us to focus our attention on unmanaged, natural honey bee colonies, and we now know quite a bit about feral honey bees and how they both differ from and interact with managed colonies.

Managed bees were derived originally from feral colonies, but the natural variation found in wild colonies provided the substrate for human selection to produce a much more usable and productive bee. Many centuries of domestication, inter-breeding between populations from distant geographic areas and shipments of bees into the Americas have resulted in a North American managed bee whose characteristics differ dramatically from those of the feral, bee-tree population. The separation between feral and managed bees is not yet complete, however, because feral and managed queens and drones mate and interchange characteristics, swarms from managed colonies escape into the feral population and hobby beekeepers sometimes stock new hives with captured feral swarms or harvested wild colonies. However, selection by beekeepers continues to push managed honey bees toward large, docile, relatively non-swarming traits, while natural selection pushes feral colonies to be smaller, swarm more frequently and be more aggressive in order to survive in the wild.

Recent studies using the techniques of molecular biology have confirmed that feral and managed bees differ in their genetic makeup. Work by Nathan Schiff and Walter Sheppard in particular, has shown that the commercial bee population in the United States is strongly dominated by Carniolan and Italian bees (*Apis mellifera carnica* and *ligustica*), while the feral population has a relatively high proportion of the German dark bee (*Apis mellifera mellifera*) that was imported through the 19th century but is no longer considered desirable for beekeeping. Further, feral bees show considerable variation throughout the United States, which is not surprising, given the wide range of climatic and habitat conditions encountered by feral colonies, while managed bees tend to be more homogeneous in their genetic makeup.

Commercial beekeepers traditionally have considered feral colonies to be a nuisance at best, because feral bees serve as a reservoir for many diseases, compete for forage with managed colonies and interfere with attempts to open-mate commercially-reared queens in any controlled fashion. Even hobbyists have been discouraged from obtaining bees from feral sources, partly because of dis-

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"Managed bees were derived originally from feral colonies, but the natural variation found in wild colonies provided the substrate for human selection to produce a much more usable and productive bee."

FERAL BEES ... Cont. From Pg. 21

ease problems, but also because the characteristics of feral bees often do not make for easily-managed colonies. There is a number of events in the beekeeping world today, however, that is forcing us to pay more attention to feral colonies.

This point was brought home to me in a reply by Richard Taylor to a letter in the August 1994 issue of *Bee Culture*. The letter was inquiring about feral bees, and Taylor's reply suggested that the population of feral colonies has been greatly reduced by the parasitic *Varroa* and tracheal mites. He went on to say that the feral colonies that are left would tend to be mite-resistant and could thus serve as a reservoir for genetic stock that could be useful for beekeeping. Some beekeepers have tried a managed version of this large natural experiment by not treating colonies in an apiary with miticides and then breeding from queens in surviving colonies. The real-world version is more highly selective, however, because feral colonies do not have the advantages provided by sugar and pollen supplement feeding, well-constructed hives, protection from winter, transportation to good forage and antibiotic treatments that give managed colonies a real survival edge over their feral neighbors.

Mite resistance in feral bees could also be detrimental for commercial beekeeping, however. There were probably millions of feral colonies in the southern United States prior to the arrival of tracheal and *Varroa* mites, and the niche created by colony deaths due to mites could be filled by potentially mite-resistant bees with other undesirable characteristics. The name of one potential feral replacement is a familiar one: the Africanized bee. There is some evidence that *Varroa* mites are not as damaging to Africanized bees as to European-derived races, possibly because the shorter development time of Africanized workers does not leave sufficient time for the *Varroa* mites to reproduce successfully before the adult bee emerges. Some of the more optimistic predictions for a minimal impact of Africanized bees in the United States have depended on the northward-spreading Africanized bees encountering high populations of feral and managed European bees in the southern and western United States. The death of many, if not most, feral colonies because of mites, coupled with reduced numbers of managed colonies due to mite damage and economic factors, could provide a real opportunity for Africanized bees to become well-established in the wild, thereby increasing their potentially detrimental impact.

Thus, the future feral bee population poses some interesting dilemmas for the steward vs. dominator sides in the human-nature interaction. On the one hand, feral bees might provide important genetic stock in the future to use in breeding programs to minimize mite or other pest damaged in manage colonies. On the other hand, the feral population may be highly undesirable for other reasons, such as having Africanized traits, so that the beneficial aspects of mite resistance might be overwhelmed by the negative impact of a large feral population of aggressive bees that swarm often and don't grow to large populations in colonies, even when managed. The stewards among us would want to maintain feral bees, while the dominators would support eliminating feral bees, if possible, and leaving the natural and agricultural worlds for the managed population.

Fortunately, we probably won't have to face this dilemma because, at least up until now, we really haven't been able to overly influence feral bees. Our failure to have any impact on the spread or characteristics of Africanized bees is good evidence that the beekeeping community has not yet developed the domestication of honey bees to the point that dairy and cattle farmers have for cows. That is, bees are still basically feral organisms that respond more strongly to natural selection than to human selection. We have domesticated honey bees to the extent that we can manage them, but, although we have shifted the average traits of managed colonies away from being "feral" in nature, we have not yet domesticated bees to the extent that we have destroyed the ability of honey bees to survive in the wild.

I'm comforted by this because I think there is some merit to a world where humans can't always win over nature. In many ways, I appreciate the fact that the Africanized bee has succeeded in overcoming all of our attempts to modify its characteristics or stop its spread through the tropical Americas, and it also pleases me that feral bees in North America are different from managed ones. Anyone who has cut open a bee tree or caught a wild swarm knows the feeling, a sense of wonder and admiration at how something as complicated as a bee colony can survive without our human help. I'm certainly not naive enough to think that modern agriculture could prosper without managed bees, but I'm enough of a steward to appreciate that there is also a feral population out there that does not respond to our needs or evolve for our benefit. Sure, let's do our best to select managed bees with characteristics that are good for beekeeping, but we should also appreciate that there are feral bees out there that don't, and shouldn't, answer to our call. BC

"In many ways, I appreciate the fact that the Africanized bee has succeeded in overcoming all of our attempts to modify its characteristics or stop its spread through the tropical Americas, and it also pleases me that feral bees in North America are different from managed ones."

Mark Winston is a professor and researcher at Simon Fraser University, Burnaby, B.C. Canada.

This Year, Make An OBSERVATION APIARY

rick frey

With the public's focus on observation hives, I thought you might be interested in our variation, which is actually more of an Observation Apiary, located in one of our city parks. Four conventional full-size hives are located to one side of a screened-panel and board fence that helps separate the honey bees from the people. One deep hive body does have transparent sides for a look at interior traffic over the end bars and the outside frames. The people side of the board fence holds framed posters and close-up photographs to explain bee behavior and the beekeeper's year. The screened panels allow observers to sit and watch the hive entrances from only a couple of feet away. All of the action at the "front door" – air traffic, guard bees checking incoming, heavy pollen loads, and the rest – is safe for spectators to view whenever they're using the park.

Our arrangement has been in place nearly five years, and it has proved to be very satisfactory. The apiary is located on the fringe of a cattail marsh in the nature area of Bixler Lake Park, in Kendallville, IN. It is near a culinary herb garden, wildflower gardens, native tree plantings, the lake and marsh, and a paved walking path. It is off the path enough to be isolated from anyone who doesn't want to visit it. Signs are posted at the walking path entrance and on the apiary wall advising persons who suffer allergic reactions to bees.

The apiary is used by individuals, scouts and school groups. It is self-guiding and can be accessed without any additional personnel. Several times a year, it is the centerpiece of a program with hive manipulation or the source of two brood frames for the conventional one-frame-thick, two-high observation hive that travels to school classes or other programs.

The honey produced is sold through the park office with proceeds going to benefit special nature projects in the park, and the whole operation has paid for itself and then some. Liquid honey and, this year, round-comb honey quickly sell out. People especially like the connection of knowing that their honey came from bees they've been visiting and observing all season.

The initial start-up honey bees were taken from two colonies that had settled in wood-duck nesting boxes in the wetland nature area of the park. During the 1990 spring clean-out, these colonies were hived and moved to their present location. Since that time, we've been able to over-winter at least one hive (three in '93-'94) and make splits, hive swarms, and other activities to keep the display active and full. Only once has a hive been so aggressive that it had to be relocated away from the public. Otherwise, stinging incidents have not been a problem.

Vandalism has been minimal. The only problems have been either a kicked-out screen or a tipped-over hive. Once, a tip-over in the fall resulted in chilled brood, and the hive was lost as a result, but that has been the most damage done.

The only changes I can suggest would be to make the whole wall a minimum of 8' high, and 10' would probably be even better. The board fence at either end of our wall is only 7' high, and the flight clearance over that section is usually disconcerting to taller visitors, especially on windy days.

If I can provide any additional information, feel free to contact me. This display has been an asset to our park. It has also been an effective tool to educate the public about honey bees, their value to us, and the problems they face. I would encourage every community to find space for an Observation Apiary. BC

If you would like more information on this Observation Apiary, you can contact Rick Frey at the Kendallville Park & Recreation Department, 211 Iddings St., Kendallville, IN 46755

The "people" side of the Observation Apiary, complete with screened area and poster.

Citizens watching the Apiary in action, safe and sound behind the screen.

OBSERVATION HIVES

thomas webster

Part I

dewey caron

INTRODUCTION

Observation beehives are small colonies of honey bees behind clear plastic or glass walls. Observation hives allow you to see nearly all the activities that happen inside normally dark beehives with minimal disturbance to the bees. Observation hives can provide hours of entertainment and educational fun. They make good exhibits for schools, fairs, parks and public places and events. They can also be a highly effective crowd-attracting or honey-promotion device.

A large number of observations and experiments are possible with an observation hive. Honey bees make excellent study animals. They can be used to examine many basic biological concepts. They can be models for comparison with other animals when studying social behavior, communication, visual and olfactory perception, nesting behavior, preparations for winter, hunting for food and many other subjects.

This is the first installment of a 12-part series on observation beehives. The information is intended for teachers, 4-H and scout leaders, beekeepers and anyone else who wishes to teach or learn about honey bees. In this first article, we will talk about observation hive basics and locations. Next month, we will discuss establishing and maintaining observation hives. In subsequent articles we will describe practical and uncomplicated activities you can carry out with your observation hive. Each activity will help you to learn more about bees, to teach others bee biology (and beekeeping) and to explore the fascinating world of honey bees. We caution you to proceed at your own risk – you will find, as many do, that you want to advance your knowledge and skills of this interesting subject.

Basics

It is possible to maintain an observation hive and conduct experiments on honey bees without prior experience with honey bees or beekeeping. For the complete novice, an experienced beekeeper will be helpful in the initial establishment of the observation hive itself. Some background and interest in biology will also be useful.

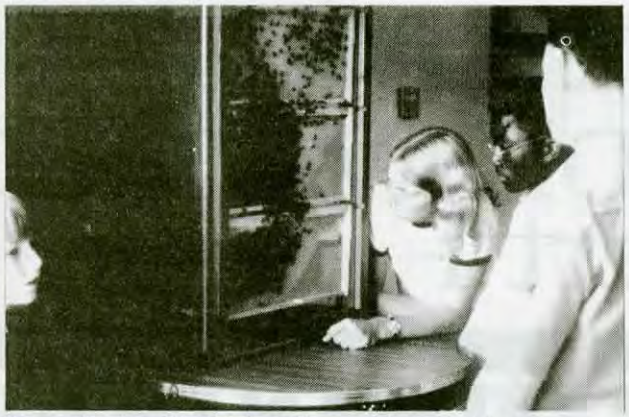
Observation beehives can be established in virtually any geographical area and maintained in any sort of building, provided the bees have access to the outside. An observation hive is simply a small version of a regular beehive. Instead of parallel combs of beeswax, we confine a single beeswax comb (normally inside a wooden or plastic frame) between two panes of plexiglas or glass (shatter-resistant recommended). If you plan to keep your observation hive in your home or business where it won't be bumped by unsupervised children or visitors, glass will be cheaper and may be your best bet. Transparent plastic (Plexiglas® or other like brands available at most hardware stores) will be stronger, and safer, if the hive is maintained for public viewing. It also has the advantage of being easier to cut or drill, if that is desirable. To clean wax from either glass or plastic walls, try a little WD-40®, sold at many stores as a lightweight lubricant.

You can buy an observation beehive or build your own. Observation hives for sale are small in size, permitting use of a single frame or a standard frame and additional standard or smaller-depth frames (supers) for additional space. Some assembly is required when you purchase a commercial observation hive. Costs range from less than $20.00 to more than $70.00. You must also purchase the glass or plexiglas for the hive sides (the observation portion). One commercial model is 15-3/4" high (40 cm) and holds a standard frame and a special shallow frame or comb section holder of four comb section boxes. Another model holds a single standard frame to which you can add additional standard frame size units to the top (as you would add supers to a regular colony).

Traveling Road Show

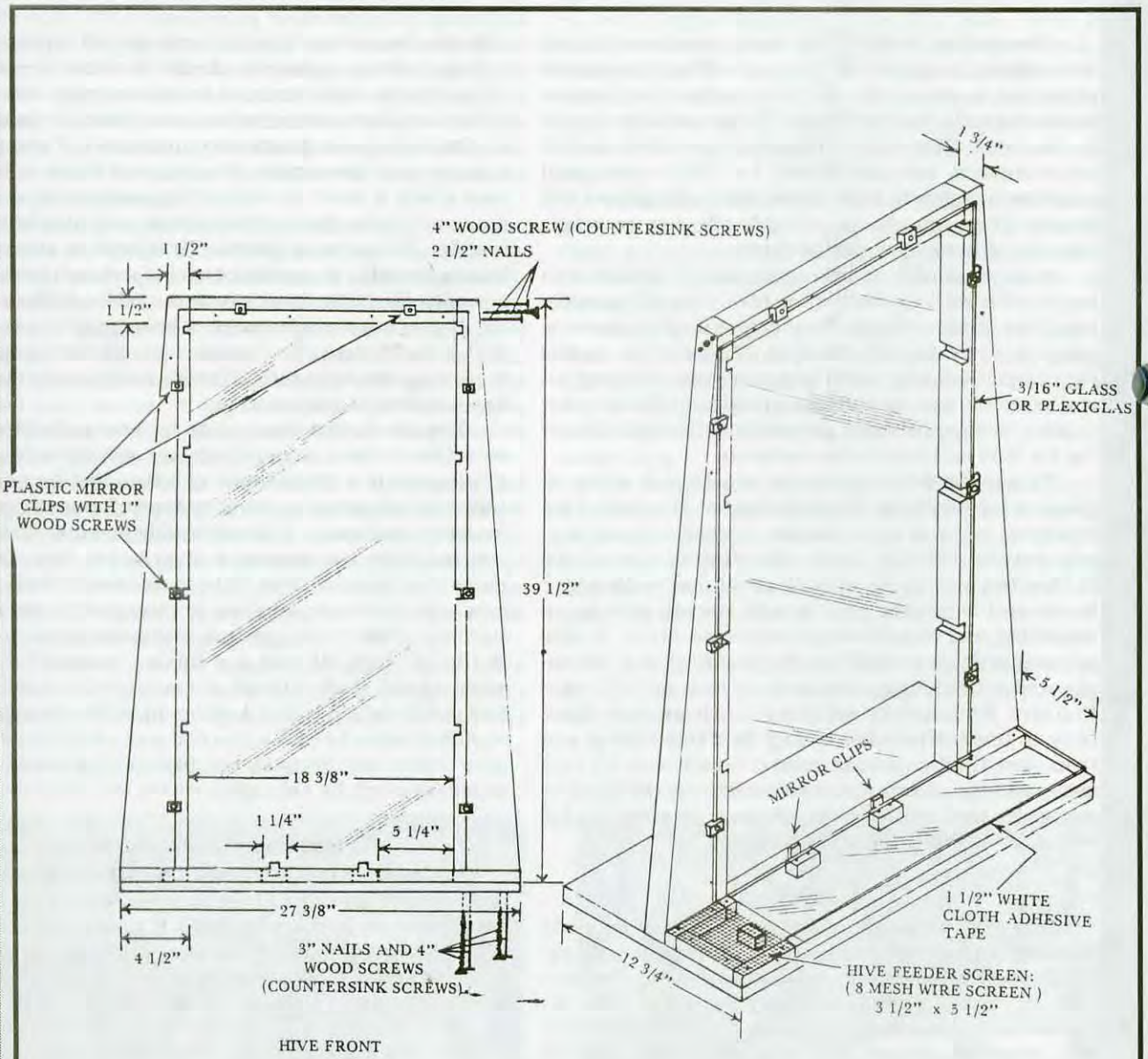
At times it's useful to have a portable observation unit without an exit to take to fairs, schools or markets. Since the bees are confined, it's not really a functional hive. It is possible to keep this unit alive for only two or three days. Many bees will perish, but such a temporary unit will allow you to display bees and attract a crowd for a limited time period.

You can make up a temporary unit from an existing colony just before it is needed and then return the surviving bees to their original colony upon conclusion of the event. For larger displays, you can make a glass-walled unit or purchase a commercial unit. If you



Observation hives like this three-frame revolving model are a fascination for all ages. (B. Julian Photo)

A temporary observation hive as part of a beekeeping display.



Dimensions from the California extension leaflet.

LOCATIONS

- Locate the entrance away from pedestrian traffic, especially where small children play or walk. This need not be at ground level – a second or higher story will suit the bees just fine.
- Make the entrance tube as short and as straight as possible. It should also be as large as possible.
- If the entry/exit area is not at the bottom of the hive, or the entry/exit tube has a portion lower than the hive itself, debris will accumulate at these locations. Some means of removing this debris with minimal disturbance of the bees is desirable. We prefer wooden entry/exit tunnels for permanent observation units over circular ones of glass or plastic tubing.
- Locate the observation beehive where it will not be exposed to direct sunlight or temperature extremes. Avoid locations over radiators or close to heating and air-conditioning ducts.
- Be absolutely certain that the observation hive is securely attached to the base if it will be on display at any time without direct and constant supervision. We recommend bolting it to a secure and heavy base as a minimum. Tall (three or more frame) units should also be secured at the top with wire or braces to a wall (above the heads of people) or the ceiling so it will be less likely to tip over.
- Provide adequate space around the observation hive itself to permit unobstructed viewing by the audience. It is recommended that supplemental display material be close to but not interfere with, the viewing area itself.
- A stool or step will be very useful to permit small children to see the hive. Supplemental lighting may be necessary for senior citizens or for locations where room lighting is inadequate.
- Provide a magnifying glass and flashlight to help observation even if the room is well-lighted.

use the queen from the colony in your observation unit you will need to reintroduce her to the colony or risk having the bees kill her even if she is used for only a few hours or days.

Building Your Own

Frankly, we don't recommend designing and building an observation beehive if you're just beginning in bees. However, if you choose to do so, we'd like to make some suggestions. The bigger the observation hive the harder it will be to maintain, and a very large unit will be the most difficult to remove, keep clean, maintain and will take longer to install.

We make the above recommendation because its important to have some experience with beekeeping. You can, however, with the assistance of an experienced beekeeper who is thoroughly familiar with the concept of "bee space" do quite well. We have seen some beautifully-made units that have taken hours to handcraft but are virtually worthless as an observational unit because of construction errors. RESIST THE TEMPTATION – don't build until you are sure your observation hive will do as you expect.

You can build a hive one to four (or more) frames high, but it should be one frame wide if you wish to view the interior with ease. Your observational side walls can cover the entire side or individually support single frames. Hives can be made of wood, metal, or other construction materials. Even entirely of plexiglas if you wish. If you decide to build a hive, be certain to adhere carefully to bee spacing between glass (or plexiglas) surfaces (1-1/4 to 1-3/4" wide - not 2" wide - 3.1 to 4.5 cm wide, not 5 cm wide) and around comb holding frames internally. Suspend frames normally and insure proper bee space between each frame if your unit is more than a single frame high.

The best designs for observation beehives you can build yourself are from the California and Wisconsin extension leaflets on observation beehives. If you deviate from standard dimensions, be certain you know why you need to and exactly what you will accomplish by doing so.

The bees will leave and return to the hive via a specially-constructed runway. We recommend a simple wooden runway covered by glass or plexiglas. Make it the same dimensions as the exit end of the observation hive so that they fit together. Add doors, one at the end of the hive and another at the corresponding end of the runway, of metal or plastic that you can slip through slots to stop the bee traffic.

Sources of Help

Extension leaflets on observation beehives are available from several states. Information on these can be found in the sidebar.

There is one book on observation beehives that mainly discusses the history of full-sized observational hives (as opposed to observation hives). It does not include related activities or management requirements of an observation hive. The book is "The Observation Hive" by Karl Showler. It is published by Bee Books of Burrowbridge, Somerset, England. In the U.S. it is available from Beekeeping Education Service, P.O. Box 815, Cheshire, CT 06410. There are occasional articles about observation hives in the bee journals. Recent articles by Keith Delaplane (June 1992, ABJ) and Richard Taylor (May 1991, GBC) are two examples.

Buying an Observation Beehive

Commercial observation hives are available from bee supply dealers. The three firms below sell observation hives. Write for free supply catalogs:

Two types of observation hives before stocking. On left is homemade three-frame and at right is commercial frame with special frame on top.

Brushy Mtn. Bee Farm, Inc., Rt. 1, Box 135, Moravian Falls, NC 28654

Dadant & Sons, Inc., 51 2nd St., Hamilton, IL 62341

Walter T Kelley Bee Supply Co., 3107 Elizabethtown Rd., P.O. Box 240, Clarkson, KY 42726

Biological supply companies such as Carolina Biological (2700 York Rd., Burlington, NC 27215) also sell observation beehives.

Observation Colony Locations

An observation colony should be placed inside a building, at a convenient viewing location close to an exterior wall. The hive should be firmly anchored on a sturdy table or platform where it isn't in the way. The exit to the outside should be as straight and short as possible. Avoid direct sunlight hitting the hive from nearby windows and areas of temperature extremes such as near air conditioners or heat registers.

It's best to use a window for the entry/exit of your observation hive. Modify it to accommodate your hive the easiest way possible. Otherwise, a specially constructed opening must be made in the wall. Avoid having your hive open onto heavily traveled areas such as sidewalks, building entrances and playgrounds. Shrubbery near the hive entrance will help conceal it and require the field bees to fly up and away from the building. You can locate your hive on a second story or even higher. Bees do well just about anywhere provided the temperature is above 60°F (18°C) to allow flight. Suburban locations, and even inner cities, have more than enough flowering plants and water sources to supply your bees.

Consider using a temporary observational unit where you only need bees for a short time period. Scavenging yellowjackets are almost universally confused for honey bees and **your bees will likely be blamed** for every human/"bee" incident if your bees have free flight conditions. Alternatively, consider an entire colony observational unit where conditions might permit and the hive can be permanently sited. You can replace hive bodies with plexiglass or construct observational panels of glass/plastic into the hive bodies to convert a standard beehive into an observational hive. The book "Observation Bee Hives" by Karl Showler may give you some ideas as he presents a history of beekeepers making such observational units. You can cover the modified hive bodies with some type of insulating and darkening panels when they are not being viewed.

Building and Maintaining an Observation Beehive

• Resources •

"Building and Operating an Observation Bee Hive" by Walter Gojmerac. Publication A2491. Contact: Wisconsin Cooperative Extension, Agric. Bulletins, Rm. 245, 30 N. Murray St., Madison, WI 53715. Cost: $.50 plus .75 postage and handling.

"Observation Bee Hives" by Malcom T Sanford. Fact Sheet ENY-131, Apr. 1994. Contact: M.T Sanford, Dept. of Entomology and Nematology, Co-op Extension Service, Inst. of Food and Agricultural Sciences, Univ. of Florida, Gainesville, FL 32611. Cost: single copies available at no charge.

"How to Construct & Maintain an Observation Bee Hive" by N.E. Gary and Kenneth Lorenzen. Rev. 1980. Leaflet 2853. Contact: ANR Publication, Univ. of California, 6701 San Pablo Ave., Oakland, CA 94608. Cost: $1.75.

Conclusion

In this first article in our series, we have discussed the basics of observation beehives. Next time we will discuss establishing and managing observation hives. Part three will begin our series on activities you can do with an observation beehive.

Thomas Webster is Extension Specialist in Apiculture, University of KY.

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Dewey Caron is Professor and Extension Specialist in Apiculture at the University of Delaware.

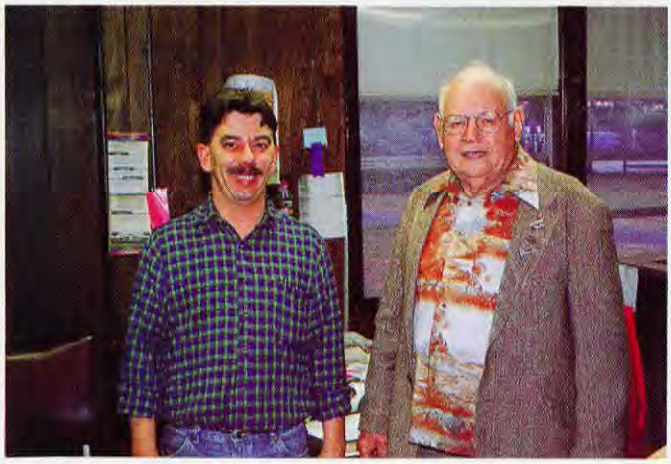
NEXT:
Starting & Maintaining Your Observation Hive

Bill Maxant

richard bonney

Bill Maxant and Maxant Industries, manufacturers of honey processing equipment, are names known to beekeepers all over North America, and in fact, to beekeepers all over the world. Bill has been a fixture on the beekeeping scene for longer than most of us remember and has made countless contributions to our enjoyment of the craft. In the course of it all, he has traveled widely and met many people. "It's been fun," Bill said several times during our recent afternoon together, as he recounted events in his 52 years with bees and beekeepers. One of the things that becomes clear when talking with Bill is that he is a beekeeper first, then a manufacturer. A carefully-tended bee yard is one of the first things to be seen upon driving into the Maxant Industries parking lot. His personal knowledge of bees and honey processing has had much to do with the success of his business.

As with so many of us, Bill fell into beekeeping by chance. Back in 1942 he had no particular knowledge of bees, and he was running the family business, the Chan-



General Manager Rick Thibault (l) and Bill Maxant.

dler Sewing Machine Company, making industrial sewing machines. At the time, he lived in the same house in rural Ayer, Massachusetts (just north and west of Boston), where he still lives today. On his property was a small apple orchard. One day, he observed that a couple of rows of trees on one side of the orchard were bearing more apples than the rest. Curious about this, he sought advice from his neighbor, an orchardist.

The answer, as it turned out, was honey bees. The neighbor had a couple of colonies, and the bees were pollinating part of the way into Bill's orchard. The fateful advice he received that day was that he should get some bees of his own. The neighbor then made it easy. It just so happened that he was ready to give up his colonies. Bill took them over. He became a beekeeper.

For the next 25 years or so, Bill was a backyard beekeeper, with no particular thoughts of going beyond that. The bees pollinated his apples and gave him some surplus honey which he retailed from his home, but he continued to operate the family business and as a part of it all, he traveled around the country.

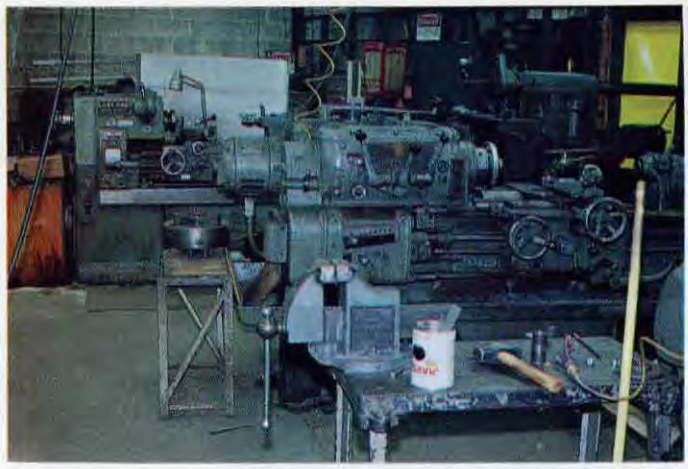
As with any beekeeper, in those early days Bill accumulated the basic equipment to extract and process his honey – extractor, clarifier, holding tank and all the rest. At first this equipment was made of the standard material of the times galvanized steel. But galvanized steel has a particular shortcoming. The zinc coating can wear off with use and age, leaving occasional bare areas, and deficiencies in the manufacturing process can leave unprotected areas in the underlying steel. Honey is acidic and will take advantage of these vulnerable spots by attacking the steel. In the process, the honey may become badly discolored.

One day, Bill extracted some honey, ran it into his galvanized clarifying tank and then went off on a business trip. Upon returning several days later, he found that an unsightly black bloom had appeared in the honey, spoiling that batch. The galvanized tank had failed him. He then proceeded to correct the problem permanently. He built a clarifier out of stainless steel, a material not vulnerable to honey's acidic nature.

Bill enjoyed beekeeping, and as time passed, the number of hives increased, eventually peaking at about 100. The quality of the equipment in his extracting operation increased, also, as he built more pieces for himself, each time using stainless steel. Many beekeepers have built their own extracting and processing equipment in the past, but rarely, if ever, from stainless steel. It is a difficult material to work with, and even some regular machine shops could not work it readily. Bill had the particular advantage of the sewing machine factory, a facility full of the tools and the technology to work stainless steel.

Bill was active in local and area beekeeping activities during those early days. As time passed, other beekeepers began to see and hear about Bill's equipment. They liked it and wanted some for themselves. They kept asking, and the pressure built up. And, as more time

Stainless tanks on their way to become finished products.



One view of the machine shop. The right equipment and skills led Maxant Industries to the top during the heyday of beekeeping in the 1970s.

passed Bill began to build pieces because there was an obvious market, and he met it. In about 1969, Maxant Industries was born in the sewing machine factory across the street from his home. Soon it took over the building, and the sewing machines moved to another facility across town. That business was ultimately sold about 20 years ago, although a small part of it lingers on in the Maxant facility. Bill's son-in-law carries on the family tradition with a small business which modifies off-the-shelf industrial sewing machines for special purposes. The sewing machine under the sign in front of the building is a testament to the family tradition, past and present.

Maxant Industries has always been a leader. The company began with the advantage of a 75-year history of manufacturing finely-detailed machinery – sewing machines. They built on this experience with such innovations as the use of stainless steel in honey processing equipment. They offered the first stainless steel extractor. It was also the first extractor to be welded rather than soldered. They introduced stainless steel smokers in this country, and for a time they made their own stainless steel hive tools, although they now use carbon steel, because the particular kind of stainless used for these tools is no longer readily available.

As time went by, Maxant's product line grew to include extractors in several styles and sizes, bottling tanks, clarifiers, uncapping tanks, filter units, chain uncappers, capping spinners, honey pumps – everything a beekeeper could need or want for a complete extracting operation. Maxant was also the first to offer a complete coordinated setup for the small or medium sized beekeeper.

At the time that Maxant Industries came into being, beekeeping was on an upswing. The back-to-the-land movement of the late '60s and early '70s and the heightened interest in natural foods made many people more conscious of both honey bees and honey. The number of beekeepers was steadily increasing, and the demand for equipment increased as well. Maxant's fortunes reflected this. The operation grew to fill the entire building where once sewing machines had been manufactured, and by 1986, the number of employees peaked at about 40. They kept a constant stream of new equipment going out the door.

And then came the mites, along with the economic recession. All of us who have had bees over the last eight or so years know the impact of the mites on our industry. Obviously, equipment manufacturers and suppliers have felt that impact, too. The demand for new equipment has slowly declined, while used equipment is readily available.

Maxant Industries is still offering a full line of equipment, although the state of the industry is obvious as you walk through the factory. First, the area devoted to beekeeping equipment is considerably smaller. The build-

Maxant's newest Beekeeper's Helper. A holder for five-gallon pails that fit a variety of tanks.

Stainless still makes the best smokers and these are ready for shipment.

ing is shared now by two other businesses, with Maxant retaining about half its former space. At one time, new equipment sat ready to be crated and shipped as orders came in, but now the pace has been slowed to match actual demand. Each piece is shipped as it is completed. There is no diminution in the quality, though. Bill Maxant takes pride in his product. Any piece of equipment made of metal, and with welded joints, has the potential for rough surfaces and jagged edges. Bill insists on a smooth finish. He told us of an experience at a conference where his equipment was on display. He had set up the display and left it for a while. When he returned he saw a man standing over one of the extractors with his eyes shut, running his hands over and over all the surfaces. When queried, the man explained that he could tell Maxant equipment anywhere by touch alone, it was sooo... smooth. He just enjoyed touching it.

Another first for Maxant Industries was the company's participation in the first vendor exhibit at the Eastern Apicultural Society's annual conference. Maxant was the first commercial exhibitor at EAS 25 years ago. In 1987 Bill was presented with a plaque recognizing Maxant as the society's longest continuous commercial exhibitor. He continues that participation, missing only one EAS conference since 1987

EAS, of course, is just one of the hundreds of conferences that Bill has attended throughout the world. Until about eight years ago, he flew his own airplane to many of these conferences, with his wife Helen as his copilot. Helen died in 1986, and Bill gave up the airplane. Flying just wasn't the same anymore. Helen wasn't just a traveling companion, though. She shared in running the business and was a knowledgeable beekeeper herself.

I have been in the Maxant factory several times over the years. Each time Bill showed me around, talking with enthusiasm about everything that was going on. It was no different this time. Bill, at age 86, is still fully involved in running the business, although he has given over much of the day-to-day operation to general manager Rick Thiboult. Although the scale of operations is smaller, the product line has not been reduced, and in fact is expanding in a small way. A very handy pail holder is about to be put on the market. It is a stainless steel bracket that can be hung on the side of a honey tank to hold five-gallon pails as they drain into the tank. Different sizes will be available to fit different-sized tanks. What a relief it will be not to have to stand there holding the pail until that last little bit of honey runs out.

Some years ago, Bill became interested in working with rocks – tumbling, cutting, grinding, polishing, mounting – all those things a lapidary does to make ordinary and not-so-ordinary rocks into jewelry and display items. Out of this interest has grown another product line for Maxant Industries – lapidary equipment. Their lapidary catalog shows polishers, grinders, saws, slab trimmers, tumblers and more, all intended for use in cutting, shaping and polishing rocks. As we wandered through the factory, Bill also showed us some of the raw materials of lapidary work – a piece of petrified dinosaur bone, a chunk of ordinary granite and other plain-looking rocks. Then he showed us finished products, some of which he had done himself. One very striking mounted set included a bracelet and pendant, each made from ordinary granite, cut and polished. It was beautiful.

Some would say that lapidary equipment is a strange product line for a manufacturer of honey processing equipment. On the other hand, it's not so strange at all. The interest and enthusiasm were there, the manufacturing capability was there and the technology for making complex pieces of machinery was there. Why not? Furthermore, it helped pick up the slack. The beekeeping aspects of the business always slowed down a bit in the winter. The overall decline in the industry has emphasized this. Lapidary equipment fits in naturally to help take up that slack.

Besides, it's fun, and Bill will never lose sight of that aspect of life. BC

Richard Bonney is the Extension Apiculturist for the state of Massachusetts and the author of two books on beekeeping. He is a regular contributor to Bee Culture.

BE E SPA CE?
Or Space For Bees?

vincent doyle

"A Century of Wrong Spacing" . how does that strike you? Me too. A *Gleanings* article by Charles J. Koover in the January 1977 issue cites an article in the *New Zealand Beekeeper* (Aug. 1975 by R.R. Bushby), which in turn cites an article by M.A. Alber of Italy:

"A Century of Wrong Spacing"

While the right cell size caused endless discussion for long years, with the only exception of the Soviet Union, nobody seemed to be interested in right comb spacing. More than 20 years ago, Livenets described the reduction of space as a current trick for better spring buildup. Later Soviet research revealed that a narrow space of only 30 mm to 31 mm, 1-3/16" to 1-1/4" gave about 25% more brood surface as compared to that of wider-space colonies.

Then R.R. Bushby tried it. He squeezed the bees. "A conservative estimate was at least 25% more honey surplus " he says. "We all know that bees will not tolerate open space in the brood nest and proceed to fill it with comb. With 1-1/4" end bars, we find that we have 3/8" between the top bars, which are 7/8" (thick). *We have two layers of bees, one on each face of the comb.*

"With 1-3/8" end bars, we have 1/2" between combs, so we get three layers of bees, and the result is, we squeeze out the extra layer. These bees, which were serving no useful purpose other than maintaining the micro-climate, moved to the side of the cluster, therefore enabling the queen to lay in those outer combs (using 11 frames to the super), which would otherwise be unattended. Hence the faster buildup with 25% more brood, as found by the Soviet researchers 25 years ago . . When the brood chamber becomes full of bees, the overflow (probably) moves into the supers and out into the fields to work, so we have 25% more workers, as there are no 'hangers-on' in this 11-frame set-up . we get straight flat combs . there is no need for brace comb or bridging pieces of wax on the sides of the supers, which make the removal of the first comb difficult."

Koover continued to push the idea of "squeezed bees" for several issues of *Gleanings* in the following years. Since the system meant modifying top bars and end bars, it is unlikely that many took his advice. But that's not the point. What interests me is that beekeepers continually meddle with what I have always considered to be sacred – bee space. Further investigation, however, proved that what was being varied was not bee space but rather the space for bees *an entirely different matter.*

Space for bees or bee space? What's the difference? All beekeepers know about bee space. Rev. L.L. Langstroth, discoverer, made use of it. *Bee space is that space allotted to prevent the bees from propolizing and building burr comb. The space that the bees respect. It is also the*

How Much Space

USE	FRACTION	INCHES DECIMAL	METRIC MM
Queen cages –			
Worker access (no entry)			
Slotted hole	7/64	0.110	2.8
Square hole (8-mesh)	8/64	0.125	3.2
Round hole	9/64	0.141	3.6
General use –			
Minimum worker entry	5/32	0.156	4.00
Queen-excluder wire #14 ASWG		0.162	4.10
Excluder – zinc – slot min.		0.163	4.14
6-mesh (pollen tray cover)	1/6	0.166	4.20
Queen-excluder, zinc-slot max.		0.167	4.24
Easy worker entry	11/64	0.172	4.40
5-mesh (pollen guillotine)	1/5	0.20	5.10
Bee space –			
Minimum crossover space	1/4	0.25	6.40
Compromise	5/16	0.313	7.94
Maximum	3/8	0.375	9.53

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BEE SPACE ... Cont. From Pg. 33

space through which all castes of bees can pass without effort.

Space for bees that's something else. A queen excluder, for example, excludes not only queens, but drones as well. Does the fact that workers climb through it mean that it has bee space? A queen cage excludes all three castes, but is generally thought of as excluding workers which might in some way injure the queen. But queens won't survive long unless the workers have some access. They must feed and groom her. Space for bees in this case is definitely not bee space. But how much space to you leave for the bees?

A bee escape must pass all castes. It has bee space as well as space for bees. A pollen trap on the other hand, must pass the workers while knocking ***some*** pollen out of their baskets. Does the pollen trap have bee space? If not, how much space for bees is needed?

Sometimes, when building equipment either from someone else's plans or maybe our own, we assume that we must leave bee space when what we really want is space for bees. A worker's cell is about 1/5" (0.20" or 5.0 mm) in diameter. Obviously not bee space, but a good figure to remember. Since it once contained a worker bee and her cocoon this size opening will certainly pass worker bees. Drone cell size is 1/4" diameter. Artificial queen cells are 1/4" to 5/16" diameter.

Bee space: Between 1/4" and 3/8" with 5/16" given as a compromise for non-believers, is something else. Helps prevent excessive burr comb or propolizing. Permits all castes to pass. It is greater than space for bees.

You might want to build some equipment or understand better the intention of equipment used by other beekeepers. Here, then, is a listing of various spaces for bees and bee spaces that have been gleaned from many sources

There you have it. For future reference, information on what constitutes bee space and space for bees. Now that article on *"Squeezed Bees"* that tells you to reduce the space between combs to 1/4" to accommodate 11 frames and provide greater brood nest temperatures won't make you feel sorry for the honey bees. You'll see at a glance this represents minimum bee crossover space, yet provides ample space for bees; all three castes. BC

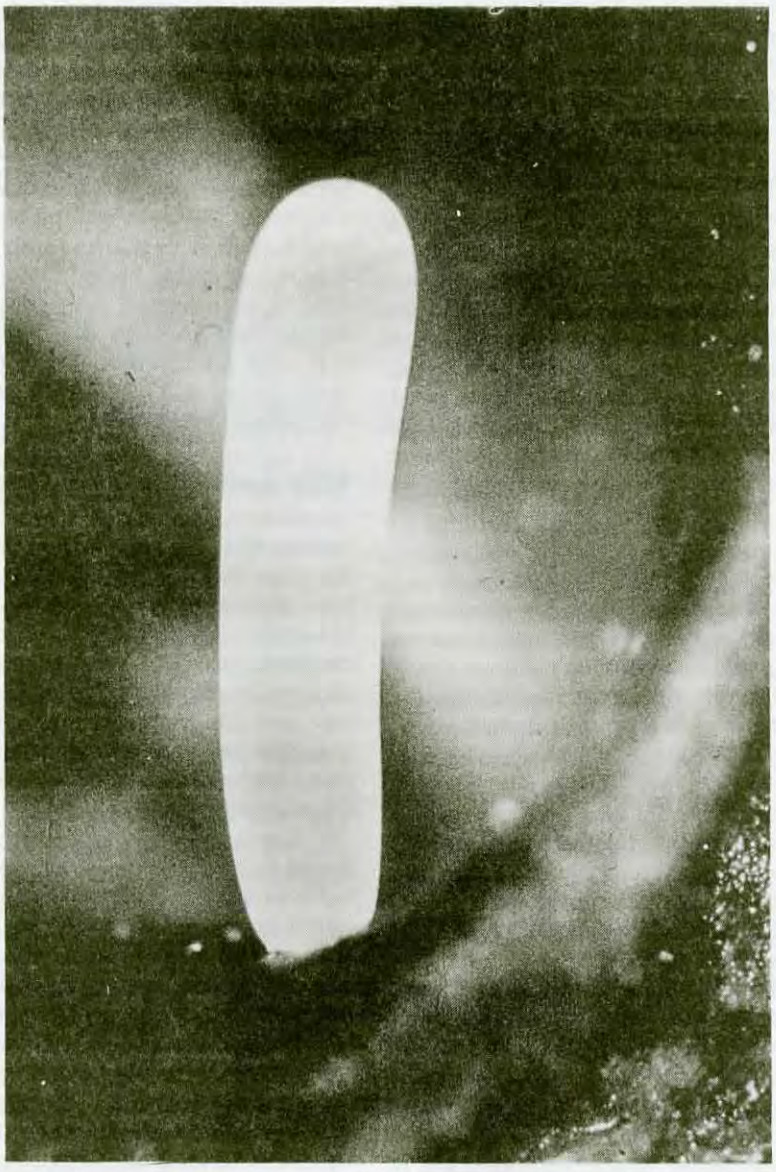
Vince Doyle lives in British Columbia, where he keeps, and measures, his bees and bee space.

THE EGG AND I

dewey caron

The egg is the starting point in the life of the honey bee. It is incredible that the tiny egg contains all the genetic material that will yield the marvelous behaviors, intricate morphology and complex life of the adult. Which of the three hive adults the egg becomes is determined by both genetic and nutritional factors.

As a beekeeper, you need to be able to recognize honey bee eggs when you look in the hive. You should also be able to distinguish and diagnose problems with eggs or with the pattern in which and where they are deposited in the cells. It is not easy to see the eggs of honey bees – but it is a necessary skill you should develop to become a better beekeeper.



Tiny, Tiny

Honey bee eggs are tiny. They are about 1-7/10 mm long by four-tenths of a mm wide (25mm = one inch). Interestingly, drone and worker eggs are essentially the same size, but lengths and widths can vary considerably These fluctuations in egg size have not been correlated with the reproductive cycle of host colonies, so other factors such as queen variability must be responsible for this variation. It is not known if egg size is a factor in adult size; it is likely that food quantity and quality during the larval stage is more important in determining final adult body size.

Normally, a cell contains only one egg. It may be fertilized or unfertilized. In almost all other organisms in the animal kingdom, unfertilized eggs do not develop. But in ants, wasps and bees, including honey bees, unfertilized eggs continue cell divisions and grow into the next developmental stage. This development, however, is always going to produce a male – what we call the drone among honey bees.

Eggs that are deposited in or get shifted to, unusual positions within the cell will hatch normally. Dupaw described the egg hatching process for *Bee Culture* readers a number of years ago (1960), and John Harbo, in a 1982 *Bee Culture* article, noted that eggs that weren't fertilized with normal sperm did not hatch as frequently. He postulated that the process of eggs passing through the oviduct and being deposited in a worker-size cell needed a sequence of messages transferred that included egg fertilization. No such message was needed for eggs placed in larger drone-sized cells because these eggs were not fertilized when they left the body of the queen.

Eggs not properly deposited in the beeswax cells do not usually result in larvae. You may occasionally see a queen walking around with an egg protruding from the end of her abdomen. When these are eventually dropped, they are eaten by workers. Virgin queens will drop many more eggs than mated queens, but some do this more than others.

Obtaining information on cell size is part of the cell examination process undertaken by the queen. She must determine if the cell is clean, and when she passes her antennae over and inside a cell, she also uses her front legs to measure the cell diameter. Larger cells (roughly a

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THE EGG AND I ... Cont. From Pg. 35

"You can tell alot about a queen just by observing her eggs, and the pattern she places them in."

quarter inch in diameter) require drone (unfertilized) eggs. Smaller cells or vertically oriented queen cups receive fertilized eggs.

It is possible, with a little experience, to recognize these worker-cleaned and -prepared cells which are ready for a queen to lay her eggs. They have a different appearance, usually described as polished. They glisten almost. They have no debris inside and the top rims are rounded with wax. Look for these cell preparations. They are especially evident in the spring when the brood nest is expanding normally.

Timing Is Everything

Egg hatching is a function of the temperature of the brood nest and the genetic make-up of the population. It's known that eggs of the African bee in the Americas hatch into larvae in an average of 70-71 hours. Our European bee averages 72-76 hours when the temperature is 94.6°F Male (unfertilized) eggs require three additional hours. Temperatures lower than normal result in reduced egg hatch; below 85.6°F less than 1% of honey bee eggs will hatch. Eggs that don't hatch, such as when the brood is chilled on cold spring orfall nights, are removed by the workers.

Seeing Is Believing

Besides being tiny, honey bee eggs are positioned upright at the bottom of the cell by the queen. Thus we are looking at the diameter of the eggs as you peer down into the cells. And adult worker bees are plentiful in the brood area, so seeing the eggs is often a real challenge.

Don't give up, however. Develop the practice of checking to see if eggs are present every time you look in the brood-rearing area of the colony. If you have never seen eggs ask a fellow beekeeper to point some out to you. As an alternative, many local beekeeping associations have one or more meetings each year in an apiary, and this is an excellent time to get some help. When someone helps you, you, in turn, can help someone else.

To improve your chances of seeing these tiny eggs, do your looking on a bright, sunny day. Position the sun or bright sky behind you, then grasp the brood frame firmly and turn it so the light penetrates to the bottom of the cell, such that the surface is not in your shadow. Look in an area where the cells appear empty and clear because some eggs will be easier to see than others. It is often easier to see eggs in lighter beeswax cells than in darker comb.

You need to know where to look for bee eggs, too. In the spring, eggs are easier to see because of an expanding brood pattern. The eggs will often be on two, three or four different frames, just beyond the capped and older brood in the brood sphere. You need a nice day to do your examination so you don't chill the brood nest. Nice means temperatures above 70°F, sun, and little or no wind blowing into the open colony. Gently shake or brush adult bees off the frame to reduce their interference.

In late spring and during the summer, eggs are more plentiful but more difficult to see. You have a larger brood nest, and the queen is more likely to be laying her eggs in cells from which brood has emerged, once the workers have cleaned up the remains of the previous brood. Thus, eggs may be almost anywhere in the brood chamber, and you may need to do more searching. It will also be harder to see eggs due to the number of adults present, and a larger colony means a greater chance of being harassed by guard bees during your inspection.

During the fall, there may be only a small number of eggs present in the colony. If you live in the more northerly states, the brood nest should be a compact sphere located below honey stores. Thus, you need to remove those supers of honey stores to get to the brood area. Eggs are frequently found on several frames in the fall brood nest, and relatively few are deposited in one area.

Though it may be difficult to see eggs and to look for them during some parts of the annual cycle of the colony, get in the habit of looking every time you go into the brood nest. If you are merely checking supers, adding supers, removing honey-filled frames or performing disease or pest control manipulations or other colony manipulations, you may not be in the brood area. That is O.K. Just try to check for eggs and brood at least once every spring and fall and assess the egg-laying pattern of the queen in each colony.

Why Look For Tiny Eggs?

Since all honey bee eggs hatch within three days, you know the queen is somewhere nearby when you see her eggs. You can tell a lot about a queen from observing her egg laying pattern. For instance, you can determine if a colony is queenright just by seeing eggs. It is not necessary to actually see the queen to know this. What can you really tell when you see the queen anyway? Her size and color have little bearing on her two roles of laying eggs and producing pheromones. She is the "social glue" of the colony but seeing her eggs will tell you more than seeing her.

If you see a queen, you won't know if she is a virgin queen or a mated queen. But her egg-laying pattern will tell you right away. Virgin queens assume the egg laying position in a colony with the same frequency as mated queens. However, they do not lay as many eggs, and the eggs are usually removed quickly by the workers and eaten. Thus, with virgin queens you have a brood area well prepared with cleaned and polished cells but no development of the eggs into larvae.

When you do see the queen in your inspection, you don't usually find her performing "normal" behavior. She is, rather, trying to escape from the bright sunlight resulting from your intrusion into the brood sphere. "Normal" queen behavior is an alternation of egg laying with "resting" behavior. A queen walks the length and breadth of a comb when looking for appropriate empty and clean cells in which to deposit her eggs. She may deposit a large number of eggs at one time or fewer, depending

upon conditions both inside and outside the colony.

"Resting" behavior occurs when a queen ceases egg laying and stops moving. Worker bees, her "retinue," crowd around her at this time, and as many as 16 may touch her with their antennae. A smaller number touch the queen with their mouthparts. It is during this "resting" period the workers obtain the queen's pheromones.

The queen's "essence of royalty" is a primer pheromone that originates in the mandibular glands of her head. Several functions have been identified for this queen pheromone or queen substance. It helps identify the queen and give her the distinctive smell she has so her workers can tell her from all other queens, and it elicits queen retinue behavior. It keeps colonies from rearing replacement queens, too. It has also been thought to inhibit worker ovary development, but recent findings by Winston and his students suggest that not to be the case. After it serves as a pheromone and then enters into the worker's (and her own) body, it may serve as a hormone.

Two infrequent but important management-requiring situations in a colony may be detected simply by looking at eggs. These are the conditions of laying workers and the situation of a drone layer.

Laying Workers

When a colony is queenright, worker bees do not normally have developed ovaries. Suppression of worker ovaries is one of several recognized functions of the queen. When queenless, a colony rears many more males than females. These male bees are derived from the eggs of laying workers. Although uncommon, laying workers may also contribute unfertilized eggs to a queenright colony.

Egg deposition by laying workers appears different from eggs laid by the queen. The difference most often seen is that the eggs are not placed individually in the bottom of the cells but are often haphazardly arranged. And normally with laying workers in a colony you will see more than one egg per cell. Thus, by looking at eggs, you can readily diagnose a laying worker situation. Other clues would be present but the abnormal situation in egg-laying behavior is your best clue.

Worker eggs are always unfertilized because workers never mate, and have no way of supplying sperm to an egg. If these eggs are allowed to develop, they yield males. Unfertilized eggs produced by laying workers apparently don't have the same chemical signature as unfertilized eggs laid by the queen. We can't tell of course, since we can't detect these chemicals, but the bees can tell the difference. They remove the vast majority of eggs laid by laying worker sisters – a behavior called "worker policing." Such worker policing forces cooperation between sterile workers and a sole reproductive queen.

Usually by the time you discover the laying worker condition, the colony has dwindled in strength and may be already invaded by wax moths, wasps or other pests. It is difficult to requeen a laying worker colony. The best recommendation is to dump the laying worker colony out on the ground and start over with a swarm, package, or divide to replace the lost colony. The adults dumped out will return to their original colony, but with a new population, and queen, cease laying, or are not accepted. They will then, mostly likely, drift to another colony or perish.

"Two of the most common problems detected by looking at eggs are 'Laying Workers,' and 'Drone Layers.'"

Drone Layers

A queen has a tremendous egg-laying potential. She can produce more than her body weight in eggs in a 24-hour period if conditions are favorable. In her lifetime, she will lay one-half million to as many as one million eggs. Some queens, however, run out of sperm capable of fertilizing the eggs they lay. Such queens are called drone layers.

Drone layers still produce pheromones so sometimes they persist in a colony. They also lay the normal one egg per cell. But all the larvae develop into drones, since the egg isn't fertilized when the queen releases it from her body. However, most of the drones develop in smaller, worker-sized cells and therefore are smaller than normal in body size.

Such colonies are usually a dead-end since it cannot become queenright with a drone layer. There are no fertilized eggs for the workers to select to raise a supercedure queen. They get weaker and weaker over time and when finally diagnosed the colony is seldom of value. As with a laying worker condition, dumping the bees out and starting over is the best bet for recovery.

The Egg and You

You can see that it is possible to determine when colonies are healthy and expanding as well as to diagnose some management challenges when first looking at honey bee eggs. This most basic stage, the one that starts the life cycle, is not easy to see, but you'll be a better beekeeper once you learn to see, and to read, honey bee eggs. BC

Dewey Caron is Professor and Extension Specialist in Apiculture at the University of Delaware.

How To Plan & Carry Off A Honey COOKING DEMO

ann harman

So the telephone rings and it's the program chairman of a local beekeeping association asking you to give a honey cookery presentation at the group's monthly meeting. You cheerfully said, "Yes. Sure!," hung up the phone and ... panic set in. Now what? Relax. Honey cookery demonstrations are lots of fun and are very well received because everyone appreciates sampling good food. Are you ready to make plans? Good. Let's get started.

The first thing to keep in mind, now and throughout your demonstration, is that **you are not teaching people how to cook - you are showing people how to use honey when they cook.** Of course, if you have a clever cooking tip, you can mention it but do not emphasize it. And, someone in your audience may have a better way, that you haven't discovered yet. By all means, let the audience give you tips - I've learned all sorts of neat things from my audiences. You can do the demonstration yourself, or you can ask a member of the audience to come up and cream the butter and honey or whip up the salad dressing. In this way, you can emphasize how easy such steps are when cooking with honey.

What comes first in our planning? Let's look at several choices. The time of year – hot summer or cold winter – really doesn't make any difference. Barbecue sauces, salads and dips are good any time of year. So are baked goods, such as cookies. Think about the audience. Men like meat things and snack things and love to bake bread; children like cookies. You really need to have an assortment of recipes to choose from so you can tailor your presentations to the type of audienceyou're working with. Another important factor is the facility. Call the program chairman back and ask what sort of meeting room you will be using. The ideal is the cooperative extension service building, where the meeting room may be equipped with a full demonstration kitchen - stove with oven, sink, mirrored table, lots of electrical outlets, refrigerator and maybe even a microwave. But you could also be in a motel meeting room with carpeted floor and one electrical outlet 50 feet away. Or in the firehall, or in a school classroom. While you have the program chairman on the phone, don't forget to ask what the usual number of attendees is. Fifteen? Fifty? Something in between? You'll want to purchase enough food so that you have leftovers. You can always take leftovers home or give them to the president or program chairman to take home. Running short of food to sample is not good.

Now that the information on type of audience, type of facility and expected number of people has been determined, the next step will be the choice of recipes. Read through recipes with several things in mind: Is preparation relatively simple? Are ingredients readily available? (You don't want your audience trying to chase down some exotic ingredient that costs too much when it is finally found.) Do the ingredients have universal appeal? (Some people cannot stand the taste of broccoli.) Can the food be prepared easily in the available facility? Is preparation and consumption messy and drippy? (Not good for carpeted rooms.)

If the meeting takes place in a room not normally used for numerous electrical appliances, try to limit your usage to small items, such as an electric hand-mixer and an electric frypan. (A tripped circuit breaker can bring the demonstration to an awkward halt.) That combination, or its equivalent, can be used everywhere.

Here are several hints that will help in recipe selection. A sauce, such as barbecue sauce, will make an excellent meat dish. Salad dressings that can be used on coleslaw, mixed greens or fruits are quick and easy to make. Dips and spreads for breads are also quickly made. Cookies can be made at the meeting if you have a demonstration kitchen. Cakes are nice, but they are best made at home and brought to the meeting already sliced, ready to eat. Pies are difficult to serve, particularly in small quantities. Make

Continued on Next Page

In these three boxes are a few recipes that can be used for honey cookery demo, with modifications for demonstrations added.

FAST BAKED BBQ CHICKEN

2 lbs chicken, cut up (use pre-cooked chicken "roast" cut into cubes)
1 green pepper, chopped
1/2 cup tomato sauce
1/4 cup Worcestershire sauce
1 teaspoon dry mustard
1 teaspoon ginger
1/4 teaspoon ground cloves
1/2 cup honey (keep it light, mild and sweet)

Place chicken in baking dish and salt and pepper to taste. Combine remaining ingredients and pour over chicken pieces. Turn pieces to coat chicken. Bake one hour at 325°. Turn at least twice during baking. Serves four to six.

For demonstrations: Combine all ingredients except chicken in warm electric frypan. Blend well. Add chicken cubes and stir to coat cubes. Keep warm, stirring occasionally to keep cubes coated. Serve with toothpicks.

A Honey Cookbook
A. I. Root Company

COOKING DEMO ... Cont. From Pg. 39

test batches of your chosen recipes or use recipes that you have tried before. Never, ever use a recipe you have not tried at home first.

To serve meat with a sauce that's easy to make and consume, choose hot dogs that can be pre-sliced at home; or choose one of the pre-cooked, packaged chicken or turkey breasts. These you will cut, **at home**, into 3/4-inch cubes. Now you have meat that needs only to be heated and stuck with a toothpick for sampling. After all, it is the sauce that you want people to taste - the meat is just a carrier.

Salad dressings can be made in a big bowl. **At home,** you have shredded the cabbage if you are serving coleslaw or torn up the greens into **small** pieces for a tossed salad, or diced the fruit into 1/2-inch cubes for a fruit salad. (Remember - your audience doesn't need to learn how to cut up food.) You make the salad dressing, emphasizing how quick and easy honey is to use, then dump the rest of the ingredients on top of the dressing and toss. In this way, you can bring the greens or fruit in a plastic bag, and you only need one big bowl for the final mixing.

Choose a dip that is compatible with a fresh grape, a cube of pineapple or a strawberry. Grapes, strawberries and cubes of a firm fruit can be speared with a toothpick, then dipped into the dip. Grapes work really well - they stay on the toothpick much better than a soft, juicy fruit.

Spreads are also very successful. **At home,** try several different types of crackers when you make a test batch of your recipe. Keep in mind that the spread is to be tasted, not the cracker. Melba toast or some of the plain "biscuits for cheese" are good choices. Since your dips and spreads will be at room temperature, dipping and spreading should be easy.

Tasks such as squeezing lemon juice or orange juice, mincing onions, chopping up fresh parsley or celery and other usual food preparations should be done at home. Plastic ziplock bags are ideal for transporting chopped foods. Juices and milk can easily be put into empty honey jars - they don't leak. If you need to grate lemon rind, do that at home and add to the juice you are taking. Always take an extra egg -- just in case. An empty egg carton is the best way to transport eggs. Measure out flour, and if you are using salt or baking powder, add those to the flour, **at home**, and put into a ziplock bag. Review your recipes to decide what you can chop or measure before you leave home.

Since you're promoting honey and good cooking, use fresh ingredients whenever possible. Also use *real* vanilla extract and *real* chocolate. If anyone wants to substitute imitations at home he or she certainly can.

Now for the honey. Obviously, your own is the honey of choice. But if you can take one or two different honeys, you can have some fun. Choose a simple, quick recipe, such as a spread, and make the same recipe with two different flavors of honey. In this way, your audience can see just how the different types of honey influence the final flavor. Let your audience taste the flavors of honey you are using. Bring your honey in a two-pound jar if you need to measure out one cup or more and in a one-pound jar for quantities less than a cup. Bring honey in a squeeze container for quantities like one or two tablespoons. Be certain your honey jars are attractive and *have your label on them.* Honey should always be presented with the dignity it deserves.

If you are working in a demonstration kitchen and decide to make cookies, ask a member of the audience to help you keep track of the baking time. It is so easy to be busy explaining a procedure or answering questions and forget time - burned honey cookies are really awful. If you are determined to bake a cake at the demonstration, choose a recipe of the "dump cake" variety - that is, you dump all the ingredients in a bowl, mix, put in a pan and bake. You will have to make your cake at the beginning of your talk to allow enough baking and cooling time before the end of the meeting. It really is best to make cakes at home.

Is your menu ready? Good. Now for the logistics. Go through each recipe and make a list of exactly which utensils, how many utensils, the sequence in which utensils are used and how many bowls of what size you will use. Will you need measuring cups, both for liquid and dry ingredients? How about an electric hand-mixer? Cookie sheets? Mixing spoons, rubber bowl scrapers (essential when cooking with honey), measuring spoons? Once you have accumulated everything you need, go back and throw in a few more measuring spoons and cups. Why? Well, sometimes I get busy talking, don't pay careful attention and end up with lots of wet or gooey measuring cups or spoons. Then I find I am ready to measure something dry. If an extra measuring spoon or cup is available, it is a big help.

My most treasured item for honey cookery demonstrations is an electric frying pan, complete with lid, that I bought for $2 at a white elephant booth. In this pan, I can stir up a sauce, add meat cubes or slices or pre-cut vegetables, keep everything warm until time to serve and have people spear the food right out of the pan. If you have one, use it! If you need one, check at yard sales; or perhaps your neighbor has one that has been ignored in favor of a microwave.

Now that the cooking items have been selected, servings items come next. Take a couple of boxes of toothpicks so they are readily available along your demonstration table. For salads or anything else of that sort that needs to be served, go to a party

HONEY COOKIES

1 cup honey
1 cup butter
2 eggs
1 teaspoon vanilla
2-1/2 cups flour
3 teaspoons baking powder
1 teaspoon salt

Cream honey and butter until light. Add eggs and beat until mixture is a light, creamy color. Add vanilla and dry ingredients. Beat until well blended. Drop from teaspoon onto cookie sheets, leaving room for batter to spread. Bake at 375° for 12 15 minutes.

For demonstrations: Cut recipe in half unless you have a very large audience. Make cookies small. Watch baking time carefully, since ovens differ in heat.

The Honey Kitchen
ed. by Dadant & Sons

supply store and purchase some little plastic cups (they are about 2" high and 2" in diameter). Also purchase a supply of plastic spoons (much cheaper than at the grocery store) and some plastic knives for spreads. Don't forget several large plates suitable for cookies. If you wish, you can include some little cocktail napkins. With these few items, you can serve anything.

What else do I put in my cardboard box for cooking demonstrations? Here are some very important items that will make your life easier. If you are baking cookies, put in a couple of pot holders. **Extension cords!** Two 25-foot cords are a perfect choice. It is also a good idea to include three-prong to two-prong adapters for electrical outlets and a multiple-outlet plug. If you are doing your cooking in a demonstration kitchen, then you will have water available. If not, take along a small bucket and washcloth. These plus a small towel and a roll of paper towels, will make clean-up of your work and serving areas easy. Washing up your bowls, frypans and utensils is time-consuming and messy. Take a bunch of plastic grocery bags and throw all your dirty cooking stuff into them for transport home. (Remember, your audience already knows how to wash dishes!) and finally, include some disposable plastic tubs with tight-fitting lids for any leftovers. Now is the time to make a checklist of what you need to take. In this way, you won't arrive at the meeting and be missing something vital to your demonstration.

The audience will always want *recipes* – recipes for the foods you are cooking and other recipes that you particularly like. So handouts are an important part of your presentation. You can make a fancy three-fold brochure if you wish or you can just type the recipes on a sheet of paper. If you want to make your recipes fit a 3"x5" card file, you can fit a total of five recipes on a standard sheet of paper – three down and two sideways. You can cut the recipes apart or just hand out the whole sheet. When you type your recipes, be sure you include the name of the book or leaflet where the recipe originated. Contact your local or state beekeeping organization to see if any recipe books or brochures are available. The American Beekeeping Federation has Honey Queen recipe folders. The National Honey Board has some excellent recipe brochures available also. And Dadant, Root and the National Honey Board have excellent cookbooks for a modest price. Finally, if you own any honey cookbooks, have them on display.

Although it's difficult to talk and cook at the same time (at times it's better to stop talking and cook instead) give your audience helpful hints about cooking with honey. For example: use honey as a substitute for sugar; don't let baked or barbecued foods burn; and honey mixes quickly in salad dressings and baked goods. Ask for questions - and don't be afraid to say "I don't know. I've never tried that." Perhaps someone in the audience has and can come to your rescue. Encourage people to experiment and let you know the results, good or bad.

Stongly encourage your audience to enter honey cookery in various county fairs and competitions. In this way, they will be showing others that honey can be used in cooking with great success. Spread the honey and spread the word that cooking with honey is the best part of a honey harvest. BC

Ann Harman has been writing about cooking with honey on these pages for several years, and has been giving cooking demos with honey for even longer.

BEES IN THE GARDEN COLESLAW

1 head green cabbage, shredded
1 medium green pepper, diced
1/2 cup diced sweet red pepper
1/2 cup mayonnaise
1/3 cup honey
2 tablespoons vinegar
1/2 teaspoon salt
1/2 teaspoon dry mustard
1/2 teaspoon celery seeds
1/4 teaspoon black pepper

Toss cabbage and peppers in a large bowl. Combine rest of ingredients and blend well. Add to cabbage mixture. Mix well. Cover and refrigerate until thoroughly chilled. Makes 8 to 10 servings.

For demonstrations: Mix shredded cabbage and peppers at home. Dressing ingredients can be mixed quickly with a wire whisk. Spoon into little plastic cups for serving.

Sweetened With Honey The Natural Way
National Honey Board

INNER ... Cont. From Pg. 4

And, of course, I had placed my almost-new camera on the floor (in the well) in back. When the pail with the loose lid tipped its contents (at least four of the five gallons) poured over the edge of the back seat and neatly filled that well below right to the top.

I had to go a couple of blocks before I could pull over and examine the damage. I flung open the back door and there, way down in the bottom of that well was my camera, completely submerged in honey, the strap still floating, but only barely. Just as I stooped to look closer a large air bubble escaped from somewhere inside. Then the strap settled to the bottom, and all was very, very still.

I drove to my delivery point, scooped as much honey as I could back into that single pail and wrapped my camera in plastic, assuming it was only junk. When I got home I drove my car to an isolated apiary, and opened the windows. The bees cleaned the car almost completely and did a pretty good job with the camera. When the bees were finished I took the camera to a repair shop, explained what happened and asked what could be done. "Well," the repairman said, "I'll take a look and see what I can do, but I'm not going to make any promises."

Between the repairman and the bees, mostly the repairman, I think, my camera was back to 100% in a week or so, and never missed a click until that day so many years later in the beeyard.

So now, not one to give up without a fight, I took my silent friend to a repair shop and pleaded my case.

"Well," he said, "I'll take a look and see what I can do, but I'm not going to make any promises." I think they learn that line in Camera Repair 101.

A week later he called and said that it was ready and I could pick it up anytime. I rushed over and asked what had been wrong that took only a week to fix. His explanation was that some sort of "goo" had worked its way into the mechanism and simply gummed it up. Nothing could move. The "goo," if you haven't guessed, was 15 years worth of propolis and other hive 'sticky stuff' that had slowly accumulated until it clogged the system. So now I have my faithful friend back, working good as new. She's still not fancy, not pretty and certainly not very sophisticated.

I never did get those slides I wanted though. November turned back into, well, November, and I gave that project up 'til spring. But my faithful Fujica is back in action, heavier than those new plastic models, propolis smeared all over the outside of the case, frayed strap and all. She's comfortable, she's easy to use, and she still takes pretty good pictures. Life is good.

Lessons from this? Some, I suppose. Keep *all* your equipment clean and in good shape, and if you spill four or so gallons of honey in the back of your car, let the bees do the work. They do a good job. Even on cameras.

•

If you have ordered bee supplies from the A.I. Root Company by phone much at all in the last 20 years, the lady you most likely talked with was Ellie Failor.

Ellie's soft, almost too soft voice usually had an answer to almost any of the (it seemed) thousands of questions that came in on a daily basis. She really liked working with the bee supply part of the company and wasn't real happy about the gradual change in the business. In fact, during the past year her business in bee supplies was eclipsed by the business from the factory outlet that shared her space.

But she took it in stride, and did well with both bee supplies and candles.

This past October she celebrated her 20th anniversary with the Root Company. Twenty years of selling supplies to beekeepers. Twenty years of answering questions, filling orders, boxing supplies, assembling equipment, stacking books and harassing the appropriate managers when she's out of something and needs it *now*. I was often in her sights to get things done so she could get things done. She was relentless in making sure customers were taken care of.

In early November Ellie came down with pneumonia. Complications set in and she died a few days later.

Ellie helped literally thousands of people with bees, and bee equipment. She liked her job, and she was liked by all who knew her. She has left a spot that will be difficult to fill.

•

As we went to press this month two things occurred over which we have absolutely no control. Neither was unexpected, (my addiction to the news has kept me appraised of these earth shaking events), but I kept hoping they would stay 'news, and not land on our door step. Silly me.

The first is the postage rate increase. The Postal Rate Commission has, in their infinite wisdom, decided to give the Post Office more money for less work (I need to figure out how to do that). So a rate increase, effective with this issue, is in effect. It costs us more to send the magazine to you. We hope this increase helps service.

The second event that occurred has actually been building for several months. It wasn't a surprise that it happened, only the degree. I'm referring to the cost of paper. Even recycled paper has jumped in price nearly 300%. Other types of paper have gone up even more. That's a pretty hefty increase. The environmental movement, increased construction, exports, speculation, maximum mill capacity seasonal increases, (Christmas catalogs and mailing before the postal increase (see above) all have contributed to this).

The results of these two events are pretty fundamental. The cost of business just went up. We were prepared to absorb the postage increase because we found a couple of extra notches on our production belt that hadn't been there six months ago. And, the paper increase may only be temporary. Let's hope so. But, if that 300% increase stays in effect long all of us will pay – either smaller magazines (in size and number of pages), less expensive and/or lighter weight paper, fewer issues (10/year?) or increased subscription prices.

We are determined to hold our current subscription price as long as our accountants will comply. But if paper costs continue to rise everything in life (packaging of grocery products, daily newspapers, envelopes, etc.) will increase in price. Be prepared.

Kim Flottum

BEE TALK

richard taylor

"Producing comb honey without lots of fuss and bother is the goal of the next several articles here."

My apiaries went into winter in the best condition I can remember in all my many years of beekeeping. Not only were the hives heavy as lead, they were absolutely filled with bees. This is what is needed to get a good crop next year – colonies that will remain strong all winter, because of lots of stores, and emerge strong in the spring, with some combs in the top still full of honey. My optimism soars.

As I was going around "putting the bees to bed" for the winter – screening the entrances against mice and wind – I got to thinking. The past few years have been filled with problems for beekeepers – mites, primarily. I went through some discouraging times. And yet, three of the past four years have given me the best honey crops I can remember. It doesn't figure, does it? Well, I'm going to rest on my comfortable optimism, reminding myself that, although I have had many problems in my life, most of the time things turned out just fine.

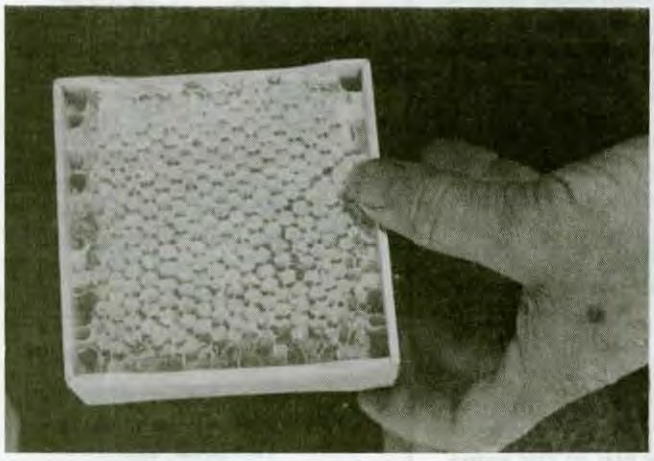
Now what I'm going to do, for this month and maybe for several months to come, is talk about comb honey and how to produce lots of it without all kinds of fuss and bother. It is something I greatly enjoy doing, and over the years I have learned quite a few things that you don't find in books. Most bee books, in fact, make it sound pretty difficult to produce comb honey. They make you think that you need to be an expert (like their authors themselves!) and work up some fancy management system to do it. That's not so. What you do need is, first, one or more fast and heavy nectar flows, rather than slow, drawn-out ones, and second, attention to the beekeeping basics, which means, doing the rather few fundamental things that need doing, and doing them on time.

But before we get into that, let's get a little background.

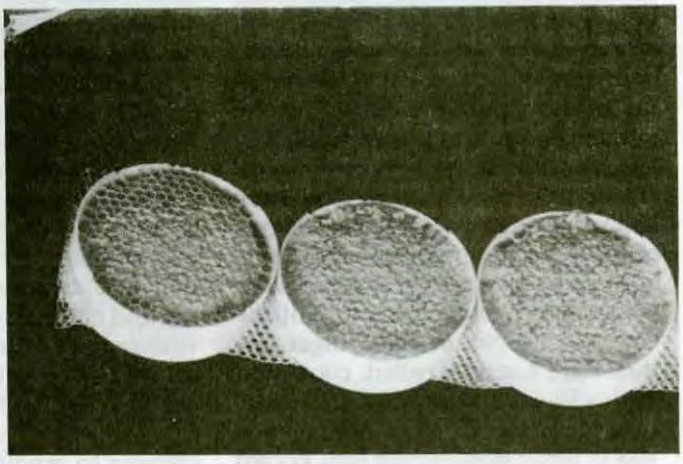
From the dawn of human history until relatively recently, all honey was comb honey. With the invention of the extractor it was thought, and quite correctly, that beekeeping would be revolutionized. Beeswax, while harmless and probably even valuable as fiber in the diet, is not really food, so the separation of honey from the comb seemed an obvious step. But there have been a few side effects of this advance that were not anticipated. For one thing, extracted honey does not look very different from certain syrups, so to that extent, the uniqueness of honey was lost. Comb honey, on the other hand resembles no other food. Its uniqueness and distinctive beauty have no competition. Also, extracted honey granulates sooner than comb honey, so it is usually heated, and sometimes overheated, to prevent this. There is no way comb honey can be heated. And extracted honey is usually a mixture – euphemistically called a "blend" – of honeys from different nectar sources. There is nothing wrong with that, but comb honey is almost always from a single source. And finally, for the backlot beekeeper like me, comb honey beekeeping requires vastly less equipment and less

Continued on Next Page

The original wooden square section. Not as well liked by the bees as



the round plastic section, commonly in use today.



BEE TALK ... Cont. From Pg. 45

toil. You don't really need a honey house, and you need no indoor equipment at all other than a pocket knife and a deep freezer. Perhaps to all this should be added the extra thrill of seeing comb honey supers fill up with beautiful snow-white sections.

What we now call extracted honey was once called strained honey for an obvious reason. In Europe, bees were, for a very long time, kept in inverted straw baskets, or "skeps." When it came time to take the honey, the beekeeper dug a small hole in the ground, ignited some sulpher (or "brimstone," the legendary ingredient of Hell) in it and set the skep over the hole to kill the bees. Then he scooped out the combs, which were strained through fabric, separating the honey from the wax, brood, dead bees and so on. This procedure is referred to by Shakespeare, and more than one of my colleagues in literature has asked me what he was talking about there.

On this continent, boxes and hollow sections of logs, called "gums," were mostly used, rather than straw skeps, and often, in the South, the combs were packed in jars along with the honey, giving rise to "chunk honey," still popular there but seen less often in the North. Southern tourists are sometimes drawn to my honey stand by the "COMB HONEY" signs, this "chunk honey" being what they erroneously expect to find there.

Of course, this method of getting strained honey resulted in lots of beeswax, since the combs could not be reused. And beeswax was, prior to the development of petrochemicals, the main ingredient of candles, so it was much prized. Beeswax candles were, moreover, basic to the liturgy of the church, so it was very common to find apiaries near churches and monasteries. The tending of the apiaries often fell to the parish priests, and this explains why much of the early literature of apiculture was written by clerics, especially in England. They, like the rest of us, got caught up in beekeeping and, since they could read and write when, for a long time, most of the common people, or the "vulgar," as they were quaintly called, could not, authorship fell naturally to this class. Indeed, when Brother Adam, who was to become one of the best known of modern beekeepers, arrived as a young man at Buckfast Abbey, there was already an extensive apiary there, so the foundation of his life's work was in place.

Beeswax, incidentally, is still a much sought-after ingredient of candles, and beekeepers who make candles find ready outlets for them. When Mr. H. H. Root became a regular tennis partner of a Roman Catholic priest and, through that friendship eventually joined that faith, he introduced beeswax candle making into the Root operations and today the A.I. Root Company is one of the world's leading suppliers of church candles.

The wooden comb honey section box was the invention of Mr. J. S. Harbison, in 1857 The perfection of the folding basswood section was mostly the work of the A.I. Root Company, and until only about twenty years ago, it was still the basis of most comb honey production, although comb honey had by then declined in popularity to the point that most people did not even know what it was. Several sizes of wooden section boxes came into use, and for a brief time the Root Company even made tiny ones that held only a couple of ounces. These were detested by the bees and much work for beekeepers, so they did not last long.

By now the circular plastic section has almost completely replaced the wooden section and is, indeed, the main reason for the strong comeback in the popularity of comb honey. Not only are these circular sections vastly easier to use, thus reducing labor, but the bees like them better. It has been strange to discover that plastic, of all things, is quite acceptable to bees. Queen cell cups, as well as honey combs, can be made of plastic, and the bees have no tendency to reject them. One result, of using plastic sections, as opposed to wooden ones, is that the bees fill them up better, though their round shape also has much to do with this. In any case, the circular plastic section will surely remain the foundation of modern comb honey beekeeping and contribute greatly to the revitalization of this specialty. It is rivaled only by cut comb honey, produced in regular frames and then cut from the comb, which is sometimes cheaper to produce but at the same time much more work and messier.

So much for background. Next time, I shall start getting down to the basics of getting comb honey, stressing, as always, simplicity of method. Meanwhile, please note that the foregoing comes out of my head, for I sold all my bee books a few years ago and no longer have any reference sources, so if I have made some big mistakes, I shall be glad to be corrected. BC

Richard Taylor raises bees, produces comb honey and waits to be corrected from his home near Interlaken, NY.

?Do You Know Answers?

1. **True** The increased pollen collection by colonies fed sugar syrup is primarily due to changes in the behavior of individuals. The bees that handle the syrup in the hive are at the stage of their lives just before they begin foraging – accept nectar from foragers. Feeding sugar syrup is likely to create a shortage of bees ready to receive nectar. Many nectar gatherers, due to the shortage, then switch to collecting pollen.
2. **True** Drone comb in the spring stimulates drone production, and a colony with abundant drone comb will produce more drone brood than a colony with a limited supply of drone comb. The amount produced, however, does not show an unlimited increase. There is a limit to the amount of drone brood a colony will produce at any given time.
3. **False** Queens go on mating flights when the weather is warm, the wind is fairly calm and during the afternoon.
4. **True** The genetic composition of the bee exerts an effect on behavior, since external and internal factors stimulate various behavioral responses. Thus the genetic makeup of a bee affects how it responds to a specific stimulus. Since environment also affects behavior, bees do not always respond the same way.
5. **False** When young workers begin caring for brood (within a day or so after emergence), they feed nectar, diluted honey and pollen to larvae more than three days old. When six to 12 days old, their brood food (hypopharyngeal) glands mature, and they feed royal jelly to larvae less than three days old.
6. **True** Extensive behavioral experiments have shown bees can learn to distinguish odors, remember shapes, tell time of day and perform a large variety of other tasks.
7. **True** Honey bees can detect and orient to the earth's magnetic field, but how is still unanswered. However, they contain magnetite, an iron-containing area in the body.
8. **False** Honey bee workers forage for food, in response to those of the colony. When they return with their nectar their acceptance by house bees gauges nectar demand. If quickly relieved they forage for more, or recruit others. If slow, collecting decreases.
9. **True** Colonies without queens are stressed. Workers are defensive, and the number of guards is higher. When little nectar is available, guard bees continuously examine all bees coming into the hive. Thus, both situations increase the defensive behavior of the colony.
10. **True** Drone brood production occurs within the colony when prosperous conditions are present or when the colony is doomed because of queen problems. When rearing conditions are marginal, worker brood receives better care than drone brood. If conditions are poor, drone brood will be destroyed by the workers.
11. **True** Members of a colony can recognize their own nestmates and distinguish them from foreign visitors. Workers use volatile odors in discerning related drones and workers, recognizing their own queen and identifying kin.
12. **False** Nasonov (=Nassanoff) secretion, not 2-Heptanone, is released when a temporarily-disoriented forager locates the hive entrance. This is a strong orientation signal released at the entrance of the nest or on the surface of a swarm to help returning bees find home.
13. **True** The intensity of defensive behavior is highly dependent on external environmental factors. The more defensively inclined bees are usually located near the hive entrance. When flight activity at the entrance is reduced (poor foraging and/or inclement weather), the intensity of stinging behavior is increased.
14. **True** Defensive behavior commences when guard bees alert the colony. This is followed by numerous bees taking flight. Alerted or stinging workers release alarm pheromones (especially isopentyl acetate) that elicit colonial defense.
15. **True** As worker bees age, they are engage in various activities correlated approximately with age and physiological development. There is great flexibility because bees of the same age have the potential to change in response to changes in the colony. Individual bees of a given age can and do engage in diverse activities within a matter of minutes.
16. **True** Transfer of food between two bees is preceded by either begging or offering behavior. A bee that is begging attempts to thrust its tongue between the mouthparts of another bee, and a bee offering food opens its mandibles and moves its still-folded tongue slightly downward and forward from its position of rest.Antennal contact is important. During feeding, the antennae of both bees are in constant motion, continually striking each other.
17. **True** The stimulus that initiates the expulsion of drones is a lack of nectar/pollen brought into the hive. In the fall, a reduction in the amount of food coming into the hive causes reduced brood rearing since the queen's egg laying is drastically reduced or ceases entirely in response to the same stimulus.
18. **True** In the northern temperate regions queens cease laying eggs in October or November and resume shortly after the winter solstice. Under subtropical, tropical and mild winter conditions, egg laying and brood rearing usually never stop.
19. D) red
20. E) antennae
21. The members of the queen's court face toward the queen, offer food to her, palpate her with their antennae and lick her.
22. Swarming, absconding
23. Robbing

There were a possible 25 points in the test this month. Check the table below to determine how well you did. If you scored less than 12 points, do not be discouraged. Keep reading and studying - you will do better in the future.

Number Of Points Correct
25-18 Excellent
17-15 Good
14-12 Fair

Questions?

Readers, please note: We wish to expand this question and answer department, and so, we urge you to send in questions. Address them to Dr. Richard Taylor, Box 352, Interlaken NY 14847, not to Medina. We shall select for each issue a "Question of the Month," with special credit and a five dollar bill to its author. Questions should be brief and to the point and of general interest to readers. Enclose a stamped and addressed envelope for a personal response.

Replacing Old Combs

Q How often do you recommend replacement of old combs with foundation?

John E. Palmer
Newmarket, NH

A I do not think brood combs need to be routinely replaced at all, though some beekeepers, do this. The claim that the cells get smaller with age, resulting in smaller bees, is not borne out in my experience. One beekeeper has reported finding a 47-year-old brood comb in one of his hives, and its cells appeared normal. If mice chew a hole in a comb, the bees will rebuild it, but with drone comb, so it is worthwhile, but not necessary, to replace it. And, of course, if wax worms severely riddle a comb, you have to replace it. As for extracting combs, there is some reason to think that the honey spun from old ones is darkened, but it is not clear that it is, to any significant extent.

Editor's Note: There is evidence to support replacing combs when they become to dark to see sunlight through from several sources. All of this research points out that bees wax does tend to accumulate both manmade and natural environmental toxins. While the wax keeps these compounds away from the bees, the question remains, how much of these can wax hold?

Cleaning Beeswax

Q How does one clarify beeswax? And how can you restore the yellow color of brown beeswax that has become mixed with propolis?

Andy Moore
Sweetwater, TX

A The best way to get particles of dirt and whatnot out of beeswax is to melt it on a layer of hot water. Most of the impurities end up in the water, and those that do not can be scraped from the bottom when the wax has hardened. As for color, beeswax is discolored, not only by propolis, but also by contact, when melted, with iron, copper and other metals. It is not discolored by being melted in contact with stainless steel or a clean, well-tinned can. There is no way for a beekeeper, without the resources of a candle factory, to make dark wax light again, but dark wax can be sold or traded for foundation, the same as light yellow wax, at only a slightly lower price.

Standard Hives?

Q How did bee hives become standardized? And why are super depths not standardized? I have found that the bee space between supers can vary greatly. Is this not bad?

Andy Moore
Sweetwater, TX

A Around the turn of the century, there was much debate concerning the best hive size, and many different styles and sizes were experimented with. A. I. Root, who was interested in mass production of hives, was mainly responsible for getting one standard hive. This has beem enormously advantageous to beekeepers. In England, there are so many shapes and sizes of hives that a whole book has been written just on this subject. This greatly hinders commerce on woodenware. One of the great advantages of a standard hive is that hives and their parts are interchangeable, giving much flexibility to management. The Dadant Company used to offer a large hive, but no longer. As for supers and frames, there is no excuse for the variations in the bee space between them that one often finds, and it continues to amaze me that some manufacturers remain oblivious to this.

Editor's Note: Although equipment made by each manufacturer tends to be fairly precise, when interchanging equipment between companies bee space may be violated. This is, primarily, due to the principle of having a 'bee space' above the top bars provided by 1) the top bars flush with the top of the super, or 2) the top bars below the top of the super. Mixing these violates bee space, and causes problems.

Making Splits

Q Of my five hives, only one survived the winter. Could I, by buying four queens, revive the other four winter-killed colonies with combs of brood from the surviving colony?

Arthur Young
Norwalk WI

A That might be stretching things too far. It depends on how large your surviving colony is. You need at least three combs of brood and bees, and preferably four or five, to make up a nucleus colony. Otherwise the units will be so small as to perhaps never thrive.

Answers!

Richard Taylor

Snow Removal

Q There has been a lot of snow here, so I keep shoveling it away from the hive entrances. Is that necessary?

A Hives can remain buried in snow for long periods without adverse effect. As long as the bees can fly when it warms up, there is no need to clear the entrances of snow, especially when the hives have upper entrances. The only danger of the snow is its melting, flowing into the hive, then freezing, and this is easily prevented by having the hives tilting forward.

Tough Bees

Q Are some strains of bees more winter-hardy than others? Which ones would you recommend?

Tim Grove
Searsburg, NY

A I think the race or strain of bees is one of the least important factors in wintering and would be dubious of any claims made for this. Of course, some tropical bees would not be able to survive winter conditions, but these cannot be purchased from bee breeders anyway. We hope the Africanized bee will turn out to be one of these. To date no one knows.

From Which?

Q Since goldenrods and asters bloom at about the same time, and bees forage from both, how does anyone know which honey comes from which?

Pat Morris
Newfield NY

A This is a terribly good question, and I have often wondered about the answer. Indeed, it seems to me perfectly possible that the fall honey which beekeepers have for generations been calling goldenrod honey, and the strong yeasty scent the hives have in the fall, might in truth come from the asters. We would be very interested in any clear evidence anyone has on this.

Moving Up!

Q I have a hive that has two deep hive bodies for the brood chamber. The top story is all new equipment, but the bottom one is old and needs to be replaced. What is the best way of getting the bees out of the bottom one and into the top? Can they be drummed up?

Garrick Sherman
Virgie, KY

A If you wait until spring, most of the bees, and probably most of the brood too, will most likely be in the top story. Set this off onto a new bottom board, then go through the bottom story and save any combs that seem worth saving. They will probably turn out to be in better condition that you expect. Do this as early in the spring as you can.

Gleanings

JANUARY 1995 • ALL THE NEWS THAT FITS

TEXAS HANDLES HONEY BEE EMERGENCIES

Firemen and beekeepers gathered together for a training event on October 22, 1994, in Midland, TX. The event was open to outlying fire departments and several came as well. Their purpose was to become more knowledgeable about working with the Africanized bee. Midland County is quarantined for the AHB. Doug Paxton, entomologist for the Martin and Midland counties and Jon Langley, a local beekeeper, presented a video program with materials from A.I. Root and Texas Agriculture about the AHB. A pamphlet from Texas Agriculture called, "The Africanized Honey Bee," was handed out to the participants. (Texas Agriculture Extension Service, Texas A&M University, College Station, Texas 77844.)

The group moved to the training area where there were three colonies, one an AHB hive, to be used in training with surfactants. In the photo, you will notice a beekeeper down on the ground. In the event of a physical problem with as seizure or cardiac arrest or someone stung severely by Africanized bees, the firemen would put up a surfactant spray over the victim, remove the victim and spray into the hive to kill the bees there. Instruction was given to closing up fire fighters' clothing from bees and the use of breathing masks for protection. Fire department evaluations gave it "high marks."

To the knowledge of Doug Paxton, this was one of the first seminars for fire fighters in Texas. Two television news crews were on hand to document the program. They were dressed in protective wear. Three other beekeepers, including the author were on hand to observe and help where needed. Recent materials in *Bee Culture* have encouraged people to see the AHB as a new neighbor who isn't going to go away and with whom, we need to learn to work and co-exist.

HYBRI-BEES MOVES

Hybri-Bees announces the relocation of its breeding facility from Labelle, FL, to Dade City, FL. This move was made out of necessity due to the reorganization plan initiated by the stockholders of Hybri-Bees. Through this reorganization Hybri-bees will continue its long standing commitment to the development of better bees. This reorganization will better facilitate the ongoing selection of stocks for the Starline, Midnight and ARS-Y-C-1 programs. The stocks will be selected to be more productive over a larger geographical area and out of a much larger gene pool.

The reorganization will enable us to reduce the price of breeder queens to $300 each. The royalty payments will be eliminated on all Stocks with the exception of the USDA ARS-Y-C-1 stock. In addition to the Hybrid Breeder Queens we will also offer Inbred lines. With the exception of the stock released from the USDA, all breeder queens will now be the sole possession of the purchaser, who will be licensed to use the Starline and Midnight logos for one year from the date of purchase.

We would like to wish Melvin Greenleaf the best in his new teaching career as well as thank him for what he has contributed to Hybri-Bees over the past 14 years. Hybri-Bees has selected Dean M. Breaux to assume Melvin's position of Executive Vice President. All future inquiries about the stock and the various programs of Hybri-bees should be sent to: Dean Breaux, Executive Vice President, Hybri-Bees Inc., 11140 Fernway Lane, Dade City, FL 33525, (904) 521-0164.

AG IMPORTS UP

The U.S. agricultural trade surplus fell $102 million dollars in September, down to $1.2 billion. That puts the Fiscal Year 1994 agricultural trade surplus at $17 billion, down $600 million from last year. While agricultural exports nearly broke a record, imports did break records, accounting for the drop in the trade surplus.

Bees & Stamps

Calling all apiphilatelists, or should I say philatophilic apiarists? Whatever, there's good news for stamp collectors interested in the theme of bees and beekeeping.

It's been 21 years since the last catalogue of stamps on a bee theme was published, in Bee World 54(2): 53-56. Now there's an updated list, including all stamps showing: honey bees, beekeeping or any allusion to beekeeping; non-apis bees; stamps omitted from the 1973 article.

'Bee and bee interest postage stamps of the world: supplement 1' by Dorothy E. Shaw and J. Stuart Ching. Bee World 75(4): 181-193 (1994), with four full-color plates. Also available as reprint M128 from IBRA.

Doing Business Island Style

KONA QUEEN COMPANY

Gary "Gus" Rouse is the owner of Kona Queen Company. Rouse was named Small Business Exporter of the Year for the state and region nine at the 1994 U.S. Small Business Administration awards luncheon hosted by the Kona-Kohala Chamber of Commerce on April 13.

Kona Queen Company raises queen bees for markets around the world and has become an industry leader across the country in the last four years. The company, located in Napoopoo, has also become a referral center for buyers and sellers working with bee-related products.

The company has the biggest operation of the three commercial beekeepers on the Big Island, is the largest commercial queen bee operation in the state and one of the largest in the U.S. Operating since 1976, it is one of 2,700 beekeepers in the U.S. and produces 1,000 queens daily.

Rouse, a delegate for the American Beekeepers Federation, began as a beekeeper when he and his wife started working for the company in 1979, worked his way up to part-owner, then majority owner and now full owner.

"The company was owned by two owners when I bought into it," Rouse said, "and last month I finally became sole owner. It has taken me 15 years."

Rouse was in the bee business in California before he moved to the island in 1979, traveling around several states with the hives on his truck, going from farm to farm.

"If we finished pollinating one area and the blossoms were ready somewhere else, we would pack up in the middle of the night to get there at the right time," he said. "It was nomadic, migratory life."

When he and his wife visited Kona on their honeymoon, they saw the potential at Kona Queen Company, went back to California and packed.

At that time, the majority of the bees were shipped to farms for honey production and the Kona operation was smaller than it is today. Currently there are 2,500 hives.

Queen bees, who mate for life, are selected for their high performance and behavior. Kona Queen Company has two breeds, Italians and Carniolan from Czechoslovakia and Austria. Bees are not native to North America.

"We start with good genetic stock," said Barrie Rouse, Gus' wife. "The hive is just a box with a comb in it. We graft the worker bee larvae out of the hive into cell cup, then take the larvae into a queenless hive for 10 days to mature into queens."

The workers are fed sugar syrup and protein supplements like brewer's yeast, which they ingest and feed as royal jelly to the queens.

The queen larvae are then moved to a queen mating nucleus, or miniature hive, where they hatch within 24 hours, leave the hive, mate with a dozen or more drones in flight and return to the hive. Each queen is then ready for shipment and has enough semen from the drones to lay eggs the rest of her life.

"The agriculture business is basically a 15-week business, then we scale back and maintain the hives and operate at 25% capacity the rest of the year," Rouse said.

Queen bees are shipped one per miniature cell as they will kill each other. Bees are shipped priority mail throughout the U.S. postal service in small containers with 100 bees per box.

"We ship as many as we can every day during the season," Rouse said. "The price of the queens varies from $4 to $7 each, depending upon the season.

"We move about 2,000 hives to the north end of the island to Waimea, Hamakua and the Saddle Road areas during the winter months where plants and trees are flowering, and through the good graces of the community our business is able to survive because we have various arrangements with land owners. Our queen yards are 16 different yards in the North Kona area," he said.

Rouse said his bees are sent mainly to large commercial beekeepers/honey producers, but honey production has fallen off because the Chinese are now exporting honey to the mainland.

His biggest competition is from beekeepers in southern states, but he is able to start six weeks earlier than his mainland competitors and rouse said Hawaii has one of the best queen mating climates.

"Hawaii is also free of the two parasitic mites known on the mainland which can either shorten the bee's life or kill the larvae. The mites have been devastating to the U.S., Canada, Europe and Russia," he said.

It is illegal to import bees into Hawaii.

"I think our business will feel the impact of unrestricted Chinese honey imports," Rouse said. "Our entire industry is getting hammered by that. But up until now business has been good."

170 Pgs. Practical Info

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Small-scale farmers are tenacious and they are innovative.

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Published by Univ. of CA Div. of Agr. and Nat. Resources, the 170-page book covers topics ranging from how to buy used farm equipment to interpersonal communication.

Thirty-eight authors, many of them farmers, contributed to chapters on personal commitment and skills needed for successful farming, farming basics, finances, marketing, ideas on what to produce, how to grow crops and raise animals, postharvest handling of perishable crops, alternative farming methods, labor management and farm family dynamics. Nearly each chapter lists references and suggests sources for further information.

Available for $20+ tax, shipping and handling, the *Small Farm Handbook (SFP001)* is available through ANR Publications, Univ. of CA, 6701 San Pablo Ave., Oakland, CA 94608-1239. Call 800/994-8849 (CA only) or 510/642-2431 for details.

IBRA GOES ONLINE

The information superhighway is reaching out to your apiary. A newsletter for scientists and beekeepers is now available on E.mail, with the recent launch of the free 'B.mail' service from IBRA. IBRA is the International Bee Research Association, a worldwide information service based in the UK but serving beekeepers and scientists around the globe.

'B.mail' is released at the beginning of each month, and contains news of events in the bee world and brief discussion of current issues.

You can find B.mail on four bulletin boards: BEE-L (bee-l@albnyvm1.bitnet), SOCINSCT (socinsct@albnyvm1.bitnet), POLPAL (polpal-l@uoguelph.ca), and BEENET in Europe (hugo.veerkamp@f28.n2801z2.fidonet.org).

For more information contact IBRA at ibra@cardiff.ac.uk, or at 18 North Road, Cardiff CF1 3DY, UK (Fax {01144} 1222-665522)

NCBA CALENDAR

The North Carolina Beekeepers Association is continuing its 16-year tradition of publishing an annual beekeeping calendar, and the 1995 edition is now available to anyone interested in beekeeping.

The calendar serves two valuable purposes. It functions as a very useable wall calendar (measuring 11" x 17") with ample space for writing on the calendar, plus it provides a wealth of information for beekeepers. The beekeeping information is especially applicable to the middle Atlantic states, but it is also of use to beekeepers throughout the continent.

The calendar contains dates of various national and regional bee meetings for 1995, blooming dates on a wide variety of honey and pollen producing plants, and a number of articles. Special articles include a biography of Charles Dadant, natural history of the bumble bee colony, background and control of wax moth, a description of the "inguometer" (a device for measuring the length of a bee's tongue), and more.

The NCSBA provides the annual beekeeping calendar as a service to its members and each current member receives a free calendar. A small supply of calendars are produced for sale with receipts going to support the Apiculture Science Fund at NC State Univ. The cost of a 1995 calendar is $6 which includes shipping and handling. By joining the NCSBA and paying 1995 dues of $10 you will receive a 1995 calendar plus a 1996 calendar when it is produced and all benefits of NCSBA membership.

Orders should be sent to NCSBA, 1403 Varsity Dr., Raleigh, NC 27606. Make checks payable to NCSBA and include $6 for a calendar only or $10 for 1995 dues and both a 1995 and a 1996 calendar as described above.

Honey Production Down 50%

AUSTRALIA SUFFERS DROUGHT

Australian beekeepers are facing disaster as a crippling three-year drought burns into a fourth year.

Honey production is expected to fall by 50% to some 13,000 tons, in turn threatening the country's A$20-million (US$15-million) a year export earnings. Exporters also fear Australia's reputation as a reliable honey supplier will be damaged in the process.

The drought has in some degree hit all of the country except Western Australia.

With honey shortages anticipated, wholesale prices have already risen by 10%.

But the drought-induced depletion of bee numbers has even more serious implications for Australia's vital agricultural industry.

The pollination of crops has been valued at A$1.2 billion a year and the failure of crops and grasses to reseed could affect everything from the fruit and vegetable sector to the multi-billion-dollar dairy and beef industry.

Already, with the drought decimating this year's grain crops, beekeepers are having trouble finding crops for their bees.

Grain crops have been hit so badly that for the first time in memory Australia has been forced to import wheat, mainly from the United States.

By November, apiarists were looking to flowering native trees to save their bees.

Many beekeepers doubt they will be able to get a honey crop this southern summer.

Amateur apiarist Chris Allen, who operates on the edge of Sydney, New South Wales, said his bee numbers are low and there is little honey in their poorly formed cells.

"They are still at winter strength," Allen said. "Bees need water. They can really suffer during a hot, dry summer. My bees are way down in number. It is only because they are close to well-watered suburban gardens that they haven't eaten into last year's reserves."

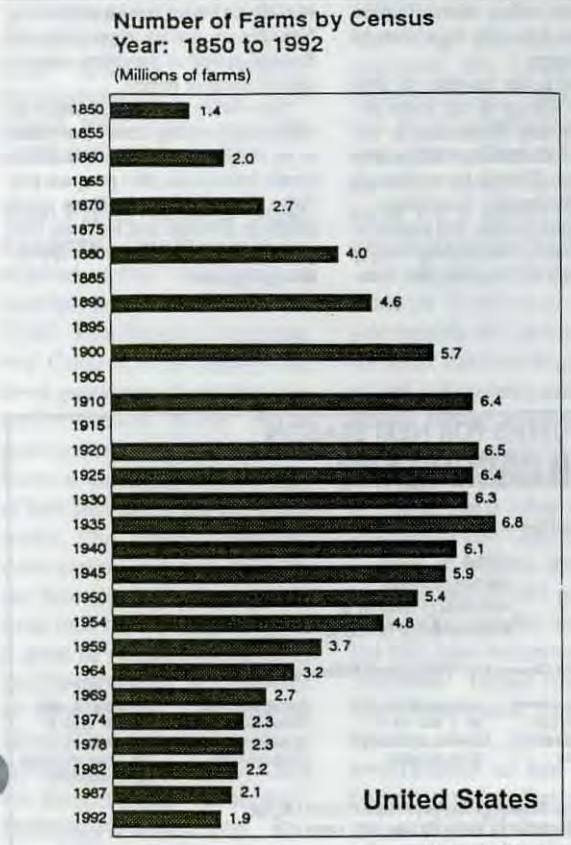
Professional apiarist in some areas have begun feeding their bees pollen and nectar substitutes.

New South Wales queen bee producer Pat Carroll said his business is at a standstill.

"Because beekeepers are not producing honey they can't buy queens," Carroll said. "They don't have the money. Because there's no chance of producing honey they are just going to sit and wait until the rain arrives."

He said in the state of Queensland beekeepers have been suffering from the drought for the last three years.

"Some have closed up completely and gone to work somewhere else or are hanging on by the skin of their teeth waiting for things to improve," he said.



Source: Bureau of Census

Good Pollinators

SHAGGY FUZZYFOOT BEES

A bee that keeps on pollinating apples, blueberries and other fruits during early-spring rain or cold is now available to beekeepers and fruit growers in the United States.

Honey bees usually stay in their nests when it's raining or when it drops below 50°F. But the shaggy fuzzyfoot keeps on pollinating at temperatures as low as 48°F. So it's no surprise that a female shaggy fuzzyfoot is a prolific pollinator, visiting up to 337,000 flowers in her 60-day adult lifetime, said U.S. Department of Agriculture scientist Suzanne Batra.

Batra, who raises the bees at her Beltsville, MD laboratory, said she will ship them with instructions in late winter, while they're dormant.

Why do shaggy fuzzyfoot females work so hard as pollinators? Because collecting enough pollen and nectar to feed her young – and herself – and to help her make new nests, takes about 15 hours a day, said Batra, an entomologist with USDA's Agricultural Research Service.

"I named it shaggy fuzzyfoot because that's what its Latin scientific name means. It has a furry body and fuzzy hind legs," said Batra, based at the agency's Bee Research Lab in Beltsville, MD.

Shaggy fuzzyfoot (*Anthophora pilipes villosula*) bees are dormant almost the entire year – except for about two months from late March to late May. This is when the adult bees emerge, and when many fruits need to be pollinated. The shaggy fuzzyfoot fills this role.

"I brought the shaggy fuzzyfoot from Japan because it fills this early-spring niche when honey bee and bumble bee populations are low," she said.

Batra said there are 60 native *Anthophora* bee species in the United States, mostly in the western and central states. But only two of these species live just in the eastern states, and they become active in June – too late to pollinate fruit that begins to blossom in early spring.

The shaggy fuzzyfoot has another advantage: it can "buzz pollinate," meaning it shivers its muscles to create a vibration that releases the pollen from inside tiny tube-like anthers in the blueberry flower.

"Honey bees can't buzz pollinate because they don't vibrate their bodies to shake pollen loose," she said. "Buzz pollination is critical in blueberries and some other crops, because it releases the most pollen so that flowers are well fertilized and produce the best fruit."

Batra found the shaggy fuzzyfoot in the adobe walls of a century-old farmhouse in Japan in 1988. "I noticed that it started pollinating before sunrise and continued until after sunset," she said. "It also pollinated in light rain, and in the cold."

Batra received permission in 1989 to bring the bees into the United States so she could study them. Now she has about 1,000 nests at the bee lab, and wants to release some shaggy fuzzyfoots to interested apple, peach, pear and blueberry growers and beekeepers for trials in the United States.

The bees, which are gentle and easy to keep in adobe blocks, survived temperatures as low as 10°F last winter. Batra recommends them for a moist, warm, temperate to subtropical climate similar to their home in southern Japan, where camellias grow.

In the United States, that would be parts of Delaware, New Jersey, Maryland, Virginia, North and South Carolina, Georgia, Alabama, Mississippi, and Louisiana in the east; and coastal areas of northern California, Oregon and Washington in the west (USDA Plant Hardiness Zones 8-9).

Interested beekeepers and fruit growers should obtain import permits from their state's agriculture department. Batra will provide information on how to manage the bees.

For information, contact Batra at the Bee Research Lab, ARS-USDA, Bldg. 476, BARC-East, Beltsville, MD 20705, telephone (301) 504-8384/8305, fax (301) 504-8736.

HONEY BOARD TAKES PLASTIC

Beginning January 1, 1995, purchases of Honey Board promotion materials (such as posters, bears, aprons and cookbooks) may be made by telephone using Visa or Mastercard. "We're very pleased to now be able to accept credit card payment with orders it'll really save time for customers who 'need their orders yesterday'!" said Tracy Baker, fulfillment coordinator for the Honey Board. "Of course, we'll continue to accept checks and money orders accompanying promotional material orders as well," Baker added.

Credit card purchases require a $5.00 minimum order and, as will all orders, two to four weeks should be allowed for delivery of materials.

For questions regarding credit card purchases, please call Tracy Baker at 1-800-553-7162.

FRESH BAKED GOODS GAIN

The processed food industry continues to be affected by changing demographics and demands on consumers' time. Dennis Henderson, retired Ohio State agricultural economist working for USDA, says the big gainers for U.S. food product manufacturers will continue to be products associated with "healthy eating." Henderson's predictions for the food industry are in the 1995 Ohio, Indiana and Illinois Agricultural outlook Guide due out in December. He says fresh fruits, vegetables and pasta will be particularly popular in prepared, fresh-packaged form. In fact, "convenience" closely follows "health" as the reason consumers are picking the new products they do. Expect fresh baked goods, microwavable soups and pastas to also make progress in the market.

NEW FRUIT

A new apricot named Helena could offer tomorrow's consumers a more colorful, plumper, tastier summer snack. Craig Ledbetter with USDA's Agr. Research Service says Helena apricots are big and juicy, with deeper orange skin than most apricots. The flesh is firm and sweet,so Helena is ideal for eating fresh or adding to summer salads. Helena apricots could appear in supermarkets in a few years. The new variety can self-pollinate. Ledbetter says that's a bonus because Helena can bear fruit without needing another variety of apricot tree nearby to furnish pollen.

ITC RULES IN FAVOR OF U.S. BEEKEEPERS

Because the preliminary injury determination was affirmative, Commerce will follow this tentative calendar:

Monday, March 13, 1995
DOC (Dept. of Commerce) will make a preliminary dumping determination. They can either accept the dumping margin of 169.18% asked for in the petition, or make a different determination based on their own investigation. The dumping duty will be imposed at this time provided the case is not extended by Commerce (day 160).

Monday, May 1, 1995
DOC preliminary dumping determination is due if case is fully extended by an additional 50 days (day 210).

First week in June 1995
DOC final dumping determination due if neither preliminary nor final determination are extended. (75 days after the date of publication of Commerce preliminary determination in the Federal Register.)

First week in July 1995
DOC final dumping determination due if preliminary determination is fully extended but final determination is not extended.

Week of September 18, 1995
DOC final dumping determination due if both preliminary determination and final determination are fully extended.

The ITC's final injury investigation will be initiated by the ITC as soon as Commerce issues an affirmative preliminary dumping determination. The ITC's final injury investigation will climax with a public hearing before the Commissioners on a date that will coincide with Commerce's announcements of its final dumping determination. The ITC's final injury determination will be due 25 days after Commerce's final dumping determination is issued.

Given all of these permutations, this dumping case will be concluded at the earliest by mid-July 1995 (i.e., if Commerce does not extend the due date of either its preliminary or final dumping determinations), and could be as late as the first week in November 1995 (i.e., if Commerce fully extends the due date of its preliminary and final dumping determinations).

HONEY QUEENS

Pictured left to right: Dee Dee Harvey, New Jersey Honey Queen, Alexandra Leuchf, New Jersey Honey princess.

Dee Dee is the daughter of Bob and Dottie Harvey of the South jersey Branch and Alexandra is the daughter of Michael and Mary jean leuchf of the Central Jersey Branch of the NJ Beekeepers Association.

These young ladies will represent the New Jersey Beekeepers during 1994-95 and will explain and communicate the importance and necessity of the honey bee in pollinating New Jersey fruits, vegetables and flowers as well as providing nature's organic treat of honey.

New Jersey Beekeepers know the value of promoting honey bee values to all of New Jersey, but in addition firmly believe that this program provides an opportunity for these young ladies to develop and increase their poise and skills in this public appearance program.

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BOOKS & NEWSLETTERS

AN EYEWITNESS ACCOUNT of Early American Beekeeping by A.I. Root. The pioneers of beekeeping as close your bookshelf. Cat. No. X1, $3.69 postpaid. The A.I. Root Co., 1-800-289-7668. (TF)

BEE BOOKS BY RICHARD TAYLOR. Send for list, Linden Books, Box 352, Interlaken, NY 14847 (TF)

PERIODICALS

RURAL HERITAGE – bi-monthly how-to, dedicated to preserving the traditional rural lifestyle, with emphasis on farming & logging with horses, mules, & oxen. Sub. includes THE EVENER Workhorse, Mule & Oxen Directory; $19 for 6 issues; $34 for 12 issues; sample $6. Rural Heritage, 281-B Dean Ridge Lane, Gainesboro, TN 38562.

WANT INFORMATION ON EXOTIC animals & the marketplace? Subscribe to Wings & Hooves. $16 yr. Dept. 1, Rt. 1, Box 32, Forestburg, TX 76239-9706.

THE SCOTTISH BEEKEEPER. Magazine of The Scottish Beekeepers' Assoc. Rates from D.B.N. Blair, 44 Dalhousie Rd., Kilbarchan, Renfrewshire, PA 10 2AT, Scotland, U.K. Sample $1.

DIE NEUE BIENENZUCHT Monthly magazine for beekeepers interested in German beekeeping. Hamburger Str. 109, D-2360 Bad Segeberg, West Ger.

THE AUSTRALIAN BEE JOUR. Monthly, SeaMail $27.50 (Aus.), AirMail $40.70 (Aus.). Write to: Victorian Apiarists' Association Inc., Editor, Ms. Judy Graves, 23 McBride Rd., Upper Beaconsfield, Victoria, 3808, Australia. Sample $3 (Aus.) on request.

IBRA: INFORMATION AT YOUR FINGERTIPS. IBRA is *the* information service for beekeepers, extension workers and scientists. Our members support this service and enjoy the benefits of belonging to IBRA, which includes *Bee World*. We need your involvement join IBRA support this important information network and extend your beekeeping horizons. For more information contact: IBRA, 18 North Road, Cardiff CF1 3DY, UK. Telephone (+44) 1222 372409. Fax (+44) 1222 665522.

SCOTTISH BEE JOURNAL. Monthly magazine. Sample copy from Robert NH Skilling, FRSA, 34 Rennie St., Kilmarnock, Scotland. $4. per annum.

BEE CRAFT – Monthly journal of the British Beekeepers Association. Subscription, including postage is £12.96 surface mail to Mr. L. Connor, P.O. 817, Cheshire, CT 06410.

THE AMERICAN BEEKEEPING FEDERATION needs your support in efforts to stop adulteration, improve marketing conditions and encourage research on African Bees and Varroa and Acarine Mites. For information, membership application and sample of bi-monthly News Letter write to: THE AMERICAN BEEKEEPING FEDERATION, INC., P.O. Box 1038, Jesup, GA 31545-1038.

IRISH BEEKEEPING. Read An Beachaire (The Irish Beekeeper) Published monthly. Subscription $15.00/year, post free. Mr. Seamns Reddy, 8 Tower View Park, Kildare.

THE AUSTRALASIAN BEEKEEPER. Published monthly by Pender Beekeeping Supplies Pty. Ltd. Send request to: The Australasian Beekeeper, PMB 19, Maitland NSW 2320, Australia. Sub. $US 27.00 per annum, Surface Mail (in advance). Payment by Bank Draft. Sample free on request.

RARE BREEDS JOURNAL. Bi-monthly journal about exotic, minor & rare breeds of domesticated animals & their owners. $18.00 (U.S.)/year, $24.00 Foreign; $2.50 for sample copy. Rare Breeds Journal, Dept. Bee, HCR 1, Box 45, Hebron, ND 58638 (701) 878-4970.

CANADIAN BEEKEEPING. The news media of Canadian Honey Industry. One year sub. (10 iss) in Canada and U.S. $20. Foreign subscribers send $40. Send to Canadian Beekeeping, Box 678, Tottenham, ON, Canada, L0G 1W0.

BRITISH BEE JOUR. Monthly single copies 33p plus postage. $15./yr. U.S. Annual subs. post paid. Sub-agent: 46 Queen St., Geddington, NR Kettering, Northants, NN14 1AZ, England.

Bee interested. For beekeeping information read the AMER. BEE JOUR. New editorial emphasis on practical down-to-earth material, including question & answer section. For information or free copy, write to: AMERICAN BEE JOUR., Hamilton, IL 62341.

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THE NEW ZEALAND BEEKEEPER. Quarterly magazine by the National Beekeeper's Association of NZ. Write for rates & indicate whether airmail or surface mail. NZ BEEKEEPER, P.O. Box 4048, Wellington, NZ.

THE GIBSON LETTER. A monthly newsletter that takes another look at beekeeping news. Edited by Glenn Gibson. Subscription - $48/year. The Gibson Letter, P.O. Box 368, Minco, OK 73059.

BOTTOM BOARD ... Cont. From Pg. 60

signed) honey bee line is by most genetic definitions, a hybrid constructed from crosses manipulated by bee scientists. It is not genetically "fixed" and without continual human intervention, the qualities of the line will be eventually lost when those queens are placed into hives. Why? Because most beekeepers do not re queen frequently enough. Because many newly requeened colonies will undergo supersedure without the beekeeper's knowledge. Because those supersedure queens will be mating with drones from local (unselected) stock. Because a single selected line cannot be well adapted for all the beekeeping conditions found in North America. There is no genetic quick-fix. Because of the open, multiple male mating system of the honey bee, there can never be a genetic quick-fix.

Should we stop the search for improved lines of bees necessary to improve beekeeping in North America and elsewhere? Absolutely not! What I wish to encourage is a reality that the solution for most beekeeping problems is better beekeeping and artificially produced and maintained hybrid lines are a part of the solution to improved beekeeping, but the "genetic solution" cannot stand alone.

Michael Burgett is Professor and Apicultural Extension Specialist at Corvallis Oregon.

The Problem With Genetic Solutions

michael burgett

For many decades beekeepers of every stripe have called for genetic solutions to beekeeping problems. The philosophy of a human-selected "race" of honey bee adapted for a given region, climate, or problem is often regarded as an ideal solution, whether it be for improved honey production, winter survival, or disease and parasite control. As an example of the latter, the USDA has recently released a honey bee line (read that as artificially selected "hybrid") reported to be resistant to mites. As a bee scientist this is a line of research that I strongly encourage, especially considering the chemical burden that we are currently placing on our colonies. An important goal for anyone involved in honey bee research is to reduce or eliminate the need for chemical intervention for bee problems. However, I would like to suggest a few reasons why we should not place too great an overburden of faith in quick-fix genetic solutions.

As an entomologist who specializes in honey bees I find myself, like the majority of my colleagues, in a constant battle to find sufficient time to read all the available and pertinent literature in my field. However, I will occasionally read outside of the fascinating world of the honey bee. Over the years I have found that my favorite "non-bee" author is Stephen Jay Gould, a professor from Harvard University who writes a monthly column for the magazine *Natural History*. In the September 1994 issue Professor Gould addresses his favorite topic of evolution and in that article, titled "Lucy on the Earth in Stasis," he writes the following:

"Humans live all over the world, move vigorously from place to place, and maintain an apparently unstoppable habit of interbreeding everywhere they go."

For this truism, one can very easily replace the word "Humans" with the words "Honey bees" because all the traits Gould's sentence describes for humans are also possessed by honey bees. Gould goes on to comment that due to the migratory and reproductive nature of humans " *we permit ourselves no opportunity for isolation and speciation.*" And thus it is the same for honey bees.

Around the world there are approximately 25 recognized races or subspecies of the western honey bee, *Apis mellifera*. Prior to human intervention, e.g., before there were beekeepers, these races maintained their unique genetic purity through geographic and ecological isolation. Such is not the case now. Well intentioned beekeepers have been spreading and mixing honey bee genes from the first time a human picked up a honey bee colony and moved it to a new location. Today we do it ever more efficiently with the aid of airplanes in an ever shrinking world. (Please remember, only humans have to carry passports, and geographical borders are very artificial constructions convenient only for humans and not recognized by non-human species.)

One of the questions I am frequently asked by beekeepers is, 'what line or race of bees do I prefer. My answer is, and it is not given facetiously, "I prefer the honey bee *Apis mellifera*." This is in recognition that we beekeepers have had a tremendous influence on the purity of supposed honey bee races. We have taken honey bees around the world to environments they would have never experienced. We mix lines of bees with every introduction of a queen bee into a colony by a beekeeper. We have created a genetic melting pot that is ever changing. This provokes the question; are there any pure races of honey bees remaining? Probably there are, in areas of Africa isolated from modern beekeeping. But in Europe and most especially, the Western Hemisphere where honey bees were not an integrated part of the native fauna, I would challenge any geneticist to provide evidence that shows a pure race is able to maintain itself free from human intervention. I am not saying there are no differences between honey bee lines, I am saying that we as beekeepers have changed the genetic "purity" of most races in most areas of the world.

This strays from my point of what's the problem with genetic solutions. And here I speak from the realities of beekeeping in North America. An artificially selected (de-

Continued on Page 58