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APRIL 1985

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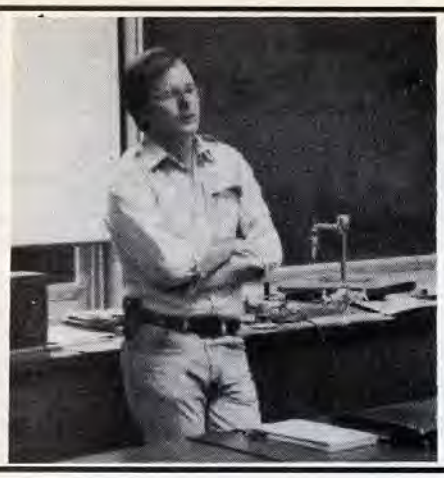

Beekeeping Technology

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

Old Bee Supply Catalogs— They Map The Evolution Of Beekeeping Equipment

I don't consciously collect anything. Well, maybe an arrow point if I should be so lucky, but I don't go to any extreme to buy old bee books, honey pots or whatever. This is not to mean that I have a problem with people that do enjoy gathering bee libraries or some such.

Neither am I particularly wild about antiques, since woodworking is a serious hobby of mine, I do have an appreciation for older pieces that are well constructed using nothing more than hand tools and a wood master's touch.

With all this justification in mind, it was my good fortune to be given a mixed group of old bee supply catalogs. The oldest was a 1907 Dadant & Sons catalog. For a while I did look for other old catalogs and — can you believe it — I found a few. I have discovered that this old series of catalogs is an excellent source of information concerning hive measurements, comb honey equipment and bee equipment that is no longer manufactured. I also observed the real world effects of inflation. The prices have clearly gone up a bit.

In the early years the catalogs listed bee hives with frames, smokers (all types), comb honey equipment, extractors, honey tins, wax melters and possibly a couple of books. Except for a plethora of advice on bee management, that was most of what the very early catalogs offered.

45-FRAME SIMPLICITY EXTRACTOR
$135.00
Height of can, 33½".
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Things developed quickly. By 1935, all the bee supply companies had a catalog that was around 65 pages long. The diversity of equipment was extravagant, and things were incredibly cheap by today's standard. Five deep supers with frames, unassembled cost $6.75. All equipment was top grade lumber. No seconds were offered. "Buckeye double-walled hives, the all weather hive for your bees" was a major item in 1934. The entire hive complete was $6.00 (plus foundation).

Large catalog spaces were devoted to section equipment. Obviously, the second round section equipment had not been developed. Plain supers, bee way supers, "N" section supers were all listed with ancillary equipment.

I suppose the most significant effort was devoted to extracting equipment. Super heavy duty leviathan old machines that were primitive and yet indestructable. As you would expect, the selling prices would barely cover the freight charges today. Everything changes.

As educationally quaint as my old catalogs are they don't being to compare with today's colorful supply catalogs. The path beekeeping has taken is clearly delineated. One can follow the early catalogs with their scant offerings right on through the research and development days of the 1930's and 1940's. During those years all types and all models were offered. Present day catalogs exhibit the results of a great deal of trial and error. I can't help but envision a beekeeper in the year 2010 with his laser beam uncapper and vacuum-type extractor as he reviews a 1985 catalog and smiles condescendingly as he looks at our "quaint but functional equipment".□

Questions and Answers

Editors Note: *In the February, 1985 issue we advised a reader of this page that a microwave oven was not suitable for reliquefying honey. Another reader, Joyce Johnson, of Greeley, Colorado, writes that this is incorrect. If such an oven is begun at high setting for one to three minutes, until the honey begins to liquefy, and then dropped to a lower setting the honey can be reliquefied without damage.*

We are very happy to bring to the attention of readers the conclusions or experiences of others which may differ from our own.

—Richard Taylor

Q. You have suggested placing a dark comb in swarm boxes to attract swarms. Wouldn't this comb become infested with wax worms before a swarm arrived? **Richard Beaumier, Durham, NH**

A. No. Swarming probably peaks in your area in June, whereas wax moths are not a significant problem until August. Also, wax worms tend more to invade combs containing pollen. Comb by itself is not very attractive to them. Furthermore, wax worms prefer combs that are in close proximity to other combs and relatively unventilated, as in the case of stacked supers. Some of the more experienced commercial beekeepers in these parts protect their supers against wax moths by stacking them, still sticky, with the bottoms wide open for ventilation but on excluders to keep mice out, on racks on the north side of the building, where it is cool. The bees lick the combs dry and the ventilation discourages moths.
— Richard Taylor

Q. My problem is how to reconcile a rose garden with keeping bees. It has been recommended that I protect the roses with Isotox and Diazinon. If I spray the roses with Isotox and scatter Diazinon on the ground, will that hurt the bees? **William C. Pierce, West Baldwin, ME**

A. Most roses have little if any attractiveness to honey bees, so if your hives are far enough away from the roses to avoid direct contamination by drifting spray, there should be no problem at all.
— Richard Taylor

Q. Can I perform the shook swarm method even though there may be no queen cells or other indications of swarm preparations in the colony to be used? **Marshall Slotterbach, Sellersville, PA**

A. Yes. All you need is a very strong colony, since the aim is to get as many bees as possible into a small and broodless colony.
— Richard Taylor

Q. I have an exceptionally mean colony, headed by a commercially raised queen. I've planned to requeen it in the spring, but now I'm tempted to just remove the cover and let them freeze. What do you think? **Milford, MI**

A. That would be needless cruelty. Queens are sometimes blamed unjustly for testy colonies. Maybe the problem is that a skunk was visiting that hive every night. I came close to gassing a colony once, it was so unbelievably cross. Instead I moved it to another apiary, and that cured them at once. In any case I wouldn't think that letting a colony perish would be very good management.
— Richard Taylor

Q. I have some partially filled supers I left on the hives this winter. Will I be able to extract the honey next summer? **Larry Davis, Vilas, NC**

A. Probably not. It will almost certainly be granulated. To get the bees to clean the granulated honey out quickly, put those supers at the bottoms of the hives, under the brood chambers, as soon as the bees start flying in the spring. They'll use that granulated honey for buildup. Then put them back on top for the new honey crop.
— Richard Taylor

Q. I sent a sample of brood comb to the Beltsville bee laboratory last summer, and they said it was chalkbrood, but they did not tell me how to cure it. Can you? **Maurice Kennedy, Farmington, ME**

A. Chalkbrood is a fungus disease that attacks only brood. It was not reported in this country until 1968 but may have been here much longer. According to Roger Morse (*Honey Bee Pests, Predators, and Diseases*) **"the disease is usually transient and not considered serious." A strong and well managed colony, in my experience, cleans the dead brood out without assistance. Development of chalkbrood is encouraged by moist conditions in the hive and poor ventilation. Get a chalkbrood infected colony up on a proper hive stand, in the open air or sunshine, and warm weather combined with incoming nectar, good ventilation and colony buildup will solve the problem.**
— Richard Taylor

Q. When trapping bees from a house into a hive, can you put a new caged queen in the hive, then release her a few days later, thus preventing the new bees from killing her? **Dale Aldrich, Clare, MI**

A. Yes, but what is essential in thus trapping bees out of a house or bee tree and into a new hive is to have two or three combs of brood in the hive. Using a weak but otherwise normal colony, with brood, to trap the bees into, it is not really necessary to cage the queen at all. At least that has been my experience.
— Richard Taylor

Q. Can you use polyurethene instead of paint on new hives? If so, can it also be used for the inside of the hive, making it easier to scrape propolis? **Eugene H. Beach, Jr., Highland, MI**

A. I have not been able to locate anyone who has tried this, but I see no reason at all why it would not work just find. As for the inside of the hive, I suggest not treating this with anything. The bees like bare wood, there is almost never any need to scrape propolis from the inside walls, and in any case, propolis will serve the same function as polyurethene, only better.
— Richard Taylor

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The Monthly Honey Report

March 10, 1985

The following figures represent the current prices reported by beekeepers and packers over the country. They are based on reports from many states averaged out for each region. Where insufficient information is received no price is shown. The retail prices represent the price of each size jar.

Wholesale Extracted — **Reporting Regions**

Sales of extracted, unprocessed honey to Packers, F.O.B. Producer. Containers Exchanged	1	2	3	4	5	6	7	8	9
60 lbs. (per can) White	45.00	42.00	50.00	35.40	42.00	40.00	33.00	36.00	42.00
60 lbs. (per can) Amber	45.00	40.00	42.00	32.40	33.00	35.00	30.00	35.00	39.00
55 gal. drum (per lb.) White	.52	.54	.50	.50	.64	.60	.55	.56	58
55 gal. drum (per lb.) Amber		.50	.42	.45	.53	.52	.48	.55	.54
Case lots — Wholesale									
1 lb. jar (case of 24)	31.50	24.00	23.95	20.45	25.00	24.00	23.85	23.00	25.20
2 lb. jar (case of 12)	31.50	23.40	22.75	19.20	26.20	21.00	23.50	21.60	
5 lb. jar (case of 6)	32.00	28.50	23.75	24.00	28.50	24.00	25.00	23.75	24.60
Retail Honey Prices									
½ lb.	.90	.90	.75	.78	.90	.90	.87	.95	.90
12 oz. Squeeze Bottle	1.50	1.25	1.35	1.29	1.25	1.35	1.30	1.29	1.25
1 lb.	1.65	1.40	1.35	1.29	1.50	1.55	1.50	1.23	1.45
2 lb.	3.00	2.60	2.65	2.50	2.50	2.60	2.50	2.89	
2½ lb.					3.55	3.25	3.65	3.29	
3 lb.	4.00	3.75		3.49	4.60	3.85	4.00	3.59	3.40
4 lb.	5.00	5.00		4.69	4.98	4.90	4.72	4.79	
5 lb.	6.50	6.00	4.95	5.80	5.75	5.80	5.40	5.79	5.00
1 lb. Creamed		1.75	1.45	1.49		1.39	1.50	1.99	1.50
1 lb. Comb	2.25	2.25	2.25		2.00	1.85	2.00	1.70	2.25
Round Plastic Comb	1.75	1.75	1.85			2.00	1.75	1.69	1.50
Beeswax (Light)	1.35	1.25	1.10	1.40	1.25	1.35	1.10	1.15	1.40
Beeswax (Dark)	1.25	.1.15	1.00	1.25	1.12	1.25	.97	1.10	1.20
Pollination Fee (Ave. Per Colony)	24.50	20.00	27.50	15.00	20.00	21.00	25.00	19.00	25.00

REGION ONE

Vermont retail sales slow. Bees wintering well; clover there is protected well by snow. CT colonies in good shape but some will need feeding. Honey not selling at retail or wholesale. Bee equipment purachases may be off due to money shortage.

REGION TWO

Extremely cold in West Virginia after warm December. Prospects look good though -- plenty of soil moisture. Central Maryland bees did well this winter. Pollen coming in Feb. 23rd. Honey sales steady. NY bees came through with more honey than expected. Honey sales low. Moisture fair. More people interested in Northern raised bees this year.

REGION THREE

Too early to tell in Wisconsin on wintering status. honey sales low. Illinois reports past two months severe on bees, with early feeding necessary. Extreme caution in package bee and queen purchases. Wax market almost nonexistent in Indiana. Honey market slow, with glass prices going up. Bees need weather break and probably feeding.

REGION FOUR

Severe cold in late Jan./early Feb. in N.Dakota and in Minnesota. Sales still slow there. Missouri reports light wax in 10 pound quantities brought $5.00 per pound at local outlet.

REGION FIVE

Weather changed from severe cold to mid-seventies in parts of N. Carolina with pollen activity beginning but some feeding required. Other areas bees much weaker with brood rearing way below normal.

REGION SIX

Tennessee bees reported wintering well with early feeding. Sales slow at retail level. Kentucky warm-up came in last half of Feb. after six weeks of bitter cold. Bees did not winter well where honey was dark. Losses -- 10-40 percent. Feeding needed. Honey sales up a bit.

REGION SEVEN

Sales slow in Texas. Dry weather in parts has weakened colonies. In other areas, moisture good with peach treees and bluebonnets blooming. Pollen coming in --

Continued on page 179

Gleanings Mail Box

Soybean Pollination

Dear Editor:

I enjoyed reading the article in *Gleanings* on soybean pollination by Dr. Eric Erickson, but wonder whether you might get him to clarify a couple of points that were not clear in the article.

One odd coincidence in the soybean pollination story is the lack of acceptance by growers that they can increase their commercial yields of soybeans from 5 to 22 percent by using honey bees in the field. When the results of pollination research on cucumbers and blueberries were published, research workers were unable to find areas where growers were not using bees, hence they had a problem with obtaining control plots. Soybean growers are no less observant of changes in their yields, yet few are hiring bees for pollination. The price of soybeans is usually great enough than an increase of 20 percent in yield would pay for quite a few colonies of bees. Some studies of soybean yields have been calculated according to the number of seeds, or pods, produced, not the commercial weight produced. Is this perhaps part of the difficulty, if growers get more seeds but no increase in the weight of their crop? Do Dr. Erickson's figures relate to weight or to numbers of beans produced?

In my studies of soybean yields in Illinois on a number of commercial varieites, we were able to find increases in weight of about 3.5 percent in cages with bees, but no increases outside the cages or in relation to the distance from the colonies. None of our cooperators was ever able to detect improved yields with as many as 50 colonies, and they do not now bring bees to their fields. Some of the varieties involved were those for which Dr. Erickson reports a significant yield increase. It seems odd that we obtained such different results when the environmental conditions, including soil and temperatures, in central Illinois are ideal for soybean production.

In one place in the article, Dr. Erickson reports that yields of 'Hark' increased 5.2 and 16.3 percent. A few lines later, he notes that 'Hark' was one of the five cultivators on which he was unable to show yield differences. Which statement is correct?

If most soybean varieties, in most areas where they are grown, do not produce greater saleable yields when visited by bees, we should be very careful about our statements in relation to the effects of bees on soybean production. We can only damage our relations with growers who have been led to believe that bees will usually increase yield by 16, 20 or 22 percent. We may even damage our relations with growers of other crops that are insect pollinated.

Elbert R. Jaycox
The Bee Specialist
5775 Jornada Rd., N.
Las Cruces, NM 88001

Dr. Erickson's Response

Dear Editor:

In reply to Dr. Jaycox's letter, I must point out that it is common knowledge that comparatively few soybean growers rent bees for pollination. I do not view this fact as odd coincidence. Rather, this circumstance appears to result from the influence of several factors: 1) Traditional thought has held that bees neither gather nectar from nor pollinate soybeans and Agronomists have been slow to change their views. 2) Formal recommendations of university extension specialists for the use of bees to pollinate soybeans are not generally made. This reflects in part a reluctance to depart from tradition. Moreover, the pollination requirements of fruit and vegetable crops like cranberries and cucumbers are more widely recognized than those of certain agronomic crops like soybeans. Finally, further research is needed to define specific soybean agroecosystems wherein yield increases with bees can be expected. 3) Cultural practices such as weed control and field size affect bee foraging behavior. Other blooming plants compete for the attention of bees and given the foraging behavior of bees, little impact on yield can be expected at the interior of large fields where few bees forage. And 4) Many soybean growing areas are somewhat densely populated by honey bee colonies kept by beekeepers anticipating substanial honey yields. Wishing to avoid the loss of favorable permanent apiary sites these beekeepers decline to ask for pollination fees. Even so, farmers who permit the keeping of bees on their land frequently report that bees contribute to soybean yield.

I have pointed out that soybean yield increases with bees may well be unattainable in some locations or with some varieties. Our data seem to suggest that such increases in production will be most significant in marginal soybean production areas. If true, this along with varietal differences would explain Dr. Jaycox's results in Illinois as well as my own.

Our soybean yield data have been presented in terms of harvested weight and in numbers of beans and pods. In addition we determined that there was no difference in seed size (weight) among samples for our studies in Arkansas and Missouri. Hence, our yield differentials are real.

In my article I explained that yield increases of 5.2 and 16.3% for the variety "Hark" were obtained in one study while no such increase was obtained in a second similar study in another area of Wisconsin. Hence, both statements questioned by Dr. Jaycox are correct. In other summaries I have pointed out that the work of other scientists has substantiated my results.

It would be foolhardy to predict whether or not most varieites in most areas are likely to respond to honey bee pollination. Given our limited human and fiscal resources we can only establish new concepts. Others must be relied upon for data and acquisition relative to other locations/varieties. I have presented my

Continued on page 190

Computerize Your Bee Association

by STEPHEN McDANIEL 5314 Gwynn Oak Ave. Baltimore, MD 21207

Picture yourself talking on the telephone to a panicky homeowner with a swarm of honey bees in her backyard. She lives 30 miles away from you, so you look up her zip code in the swarm list published in your bee association's newsletter and quickly find several beekeepers in her area who take swarms. Chalk up one more problem solved rapidly and easily, thanks to your association's new computer.

Everybody seems to be talking about computers these days, even beekeepers (when you can get them to talk about something besides bees). These machines that faceless corporations blame for all of their mistakes really are pretty handy, though, and bee associations have lots of uses for them. Individual beekeepers use them for many jobs, too, but that's another story.

Most of our tools are special-purpose designs, only intended to do one or two jobs. Even a hive tool, which you can use for prying up frames, cutting queen cells, scraping off burr comb, and opening stuck windows, is a specialist compared to a computer.

A computer is incredibly dumb but incredibly fast and faithful. It doesn't "think" at all, but can follow instructions if you know how to give them — and that's **all** it can do. The instructions are called programs ("software" in computerese, as opposed to "hardware" — the machine itself and its attachments), and they are the instructions that make it go. A computer by itself is just an expensive box full of electronic doodads, but give it the right orders, and it will jump through figurative hoops for you.

Many people are afraid of computers. Many people are afraid of bees, too. Why? Because they aren't familiar with them and don't know how to handle them. That's perfectly understandable, but as any beekeeper can tell you, you're better off overcoming your fear through handling and study rather than missing out on the fun by letting your fear get the better of you. You didn't know computers were so much like bees, did you?

Our local bee group, the Central Maryland Beekeepers Association, uses a computer for a variety of purposes. It makes life a lot easier by doing several chores faster and more accurately than we used to do by hand. It's speed makes possible a number of benefits we never thought of before we started using it.

The first thing we did with the computer was to put the mailing list of our members on a database program. This is a filing arrangement in which the information we had (name, address, and phone number) was typed in and saved on a floppy disk using a program called Perfect Filer. The name is appropriate, since it really is ideal for this purpose, and it came with the Kaypro computer, so the price was right.

Once the typing was done (no more than we did every year to type up a new membership list anyway), getting the information back was a breeze. For every newsletter, we print out an up-to-date set of mailing labels. It is exceptionally easy to add members, correct addresses, and drop those who haven't paid their dues, so every list is accurate. Any typos, wrong zip codes, or other errors, once corrected, never need to be retyped.

Getting back to the mailing list, our database file allows us to do more than we ever could before. From the same information, we can print out mailing labels sorted alphabetically, by zip code, or by location — accurately.

Our membership list comes from the same information, slightly rearranged. We add phone numbers, change the format to get all the information for one member on two lines, and print three versions: one alphabetical, one by zip code, and one by county. The two geographical versions help in carpooling and locating nearby experienced beekeepers to help advise novices.

Why stop with names, addresses and phone numbers? We decided to gather more information on a questionnaire to provide easier ways to reach particular members when we needed to. The form asks a series of questions, mostly concerning services we provide, so that the member can tell us whether he is interested in receiving or providing them.

Every spring, we put together a swarm list of those who want to be notified when a swarm call is received from the respective areas. Previously, we'd put out a sign-up sheet at the meeting, and it would get lost. Our the treasurer would have it, but would be gone for the weekend, and so on. Now, those who want swarms say so on their questionnaires, without having to be present at a particular meeting, and the list, sorted by zip code, is copied and sent to everyone who might be called.

Other questions allowed us to compile a list of speakers, advisors for new beekeepers, those who have to sell by the case, cut-comb producers, candle makers, and willing workers for our honey booth at the State Fair. We even have a directory, which we publish in the newsletter in the summer, of those who have extracting equipment that they are willing to lend or rent.

We have not computerized our bookeeping yet, mainly because our treasurer does not have a computer, but dues information is incorporated into our data files. A list of those who have paid comes from the treasurer and is used to update the dues section of the data file. Those who do not pay after a set time are sent a notice — the mailing labels are printed automatically — and thereafter are dropped from the mailing list if we do not hear from them. We do not throw them out completely, though, unless they move away or stop keeping bees.

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We sometimes need to mobilize letter-writing campaigns to local legislators, and it is handy to have a list of people who are interested in bees, even if they are not still members.

Word processing is the second most valuable tool to the association. The computer is as much an improvement over the typewriter as the typewriter is over a lump of charcoal. Nothing ever needs to be typed twice, and sometimes you can even get out of typing it the first time. (Hallelujah!) For instance, this article is written with a word-processing program, and I have defined one key to type the word "computer" whenever I hit that key. (Just lazy, I guess.)

For a mediocre typist, the computer (there, I used that key again!) is a god-send. I would much rather be inspecting a hive than sitting at a typewriter, so the computer was made for me. Unlike a typewriter, where every letter is imprisoned on paper the moment I hit the wrong key, the computer is very forgiving by allowing me to correct my errors before they ever see the light of day. Rather than worrying about where I put the bottle of Liquid Paper (which has dried up because I left the top loose), the computer lets me concentrate on what I want to say. I can back up, change my mind, rearrange paragraphs, wipe out mistakes, and even correct my spelling, all before anything is committed to paper. I only print out the finished (ahem!) masterpiece!

Word processing is made to order for putting out a newsletter. Corrections are especially easy to make (all you do is delete the wrong letter or word and type it correctly), and sentences and paragraphs can easily be moved around until you get them where you want them. These functions are great if you use a mimeograph, which is annoying to change, particularly if you make many mistakes as I do. (I used to think I was infallible, but when I learned touch typing, I found that I make three mistakes a minute.) I spend a lot less time fumbling with corrections on the computer than I used to with the typewriter.

Our newsletter editor uses his own word-processing computer to put out his monthly opus, but I sometimes write articles for him. Currently, he has to retype what I send him, because his machine is an IBM, and my Kaypro uses a different disk format. That is, my disks won't work in his machine once they have been written on. This problem is common because of the lack of standardization in computers — every different type of machine has its own way of doing things. However, we expect soon to get a new program that will allow my machine to produce disks that his will read, saving a great deal of time and work for him.

Special programs can be used to perform all sorts of odd tasks. One that I have makes word puzzles — all I do is select beekeeping-type words to put in it — which we use in the newsletter to provide a little simple-minded fun.

Another specialty program prints out long banners with letters about six inches high in Gothic type. We use these to announce events like the "Maryland Honey Festival" or to put our association's name up in lights. A six-foot banner can have quite an impact at an exhibit.

Where do these programs come from? Like most things, you have to buy them or write them yourself, if you have the knowledge and time to do it. I have never written a program more complex than a simple exercise, but so many good ones are available commercially that there is no lack of instructions to tell a machine to do almost anything you want it to do. The real difficulties are selection and cost.

There are thousands of programs to choose from; picking the one that works the way you want can be a major undertaking. Books and magazines that review those available are invaluable time-savers. Such reviews always recommend that you select the program first, then get a machine that the program will run on. That's great advice, but hardly anyone actually does it that way. Programs change rapidly, with new versions often coming out every few months. People feel wedded to their machines, though, because they cost so much.

Choosing is made much easier if you first make a list of all the jobs you want to do with the computer. Then look for programs that seem to fill the bill and try them out at the computer store. Make sure that the machine you purchase is one that you feel physically comfortable with and that runs enough of the programs you like to give you a good selection. It takes a couple of days of working with a program to find out if it's really right for you. If the one you start with isn't perfect, it's nice to be able to change to another one without trading in your computer.

It is not hard to spend more on the programs than on the machine itself, and that is probably as it should be. After all, the program is the important thing; the machine just does as it is told. Still, it hurts to spend $700 on a single program. Most don't cost that much, and some are even free. Often, a package of software comes with the computer, as most of mine did.

How can your group obtain the use of a computer? There are three ways to go about it.

You can buy one for the association, if you have the money. Don't be misled by the ads for $200 boxes. After you take one home, you find you need a disk drive or preferably two ($400 each), a monitor or TV set ($200), a printer ($400), and software. You can probably buy a package for less money, and get something that works better. Figure on $1500-2000, at least. It's very easy to spend $5000 or more on a machine and software.

Then you have the problem of deciding which programs and which machines to buy and finding a member who knows how to use them or can learn. Selecting who gets to keep the machine should be fun, too. After all, the treasurer should have one, as should the newsletter editor, the secretary, the membership chairman, and the president. Ideally, each of these people should have his or her own, and they should be able to talk to each other, either by trading disks written using a translation program or over the telephone using an attachment called a modem (a $100-400 option). The road to modernization is not without problems, but the rewards are worth the effort it takes to solve them.

As a second possibility, maybe one of your members already has one. If so, you are in luck, because the

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association does not have to fork over a large outlay for equipment, and the owner presumably already knows how to use it. It's only right to pay him something for the use of the equipment and expertise, and perhaps to supply materials and any additional software your needs demand, but that should cost a lot less than getting your own setup.

The third approach is to hire the service from a commercial firm. Many of these companies exist and often provide good service. They tend to be more expensive than having a friend do it, and they may not be able to tailor their methods to your specific needs. For simple mailing lists, they should be all right. Shop around, as prices vary widely, particularly if you have special needs. Obtaining a swarm list could cost you as much as buying a computer.

If you want to help in establishing a setup or cannot find a service locally, contact me with a large, self-addressed, stamped envelope at the address given at the beginning of the article. Advice is free, and having done it once makes it easier. My wife Angie is our resident database expert, and she can even do the work for you, probably for a good bit less than a data-processing service would charge.

Don't ignore the advantages of using a computer to modernize and simplify your record-keeping. It can really make life a lot easier, but you do have to go into it with your eyes open. Investigate all the alternatives, especially if you plan to get your own equipment, but rest assured that if you do your homework, you won't get stung.□

HONEY REPORT

from page 175

good brood rearing. Pollination fees in Rio Grande Valley up to $50.00 per colony; many Valley operators expanding. Honey sales good in those sections. Canadian honey (water white) delivered to Texas at 47 cents per pound. Supply sales picking up and also package sales.

REGION EIGHT

Average rain in Arizona during Jan. Colonies in good condition. First part of Feb. gave needed break to Colorado. Some feeding help needed. Honey sales near normal with prices holding steady for past few months. Montana bees also have had cleansing flights. Water storage adequate but additional spring moisture needed. Shortage of honey in local health food stores.

REGION NINE

Extremely cold in Washington most of the winter. Losses of 10-20 percent expected. Honey sales stable and beginning to pick up. Almond bloom on in California -- six days later than average. Growers cutting back on hives and taking advantage of overlapping neighboring pollination. Average fee: $25-26.00 per hive. Mite quarantines have caused fewer available hives. Season is near normal for rain but an extra good rain is needed. Feeding will be greater as many hives are lighter than desired for good buildup.

Research Review

By DR. ROGER A. MORSE
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More On Crabapples for Pollinizers

I've written before about crabapples to supply the pollen needed to cross pollinate apples. However, the idea appears to be increasingly popular and more is being written about it in the magazines and journals than fruit growers read. The chief advantage for the grower is that one may plant single variety blocks and thus simplify orchard managment. When one plants two or more varieties in a mixed block, as is now required to have adequate pollen for pollination, there are problems. Ease of harvesting is the biggest advantage when crabapples are used. If mechanical picking of apples becomes practical having mixed varieties in an orchard would slow the process.

Testing of different varieties shows that three, Manchurian, Golden Hornet and Frettingham are the best early, midseason and late varieties to use. Varieties of crabapples with white flowers are preferred over those with red flowers as honeybees prefer to visit blossoms of similiar color, shape and design once they find a good source of pollen and/or nectar.

The closer the pollinizer is to the fruiting tree the bigger the crop. The crabapple flowers must be fully exposed to the sun as bees do not care to visit flowers in the shade. The few observations my students and I have made indicate that having tall, spindly crabapple stems with branches and flowers at the top only works very well. The crabapple trees should reach the same height as the fruiting trees.

Editor
Update your pollination. *Am. Fruit Grower* 105:46-7

Judging Queens

Studies undertaken cooperatively between the Davis campus of the University of California and the Canada Department of Agriculture in Beaverlodge, Alberta show that there is a direct relationship between the weight of queens and honey production. In these tests the queens were reared in northern California in the standard way and transported in packages to Beaverlodge. The larvae for the test queens were grafted on March 30th and the packages transported to Canada arriving on April 30th. These are normal dates for the movement of packages into the Alberta honey producing area. The colonies were killed at the end of the season as is normal practice in the area.

In addition to heading colonies that produced more honey it was found that heavier queens also produced more brood. Queen attractiveness to workers was also measured but there was no correlation between attractiveness and honey production.

The conclusion reached by the researchers was that the most practical method of selecting queens to head colonies for honey production would be to weigh them at a fixed time and to discard the lightest ones. It was suggested that discarding as many as 15 to 20% of the lightest queens would be appropriate. It is important to select the right time to weigh queens. It was stated that the best time would be when the queens were about 12 days old and still in their mating nucs.

Nelson, D.L. and N.E. Gary
Honey productivity of honeybee colonies in relation to body weight, attractiveness and fecundity of the queen. *Journal of Apicultural Research* 22:209-213. 1983.

More on Kiwifruit Pollination

Dr. and Mrs. Cameron Jay of the University of Manitoba were in New Zealand recently studying the pollination of kiwifruit. The plant is a bit different in that there are male and female plants and the flowers of both sexes produce no nectar. According to their report kiwifruit is grown extensively only in New Zealand, California, Japan and France.

The female flowers have stamens (male parts) but the tests that have been conducted indicate that while they produce pollen it is not viable and will not grow. A kiwifruit may contain 1000 to 1400 seeds and since each one must be fertilized with a pollen grain it is necessary that large quantities of pollen be transported to the sticky surface of the femal stigma. Apparently pollen is not produced in equal quantities all day and bees make most of their visits to kiwifruit in the morning.

Observations showed that colonies could be placed in small groups at the end of blocks and that the bees were as effective as pollinators as if the colonies were placed singly within each block. Pollen from the female flowers is white and that from the male flowers is creamy in color. This makes it possible to examine pollen loads and to determine if the bees have preferences for one over the other. Analysis of pollen pellets collected from pollen traps showed that three quarters of the bees carried mixed loads indicating there was little prejudice and they were doing a good job carrying pollen from the male to the femal plants.

There is still some question about how important the wind is in moving pollen from the male to the female flowers. In New Zealand windbreaks are widely used to protect the plants. This, of course, reduces the amount of wind that might aid in pollination. Other questions that remain to be resolved including the importance of interplanting male plants in female rows since honeybees tend to work along rows rather than to move back and forth. There are also questions about synchronizing male and femal varieties so as to have a maximum amount of pollen available.

Jay, D. and C. Jay
Observations of honeybees on Chinese gooseberries (kiwifruit) in New Zealand. *Bee World* 65:155-166. 1984.

What Are All These Queens About?

By KATHY & RODGER HULTGREN 155 Lovell Rd. Holden, Mass. 01520

Spring for many beekeepers is a time to requeen. In looking through the beekeeping journals and magazines, advertisements can be seen for Italian, Caucasian, Carniolan, Buckfast, Mraz, Midnite, Starline and Kona queens. What should one choose? It is the intent of this article to synthesize the literature and examine each queen variety. With this as a guide, beekeepers will be able to make a more educated decision in their queen selection.

Italian

By far the Italian bee enjoys the most popularity in America. The Italian has changed through the years just as all bees do with time. Today's Italian queen varies in her amount of yellow coloring, some possess entire abdomens, some alternate with yellow and black bands while others have their golden abdomens displaying a black tip. Brood development starts in early spring which affords them a large populous that is maintained until fall. They are excellent housekeepers which aids in their control of wax moth and provides them with some resistance to diseases. Aside from being industrious, they are gentle in nature, have a reduced tendency to swarm and are able to adapt to climates with extreme temperatures. On the negative side, they are inclined to drift and have a high honey consumption which requires ample stores for overwintering.

Caucasian

Caucasians are considered the gentlest bee in the world. The abdominal bands of their queens have a wide range in color from yellow and black to grey. Their qualities are their wintering ability, a reduced swarming tendency, adequate hive defense, minimum drifting and the production of beautiful white cappings. The Caucasian colony's strength is slow in building and reaches its peak in mild summer. These bees have a inclination to utilize burr comb frequently. In the fall, the Caucasians build a wall of comb at the hive entrance. This entry is just wide enough for a single bee to pass.

Carniolan

Carniolans are the second most popular bee in America. Their color is consistent, having black bands with greyish rings. The impression of a silver grey appearance is given due to their short dense hair. Gentleness, excellence in breeding, reduced robbing tendencies and adaptability with respect to cold winters are their chief attributes. Brood rearing has been found directly related to the availability of pollen which can pose a problem. Carniolans are often employed in comb honey production for they utilize little propolis, are diligent workers and produce clean white cappings. It should be noted that these bees have a propensity to build numerous queen cells and will swarm in as well as out of season.

Buckfast

Brother Adam of Buckfast Abbey, England has had a primary goal to create a bee which would produce a maximum crop with a minimum effort and time on the part of the beekeeper. The achieve this end, he focused on industriousness, resistance to disease/good housekeeping tendencies, disinclination to swarm and fecundity as paramount qualities to be fostered. He evaluated the Italian bee of 1915 and the old native English bee and selected from amongst them the specific bees which best emulated his desired characteristics. The pure strain of each variety became the breeding stock for his crossbred Buckfast queen. In 1968, Weaver Apiaries in Navasota, Texas became and still is the sole licensed producer of Buckfast Queens in North America. In comparing prices for queens, one notes that the Buckfasts are higher. This is due to the fact that a royalty is still paid to Brother Adam upon each sale.

Buckfast queens vary in their color often times favoring the dark Italian bee. They are noted for being prolific, having an early spring brood buildup and produce industrious workers. The building of swarm cells as well as the use of propolis is minimal. Their other qualities are their gentle temperment and the ability to adapt to various climates, especialy those with damp cold winters. Sugden and Furgala's Minnesota study of commercial honeybee stocks found the rate of survival for Buckfast queens after two years to be at an 87% level.

Mraz

Charles Mraz of Middlebury, Vermont began his quest for a bee having the same ultimate goal of Brother Adam which is to have a bee that produces the most honey with minimal beekeeper involvement. The Vermont Italian bee of 1928 provided him with his basal characteristics for his future Mraz queens. Using a trial and error process, other Italians, Caucasians and Carniolans from various locales were tested for desirable qualities. When substantiated evidence was found for improvement, these strains and races were blended with the original Italian stock of 1928. This accounts for the variability in the Mraz queen's coloring which ranges from all black to leather shades.

At this time, twenty various apiary sites containing approximately 1,000 colonies provide a pool from which a yearly selection is made. The queens which best exhibit Mr. Mraz's goal have their queen cells raised, mated and shipped to the Southern breeders. These queens then undergo a second screening which determines the queens that will be utilized for breeding. Said process is conducted on an annual basis.

Mraz queens have an early spring buildup and a survival rate of 73% after two years as noted in Sugden and Furgala's study. Their offspring are found to be diligent honey gatherers with a tendency to swarm. Appropriate management procedures need to be employed to curb this instinct. Sugden and Furgala's study detected an aggressive temperment during a nectar flow which was not at a significant level but reached in their comparative study during 1979 and

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1980. One must comment that this conclusion while valid at the time of the study needs to be reassessed due to the procedural steps employed by Mraz in selecting his breeders. The breeders, as you recall, are selected annually and the present day stock may or not possess this particular trait.

Hybrid

Hybrids were the outcome of the scientific endeavors of the Apiculture Research Branch of the U.S. Department of Agriculture. These particular bees are the result of four way crosses. In order to produce breeding stock, two selected strains are artificially inseminated to produce the needed drones (males) and queens (females). The resultant sexes have their final cross made through the natural mating process. These hybrids possess a characteristic called hybrid vigor which manifests itself in the offspring being healthier and having more stamina than their parents. Purchased queens for requeening rather than natural replacements are needed when working with hybrids. The reason for this approach is that daughter queens loose their hybrid vigor and an aggressive bee evolves.

Starline

The main intent for developing this Italian hybrid was to provide a bee which was gentle in nature, resistant to diseases and able to produce a superior honey crop. In appearance, Starlines resemble their Italian inbred lines having yellow coloring with dark stripes. They have an early strong spring buildup which when coupled with an intense honey flow allows them to perform to their maximum potential.

Other attributable characteristics are their industriousness, calmness on the comb and a disinclination to swarm. Sugden and Furgala established an 80% survival rate for Starline queens after two years and rated Starlin, Buckfast and Mraz as superior honey producers.

Midnite

Midnites were originated for the beginner and the hobbyist beekeeper. They are the result of a four way cross of inbred Caucasian lines. These bees are dark and have a gray black appearance. Midnites are very gentle, winter well, and have a slow spring buildup. They are suited to an area whose honey flow is long in duration but not intense. Their major drawback is the moderate/excessive use of propolis. In summer, it is common to observe a curtain of propolis on the lower entrance. The two year comparative study of Sugden and Furgala, observed a low productivity level in the Midnites. This might be indicative that Midnites are not suited for Minnesota and would perform favorably in the same study in a different locale. The survival rate of Midnite queens tied that of Buckfst at the 87% level in said study.

Kona

Gus and Barrie Rouse own and manage the Kona Queen Company in Hawaii which was founded in 1976 with the assistance of the Power Apiaries and the Weaver Apiaries. The main focal point in their queen rearing program is to provide queens which have diligent workers that produce maximum honey crops. The Kona Queen Company is located on the Big Island of Hawaii and has the volcanic mountains to protect their mating yards from adverse weather conditions. In this locale one can find even a mild honey flow in mild winter. Being surrounded by 2,000 miles of water, in a mite free environment with stringent import controls insures the protection of this isolated locale from tracheal mites, varroa mites and African bees. During the first five years of operation, the Kona Queen Company experienced some difficulty in their mating yards. Their queens were initially mating with the island's wild bees which were descendants of the German black bee. The crossbred queens which resulted were aggressive and of poor quality. Since this time, the drone program and mating yards have undergone new managment procedures which have corrected and now safeguard against such future incidents. Kona queens are from Italian stock with their queen mothers coming from Power's apiary and from the Kona queens in Hawaii. Selection is based on the best honey producers from both apiaries. Further consideration is given for disease resistance, size of the queen and her offspring, the tightness of the queen's brood pattern and the colony's temperment under varying weather conditions. Kona queens have a range in their band coloring from light to dark yellow. When stimulated they will expand their brood nest and will curtail their laying in the fall. This variety always stores honey in their brood nest which eliminates the need for feeding during periods of inclement weather. with the climate conditions of Hawaii these queens are available as early as mid-February and as late as mid-December.

Conclusion

This article has examined the positive and negative aspects of these queens but which one is rated the best, each beekeeper must decide. Each location varies in its weather conditions and honey flows; while each beekeeper varies in his management techniques and goals. In order to make an objective decision one needs to establish colonies headed by different queens and even queens from different breeders. The beekeeper then needs to conduct a comparison of these colonies over 2, 3 or 5 years on such factors as wintering ability, brood rearing characteristics, temperment, swarming tendencies, disease resistance, queen longevity, honey crops etc. If any of our readers have kept such records as described we'd be interested in hearing from you and will report these findings in a future article.

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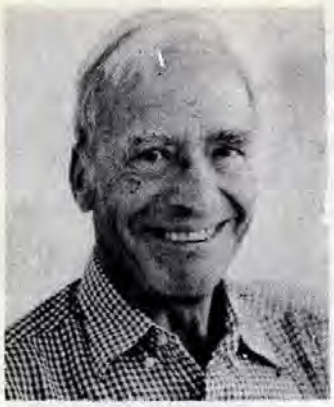

Siftings

by Charles Mraz
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In the February 1985 *Gleanings* are several articles that should be of interest to most hobby beekeepers as well as semi and professional, the matter of raising queens. Where this idea of requeening every year ever got started and why it is still being perpetuated by those, usually with little experience is hard to understand. Richard Taylor's comments on this are appropriate. For many years, since I started commercial beekeeping in 1925, I had one standing rule: NEVER KILL A GOOD QUEEN, NO MATTTER HOW OLD SHE IS! I learned that simple rule way back before that as a hobby beekeeper. Fortunately I learned my lesson with my first experience, I would kill a good queen, introduce another queen that I bought and one of two things usually happened as with Mr. Taylor. Either they did not accept the queen or if they did, the queen usually turned out to be no good. Generally speaking I let the bees do their own requeening as long as they have a good queen. The only time to kill a queen is when there is something wrong with her. Some beekeepers may be surprised to know that queens can live to be six years old. In the old days when I clipped and painted all my queens, I could tell their age at a glance, each year they were painted a different color. Many would be still good at three, four and five years of age. Six years is the oldest I remember seeing, and still doing a good job.

On page 98 of the February *Gleanings* is an excellent article by Ralph Moore, "Making Splits and Raising Queens Ralph Moore's Way." Ralph apparently does not have too many years experience because this method for raising queens has been used for perhaps 100 years. I have used this method for about 40 years with excellent results, with some differences. I do no use a double screen, but rather a "nuc board", simply a solid $^{3}/_{8}$" plywood board with a ½" rim on three sides. In addition to making nucs, a nuc board comes in handly many times to make an emergency bottom board or inner cover, so it has many uses. Avoid making special equipment that has limited uses.

The other difference is that I only use very strong colonies that wintered so strong that we must divide them to prevent swarming. We winter our bees in two hivebodies and one or two shallow supers of honey. We never feed sugar syrup, we always leave more than enough honey for winter and spring feed. We do not feed sugar syrup for two reasons; it is too expensive and the main reason being that bees wintering on honey are far stronger in the spring, and in much better condition to make divisions.

Ralph's method of dividing, just four frames of bees, brood and honey is not strong enough to make a nuc to raise a queen. You must remember that half the bees will return to the main hive, leaving the nuc sadly short of bees. To make a nuc, we use a full hive body, 10 combs of honey, bees and brood. Now you really have a nuc to raise a queen no matter how many bees return below. Usually about half of them will leave the nuc. It takes about a month after making the nuc for a new queen to be laying.

Ralph does have a great new idea; at least I have never seen or heard of it before, and that is to put a bee escape under the nuc upside down. That is, the bees can go up into the nuc from the main hive below, but cannot go back down except out through the entrances. Young bees no doubt would stay in the nuc. A great idea especially if the nucs are not strong. Thank's Ralph, I'll have to try that idea sometime, to see if it really works. In the bee buisness, no idea works, no matter how good it is until the bees try it. If it works with them, then it is a good idea. We all get such wonderful ideas, but when we try it on the bees, they too often show us up as stupid fools. It can be very embarassing.

I also use the two and three compartment nucs, but I use shallow combs rather than deep combs. Either one works well. It is well to remember in these nucs, especially if they are strong, you must have wide entrances, same width as the hive. A small entrance can cause problems, as I found out on a hot summer day years ago. The combs in the nucs melted down from a lack of air. What a discouraging mess. If the entrance is too large, just stuff grass into it, then either you or the bees can remove it when needed.

Page 92. Fryc of Ontario has a really elaborate method for insulating a hive of bees. Such a system may be fine for one hive, but I would hate to go through all that work and expense with a thousand hives. Personally, I believe it is all for nothing. When I started beekeeping some 65 years ago, a great deal of pains were taken with winter protection and insulation. We had double walled hives for years with shavings between the walls and on top of the hives. Then gradually, through the years we slowly started eliminating all this nonsense as it turned out. Now the only packing we use is a pad of glass wool between the inner and outer cover. It does help in spring to prevent the escape of some heat through the covers.

Eventually we learn that bees DO NOT HEAT UP THE INSIDE OF A HIVE. The inside of a hive, outside the cluster of bees, is just about the same temperature as the outdoors, perhaps a little warmer. Inside the cluster it is warm to be sure. What I could never understand was that the bees outside on the cluster, as long as they have their feet and body touching the cluster, even if the air around them

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may be zero, are not hurt. In fact they can move, slowly. But those same bees if you remove them from the cluster, even just ¼" away so their bodies do not touch the cluster, freeze up instantly and soon die.

Good wintering is much more than insulation. Most important is plenty of honey. Next is a hardy strain of bees adapted to long winters, five months without a flight. With us, strength of the hive is not critical. We winter over many hives of nucs, two or three pounds of bees, but with plenty of honey, they winter with almost no loss. Just a glass wood pad under the outer cover.

This brings us back to one of the most important reasons to raise your own queens in your own environment, from mothers that winter well, show resistance to disease and produce good crops of honey. It is only common sense to breed from the best queens in your area.

It is encouraging indeed to see how much interest many beekeepers have in bee venom therapy. Those that have used it report excellent results. It is one of the most fascinating aspects of beekeeping. All beekeepers should know something about it. It greatly increases the use and importance of beekeeping.☐

MAILBOX
from page 176

results precisely and in a concise and nonmisleading fashion. As with all research results they must be read carefully and understood completely before the concepts can be successfully implemented.

Eric H. Erickson
Research Leader
University of Wisconsin
Madison, WI 53706

E.T.O. Sterilization

Dear Editor:

When I read Kenneth Moore's reference to P.F. (Roy) Thurbers (February, 1985), I dug out a clipping from one of Mr. Thurber's recent letters in which he advised against attempting to clean up AFB: ". . . but I now will no longer and Washington State will no longer let one save the bees. Not because the system is no good but because a sloppy careless operator could spill contaminated nectar and honey from the AFB hive all over. Other bees would find the honey and instead of helping the AFB situation you might find AFB spread because of carelessness".

The State Bee Inspector could verify the state's policy.

Toge S.K. Johansson
R.D. 1, Box 256A
East Berne, NY 12059

A SPECIAL OFFER FROM *GLEANINGS*

By May 15th, 1985, school is winding down in most places. We'd like to offer a little something to encourage folks to get out into school rooms before then. Here's how it goes:

1. You must be a member of a national, state or local beekeeping association. If you're not, please join one or start one in your area. The cost of belonging to an association is trivial compared with what is to be gained by joining together to learn, grow and help each other.

2. After May 15th, but by June 1, 1985, send us a list including your name/the association you belong to/the schools you visited between now and then (elementary, junior, or high school), identified by name, location plus the number of groups you worked with and their grade levels. This is all on the honor system, folks -- nobody's going to confirm these sessions, but we know if you say it's so, it is! REMEMBER: COUNT BY CLASSROOM OR GROUP, NOT JUST BY ENTIRE SCHOOL. Send to:

GLEANINGS IN BEE CULTURE SCHOOLROOM PROGRAM
Box 706
Medina, Ohio 44258

To the beekeeper who has visited the most number of classrooms, we will donate one observation hive plus package of bees, suitable for installation at your favorite school. For the beekeeper with the second highest number of visits to schools, we'll forward 25 copies of our book *STARTING RIGHT WITH BEES* which can be given to school libraries or special young beekeepers. To the third most frequent school visitor, five wall charts depicting the life cycles of the honey bee. Additionally, all three top beekeeping teachers will receive a write up in *Gleanings*. We hope many of you, as individuals and associations, will join in to help the beekeeping educational process. We'll be talking about this in the future issues and look forward to seeing what comes of everyone's efforts.

Bee Talk

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

Like a lot of other beekeepers, I've been trying the past few months to learn more about acarine— or, as we're supposed to call it now, the tracheal mite. I think I've learned quite a lot. Opinions on this subject are diverse and conflicting, but one thing I have learned is to take with a grain of salt some of the large, alarming round-house generalizations that are being made here and there. By far my best source of information to date has been a British entomologist, Mr. Francis Ratnieks, currently studying apiculture at Cornell University. It was my good luck to hear him lecture on this subject, and to talk with him afterwards. He is learned, scientific, cautious and, to me, totally convincing.

The first thing we should get straight is that, in spite of long usage to the contrary, acarine is not a disease. It is the name of an animal— a very small one, measuring only about 1/200th of an inch, but nevertheless an animal in its own right, technically called *Acarapis woodi,* or the tracheal mite. It is no more correct to refer to this organism as a disease of bees than it would be to call wax moths or skunks diseases of bees. They all are, in varying degrees, pests of bees. The tracheal mite is parasitic on adult honey bees. It does not cause any disease in bees, though it may render them vulnerable. A disease is a degenerative process within an organism, which may or may not be caused by other organisms, such as bacteria.

The question confronting beekeepers, then, is **not:** What are we going to do about the disease (for it is not a disease). The question is, rather: How serious a pest is this mite?

In 1905 and 1906 the bees on a small island in the English Channel, called the Isle of Wight, started mysteriously dying out. From then until about 1919 the malady spread through the British Isles, wiping out about 90% of the colonies, according to Brother Adam, a world-famous beekeeper in Devon who was a witness to the time. Not knowing what was causing these losses, the British simply named it the "Isle of Wight" disease. Eventually a Scotsman by the name of Rennie discovered mites in the tracheal systems of bees in Britain, and forthwith concluded that this was the "causative organism" of the so-called Isle of Wight disease. It has in fact never been proven that it was, and Dr. Leslie Bailey, of the Rothamsted Experiment Station in England, seriously doubts that it was. Dr. Bailey is the author of *Honey Bee Pathology,* and probably knows more about *Acarapis woodi,* than anyone else in the world. Other beekeepers, however, including Brother Adam, have remained convinced that the Isle of Wight disease and the infestations of the tracheal mite were one and the same thing. There is probably no way of ever proving the matter, one way or the other, but my inclination is to side with Dr. Bailey. There is certainly considerable expert doubt whether the tracheal mite was responsible for the collapse of beekeeping in Britain during those years. In any case beekeeping returned to England, without the mite ever being eradicated, and in my two visits there, separated by nearly 20 years, talking with many beekeepers, I never, so far as I can recall, ever heard them mention acarine.

Mites, let us note next, are not insects. They are arachnids, of the same order as spiders. Unlike insects, they have eight legs instead of six, and have no distinct head or antennae. Mites are usually tiny, thus not often seen, though they are very numerous. Most are completely harmless, even though they may live on larger organisms such as insects, birds and mammals. Most people, perhaps virtually all, harbor microscopic mites at the roots of their eyelashes. Hardly anyone ever becomes aware of this, unless he takes a college course in microscopic biology, because these mites are so tiny and harmless. Most bee hives, too, contain various minute organisms, including mites, which are completely harmless to the bees. Some even attach themselves more or less permanently to the bees, riding about on them as harmless passengers.

So mites, and even bee mites, are not, as such, pests of bees, much less are they "diseases" of bees. The tracheal mite, however, is parasitic on the adult honey bee, and may, accordingly, be harmful to its host. The question remains, **how** harmful, and more important, how harmful are these mites, if harmful at all, to the colony as a whole?

Tracheal mites attack only young adult bees. They are harmless to the larvae and do not normally attach themselves to adults bees over five days old. Dr. Elbert Jaycox holds that the older bees are more "resistant" to the mites, but only less "attractive" to them, but it is hard for me to see how one would test the difference between those two statements. In any case the mites are not easily spread from one bee to another except under conditions of confinement, nor from one colony to another, and no stage of the mite survives in combs or equipment devoid of live bees. An infected bee must normally come into actual contact with another young adult bee for the mite to be transmitted from the one to the other. Healthy worker bees confined to a queen cage and placed in an infected colony do not normally pick up the mites, since the necessary contact is not made.

The loss of individual adult bees, even in fairly large numbers, from various natural causes, is not always of much significance, so long as the colony itself retains its basic strength and integrity. Skunks, for example, sometimes devour large numbers of bees at the entrances to the hives, and this puts a stress on the colony but does not threaten its life and is seldom of great economic significance to the beekeeper. Similarly, the destruction by tracheal mites of a strong colony of bees during favorable conditions of nectar flow is apparently unheard of. Colonies infected with the mite during the winter and early spring are

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usually indistinguishable from uninfected colonies once they have had a chance to rebuild their populations and begin nectar gathering. the claim, often made, that mite-infected bees appear as cripples around the hive entrance is apparently groundless. Such behavior, according to Dr. Bailey and Dr. Jaycox, is symptomatic of dysentery or viral infection, not mite infestation. The fact that mites are likely to be found on such disabled bees probably only indicates that diseased bees are more vulnerable to the mites, rather than the mites being the cause of their helplessness.

All authorities seem to agree that mite infestation increases when the bees are much confined to the hives, as during wet seasons. The beekeeper finds his colonies much weakened, and microscopic inspection turns up mites. He quite naturally infers that the mites have caused the weakened condition. It is equally possible, however, that it was the stressful conditions that weakened the colonies and thus made them vulnerable to mites, rather than the other way around. We have here, in other words, the question of which is the cause, which the effect.

A useful comparison can be made with the wax moth. Beekeepers used to think, and some still do, that wax moths sometimes undermine and destroy otherwise healthy colonies. They find a dead or dying colony, note that it is full of wax worms, and conclude that the latter is the cause of the former. They then fret about how to protect their other colonies from wax moths. But it is really just the other way around, at least in my latitude. I have never known a strong and healthy colony of Italian bees to be seriously attacked, much less undermined, by wax moths. What happens is that a colony becomes weakened from some cause, such as disease, and as it declines and becomes demoralized the wax moths move in and take over. The commonest sequence, in my experience, is queenlessness, followed by laying workers, followed by general debility, followed finally by wax moths. Then the beekeeper comes along, finds the dead colony and the wax worms, and thinks the wax worms killed his colony.

How closely tracheal mite infestations resemble that sequence I do not know, but I suspect a resemblance. Thus, a colony becomes weakened by adverse conditions of weather and the like, some of the bees perhaps develop nosema, they suffer long confinement— and the mites move in. The beekeeper then comes upon this suffering colony, discovers the mites, thinks they are the cause of the trouble and begins to fret about "acarine disease." It is, I think, significant that acarine is often blamed for winter loss. It is also significant that, where there is a warm, dry season and good nectar flows, the incidence of acarine appears to be minimal and of little economic significance.

There is no doubt that these mites have had a serious secondary impact on beekeeping in this country, in terms of the hysterical measures of quarantine and misguided attempts at eradication that have been undertaken. As Andy Nachbaur, in California, has with some bitterness pointed out, quarantines have become the problem, not the solution. The costs to beekeepers and orchardists have in some cases been huge. I would certainly be angry if I were one of the Texas beekeepers who had to stand by and see their colonies "depopulated" in futile attempts at eradication, only to learn that the mite was already in states as far away as New York. Florida has sensibly lifted its quarantine, but in California, I am told, the Department of Food and Agriculture has foolishly forbidden the importation even of combs and equipment from any area where the mite has been found. This makes about as much sense as prohibiting the importation of combs and equipment from areas where skunks have been found. The tracheal mite cannot live apart from its host, the live bee, and in no way affects combs and equipment, nor are its eggs or larval stages ever found except on bees.

It is a part of human nature to fear, and respond excessively, to what is not understood, and here we have, I think, a clear instance. For months we have been seeing "stop the press" and "flash" headlines about the latest mite discoveries, tending to fuel and fear and panic. What these alarms suggest to me, however, is that the tracheal mite has probably been here longer than we suspect, that it has not undermined beekeeping, and probably never will. I may be wrong about that, but I doubt it. I am in any case quite sure it is time to slow down, calm down, pay a bit more heed to responsible experts like Leslie Bailey and Frances Ratnieks, and make up our minds what we are doing before barging ahead hysterically and inflicting huge losses on conscientious beekeepers and fruit growers.

[Brief comments and questions are welcome. Please enclose stamped envelope.]

Testing Your Beekeeping Knowledge

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

Many factors affect the rate of colony development in the spring. In order to have rapid buildup, management practices must be aimed toward fully utilizing the reproductive capacity of the colony. Basic requirements include: 1) a young productive queen; 2) large food reserves of both honey and pollen; 3) ample room for food stores and brood rearing and 4) a large supporting worker population. Failure to develop strong productive colonies results in reduced honey production and poor pollination efficiency. How well do you understand basic bee biology and factors that affect colony development? Take a few minutes and answer the following questions to find out how well you understand this important topic.

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

1.____ Worker honey bees frequently destroy unfertilized eggs and drone larvae if rearing conditions are not optimal.

2.____ Honey bee queens gain weight as a colony prepares to swarm, since brood production is reduced.

3.____ Removing or destroying drone brood in colonies encourages its production.

4.____ As the colony population increases, a small proportion of bees are required for brood rearing.

5.____ Queens are capable of laying 2500 eggs per day.

Multiple Choice Questions (1 point each)

6.____ Strain of honey bees that are know for rapidly reducing brood production when the honey flow ceases:
A) Italian B) Caucasian C) Midnite
D)Buckfast E) Carniolan

7.____ During the summer worker honey bees live approximately:
A) 3 weeks B) 6 weeks C) 20 weeks
D) 26 weeks E) 12 weeks

8.____ In an emergency, the shortest possible time that a colony could successfully replace a queen would be:
A) 8 days B) 14 days C) 16 days
D) 10 days E)12 days

9.____ Please explain why a swarm cluster would return to the parent colony within 5 to 10 minutes after it emerged. (1 point).

10.____ Many factors are believed to influence the queen's egg laying rate; please name three. (3 points).

11.____ Please list two ways a honey bee colony uses propolis. (2 points).

12.____ Why should honey never be purchased to feed honey bee colonies found short of food? (1 point)

13.____ List 5 risks and problems that beekeepers face in moving bees for pollination. (5 points).

ANSWERS

1. **True** Cannibalism by worker honey bees is one mechanism by which colonies control the number of drones produced. Even though normal colonies consume both worker and drone brood throughout the season, significantly more drone brood is eaten. As a result, drone production is often used as an indicator of the nutritional condition of a colony.

2. **False** During swarming preparations, the honey bee queen is placed on a strict diet and loses approximately 1/3 of her weight. Since the workers feed the queen less royal jelly during this period, egg laying declines and the queen's abdomen shrinks, enabling her to fly with the primary swarm when it leaves the hive.

3. **True** Drone comb construction and brood production are related to the amount of drone comb and brood already present. Removing the drone brood from colonies encourages its production and adding drone brood to colonies diminishes its production.

4. **True** As the size of a colony increases, the efficiency of the colony improves. The ratio between sealed brood and colony populations decreases 10 to 14% for each increase of 10,000 bees.

5. **False** Estimates as to the number of eggs that a queen can lay in a day are highly variable; ranging between 1500 and 2000.

6. **E**

7. **B**

8. **D**

9. A swarm cluster returns to the colony soon after it emerges when it discovers that the queen is absent.

10. **A** Quantity and quality of food fed the queen.
B Number of nurse bees present in the colony.
C Availability of fresh pollen and nectar.
D Temperature of the hive or in the brood area.

11. **A** Fill up cracks and crevices of the hive.
B Reduce the size of the entrance hole.
C Smooth over the interior of the hive.
D Strengthen combs.
E To cover intruders and other objectionable objects such as a dead mouse.

12. Potential of picking up spores associated with bee diseases, especially American foulbrood.

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The Washington Scene

by GLENN GIBSON, President American Honey Producers Assn. Minco, OK 73059

The FY/86 budget and its effect on agriculture has been in the news lately. The recent filibuster led by Senator David Boren, D., Oklahoma, illustrates how difficult it is to communicate with busy cabinet officers who have an established policy. Agricultural leadership and Government agree that there is a crisis among farm folk, but seeking the right solutions brings dissension—not only in Congress but among the voters as well.

The FY/86 budget was made public at 1:30 p.m., Monday, February 4, 1985 (A delegation from AHPA was in Washington, February 4-8). Reference to honey the budget says—

"Honey price support would be eliminated."

For the first time in the history of farm programs the budget establishes a $200,000 limitation on the amount of oustanding noncourse loans that can be made to each producer during each crop year. Also, incentive payments or subsidies would be limited to $20,000 for the 1986 crop, $15,000 for the 1987 crop and $10,000 per farmer for the remaining crop years.

Accompanying me on the Washington trip in February were: Richard Adee and Jack Meyer, Jr., South Dakota; Bill Ainsworth and Horace Bell, Florida; Douglas Long, Nebraska; Dick Blake, Iowa and Bob Cook, Virginia.

How well will the honey loan program fare in the new farm bill? Your guess is as good as mine at this date, March 1, but I know one thing for sure if we don't work we will be left out and this will mean a number of bankruptcies. Also, I am convinced that Congress is our only avenue of hope.

Ponder These Points

Visualize the following facts for headlines—

* Colony numbers dwindle 30% in 35 years
* Cost of Honey Loan Program—0-$90 million in 4 yrs.
* Honey Imports increase dramatically since 1979
* Super market honey is mostly imports
* Honey exports sag below $10 million since 1967
* And so on—ad infinitum

Some or all of these headlines have been used these last few years and the prejudices of the writer were not difficult to determine. Most journalists used quotes from the Department of Agriculture and this seems to be the origin of our negative publicity. However, middlesized dailies have treated us fairly; but the idea persists that if we were politically powerful, none of the above headlines would ever be realized.

The Department of Agriculture's Position

The Department's decision to terminate the honey loan program was made in 1981. We feel that the decision was based solely on the economic value of honey and beeswax—completely ignoring the pollination value of the honey bee to the environment. Also, I have an uneasy feeling about the accuracy of the data used. Neither do we feel that any effort was made to determine the future of the industry without the honey loan program.

I have gleaned the above conclusions from news releases, conversations with Department officials, replies to letters from beekeepers and down to earth advice from friendly members of the Congress. The list of the odd statements—

* High subsidies causes over-production
* Price of honey will not have a bearing on the availability of bees for pollination—both free and paid
* To offset the effects of cheap imported honey, beekeepers can raise their pollination fees
* The solution to the import problem is to give the Secretary discretionary authority to set the loan rate
* Refusal to request a Section 22 investigation by the International Trade Commission

Repeatedly we have asked the Department officials to explain their position, but all we receive is a trite statement about the need for the Secretary to have discretionary authority.

During our February visits in the halls of the Congress, we found no one who stated they would support the agriculture budget, but everyone told us that we needed to get with it—the sooner the better. They warned us to be wary of a budget reconciliation move that might eliminate our program. (This situation where the member has to vote yea or nay on the package.)

We were advised to work for legislation that would require the Secretary of Agriculture to ask for a Section 22 investigation of honey imports. In the past, resolutions recommending the investigation have been approved by the Senate, but these were not mandates. The legislation we propose will mandate a Section 22 investigation. All of our contacts in the Congress know that imports are causing our problems with markets, but the Secretary has not conceded this. We are convinced that an investigation will reveal the true facts surrounding our problem and then our supporters in the Congress tell us that they can commence to work for us on a permanent program. They also told us to do everything possible to hold onto the program we have even though it has several undesirable features.

What We Have Done

We called a number of industry leaders from Washington updating the situation and urged them to spread the word among their neighbors. I am pleased to report that a good number have contacted their congressional delegation by phone or mail. Also, I have sent several hundred letters updating members of the Congress and we will continue to do more of the same as the weeks pass.

What Can You Do

Mr. & Mrs. Beekeeper, you can be a great help if you will join in our Washington campaign and write some letters to your congressional delegation. If we lose the honey loan program, I feel that 50% of the industry will go with it within three years. Your congressman may make a difference, so please give him a call—the Capitol switchboard No. for congressional offices is 202-224-43121. May we count on you?

Who's Who in Apiculture

To supply a handy reference of the names and addresses of state and provincial apiary inspectors, secretaries of beekeepers' associations, extension workers in beekeeping, and other information often needed by our readers, we have corrected our Who's Who in Apiculture as of March 1, 1984

State or Province	Bees on Combs Admitted	Apiary Registration Req.	Fee	Secretary State Association	Address
Ala.*	Not Allowed	Yes	Yes	Mrs. R.V. Harrell,	Hayneville 36040
Alaska	None	No		Cook Inlet Beekeepers Assoc.,	P.O. Box 8-173, Anchorage 99508
Alta.*	Not Allowed	Yes	No	Louise Zwaenepoel,	#24 7215-147 Ave., Edmonton T5C 2T1
Ariz.	Cer. & Per.	Yes	No	Clarence L. Benson,	Box 858, Oracle 85623
Ark.*	Cer. & Per.	Yes	No	Darrel Jester,	Rt. 1, Box 489, Osceola 72370
B.C.*	Not Allowed	Yes	No	A. King,	638-1701 Cedar Hill Cross Rd., Victoria V8P 2P9
Calif.*	Certificate	Yes	No	Frank Johnson,	2114 Westminster Dr., Riverside 92506
Colo.*	Cer. & Per.	Yes	Yes	Mrs. Tom Jones,	605 No. Columbus, Yuma 80559
Conn.*	Certificate	Yes	Yes	Kim F. Lottum,	2110 Purchase Brook Rd., Southbury, CT 06488
Del.*	Cer. & Per.	Yes	No	Connie Groll,	R.D. #1, Box 132D, Lewes, 19958
Fla.*	Cer. & Per.	No	No	Mary Kay Roberts,	601 S. Taylor Rd., Seffner, FL 33584
Ga.*	Cer. & Per.	Yes	No	Cecil T. Sheppard,	3204 West Mart Lane, Doraville, 30340
Hawaii*	Not Allowed	No	No	Lee Ong Chun,	2115 N. School St., Honolulu 96819
Idaho*	Certificate	Yes	Yes	Debbie Millet,	Rt. 1 Box 8 Bee, Marsing 83639
Ills.*	Cer. & Per.	Yes	No	Rita Taylor,	Rt. 2, Pleasant Plains 62677
Ind.*	Cer. & Per.	Yes	No	Claude F. Wade,	Room 613, State Office Bldg., Indianapolis 46204
Iowa*	Cer. & Per.	Yes	No	Glen L. Stanley, Agric. Dept.,	Wallace Bldg., Des Moines 50319
Kans.*	Cer. & Per.	Opt.	Yes	Duane Levin,	Box 5, Stuttgart 67670-0005
Ky.*	Cer. & Per.	Yes	Yes	Charles Barton,	791 Sherwood Dr., Lexington 40502
La.	Not Allowed	Yes	No	Ray Landry,	Rt. 1, Box 1448K, Breaux Bridge 70517
Man.*	Not Allowed	Yes	No	Don Dixon,	910 Norguay Bldg., Winnipeg R3C 0P8
Me.*	Certificate	Yes	Yes	Beth Pritchard.	RD #1, Readfield, ME 04355
Md.*	Permit	Yes	No	John Romanik,	3200 Pine Orchard Lane, Ellicot City 21043
Mass.*	Cer. & Per.	Pending		Allen B. Corderman,	Balls Hills Rd., Condord, Mass. 01742
Mich.*	Cer. & Per.	Yes	Yes	Brian Beery,	1769 Minnesota Ave., Marysville, Mich. 48040
Minn.*	Cer. & Per.	Yes	Yes	Fred Holte,	2185 W. County Rd., B, Roseville 55113
Miss.*	Cer. & Per.	No		Harry R. Fulton,	P.O. Box 5207, Mississippi State 39762
Mo.*	Cer. & Per.	No	No	Dr. Mike Rolins,	Rt. 2, Box 81A, Ozark, Mo. 65721
Mont.*	Cer. & Per.	Yes	Yes	Shelley Ronenberg,	200 Johnson, Wolf Point, Mont. 59201
Nebr.*	Cer. & Per.	Yes	No	Vicky Stutzman,	Rt. 2, Box 189, David City 68632
Nev.	Permit	Yes	Yes	Bill Goff,	14060 Edmands Dr., Reno 89511
N.B.*	Not Allowed	Yes	No	Vern Smith,	40 Beaconsfield St., Frederickton, NB E3B 5M2
N.H.*	Certificate	No		Franics W. Dodge,	P.O. Box 91, Goffstown 03045
N.J.*	Certificate	No		Mrs. Elizabeth Rodrigues,	157 5 Point Rd., Colts Neck 07722
N.M.*	Certificate	Yes	Yes	Mrs. Betty J. Cole,	600 N. Bosque Loop, Bosque Farms 87068
N.Y.*	Certificate	Yes	No	Judith A. Doan,	1263 Redman Rd., Hamlin, N.Y. 14464
N.C.*	Cer. & Per.	No		Dorothy Humble,	Rt. 3, Box 160, Liberty 27298
N.D.*	Cer. & Per.	Yes	Yes	John Miller,	Box 213, Gackle 58442
N.S.*	Not Allowed	Yes	No	Earl Blades,	P.O. Box 550, Truro B2N 5E5
Ohio*	Cer. & Per.	Yes	Yes	Glenn Rader,	Walnut St., 45877
Okla.*	Certificate	Yes	No	Pat Grayson,	8820 N. Memorial, Owasso 74055
Ont.*	Permit	Yes	No	Patricia Westlake,	RR#2, Hensall, Ont. NOM 1X0
Oreg.*	Certificate	Yes	Yes	Jack Kessler,	16122 Glisand St., Portlan, OR 97230
Pa.*	Cer. & Per.	No	No	Yvonne Crimbring,	R. D. 1, Canton 17724
P.E.I.*	Not Allowed	Yes	No	Steve Wonnocott,	Isecond St., Charlestown, P.E.I. CIA IEO
P. Rico	Not Allowed	No	No	Tito Nieves,	P.O. Box 471, Lares, Puerto Rico 00669
Que.*	Not Allowed	No	No	L. Dion,	C.P., 656 St. Hyacinthe, Que.
R.I.*	Certificate	Yes	No	Michael Boday,	Nate Whipple Hwy., RD #5, Cumberland 02864
				Judy Doan,	1263 Redman Rd, Hamlin, NY 14464
Sask.*	Not Allowed	Yes	No	John Gruszka,	Box 3003, Prince Albert S6V 6Z2
S.C.	Certificate	No		Bill Baker,	2663 Ford St., Sumter 29150
S.D.*	Certificate	Yes	Yes	Gary Schmidt,	Star Rt. 2, Box 249, Martin 57551
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NOTE: Where we did not hear from a state or organization we repeated last year's listing.

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INTERNATIONAL BEE RESEARCH ASSN. — Hill House, Chalfont St. Peter, Gerrards Cross, Buckinghamshire, England SL0 0NR. (Write for our cataloqs of publications on beekeeping and allied subjects.)

APIMONDIA — International Federation of Beekeepers' Associations — Italy, Rome, Corso Vittorio Emanuele 101. President, Prof. Eng. V. Harnaj (Romania); General Secretary, Dr. S. Cannamela (Italy). Periodicals: Apicata (quarterly); Agrindex (monthly). (Write for our catalogue of publications on beekeeping and allied subjects.)

Confessions of a Hobby Beekeeper
Chapter 3 — A Day With Celtus Doogs

by BOLIVAR EDWIN SHAGNASTI

If my encounter with Nanny Doogs had been revealing, my introduction to Celtus Doogs proved to be a totally exhausting experience. It was, after all, past midnight when a new rumble penetrated the night air and entered the driveway. An enormous squeek sounded as a car door opened and closed. But I was not prepared for the next sight.

Celtus Doog's frame filled the entire doorway. Closer to 7 feet than 6, Celtus possessed an enormous head of black curly hair, balanced by an equally large black beard. A red hankerchief was tied on top of his head like a hat, but it served as a sweat band. As he entered the house I could see that his huge body, clothed in jeans and a flannel shirt, was permanently bent from a life-time of stooping forward, either to reach items below him, or to miss low doorways.

Celtus was a relatively young man, many years younger than his wife Nanny appeared to be. While I was not prepared for this difference in ages, I did not disapprove. And since I had not determined Nanny's age, and was absolutely terrified at the thought of asking, I remained quiet.

A darting Nanny served up a plate of food and three beers from the 'fridge'. Passing one each to Celtus and I, she pulled her's open and said "Guess I better explain how I come to get me such a young husband."

"This here's not my first hubby, no SireeBob! I nabbed this 'en right after my late hubby Elwood was killed in that awful accident. Celtus had been a-helping Elwood and me with the bees at the time, and since he was one of my first converts to beekeeping he was nearly always around. So when my dear Elwood was killed, I just decided that the best thing for the bees was to ask this fine man to be my hubby, and my business partner with the bees. So we pooled our hives to make the biggest bee business in these here parts, and set up housekeeping at the same time. Anyways, Celtus gives me the best doggone backrubs I've ever heard tell about, I guess them mighty big, strong hands." Nanny stopped, and stared out into the cool night air. The story had obviously brought back more memories than she cared to talk about — for now at least.

"And as you can see I'm clearly no spring chicken, but I'm not ready for the soup yet, so I try to keep up with the dear boy, and sometimes make him look a little slow myself. Anyways, Mr. Shaggy, this here's my hubby Celtus Doogs."

At this point Celtus pulled out his enormous right hand and took mine from my side and shook it. And nearly crushed it in his enthusiasm. I said "I am most impressed to meet you, Mr. Doogs." After all I was impressed. He was a rather impressive sight.

Then Celtus spoke. "Nan, you have just gotta stop all this running around being a pro-motor of beekeeping. You need to start working on making up more nucs or we'll not get through all the bees and we will see them all hanging in the trees."

Looking at me he said, "Oh sorry, Mr. Shaggy, but we just have too much work to do with the bees for my wife to run after every swarm that lands in the country. But don't take no personal offense, cause I would say that to anybody during the nuking season."

"The nuking season?" I asked. "What is that?"

"Well, Mr. Shaggy, that swarm you caught this morning is what we beekeepers don't want, not if we are trying to make any money at all this year. We gotta stay on top of the colony buildup and pull out some of the extra bees and food that every good colony will make at this time of year. Otherwise we will be chasing swarms all over tarnation, and we won't get a honey crop either."

I tried again, and asked "What is a nuc?"

"Oh, I guest the best way to describe is to call it a baby bee hive." Celtus said. "Nucs are made up of part of a strong colony, or parts of two or three strong colonies, that would be making swarm cells if we don't get hopping. We take out frames of developing bees, the brood, and bees, and put it into a new box, and add frames of honey and pollen, and give them bees a new queen that we bought from the South. Then we put it on the truck and drive about 2 miles away — or further, and set the bees down in a new yard where we bring nucs from other yards, and we make up increase this way."

"Increase?" I said.

"Well, you see Mr. Shaggy, we always lose hives. We have some winter loss, but not as much as we use to have. So we need to put bees into the empty equipment and get a new colony going. And for the past few years we have been having more and more problems with pesticides, and we need to keep our colony numbers high to allow for whole bee yards that get sprayed and die, or are too blasted weak to survive with the winter months. In this case we got a real problem, 'case some of the combs seem to be poisoned for a long time, and we got to let them set around for a couple years to let the poisons break down so the bees can use them again. Anyways, this year we are trying to increase our colony holdin's by about 20%, and if Nanny don't get off that chair, we are not ever going to be able to do it." Celtus drank the rest of the beer and flattened the can with ease. He started to get up for the 'fridge', and Nanny bellowed:

"Whoo Boy! You remember you drove that bomb over here, and you gotta drive it back. One's the limit tonight."

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"You're right, as always," Celtus said dryly. "That old junker has got to last us through the season or we will be pulling bee hives around on roller skates this summer." I sure wouldn't want to bang it up any more than it already is."

Thinking about the nucs, I asked "You still didn't tell me why you call them nucs."

"Well, them books call them a nucleus, which I guess is the center of something. We call them nucs, but others call them nooks, splits, increase, divides, divisions and a whole bunch of other names. But they are really all about the same except for strength. And there's about a million ways of making them up, if you listen to different beekeepers or read different books, but it all boils down to the same thing — pulling out some bees, brood and food, and putting it in a new place with a new queen." Celtus explained.

He continued. "Well Nanny, we have got a lot of work to do tomorrow, and we gotta get going now or we won't be there when it's time to start. And if I can't have another brew, there's no point of getting too comfortable here. No offense meant." He said, looking at me.

So Celtus and Nanny Doogs started to leave, when Celtus stopped and turned to say to me, "Say, Shaggy, if you don't have anything tomorrow, why don't we swing by here in the morning to pick you up, and you can help us in the bee yard. It would be great way to let you find out if you want to be a beekeeper or not!"

"And you might learn something too, if you're not too careful" Nanny added.

I hesitated. "Won't I slow you down?"

Nanny laughed. Slow us down? Heavens, we aren't about to let some sweet little old fellow like you slow us down! So it's all set— we will be by in the morning to pick you up."

"What time?" I asked, not sure I wanted the answer.

"Well, Nanny said, I guess we better not make it too early, so we will stop by about 6:15 to pick you up." and with that, the screen door slammed shut, a door squeeked and the rumble of two motors started and faded into the distance.

"Six-fifteen? I asked myself?" I looked at my watch. It was 2:30 in the morning. Now I knew that I was about to become a dead man.

I somehow awoke when my alarm sounded at 6 a.m.. I jumped out of bed, pulled on jeans and a flannel shirt to mimic Celtus's wear, and started to down enormous gulps of coffee. At 6:20 a.m. the roar of Nanny's truck pierced my ears. I wondered what the neighbors would say about the noise, in a neighborhood where early morning lawn mowing always raised tempers. I jumped into the truck with the Doogs and brought along my "bee gear".

"Morning Shaggy!" Nanny said. "Look, you better understand one thing about Celtus. He is like a bear in the morning until about 10:00 a.m. And I made him git up at 5 a.m. to nail together some boxes for today's work. That's one time of day when I can outwork him with ease. We got the job done, and the boxes are put on the back of the truck."

"Celtus sat in the middle of the seat, hunkered down like a small child in a pout, only this was no small child!

Nanny backed down the driveway and sped down the road. "We want to hit four bee yards today — two in the morning and two in the afternoon. I hop you brought along a lunch!"

"Lunch! I had no idea," I said. I figured you would be out a few hours, afterall, I do have a garden to look after."

"Garden indeed!" Nanny said. You can do that before you go to work tomorrow." Don't worry about lunch — we always carry extra bread, peanut butter and honey. Never lost a helper yet!"

We were now traveling down a farmer's lane and into a bee yard. I saw a number of hives, and counted 20, each of which seemed to have two boxes on it.

"Lordy!" Nanny said, "Look at them bees flying in and out, and so early in the morning. There must be something good for them this morning. But it is warm, and that gets them out early."

With that Nanny turned off the truck and jumped out. She handed me the bee smoker and veil from the day before, and pointed to a box of pine needles, matches and long gloves.

"Get busy Shaggy".

I fumbled with the smoker veil. After two false starts, I finally got the smoker working the way I thought it should. I put on the veil, and then fumbled with the gloves. By way of example, I stuffed my jean legs into my socks, just like Celtus.

"Better wear white socks next time" Nanny warned. "How is the smoker?" Nanny took the smoker and puffed smoke into the entrance of five hives, positioned on a semicircle with each hive facing outwards. After finishing the five colonies Nanny lifted the cover off the hive using a hive tool. She puffed smoke onto the tops of the frames, driving several hundred bees back into the hive. Using a second hive tool, Celtus automatically broke the two deep hive boxes apart and Nanny immediately smoked the bees. Celtus held the top hive body on edge while Nanny smoked the bottom of the frames and quickly checked for something.

"No cells in sight" she said.

Celtus then placed the cover upside-down on the top of the next hive, and lifted the top box on the cover. He quickly used his hive tool to remove an outer frame, which he quickly examined and set on edge next to the hive he was standing beside. He quickly worked through the hive and removed each frame, turning it over top to bottom, and looked at Nanny.

Being shorter, Nanny worked the remaining hive body in similar fashion. She responded to Celtus's look with a report. "I've got 7 brood, 4 sealed, and the old lady."

Celtus responded "Six brood here, 3 mostly sealed." Nanny instructed "You take 1 sealed and I'll take 2, pull a honey, and I've got a good pollen."

While I had fumbled with the

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smoker, Celtus and Nanny had set out the empty hive boxes around the bee yard. Each was a single box, with a bottom board fastened to the box with large copper staples. With his enormous foot, Celtus raised the cover of the empty box and removed 5 frames from the box. He set these on the ground next to the empty hive.

The frames were a mixture of light new wood and dark stained wood. There were 9 frames in the box. In the dark stained frames I saw drawn honey comb, while the white wood had only sheets of fragrant smelling wax.

Celtus took the frame of the honey and placed in on the edge of the partially empty box, and followed with the frame which Nanny identified as the pollen frame. Then the 3 frames of brood, covered with bees, were added to the box. Then the frames from the empty box were distributed into the original hive, spacing them so the empty frames were on the outside of the box, not in the middle. When only one frame remained to go into the hive, Nanny took something off the frame, and placed in onto the top of the frames. After a few seconds, she took the bees onto the top of the frame, and then inserted the frame into the hive. I asked her what she had just done.

"Oh I just picked the queen bee off the frame and set here down real gentle like so as not to hurt her. Then I shook the bees back into the hive without rolling or pinching them. Then I put the frame in so everything is back where it should be," Nanny explained.

As she talked, Celtus placed the top back into position. It too had 9 frames, since he had replaced the 'nuc' frames with empty frames and foundation. Then the cover was put into place and the next hive was smoked.

In this fashion, Celtus and Nanny worked through five colonies in under 25 minutes. But in the process they made up two full nucs, each with six or seven frames of brood.

"The way we are doing this today is to make up a nuc that will be ready for a honey flow in a big hurry. Earlier in the season we make up these units much smaller, and feed them alot, and work with them to get good and strong. Now, with these bees, we must pull out real big nucs because the nectar flow is so close," Nanny said.

The two nucs were left open, without a lid, while Nanny and Celtus worked. When filled, Celtus walked to the truck and pulled out a box. From the box he removed two small cages, and pulled out a small plug from the end of each cage.

"Queen bees from the south" Celtus said. His longest speech of the morning. He put one queen cage between the tops of the center frames of each colony, and pulled on the cover.

"Load 'em up, Shaggy", Nanny said.

I did as told, and carefully lifted the boxes onto the truck bed to the next group of hives.

Except for the information about what they found in each colony, Celtus and Nanny worked without talking. Occasionally Nanny would see something and yell for me to get my "bones" over to see something. In that way I was introduced to all forms of bee life, queens, drones, workers, sealed honey, fresh nectar, and all forms of developing brood.

My duties rapidly increased. I was in charge of the smoke, and worked ahead of the team with the smoker. I also ran to the truck to get things. Celtus showed me where the queens were, and gave me strict instructions about keeping them out of the sun and in a cool place. He even let me pull out the cork with my pocket knife, and position the cage between the frames. I then was to put each nuc onto the truck and bring out additional equipment.

Not every colony donated as much brood as the first colony, and one donated considerably more brood and bees. It was also loaded with queen cells — peanut shaped cells at the bottoms of the frames.

"Some beekeepers cut these out, but we just weaken the colony to the point where it will stop the swarming instinct. It does not always work, but often enough. We leave the queen cells on all the frames — the ones we move the nuc and in the parent hive. We still add a new queen to the nuc — it seems like a waste but that works best for us" Celtus said.

On a few hives, Celtus and Nanny failed to find the queen during their inspection.

"We know we have a queen, because we have eggs and larvae" Nanny said. "But we want to remove brood and not waste time in the process. So we juggle a bit to get around this dilemma.

"First, we shake most of the bees off the frames we are taking from the colony where we can't find the queen and remove sealed brood. Then we wait until we find a colony where we can find the queen. We then shake bees off the frames — setting the queen aside, of course — and don't remove any brood. The field bees will keep the brood warm, and we end up with out objectives met — weakening the colonies of bees." Nanny said.

"It's all about the same, if you take bees and brood from the same or different colony. You can never do this if you have a disease problem," Celtus explained.

"We have these colonies on a comprehensive drug feeding program which we have finishing for the spring. We don't want any drugs in the honey the bees produce. We haven't seen any foulbrood in several years, and we hope to keep it that way," Nanny said.

We finished one yard and moved to a second. I shed my gloves and was feeling very comfortable around the bees. At noon we broke for sandwiches of honey and peanut butter and ice tea. We talked in a relaxed fashion.

In the afternoon we completed the work, and delivered 22 colonies to a new location, already for the colonies with mowed areas, hive stands, and other supplies.

It was 5:30, and although I was completely exhausted, I felt wonderful. But then a nervous feeling swept over me.

"Celtus and Nanny, you have been great teachers today, but now you need to answer one more question," I asked. "What in the dickens am I going to tell my wife and kids what I have been doing this weekend when they return from visiting Grandma?"

Nanny smiled and said, "break it to them gently, but you have got the Bee Bug bad, and there is no known cure!"

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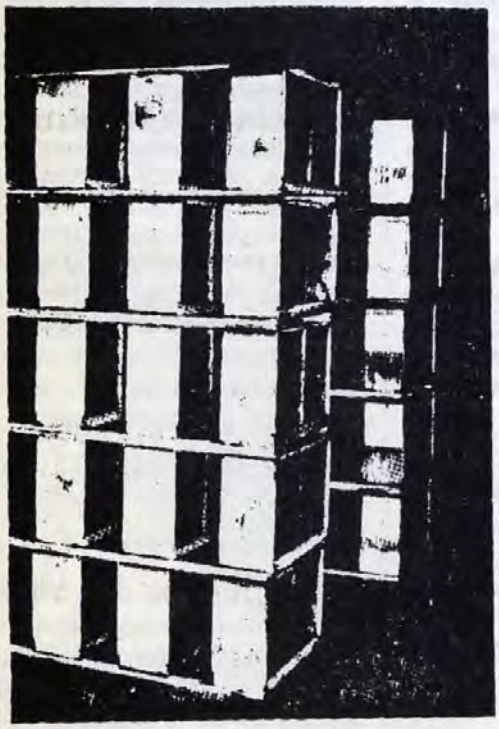

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Reasons for Replacing Queens That Are In Your Colonies

By STEVE TABER OF TABER APIARIES
3639 Oak Canyon Ln. Vacaville, CA 95688

A Rebuttal to Dr. Richard Taylor's Article in February 1985 Gleanings

If you have just one or two colonies of bees, then I agree with Dr. Taylor — keep out of the broodnest entirely because you may accidentally lose the queen. But if you have three or more hives, you can obtain a great deal more satisfaction from them if you re-queen every now and then.

As a South Carolina boy growing up, I will have to tell you about the first beekeeper I ever worked with. This man had about 30 colonies and the only time he looked at them was the first of June when the honey flow was over, to extract all the honey he could. He would get two to three supers of honey from each of about 12 colonies and maybe a half a super from the rest of the live colonies. He also would have three or four colonies dead, the combs eaten up with wax worms. The biggest strong colonies were divided and the bees and combs placed into the dead ones and wax moth frames were replaced with foundation and all stacked up on the bees until next year. I watched this procedure for five years assisting in the honey extraction. It was fascinating in that the new colonies and some of those that were poorest the previous year would be the colonies that would now produce the most honey.

Now then, from lots of experience since I started beekeeping in the late 1930's, here are a number of facts. Queens can turn into drone layers at any time and when they do and you don't replace them (murder), you colony will die (also murder). Then there is the case where the bees in a colony are no fun at all to work with because you receive too many stings and you are distributing stinging bees all over the neighborhood. I have worked with some who killed (murdered) the entire colony then and there.

Older queens do not lay as many eggs as younger queens and the colonies headed by older queens are more prone to swarm. More eggs laid at the proper time prior to the honey flow translates into more bees in the hive with a greater production of honey. Most of the queens in my colonies that are removed are not performing (i.e., laying enough eggs) as they should be so that broodnest areas are declining as well as populations.

There is another reason for requeening and that is because you should want to try something different. Some queen breeders do produce and sell queens whose stock is different from the stock you have in your hives.

But there is a great big problem that bothers many (most) beekeepers and that is a high failure rate on queen introduction (and my queens cost $10.00 each, not the six bucks sited in Dr. Taylor's article). If you are losing more than 10% of new queens, you are losing too many. In fact I don't think you should ever, EVER lose a queen on introduction but it cannot be done using an automatic queen introduction method. The queen cannot be released to the bees until the bees are ready to accept her.

Safe Queen Introduction Procedures

Remove the queen in the hive and insert the new queen in her cage leaving it plugged at both ends. Come back in three to five days and examine the caged queen to see if bees are tightly clustered around the screen wire. If they are, go through the hive and remove all queen cells. Examine combs for eggs which would show the presence of a second queen in the hive. Come back in three to five days and examine again to see if the bees are "balling" the caged queen. While holding the cage, try to push the bees aside with a finger or hive tool. If they are clinging to the cage with their "teeth" and legs and curling their abdomens down trying to sting the cage, they are balling the queen and she cannot be released. Go through the hive a second time, shake all bees off the combs and remove all queen cells. Continue this procedure until all the bees on the screen can be dislodged easily with a slight push. Now remove the cork and let the queen out.

I have lost queens when at the first examination the bees show acceptance of the queen and I've released her but when I have not examined the combs for queen cells. The queen is accepted, but many times she won't be able to get around the hive to find and destroy all queen cells so a virgin queen emerges and destroys my introduced queen.

Some do's and don'ts: Place the caged queen between combs of brood in such a position that the hive bees come in contact with the screen. Mark a date somewhere on the hive when the queen was removed. Remember a bit of bee biology that the last egg laid by the deposed queen won't hatch for nearly four days and that the bees will be able to raise a queen for almost eight days after the queen is removed. Remember also that after you remove the queen, unless you intervene, the first virgin will emerge 11 days later. And lastly, after releasing the queen, come back in three to five days and check on her. See if she is laying eggs as she should be.

I have written two articles for the *American Bee Journal* on queen introduction. Readers of *Gleanings In Bee Culture* who want copies will receive them on receipt by me of a long stamped, self-addressed envelope.

Of course there is one last reason why you should frequently change queens and buy new ones. I breed, raise and sell them and I need lots of business!

Detecting Lesser Wax Moths Acoustically

by HAYWARD G. SPANGLER U.S. Dept. of Agriculture Agricultural Research
Carl Hayden Bee Research Center 2000 E. Allen Road Tucson, Arizona 85719

Abstract

Males of the lesser wax moth (*Achroia grisella* F.) produce an inaudible ultrasonic call which can be made audible with relatively simple electronic instrumentation. Several types of instruments will detect wax moths. Plans for building one type are given. By detecting infestations of lesser wax moths early, one can reduce damage to bee comb by controlling the moths before extensive damage occurs.

Lesser wax moth (*Achroia grisella* F.) larvae are very destructive pests of honey bee comb, particularly in areas where the greater wax moth, *Galleria mellonella* L. is limited or does not occur. In the United States lesser wax moths are troublesome at higher elevations in the mountainous west and in the Pacific Northwest, although occasional outbreaks can occur throughout the U.S.

Male lesser wax moths attract females for mating by emitting sound at a frequency far above human hearing (at about 100 kHz). This acoustic calling is a continuous series of short pulses which occurs as males fan their wings. Males produce the sound by snapping in and out a small flexible area (tymbal) on structures at the base of the forewings (tegulae) (Spangler 1984a, 1984b; Spangler et al., 1984).

Outdoors, male lesser wax moths call from dusk to dawn (Greenfield and Coffelt, 1983); but they are likely to call throughout the day and night within warehouses in dimmer light. If a lesser wax moth infestation has progressed to the point of adult emergence, then the male calling sound, although inaudible to humans, will normally be present. At the Carl Hayden Research Laboratory in Tucson, Arizona, I have developed and tested an electronic device designed specifically to detect the sound of calling lesser wax moth males. With such an easy-to-use device, beekeepers can limit damage by detecting infestations early, when they can implement effective control measures.

While a device that will detect lesser wax moths could benefit beekeeping in regions where the lesser wax moth is dominant, it would probably not be helpful in other regions where the greater wax moth is dominant. Greater wax moth males do have tymbals that produce pulses of about 75 kHz sound (Spangler, 1984c; Spangler, 1985), but they produce this sound so sporadically and for so short a time period (less than ¼ second) that it is much more difficult to detect them acoustically.

Therefore, the primary purpose of this article is to furnish detailed information that allows either the beekeeper or someone he commissions to build a lesser wax moth detector. Schematics and instructions are provided, and advice on obtaining proper components is included. In addition, the background information given for certain types of commercially-available ultrasound detectors explains why these instruments, designed for broader scientific purposes, have only limited application in detecting lesser wax moths.

How Ultrasound Can Be Detected

Most animal-produced ultrasound is amplitude-modulated (AM), meaning that the intensity of the sound varies over time. Wax moths produce sound pulses or turn the sound on and off about 70-100 times per second, so that the 100 kHz signals correspond to radio transmissions with suppressed carriers. In studying katydids (Pierce 1949) and bats (Griffin 1958), the scientists used detectors similar to AM radio circuits. Instead of an antenna, a microphone detected the sound, converted it to an electrical signal and amplified it. The amplified signal was connected to the front end of a superheterodyne receiver. Instead of tuning from 540-1600 kHz like a standard radio, the receiver tuned through the ultrasonic range. Such instruments are available from a scientific supply house and can be used to detect lesser wax moths effectively. However, they are somewhat difficult to use with maximum sensitivity because individual moths vary in frequency. To maintain maximum sensitivity to the moths while searching, one must continually rotate the tuning dial through the frequency range of the moths.[1].

Design of a Prototype Lesser Wax Moth Detector

Since no detector is commercially available that will easily detect the lesser wax moths, I designed and built a prototype specifically sensitive to the frequency range of the lesser wax moths. This model detects lesser wax moth sound with a broadly tuned amplifier followed by a rectifier-averager, an audio amplifier and a speaker and has the option of using an earphone (Figure 1). A lesser wax moth sound signal from a microphone connected to this circuit will produce a characteristic buzz which can be easily recognized as wax moth sound. No calling wax moths will be missed because they are out of tune. The range of such a detector depends largely on the efficiency of the microphone. This type of detector can easily be used to interpret wax moth signals accurately by someone with little or no experience in the use of electronic instruments.

To completely describe a design that will work well if fitted with a good transducer, I am including a circuit schematic diagram and a photograph of the prototype built within a small electronically-shielded metal cabinet.

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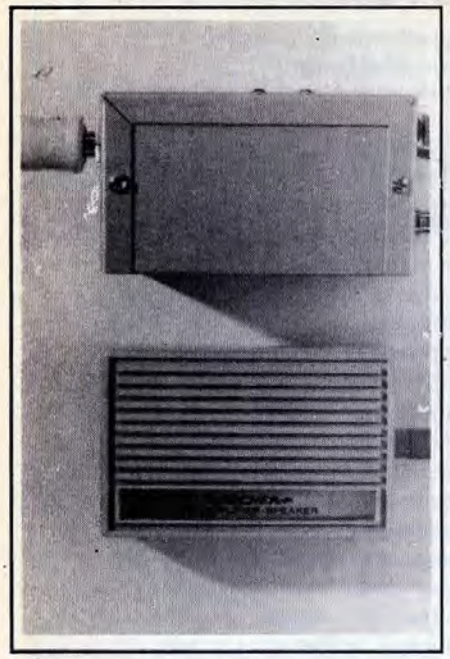

Figure 1. The lesser wax moth detector described here (top) attached to a small amplifier/speaker that produces an audible output.

A small commercially-available amplifier/speaker is used to provide audio output. Also, certain microphones and ultrasonic transducers are available which, although designed to operate at lower frequencies, will detect lesser wax moth sound well enough to allow the moths to be located at a distance of 1½ to over three feet when used with the device described here. Some of the small electret capacitance microphones will function at the high frequency range required. Radio Shack 270-090 provides fair sensitivity considering the low price. Piezoelectric ultrasonic transducers designed to operate at 40 kHz will frequently detect lesser wax moths with better results. One usable piezoelectric unit is catalog no. J4-815 from Circuit Specialists Co., Box 3047, Scottsdale, Arizona 85257.

A piezoelectric transducer tuned to the center of the lesser wax moth sound (100 kHz) would increase the distance over which the calling moths could be detected and would be the ideal choice. But I know of no commercial source where such a transducer is available in a single unit or small lots at reasonable prices.

Building A Detector

Figure 2 shows a circuit which uses a field-effect transistor and two operational amplifiers (op amps). (In general, op amps refer to any high gain amplifier whose gain and response characteristics are determined by external components.) The circuit takes signals from a microphone, amplifies them, then rectifies and averages the signals into direct current. With wax moth sounds, one pulse of low frequency signal appears at the output for each burst of high-frequency sound detected at the microphone. The output is designed to be fed to the input of a small portable speaker/amplifier such as Radio Shack 277-1008. The speaker will then produce a click or pop each time the wax moth's tymbal snaps and produces a pulse of high frequency sound. Because the wax moth produces 70-100 pulses per second, the sound from the speaker will be a continuous, characteristic buzz when a wax moth is detected.

Microphone installation is left to the builder. I used a phone jack input and mounted my microphones on phone plugs, which allowed me to interchange microphones for experimental purposes. However, if only one microphone is to be used, it could be glued inside the box behind a hole. The output jack can be either a miniphone jack or a phono jack. A shielded connecting cable with the proper plug on each end is needed to connect the detector to the amplifier.

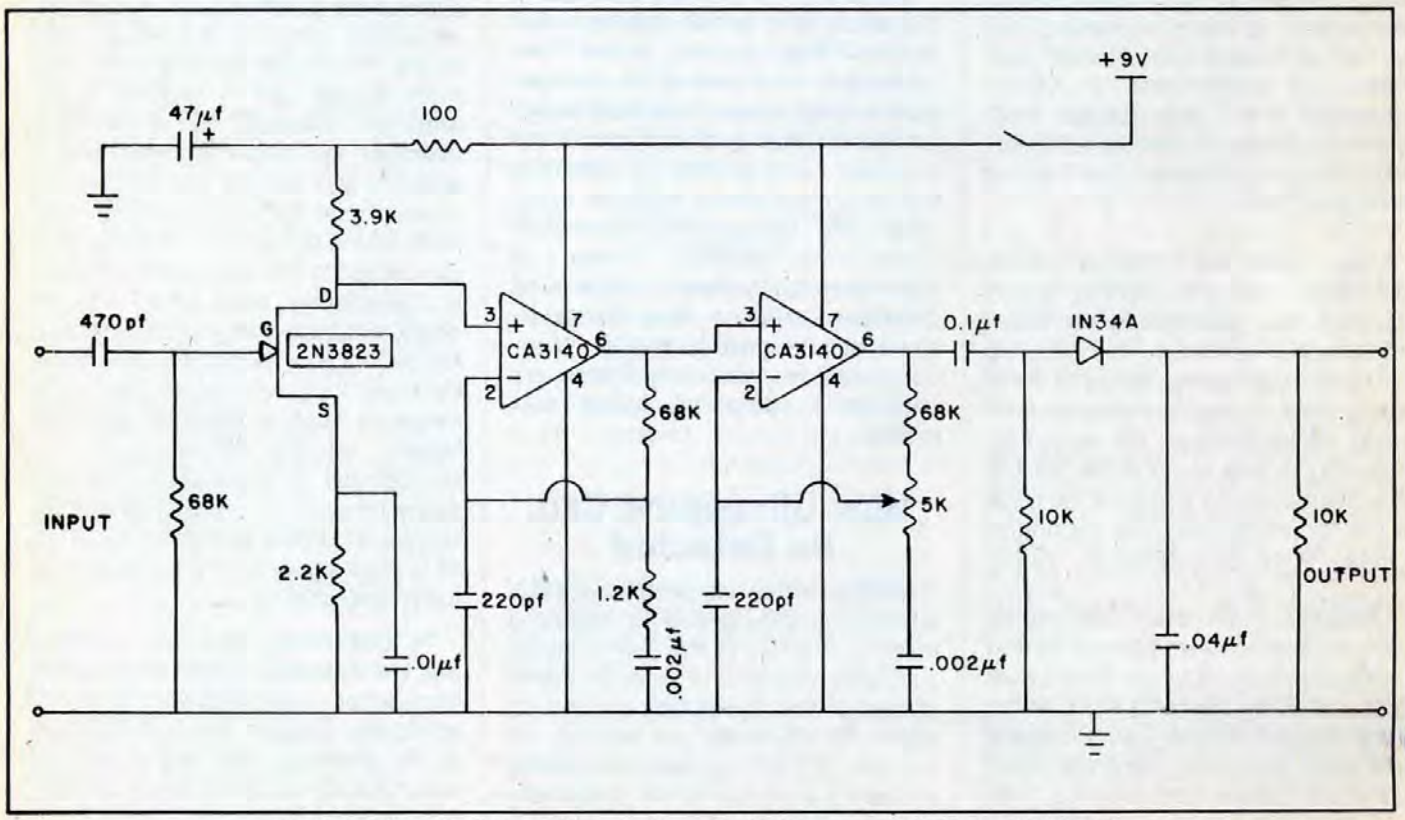

Figure 2. Schematic diagram of the circuit used in the lesser wax moth ultrasound detector.

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The circuit as shown has its maximum gain at 50 kHz. The gain is down 10 dB at both 100 kHz and 29 kHz. The op amps used have a unity gain frequency of 4.5 mHz, so they are actually operating at near the maximum gain at 100 kHz. Raising the peak gain to 100 kHz could only be done by lowering the gain at 50 kHz. When using piezoelectric microphones tuned to 40 kHz the high gain at 50 kHz seemed to enhance sensitivity by amplifying the small amount of sound energy the microphone did detect below 90 kHz. The circuit's low gain at audio frequencies, plus use of an audio amplifier and speaker away from the microphone, prevented audio feedback (howling).

The overall gain of the detector circuit is controlled by the 5K potentiometer on the feedback loop of the second op amp. At 50 kHz the gain of the first stage is 10X, the second stage is 48X while the third stage is adjustable from 21X to 74X. Above the 74X the third stage oscillates. This gives an overall circuit gain range of from 10080X to 35520X. I found that the detector gave the best signal-to-noise ratio at a gain of 21000.

Note the finished circuit in Figure 3. It is constructed on a small piece of perfboard. On your board, be sure to space the active components to help prevent interstage coupling. Although you could substitute other field-effect transistors (FET) for the first stage, you should choose one that will have gain of at least 10X. Also, it is critical that the voltage at the FET drain (D) be between 3 and 6 volts with a fresh 9 volt battery. This is necessary because the voltage at D controls the operating point of both op amps since a single-sided power supply is used. Other transistors may require another resistor value in place of the 3.9K. The circuit shown operates with an offset voltage of 4.5 volts and consumes 6.8 ma from a fresh 9 volt battery. CA 3130 op amps could be used. However, that op amp would also require a 30 pF compensation capacitor between pins 1 and 8. The gain at 100 kHz would be about the same. Most other commonly available op amps such as the 741, reach unity gain at 1 mHz so the gain of each op amp stage at 100 kHz would be reduced about 78% from that of the 3140. The detector would perform poorly with such lowered gain.

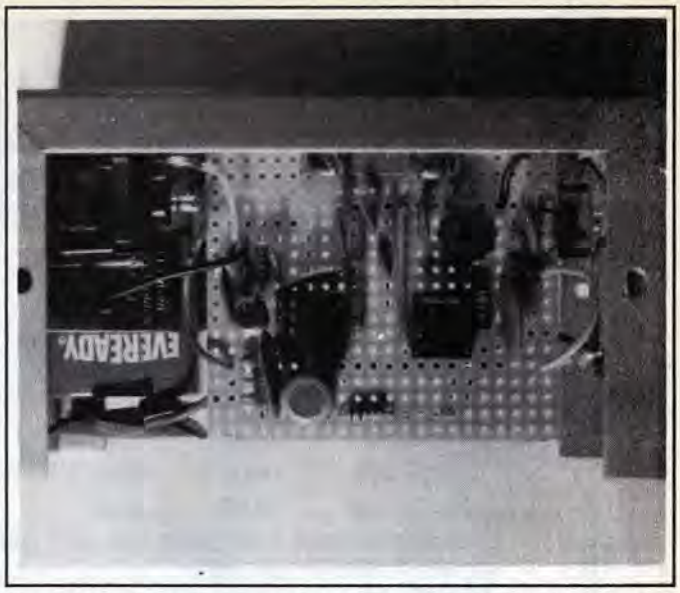

Figure 3. The internal arrangement of the lesser wax moth ultrasound detector.

After the circuit is complete, install it along with a microphone in a 2¼ x 2¼ x 4 or 5 inch minibox. Then connect the output with a cable to the amplifier/speaker. Turn both circuits on. Hissing noise should be audible. Have someone rattle a ring of keys and move continually farther away until the clicks from the key-produced ultrasound are barely audible. Adjust the gain control of the amplifier/speaker until the best signal-to-noise ratio is obtained. After installing the case bottom you are ready to detect moths. Unless switches are left on when not being used, the batteries of the amplifier/speaker and the detector should last all season.

Using the Detector

Check "dead-out" hives one half-hour after sunset by running the microphone along the entrance around and along the bottom of the hive. You can check a warehouse most anytime if the light level is low. Otherwise check it in the evening. Point the detector at the stored supers and at walls in corners, etc. Since it is especially important to detect moths on comb, point the microphone at any openings between supers or cracks and other passageways in the supers. Remember, because you cannot pick up the sound of a lesser wax moth through the wooden wall of a super, you must find some opening. Also keep in mind that if you physically disturb a super or hive you may cause any lesser wax moth males inside to stop calling temporarily.

Effectiveness of the Acoustical Detecting Technique

Tests of the detector's effectiveness demonstrate that its distinct advantages are its simplicity and accuracy. Using the prototype of the detector design covered in this article (Fig. 1) I conducted a test using 10 volunteer employees of the USDA-ARS. None of these volunteers had any previous experience locating lesser wax moths with an electronic detector; and two of them had no previous experience with bees or beekeeping equipment. Ten empty test hives were scattered throughout a distance of 70 feet in a large warehouse. Small cultures from which lesser wax moths were emerging were placed in two of these test hives at 9:00 a.m. Two cages containing calling lesser wax moth males were placed near the warehouse entrance. Only one volunteer was allowed in the warehouse at a time. Each volunteer was instructed how to operate the detector. He then entered the warehouse and used the detector to hear the translated sound from the moths in cages. He then went to each hive and moved the detector along the hive entrance from about 2-3 inches away. He recorded a positive sign of if he felt wax moths were in the hive, and a negative sign if he decided they were not detected. If he felt moths were present, he backed up until he could no longer detect the moths, then he measured and recorded the maximum distance over which he could detect them.

Since there were 10 hives and 10 volunteers, 100 decisions were made. All the volunteers made the correct decision 100% of the time, successfully locating the hives containing moths and in no case deciding that there were moths in any hive not containing

Continued on page 218

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5# TM-50D Ship Wt. 6 Lbs. $18.00

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UP TO 70# CAN NOW BE SHIPPED VIA UPS CHARGES THE SAME AS PP. IF BY PP ADD INSURANCE CHARGE.

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Smokers have been around for over 100 years and not too much has changed, using a bellows similar to those used on a black-smith forge of long ago.

Now we offer a small electronic sound emitting device operated by one 80¢ battery that will last for 500 to 1,000 hours of operation, that calm the bees similar to smoke but will not have the bad side effects such as stopping all of the hives normal work and causing the queen to hide.

This is not a fly-by-night, flash-in-the-pan, device. It has been used by commercial beekeepers throughout Canada and several in the U.S. with satisfaction and it has been tested by the Agriculture Dept. of Alberta, Canada. It has an effective range of 5 square feet and is not harmful to man, animals or bees. Actual height 3", weight with battery 2 oz. May be clipped to shirt pocket or belt loop. Guaranteed satisfactory or your money back.

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ITALIAN QUEENS — Prices **include** Postage

No. of Queens	Thru May 31	After June 1
1—5	$5.90	$4.75
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25—99	$5.50	$4.25
100-up	$5.25	$4.00

PACKAGE BEES — Shipped F.O.B. Baxley, Ga.

	1—10	11—99	100—up
2 lbs. w/queen	$18.75	$18.25	$17.25
3 lbs. w/queen	$23.25	$23.25	$22.75

Deduct $.50 per pkg. for customer pick-up.

- **All hives & nuclei fed Fumidal-B**
- **Fumidal-B in package feeder cans**
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Night 912/941-5215

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We ship pure worker bees by your truck, car, trailer or by Parcel Post.
Prices are F.O.B. Funston, Georgia.

WITH QUEENS	2 lbs.	3 lbs.	4 lbs.	5 lbs.	QUEENS
1-5	$19.80	$24.85	$30.20	$35.85	$6.75
6-24	$19.10	$24.20	$29.55	$35.15	$6.50
25-99	$18.55	$23.65	$29.00	$34.60	$6.25
100-UP	$18.20	$23.25	$28.60	$34.25	$6.00

Write for prices on truckloads of package bees.
Clipping Queens .50 each—Marking .50 each.
For queenless packages deduct $3.00 from the above prices.

Please add for parcel post shipping and handling charges below to above prices of package bees in quantity.

	2 lb.	3 lb.	4 lb.	5 lb.
1.....pkg.	$4.58	$5.23	$5.53	$6.37
2.....pkg.	$7.27	$7.55	$8.20	$8.89
3.....pkg.	$8.55	$8.86		

Shipping and handling charges include postage, special handling, and insurance. Queen bees are shipped post paid, insurance coverage is for replacement of bees only, insurance does not cover shipping charges.
A $5.00 deposit per package is required to book your order balance is due 15 days prior to shipping date. For most desirable shipping dates, book your order early.
Prices subject to change without notice. Thank you.
Shipping dates April 1st thru may 20th.

(NO MITES) IN ALABAMA (NO MITES)

Best place to buy package bees and queens. My Italian queens are large yellow gold queens that produce large colonies fast and produce large amounts of honey.

THREE BANDED ITALIANS
Prices start April 1st to May 1st

	Queens	2 lb. w-q.	3 lb. w-q.
1—4	$6.00	$20.00	$26.00
5—24	5.75	19.75	25.50
100—up	5.00	18.50	24.00

Prices include postage, insurance and special handling. Special discount prices on packages picked up at our Apiary. ANY NUMBER! CALL FOR PRICES!

Terms on parcel post orders $2.00 per pkg. deposit, balance (2 weeks) prior to shipping date. We do not guarantee live delivery—file claim with your post office and we will replace. No insurance to Canada. Fumidil-B fed to all colonies and queen rearing nuclei.

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	Queens	2 lb. w-q.	3 lb. w-q.
1—24	$4.00	$17.25	$21.75
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2 lb. w-q. $11.00 3 lb. w-q. $14.00

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Michigan Beekeepers

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Bees and Queens	Bee Supply
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Queens $4.50 ea.	FRAMES .30 ea.
	Ross Round — and Comb Honey Supply

HOWELL'S HIVES and HONEY

5994 N. Watson Rd., Elsie, Mi.
Phone: 517-862-4640

TESTING ANSWERS from page 196

13.
- **A** Hard labor involved in closing the hives, loading and unloading them with each move (often means work through the night).
- **B** Wear and tear on the colonies and equipmen during the process of moving (many queens are lost).
- **C** Increased chances of colonies picking up disease from colonies in the area.
- **D** Chance of weakening your colonies due to lost field bees or pesticide exposure.
- **E** Many of the crops that require bee pollination are not good nectar producers.
- **F** Pollination services may be required at the same time that the major honey flow occurs in the permanent location.
- **G** Difficult to manage colonies that are moved for pollination; swarming can be a serious problem.

Number of points correct

20-18	**Excellent**
17-15	**Good**
14-12	**Fair**

Diagramatic Life Cycle of the Tracheal Mite

by CAROL HENDERSON and ROGER A. MORSE
Department of Entomology Cornell University Ithaca, NY 14850

The tracheal mite, *Acarapis woodi,* complete its life cycle, from egg to adult, in about two weeks. All of its life is spent in the breathing tubes or air sacs of honeybees except for a few hours when it migrates out of one bee and into anothe Adults and larvae feed periodically on the bee's blood by puncturing the breathing tube walls.

In the accompanying diagrams we have outlined the mite's life history. Starting with the diagram in the upper left hand corner we see the largest breathing tube, called the prothoracic trachea. This is the one favored by the mites. In the circle a young mated female mite has just entered the trachea. In this and the other diagrams the relative sizes of the mites and the trachea are in the proper proportions.

Following the arrow and moving to the upper right hand corner it is noted that after three to four days the young mite will lay up to 14 eggs. Interestingly the eggs are almost as large as the mites themselves. They are obviously produced one at a time.

Larvae hatch from the eggs and move about freely in the trachea. It is not clear how often larval mites feed or if they reuse the puncture holes that they make. In heavy infestations the breathing tubes are darkened and obviously damaged.

Adult males require 11 to 12 days to mature from the time the egg is laid. The development time for females is slightly longer, 14 to 15 days. Females are larger than males. Mating takes place in the tracheae.

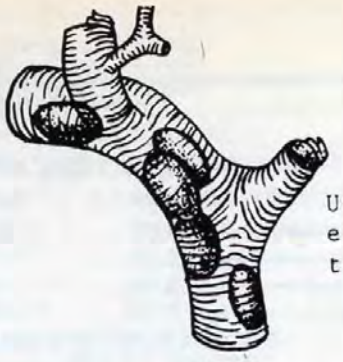
Moving to the diagram on the bottom of the page we see a migrating mite moving out of the tracheae. The prothoracic tracheal opening to the outside of the body is covered with a flap fringed with branched (plumose) hairs. The hairs are apparently for the purpose of filtering the air. According to studies that have been done mites cannot enter the tracheae of honeybees more than nine days old. Some have suggested that this is because the hairs stiffen with age and they cannot enter. However, when the hairs were shaved away mites still could not enter the trachea of old bees; why this is so is not clear.

Moving up the left hand side of the diagram it will be noted that bees must come into close contact for mite transfer to take place. A migrating mite attaches to the tip of a body hair of the bee she is leaving. She hangs on with one leg and assumes what has been called an ambush position. Her remaining seven legs are outstretched and ready to grasp a passing bee. How a mite can tell the difference between and old and a young bee is not known. The information w have at present inidcates mites cannot survive for long periods of time outside of a trachea. Those that fail to find a new host apparently die.□

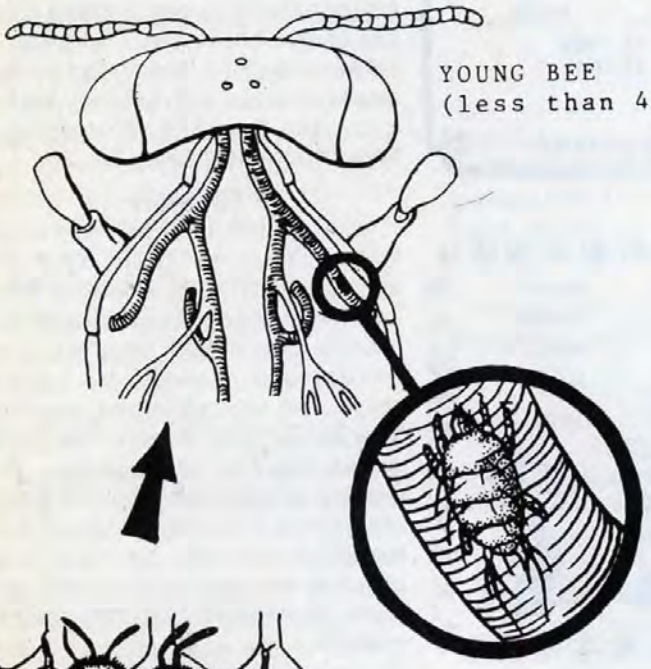
DIAGRAM APPEARS ON FOLLOWING PAGE

LIFE CYCLE of *Acarapis woodi*

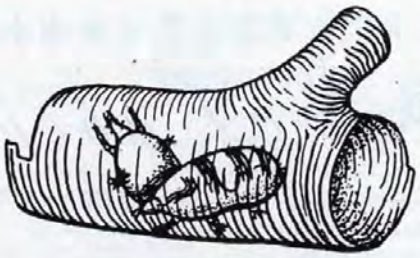
3 or 4 days



Up to 14 eggs in trachea

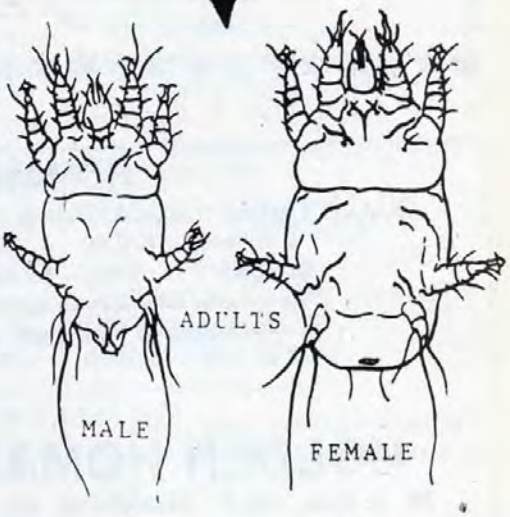


YOUNG BEE (less than 4 days old)



LARVAE in trachea

3 or 4 days



ADULTS

MALE

FEMALE

Close contact of bees permits passage of female mites from infested bee, into first thoracic spiracle of young bee

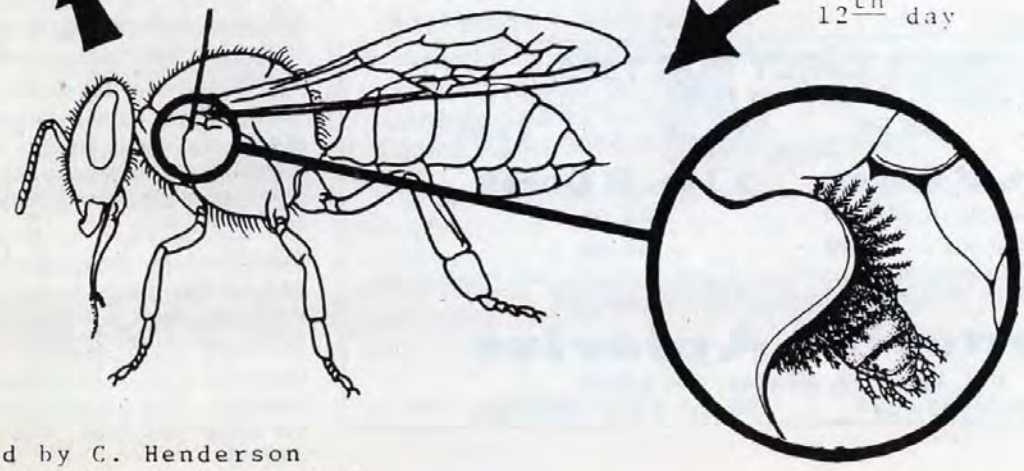
INFESTED BEE

YOUNG BEE

11th or 12th day

14th or 15th day

First thoracic spiracle



Mated female migrates out of spiracle, and attaches to tip of hair.

Prepared by C. Henderson
Illustrated by B. Alexander

APRIL 1985

WAX MOTHS

from page 209

moths. The average maximum distance over which they detected moths was 7.14 + 2.07 ft. (mean ± standard deviation, n = 20).

Thus, inexperienced persons proved capable of quickly learning to use this device effectively. There was no need to open the hive, in fact enough sound escaped from between the hive body and the lid to allow detection from several feet away.

Footnote

[1] Although this type of instrument is fairly difficult to build, QMC Instruments LTD, 229 Mile End Road, London E 14AA makes available two models. One model, the K100 is expensive and intended for scientific study. The second model, the QMC Mini Bat Detector is more reasonably priced. Mention of trademark, proprietary product, or vendor does not constitute a guarantee or warranty by the USDA and does not imply its approval to the exclusion of other products or vendors that may also be suitable.

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NEWS and EVENTS

CHINA TOUR 1985
Attention: Time-limited offer!
Places still available!!!

Are you planning to attend the 30th Apimondia (International Beekeeping Federation) Congress in Nagoya, Japan this coming October 1985? If you are, consider in addition a unique opportunity to visit with beekeepers and beekeeping experts on the Chinese mainland. If you are not, consider this opportunity to visit the Far East in a special way that combines a beekeeping focus and high-quality sightseeing.

I am pleased to announce that the Western Apicultural Society (WAS) is the official sponsor of a tour for beekeepers and apicultural experts preceding the Apimondia conference. The tour in China will take place between September 25th and October 9th, 1985. We will visit apicultural research facilities, government and commercial apiaries, factories producing by-products of bee activity such as honey, beeswax, royal jelly, and propolis, and get to meet individual Chinese beekeepers on a one-to-one basis. We will visit some of the greatest of China's incredible cities, including Bei jing (China's capital, for visits to the Great Wall, Ming Tombs, and Forbidden City), Xi'an (to visit the world-famous Qin dynasty tomb with its army of ceramic soldiers), Shanghai (a shopping mecca for Westerners), and Hangzhou (acclaimed by many Chinese as their most beautiful city, admired by Marco Polo for its silk and its West Lake).

We will see the Chinese countryside up close, using each of the cities mentioned as a base from which to visit bee-related activities in the surrounding area. Although you may return via Tokyo directly to Seattle (from which you departed via Japan Air Lines), you may also make a weeklong stopover in Japan to attend the Congress meetings between October 10th and 16th. This could be the crown jewel in your investigation of beekeeping in the Orient! (You will be responsible for making your own arrangements for attendance and lodging at the Apimondia Congress.)

Cost of the tour is about $2900.00 (per person/double occupancy), including roundtrip air fare, overnight stays in Tokyo, airport transfers, hotel charges and tips, and ground transportation costs. Your tour director, a founding member of WAS and its first journal editor, is a bee researcher at his home university, a beekeeper since 1968, and a participant in three previous Apimondia congresses (1975, '79, '81), who speaks fluent Japanese (having formerly lived in Tokyo and Yokohama).

Please join me for this exciting beekeeping adventure!!!

For further information contact:
David L. Cressler, Ph.D.
Tour Director
Associate Professor.
Portland (Oregon) State University
FREE: 1-800-541-3620

Tara Beekeeper's Assoc.

The Tara Beekeeper's Association will hold their annual beekeeping class March 19; March 26 and April 2. The dates are all on Tuesday night. The classes will be held at Clayton Junior College. The classes are open to the public. We are holding the classes for people who want to start keeping bees, people who want to learn more about bees or people who have started keeping bees and want to learn more. The instructors will be members of the Tara Beekeeper's Association. For more information, call P.N. Williams, 366-6404; Tom Jeanes, 474-4492; or Richard Morris, 471-3368.

Sacramento Area Beekeepers Association

Workshop in Practical Beekeeping
April 13 and 14, 1985
Cosponsored by Sacramento County Agricultural Extension

The Sacramento Area Beekeepers Association will host a two day workshop April 13 and 14 with an emphasis on the practical aspects of beekeeping, featuring Dr. Norman Gary. This workshop will be held from 9:00 A.M. to 5:00 P.M. at the Sacramento County Agricultural Extension facility in Sacramento, Ca.

SATURDAY TOPICS (April 13)

A Queen Bee Workshop will be held and is organized to give participants a theoretical and practical basis for rearing their own high quality queens in small numbers. Through the field demonstration and lab work, participants will have an opportunity to graft a larva and to make a queen bee. Also, other topics covered will be how to find queens easily, prevention of swarming by requeening, and queen behavior.

SUNDAY TOPICS (April 14)

The workshop will include seasonal hive management, hive manipulation techniques— especially sting prevention, and special problems like swarm control, disease and pest control including the latest information about the tracheal mite, beginning new colonies, harvesting honey, and prevention of robbing.

Pre-registration is advised since the class is limited in size. For information or registration forms contact Ben Pugh by March 7, 1985 at P.O. Box 974, North Highlands, CA 95660 or call (916) 331-2769.

ARIZONA

An Intermediate Beekeeping Workshop will be presented in Phoenix, Arizona, on April 13th and 14th, 1985, from 8:30 a.m. to 4:30 p.m. both days.

The program will be conducted by Dr. Roger Hoppingarner, Michigan State University.

The cost of the program is $30.00, which includes lunch for both days.

Limited seating is available, therefore, pre-registration is required. The deadline to pre-register is March 15, 1985. After this date, the fee will be $40.00.

For further information contact: Brett E. Cameron, 6849 West Lewis Ave., Phoenix, AZ 85035, PH: 602-245-1391 OR Mike Kuzmik, 1544 West 6th St., Tempe, AZ 85281, PH: 602-968-0969 OR Virginia Sandstedt, 117 Ash St., Tempe, AZ 85281, PH: 602-966-8683.

Continued on next page

Continued from previous page

International Symposium On Apitherapy

We have the pleasure of informing you that our bureau has been entrusted with the arrangements of services for the participants of the International Symposium on Apitherapy. Underneath we are enclosing information about conditions of participants at the symposium.

Registration Fee
US $ 90,-for participants
US $ 20,-for accompanying persons
Note: The fee covers participants at all sessions, arrival transfers from the airport in Krakow to hotels, symposium materials, transport service to the sessions and lunches at the Academy of Physical Education.

Cancellation
1 month before the Symposium — the refund of 100% of registration fee.

The Organizing Committee of the 5th International Symposium on Apitherapy in Krakow/Poland/, with International Federation of Beekeepers Association — APIMONDIA, has an honor to invite you to take part at this Symposium.

We would like to inform you that the symposium is held in the year of millenium anniversary of Polish beekeeping.

Let us hope, that your participation at this symposium may be also interesting to you because of cultural and tourists purposes. The 5th Annual Symposium on Apitherapy will be organized in the old Krakow/Cracow/ near from unicalsalt-mine museum in Wieliczka, which are recognized by UNESCO as the world culture heritages.

We believe, that the Symposium is rather a good occassion both for review of tradition of apitherapy, as well as for exchange of scientific and practical experiences in this field /eg. in reumatology, surgery, dermatology, stomatology, etc./ and for presentation of trends in development of international cooperation in therapeutic use of different kinds of bee products.

WISCONSIN

Les Philaja, 1983-84 and JoAnne Weber 1984-85, were honored at the recent Convention in Wisconsin Dells as the "Beekeeper of the Year." Philaja has contributed much time and effort in turning the Wisconsin Honey Producers Association booth at the Wisconsin State Fair into a money-making operation for the organization and JoAnne as we all know has given completely of herself on behalf of the WHPA. Our hats are off to two very deserving individuals, our "Beekeepers of the Year."

The 1985 American Beekeeping Federation Queen Committees is, left to right, Ron Fischer, Illinois; Kelly Duffin, National Honey Queen from Wisconsin, JoAnne Weber, Wisconsin; Inex Lenday, Tennesse; and Paul Heins, Oregon.

Amy Bydalek has been selected the 1985 Honey Queen for the state of Nebraska. She is the daughter of Jerry and Norine Bydalek, beekeepers in Franklin, Nebraska, and is a Freshman at the University of Nebraska in the College of Arts and Science. Amy will participate in various events throughout the state, including county and state fairs, promoting the use of honey.

BUY & SELL

Classified rates: 49 cents per word, each insertion, payable in cash in advance. Each initial, each word in names and addresses, the shortest word such as "a" and the longest word possible for the advertiser to use, as well as any number (regardless of how many figures in it) count as one word. Not less than 10 words accepted. Copy or cancellation orders MUST be in by the 1st of the month preceding publication. Send classified ads to the A.I. Root Company, Advertising Dept., GLEANINGS IN BEE CULTURE, Box 706, Medina, Ohio 44258-0706 . **Note: BLIND ADS: Any ad sent in that does not contain the seller's Name and Address within the ad, will be charged an additional $6.50 per month.**

MAGAZINES

THE AMERICAN BEEKEEPING FEDERATION needs your support! Join in supporting efforts to stop adulteration, to improve marketing conditions and to encourage the continued research on African Bees and Varroa and Acarine Mites. Send for information, membership application and sample copy of bi-monthly News Letter! Write To: **THE AMERICAN BEEKEEPING FEDERATION, INC., 13637 N.W. 39th Avenue, Gainesville, FL 32606.** TF

THE SCOTTISH BEEKEEPER — Magazine of The Scottish Beekeepers' Association, International in appeal. Scottish in character. Membership terms from A. J. Davidson, 19 Drumblair Crescent, Inverness, Scotland. Sample copy sent, price 20 pence or equivalent. TF

The INTERNATIONAL BEE RESEARCH ASSOCIATION urgently needs your membership and support to continue its work of publishing informatin on bees, beekeeping and hive products. Write for details about publications and the benefits of membership to USA Representative, H. Kolb, P.O. Box 183, 737 West Main, Edmond, OK 73034 (phone (405) 341-0984); or to IBRA, Hill House, Gerrards Cross, Bucks SL9 ONR, UK, regularly publishes new information on bees, beekeeping, and hive products, for beekeepers and scientists all over the world. Mail inquiries from USA: H. Kolb, P.O. Box 183,, 737 West Main, Edmond, OK 73034, Phone: (405) 314-0984. IBRA PUBLISHES: **Bee World,** a quarterly journal for the progressive beekeeper. **Apicultural Abstracts,** a survey of scientific literature from all languages. **Journal of Apiculture Research,** for original bee research papers. Books and pamphlets on all beekeeping topics. Catalogues of publications and details of journals and membership $1. Specimen copies of **Bee World**, **Journal of Apicultural Research** or **Apicultural Abstracts** from INTERNATIONAL BEE RESEARCH ASSOCIATION, Hill House, Gerrards Cross, Bucks. SL9 ONR, England. TF

DAIRY GOATS—for milk, pleasure and profit. Excellent for children, women and family! Monthly magazine $11.00 per year ($13.50 outside U.S.A.). DAIRY GOAT JOURNAL, Box 1808 T-3, Scottsdale, Arizona 85252. TF

BEEKEEPING. A West Country Journal—written by beekeepers—for beekeepers. 1.50p inland or 1.80p ($4.00 Overseas). 10 issues yearly. Editor, R. H. Brown, 20 Parkhurst Rd., Torquay, Devon, U.K. Advertising Secretary, C. J. T. Willoughby, Henderbarrow House, Halwill, Beaworthy, Devon, U.K. TF

SCOTTISH BEE JOURNAL. Packed with practical beekeeping. Sample copy from Robert NH Skilling, FRSA, 34 Rennie St., Kilmarnock, Scotland. Published Monthly, $4.00 per annum. TF

BEE CRAFT — Official (monthly) magazine of the British Beekeepers Association. Contains interesting and informative articles. Annual Subscription $5.10 (surface mail) and $7.10 (Airmail). The Secretary, 15 Nest Way, Copthorne Bank, Crawley, Sussex, RH10 3DS TF

INDIAN BEE JOURNAL Official organ of the All India Beekeepers' Association, 817, Sadashiv Peth, Poona 411030. The only bee journal of India Published in English, issued quarterly. Furnishes information on Indian bees and articles of interest to beekeepers and bee scientists.

Annual subscription postpaid in foreign countries: For individuals US $7.00 for institutions, companies and corporate bodies US $10.00 or it's equivilent, to be received in advance by IMO or bank draft, payable in Poona (India). TF

WANTED

WANTED—All varieties bee gathered pollen. Must be clean and dry. Pollen traps available. Hubbard Apiaries, Onsted, Mich. 49265. Phone: 517-467-2151. TF

WANTED — Christain non-drinking beekeeper interested in possible partnership in California. Write Mr Williams, P.O. Box 700, Yuca Valley, Calif. 92284. 5/85

HELP WANTED — Commercial outfit needs hired help for the 1985 season. Please write— don't call— Chris Baldwin, Rt. 1 Box 48, Fairmont, Nebraska 68354. Commercial experience not required. 5/85

WANTED: 1500 colonies of bees and equipment to lease on shares for 1985 crop in my North Dakota clover, alfalfa, sunflower locations. Must be disease and mite free. Jack Egeland, Rt. 4, Box 35B, Yoakum, Texas 77995. Phone 512-293-5844 4/85

Help Wanted: 2 Professional bee men for year-round work. Must have large scale queen rearing and package bee experience. Also can use 2 part-time bee men for package season February through May. Absolutely NO DRUG USERS. **Huck Babcock, P.O. Box 2685, West Columbia, SC 29171. Phone: 803-256-2046.** TF

SINGLE MAN — preferred, in the production of honey in the Northeast for our successful honey business of 50 years. Job starting May 1st. Howland's Honey, R 2, Box BEE, Berkshire, NY 13736 4/85

WANTED: 1000 used honey barrels in excellent condition delivered to Virginia. Stillwaters Honey Cooperative, P.O. Box 360, Keysville, Virginia 23947. Phone: (804) 736-9885 4/85

FOR SALE

INSEMINATION DEVICES. For prices write Otto Mackenson, Box 1557, Buena Vista, CO 81211 TF

For Sale: clean, fresh, dry, Bee Pollen. $6.50/pound. You pay shipping. Honeycomb Apiaries, R.R. 3, Box 74, Wrightstown (Kaukauna), Wi. 54130. Ph: (414) 532-4314. TF

FOR SALE: Bee Operation on 15 acres. 14' x 60; wood frame building on cement. Also 20' x 30' storage shed. Excellent line of equipment plus 500 hives. 25 yard sites available mostly on Sweet Clover. Call 873-5900, Renaud Realty, Box 416, Tisdale, Sask. SOE ITO TF

FOR SALE: 2700 colony bee operation with North Dakota locations, Texas locations, and queen and nuc business. 10 acres with 3 bedroom mobil home and warehouse in Texas. MITE FREE and ready for production. Equipment in excellent condition. Reply to Gleanings In Bee Culture, P.O. Box 706, Medina, Ohio, 44258-0706. JE 4/85

For Sale by Owner: Complete operation, 325 colonies, 5 deep high on location. Additional locations for 700 more. Sell separate or together with honey house and equipment. Ideal set up for combining with southern location for migratory operations. North Central Nebraska. (402) 376-1262 (evenings). MF 4/85

150 STANDS BEES WITH RELATED EQUIPMENT SALE. FOR DETAILS WRITE STEARNS, 4605 REDSTART, HOUSTON, TX 77035 6/85

FOR SALE: 90 2-story 10-frame hives, good equipment $50.00 each. 100 2-story 8-frame hives, excellent equipment $55.00 each. Ph. 303-857-2445 GJ 4/85

Nucs for sale, no frame exchange, mite inspected, delivered enroute from Louisiana to Central Minnesota. 5-frame $32.0, single story with either pallets or telescope and bottom board $47.00. Rittenhouse Honey, Rt. 3, Box 108, Paynesville, MN 56362. Phone: 612-243-4330 or 318-3435-1234. 4/85

FORE SALE Complete bee operation. Must be sold. One unit or piece by piece. Wholesale and retail outlets. List available. If not SOLD! SALE! May 4th, 1985, 9:00 a.m. Ted Shuler, Box 384, Sutherland, NE. Phone: 308-386-4374, Evening 386-4417. 4/85

For Sale — 125 Hives with two shallows; Carniolan, Italian, Caucasain stock; $65 a piece. Call 615-949-2678 mornings OR 615-949-2589 evenings. Ask for Tim. TH 4/85

For Sale — 100$ colonies in Northwestern Ohio, available in the spring. 419-478-3829 after 7 p.m. WD TF

500 Single and 500 two-story colonies after April 25. Also a few 5-frame nucs after May 15. Lawrence Winter, Wolcott, NY 14590. Telephone: 315-594-8539 4/85

FOR SALE: 25 colonies bees 70,000 each, 1 deep brood ¢ 3-658 supers. Duragilt foundation, excellent condition. Ph: 803-225-4980 After 6 p.m. TC 4/85

FOR SALE: 25 STRONG HIVES $50 EACH. MOVE OR STAY. ALSO EXTRA EQUIPMENT AND SUPERS. BARNEY HELLER, 6522 WETMORE, EVERETT, WA. 98203. (206) 355-5777. 4/84

70 Hives, 2½ stories plus super, $60 each, also extra supers, equipment; William Braasch, 315 Waldorf Street, Pittsburgh, PA 15214. Phone (412) 931-3892 4/85

For Sale — 2 stands Italian bees, 6 hives, 30 shallow supers, 4 Frame Elec. Extractor on wheels, capping melter, Elec. knife, 5 gal. galvanized bucket with drain and other accessories. All for only nine hundred fifty dollars ($950). H. Rogers, Rt. 3, Box 237, Ridgeway, Va. 24149. 703-956-3395. 4/85

FOR SALE

Complete 700 hive operation in south western Manitoba including buildings, house, trucks and all related equipment. Write to:

Gleanings In Bee Culture
P.O. Box 97
Medina, OH 44256

For Sale — Honey Bear Labels in color $10 per 100. Write for samples and your address to put on labels. Funk Honey & Veg. Farm, RR =, Box 199, Portland, IN 47371. Ph: 219-726-2425 4/85

SWARM LURE — Original synthetic pheromone developed at Rothamsted. Imported from England. Use as a swarm bait in empty hive. $3.50, ppd., two $3.00 ea. BRYANT & COOK, Box 488G, South Windsor, CT 06074. 5/85

Granulated Sugar for your bees. 25¢ per pound. Limited quantity. L. Dixon (315) 592-9581. TF

For Sale: 70 — 2-story hives, shallow honey supers available. All or part. P. Yunkes, 18265 Rt. 700, Hiram, Ohio 44234, (216) 834-4282. 4/85

For Sale: 300 two story colonies, Queen rearing outfit, 69 two ton truck, Kelly loader, good honey outlets. Best offer. Andrew Hutchison, P.O. Box 6993, Boise, ID 87707 TF

For Sale: 600 deep supers—drawn comb. Carroll Couture, Belleville, KS 913-527-5805. 5/85

Complete palletized 1300 Hive operation in Alberta including new Buildings, House, Trucks. Excellent location. Reason for sale, accident of owner. Sell all or part. Sunrise Apiaries, Box 353, Grand Centre, Alberta TOA 1TO. Ph: 403-594-2126 or 613-258-3652. 4/85

NUCS FOR SALE, no frame exchange, mite inspected. Delivered enroute from Louisiana to Central Minnesota. 5-Frame $32.00, single story with either pallets or telescope and bottom board $47.00. Rittenhouse Honey, Rt. 3, Box 108, Paynesville, MN 56362. Phone: 612-243-4330 or 318-345-1234 5/85

Supers with comb: $6^5/_8$"—$8.00, $5^{11}/_{16}$"—$5.50, quantity discounts. Root 45 frame extractors—$750. Pure Sweet Honey Farm, Barneveld, Wi. 608-924-1161 5/85

Pollinations — Services — Honey — Queens
Peter Schmidl, P.O Box 1621, Yuba City, CA (916) 673-4502. 5/85

BEES & QUEENS FOR SALE

WE USE ALL POSSIBLE CARE in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for a certificate of inspection as a matter of precaution.

For Sale: Nucs, 3 or 4 frame in your equipment. Dappen Honey Farm, Box 657, El Dorado, CA 95623. Ph. (916) 622-8522 4/85

ROYAL ITALIAN QUEENS. Strong, healthy and productive. Bruce Otte, Route 2, Box 99AG, Karnes City, Texas 78118, (512) 780-3521 5/85

Package Bees delivered to Wisconsin near Green Bay. Eau Claire and my home. Ronald Hazard, RT 2, Poynette, Wis. 53955 Phone: 414-992-3217 4/85

ITALIAN QUEENS, 3-Frame NUC and hives. Dixie Honey Co., Rt. 5, Box 38, Shallotte, N.C. 28459. Phone 919-579-6036. TF

Nucs 4-frame Golden Italian stock $35.00 each or 3 for $100. Queens $5.00 each. All postpaid. Small orders only. Johnny J. Pennington, 194 Cooper-Hurst Rd., Pearl, MS 39208. Ph: (601) 939-5994. 5/85

ROYAL ITALIAN QUEENS. Strong, healthy and productive. Bruce Otte, Route 2, Box 99AG, Karnes City, Texas 78118, (512) 780-3521. 5/85

3-Frame Italian Nucs. $35.00 each or 3 for $100.00 POSTPAID. Queens 1-10 $6.00, 11-25 $5.25, 26-up $4.75. Box's Better Bees, 410 N. Lide, Mt. Pleasant, TX 75455. Phone 214-572-0428. TF

California Italian Queens, clipped & marked, MITE FREE, no minimum $6.00 each. Woolf's Family Apiary, 4592 Quail Valley Drive, Redding, CA 96002. Ph: 916-221-2840 5/85

Package Bees Driver to Northern Ohio Area in April from Georgia. Call Tom Jefferies 216-236-5994. 24564 Squires Rd., Columbia Station, OH 44028 4/85

'ALABAMA PACKAGE BEES' will again be delivered to Wisconsin by Pegorsch Honey Farms — Manawa, Wi. 54949. Call or write for prices Ph. 414-596-2289 4/85

PACKAGE BEES & QUEENS FOR APRIL AND MAY. PICKUP POINTS REESEVILLE, WI. AND WAUSAU, WI. PHONE DAY OR EVENINGS 414-927-3848. LAPP'S BEE SUPPLY CENTER, REESEVILLE, WI. 53579 4/85

Mississippi 4-Frame Nucs for pick-up in North-Central Illinois after May 1st. Minimum order 10. Tanners Orchard, Speer, ILL. 61479. Phone: 309-493-7781, 309-493-5442 5/85

FOR SALE — Top quality Italian bees and queens since 1940; also 3-frame nuclei and single story colonies. Bring your own cages and save. WALKER APIARIES, Rt. 1, Box 34-B, Rogers, TX 76569. 817-983-2891 or 773-9086 6/85

5-Frame Nucs and Single Story Colonies with new queens, fumidil fed, quantity discounts. Gary Lamb, Ridgeland, Wisc. 54763. Ph: 715-949-1823 5/85

100 Colonies, excellent condition, two story colonies $85.00 each, one story and half $65.00 each. Gale Hurd, 3762 Summit Rd., Ravenna, Ohio 44266. Phone: 216-296-3789 5/85

BEE SUPPLIES FOR SALE

HONEYSTRAINER — Really Works! Guaranteed. Ppd. $3.50 each. 2-up $3.00 each. Try Your Dealer. Beckman, Box 633-G, Stuart, Florida 33495. TF

WRITE FOR CATALOG—Quality Bee Supplies at factory prices. Prompt shipment. Satisfaction guaranteed. Hubbard Apiaries, Manufacturers of Beekeepers' Supplies and Comb Foundation. Onsted, Mich. TF

250 NUCS — Strong Italian nucs produced in or transferred into your equipment. Bruct Otte, Route 2, Box 99AG, Karnes City, Texas 78118. (512) 780-3521. 4/84

QUEEN CELLS — South Central Texas pick-up. Bruce Otte, Route 2, Box 99AG, Karnes City, Texas 78118. (512) 780-3521. 4/85

5 Frame Nucs — Package bees, Italian or Starline — High fructose syrup, Meyer Stingless Goat skin Glove — Complete line of supplies at commercial price. WOLF BEE SUPPLY, Box 707, Baldwin, WI 54002. Phone 715-684-2095. 1/86

5 Frame Nucs. Italian or Starline. Will have limited number of nucs from bees wintered in Wisconsin, also 1 story hives. WOLF BEE SUPPLY, P.O. Box 707, Baldwin, WI 54002. Ph: 715-684-2095. 6/85

FOR SALE— 150 candy boards, 1.50 ea., 200 $9^5/_8$ bodies with comb. $10.ee ea., 1500 $6^5/_8$ supers with comb in good condition. $9.50 ea., covers with inners, bottom and 4 way pallets. WOLF BEE SUPPLY, Baldwin, WI. Ph: 715-684-2095. 6/85

MEYER STINGLESS GLOVES* are back on the market! The BEST in bee gloves. Goatskin — $13.60. Cow-hide $11.95 Plus 1.00 postage. WOLF BEE SUPPLY, Box 707, Baldwin, Wisc. 54002. Phone: 715-684-2095. 1/86

FOR TOP QUALITY BEE SUPPLIES and advice on beekeeping problems, visit your nearest Root dealer and send for your FREE Root catalog. Satisfaction guaranteed. The A.I. Root Co., P.O. Box 706, Medina, OH 44256. TF

ALL WESTERN BEEKEEPERS: Lock-corner supers — tops — bottoms — frames. Complete stock — supplies & equipment. Phone or write for quantity prices. UNITED BEE CRAFT COMPANY, 600 Harbor Blvd., West Sacramento, CA 95691. (916) 371-9340. TF

QUALITY CYPRESS BEEKEEPING SUPPLIES — dovetailed hives and hive parts, beginner's kits, complete supplies. Write: BEE-JAY FARM, Dacula, GA 30211. TF

RADIAL HONEY EXTRACTORS-5 and 10 frames. Patented, factory made of stainless steel. GAMBLE'S HONEY EXTRACTOR CO., P.O. Box 7997, Greensboro, NC 27407. Phone: (919) 299-3973, Day or Night. TF

HONEY EXTRACTORS FOR HOBBY BEEKEEPERS — Affordable Prices. FREE Literature. BEE LINE MANUFACTURING, 1019A Saint Elmo, Austin, TX 78745 TF

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(605) 393-0545 5/85

HOBBYISTS HONEY EXTRACTORS — SUPPLIES. Free Literature. **BEE LINE MANUFACTURING, Box 15682-B, Austin, TX 78761. 12/85**

Manufacturing Telescoping Covers and Inner Covers. Send $12.00 pp. for sample. Complete Standard Bee hive w/o Foundation $35.00 pp. U.S. Only Hive Tops 25115 CR 54 R1 Nappanee, Ind. 46500. 6/85

REVOLUTIONARY NEW IDEA:
METAL SINGLE FRAME EXTRACTORS, 49.95 PLUS POSTAGE. **MULLIGAN'S APIARIES, DEPT. G, 18 RICHARD AVE., N.Y. 11566. 12/85**

Bucket Opener easy to use, lifetime guarantee, made in U.S.A. with pride. Ppd. $21.50 each, 2-up $20.50 each. **Lone Star Honey Company, 17 Fair Oaks, Leander, TX 78641. Ph: 512-259-0524** TF

BUILD YOUR OWN EQUIPMENT. 34 clear plans available for as little as .49 each. Catalogue. Sunstream, P.O. Box 225, Eighty Four, PA 15330 5/85

PINE BEE SUPPLIES

9-5/8" hives dovetailed ..... **$4.00** each
6-5/8" supers dovetailed ..... **$2.75** each
5¾" supers dovetailed ..... **$2.50** each
Select grade heavy duty frames, all sizes
$31.00 per 100 **$280.00** per 1000
Hoffman 9-1/8, 6¼, or 5-3/8 specify style
Powers super frames 6¼, 6 and 5½
Wooden lids and bottoms (migratory)
$2.25 each or **$4.50** per set
Bee PalletsCut To Order ..... **$6.50** & Up
Foundation available — plain or wired
Sale Price ..... **$3.00** lb. in 25 lb. box only
Wax rendering — combs, slum or cappings
Allow manufacturing time on all orders

MARVIN SMITH APIARIES
Rt. 1, Box 1268
Phone: 208-722-5278, Parma, Idaho 83660

New Beekeeping Dealer in the Southwest Chicago area. Conveniently located along I-55. Darin and Doug's Honey, 2 Division St., Lemont, Illinois. Phone: (312) 257-5537 4/85

Honey Equipment, Stainless steel, Filters, 3 storage tanks, sump, boiler, milter, pumps, filter, bees, supers, and misc. Syl Wagner, 296 So. 7 Mile Rd., Linwood, Mich. 48634. 5/85

MISCELLANEOUS

RENDERING every day in our all new plant. All honey saved from cappings. Rendering slumgum and old combs. Write for FREE shipping tags and rates. HUBBARD APIARIES, Onsted, Mich. TF

Dealership Territories available in some areas. Please contact The A. I. Root Co., P.O. Box 706, Medina, OH 44258 TF

Michigan Beekeepers — I will be hauling package bees from Georgia again this spring. For prices, dates and information call: Don Reimer at 517-695-9031. 4/85

STUDYTRIP TO SWEDEN AND NORWAY

August 5-17 with possibility for individual programs afterwards. Visits to small and commercial beekeepers, research institutes, queen breeding station etc. Interesting countryside sightseeing and guided tours through Stockholm and Oslo. First class hotels and most meals included. English spoken guide. Send addressed envelope for full information to: Harold Liberman, 2701 Oxford Circle, Upper Marlboro, Maryland 20772, USA 5/85

MEAD — Complete kit for 5 gallons (except bottles and honey). Includes special yeast imported from Germany, $18.95 postpaid. BRYANT & COOK, Box 488-G, South Windsor, CT 06074. 5/85

HOLLAND HONEY CAKES have fresh, natural ingredients. Low Sodium, no preservatives or fats added. Outstanding keeping qualities with or without refrigeration. Special offer, variety package containing six cakes, only $9.95 postpaid. Visa, Mastercard, welcome. Holland Honey Cakes, 420 West 17th, Holland, Michigan 49423. Shipping promptly, excellent gift idea. 5/85

VITEX TREE SEED, 100 seeds $2.00. Hagerite Bee Keeper, 3456 Richmond Dr., Conyers, Ga. 30208 4/85

NO HEAT OR ELECTRICITY USED. Uncapping fork (not just a scratcher). No flavor loss and better flavor retention. No burnt fingers or shocks. Honey from dark comb not discolored as with hot knife. $11.00 ea. pp., Blossomtime. P.O. Box 1015 Tempe, Arizona 85281 TF

POLLEN

FRESH, PURE, Bee Pollen available in 1 pound containers at $8.50 per pound postpaid. 10 pound bulk pack at $7.90 per pound. Large lots, ask for price. Hubbard Apiaries, Inc., Onsted, Mich. 49265. TF

SPANISH BEE POLLEN. Excellent taste and quality. 3 lbs. $20.00. 6 lbs. $36.00. 10 lbs. $50.00. 20 lbs. $90.00. Free UPS shipping. BLOSSOMTIME. P.O. Box 1015, Tempe, Arizona 85281. TF

Pure Fresh Bee Pollen in 1 lb. jars $6.50. In 50 lb. bulk — $5.00 per lb. Prairie View Honey Co., 12303 12th St. Detroit, Mich. 48206. TF

PURE FRESH EXCELLENT QUALITY BEE POLLEN. 1 lb. Packages $5.00 lb., Bulk 20 lb. Packages $4.00 lb. Prepaid. STAKICH BROS., INC. BLOOMFIELD HILLS, MI 48013. Phone: 313-642-7023 5/85

CLEAN FRESH FROZEN AMERICAN BEE POLLEN, give us your needs and we will quote prices. Howard Weaver & Sons, Rt. 1, Box 24, Navasota, Texas, 77868, or phone: 409-825-7714. TF

BEE HEALTHY & ENJOY Canada's Best Bee Pollen. Air dried at 110 degrees F., from the pure north of British Columbia. Excellent flavor, superior quality, and guaranteed pesticide free. 3 lbs. $20.00, 6 lbs. $39.00. 10 lbs. $54.00. 20 lbs. $100.00. Free UPS shipping. BLOSSOMTIME. P.O. Box 1015, Tempe, Arizona 85281 TF

ROYAL JELLY

PURE FRESH Royal Jelly, 2 oz. bottle, $22 pp.; 1 lb. $120. Prairie View Honey, 12303 12th St., Detroit, MI 48206 TF

BEESWAX

BEESWAX WANTED — Highest prices paid in cash or trade for bee supplies. The A.I. Root Co., Medina, OH 44256. TF

PROPOLIS

PROPOLIS U.S.A. has stopped buying until further notice. TF

BOOKS

Dr. Richard Taylor's *'Beekeeping for Gardeners'* **with order of any two books. Linden Books, Interlaken, NY 14847. 5/85**

Have your read Dr. Richard Taylor's 'How To Do It Book of Beekeeping' *"The Beekeepers Bible"* **$9.45 postpaid. Linden Books, Interlaken, NY 14847. 5/85**

"Poems Of The Honeybee". 63 pages. Unique, informative, delightful. $4.00 pp. Walt Crawford, 3569 Amherst, Massillon, Ohio 44646. 4/85

HONEY WANTED

BEEKEEPERS TAKE NOTICE — We cannot guarantee honey buyer's financial responsibility and advice all beekeepers to sell for CASH only or on C.O.D. terms except where the buyer has thoroughly established his credit with the seller.

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. Hubbard Apiaries, Onsted, Mich. TF

BUCKWHEAT, light and light amber honey. Bedford Food Products, Inc. 209 Hewes St., Brooklyn, N.Y.TF

All Grades of Honey. Any quantity drums or cans. Call Toll Free 800-248-0334. Hubbard Apiaries, Inc. Box 160, Onsted, Michigan 49265 TF

WANTED — All grades of extracted honey. Send sample and price. Deer Creek Honey Farms, London, OH TF

WANTED: Comb and all grades of extracted in 60's or drums. Send sample and price to MOORLAND APIARIES, INC., 5 Airport Drive, Hopedale, MA 01747 TF

HONEY FOR SALE

CLOVER, ALFALFA, Buckwheat, Tulip Poplar, Wild Flower or Orange in 60's. Dutch Gold Honey Inc., 2220 Dutch Gold Dr., Lancaster, PA TF

HONEY IN 60's FOR SALE. Bedford Food Products Co., 209 Hewes St., Brooklyn, New York 11211 Phone: 212-EV4-5165, TF

CLOVER, ORANGE, U.S. and Yucatan Wildflower, in sixties. Other flavors and bakery grade available. MOORLAND APIARIES, 5 Airport Drive, Hopedale, MA 01747 TF

Goldenrod Honey in 60 lbs. can $32.00 each. Gale Hurd, 3762 Summit Rd., Ravenna, Ohio 44266. Phone: 216-296-3789. 5/85

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. Hubbard Apiaries, Onsted, Mich. TF

SEEDS & PLANTS

HONEY PLANTS AND BEE-BEE TREES OUR SPECIALTY. SEND STAMPED ENVELOPE FOR CATALOG. ARLETH'S APIARY GARDENS. 395 CAROLINA ST., LINDENHURST, NY 11757. TF

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Mixed sweet clover seed, 50% Yellow 50% White. 10# $8.25. White Dutch clover $2.00/lb. Birdsfoot Treefoil $2.75/lb. Inoculant $2.00. Plus U.P.S. charges. Visa or Mastercard. Higgins Apiary, 3801 U.S. 50 Hillsboro, Ohio 45133. Telephone: (513) 364-2331. 4/85

NORTHERN NEW YORK BEEKEEPING SEMINAR

The William H. Miner Agricultural Institute will be holding its annual beekeeping seminar on Saturday, April 27, 1985 at Miner Center auditorium in Chazy, NY from 8 a.m. until 5 p.m. Dr. Larry Connor, Beekeeping Education Service, will conduct the seminar entitled: "Bee Problems: How to Recognize and Solve Them." Registration is $10. Champlain Valley Beekeepers Association members will be charged $5.00. For further information contact: Loretta M. Suprenant, Miner Institute, Chazy, NY 12921, (518)846-8020.

Index to Display Advertisers

PACKAGE BEE SPECIAL

For Parcel Post Shipment or Pickup
MAY 15th TO JUNE 5th

Deduct $7.00 per package from our regular 1985 prices listed below. All orders shipped on first come . . . first served basis. Parcel post shipping charges are unchanged.

QUEEN BEE SPECIAL

MAY 15th TO SEPTEMBER 30th

1-5 . . . . . $5.00 EACH
6-24 . . . . . $4.00 EACH
25 up . . . . . $3.50 EACH

1985 PRICES (April 1st to May 14th)

BABCOCK GOLDEN ITALIANS are large golden yellow bees that are easy to handle, very gentle and produce very large colonies. They are extremely good honey producers developed from my top honey producing hives. They are "THE MOST BEAUTIFUL BEES IN THE WORLD."

BABCOCK IMPROVED SILVER GREY CARNIOLANS have been developed from hardy, tough strains from the far North and can be wintered very successfully outdoors in extremely cold temperatures. These large silver grey bees work equally well in hot or cool climates and are excellent honey producers. I believe my strain of Carniolans are the most Winter Hardy race in existence. These bees are extremely gentle and can be worked in good weather without smoker or veil.

BABCOCK RACIAL HYBRIDS are a true cross of my Silver Grey Carniolans and my Golden Yellow Italians. To obtain this cross bred hybrid, Carniolan queens are mated to Italian drones. This hybrid is a very prolific hard working bee developed for rigorous commercial honey production. This cross bred bee is very Winter Hardy and does well even under adverse conditions.

QUEENS — All of my queens are double grafted and are guaranteed mated and laying. My large 4-standard brood frame mating nucs allow me to carefully check the egg laying pattern of each selected queen before she is caged fresh and shipped to you via air-mail the same day. Fumidil-B is fed as a nosema preventative to all package colonies and queen mating nuclei. A government certificate of health inspection certifying our bees are free of all brood diseases as well as ACARINE mites accompanies all shipments. The state of South Carolina has never had a known case of honey bee trachael mites (Acarine Mite Disease). Queens clipped or marked or both, please add $1.00 for each package or extra queen.

Indicate your choice of race. Mixed orders will carry the quantity discounts.

1985 PRICES

Quantity	2-Lb. w/Queen	3-Lb. w/Queen	Extra Queens
1-9	$23.00	$27.00	$10.00
10-25	22.00	26.00	9.00
26-99	21.00	25.00	8.00
100-up	20.00	24.00	7.50

Add for shipping packages via parcel post:

1-2 lb.	$4.60	3-2 lb.	$7.90	2-3 lb.	$7.70
2-2 lb.	$6.80	1-3 lb.	$5.50	3-3 lb.	$8.80

Add shipping prices to packages if ordering by mail: Shipping charges include postage, insurance, special handling fees, and handling charges. Insurance coverage is for full value of bees only. Insurance does NOT cover shipping charges. Personal checks, money order or cashier's check accepted in U.S. currency only. Queens are postpaid and shipped air mail. Shipments begin April 1st. Please indicate desired shipping date.

HUCK BABCOCK — Queen Breeder

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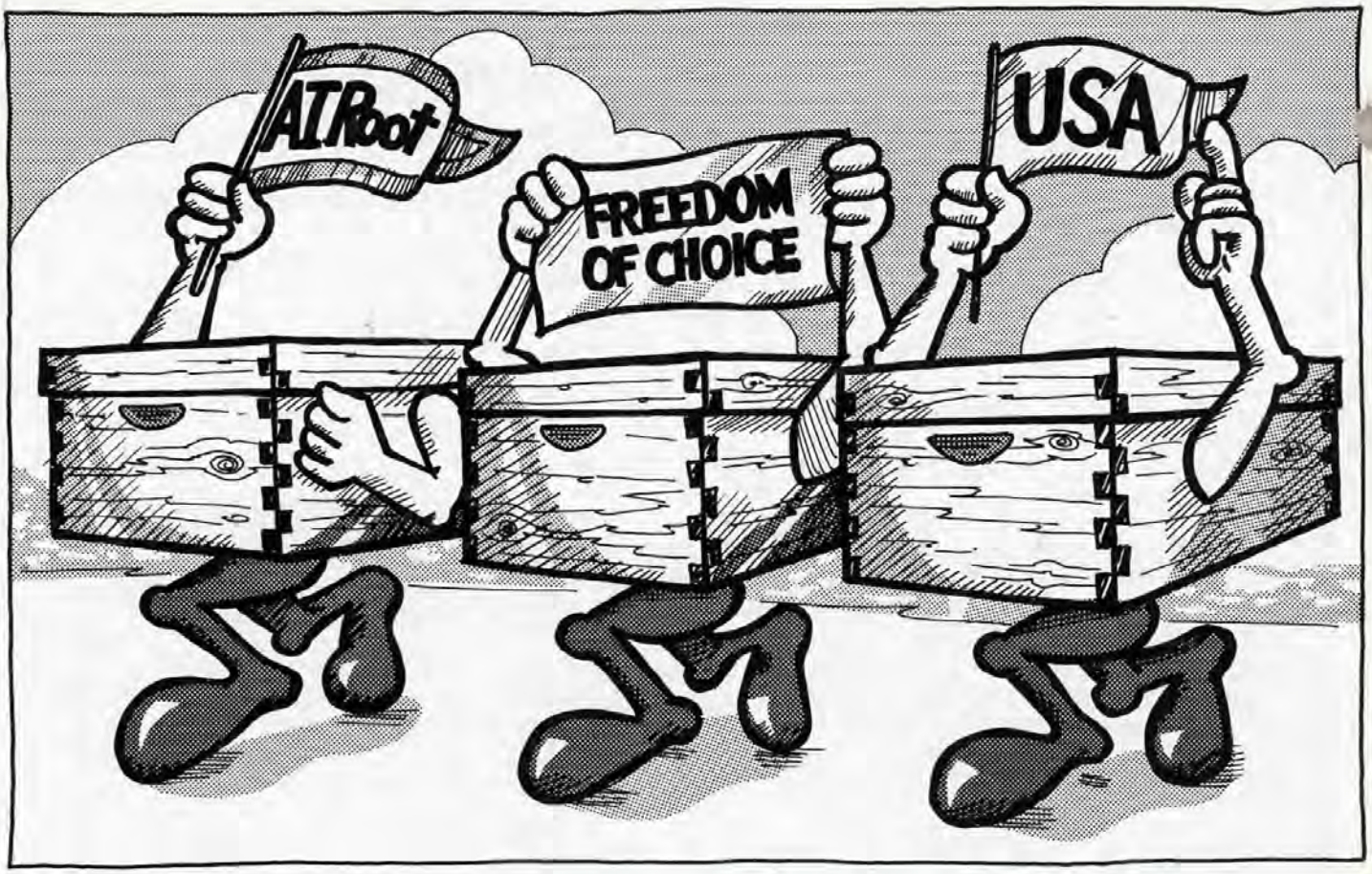
Office Phone — (803) 796-8988 Phone after 9 p.m. only (803) 256-2046



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A totally new Commercial Line of wooden hive equipment . . . from The A.I. Root Company . . . offers you new freedom in volume purchases, a choice you've never had before.

Now U.S. beekeepers have the equipment price stability and product availability that you need to be competitive in today's market.

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Effective immediately, you can buy A.I. Root Commercial Line supers, covers and bottom boards in lots of 100, and frames in lots of 1000 — all priced low at quantity discount levels.

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So in our Commercial Line we've emphasized function.

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You get the same true fit and solid construction for which A.I. Root is famous, but in your choice of three cost-saving grades of wood.

Of course, The Root Company continues to offer its other high quality line of wood products. Our new line simply provides choices you need to stay competitive and control your costs.

Write today to your nearest A.I. Root location for free price lists and product specifications.

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