APR 1996

Bee Culture

1996
Who's Who In Apiculture

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

APRIL 1996 VOLUME 124 NUMBER 4

FEATURES

COVER

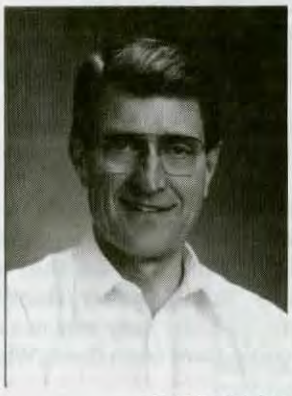
Dandelions are certainly the most obvious Spring flower. It is impossible to tell how many bees are produced each year from this imported-by-accident composite. But one thing is for sure – you know it's only going to get better when they appear

photo by Kim Flottum

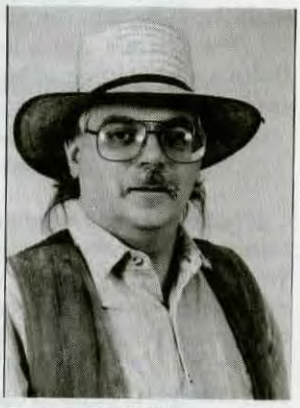
1996 WHO'S WHO IN APICULTURE

DEPARTMENTS

COLUMNS



JOHN ROOT
Publisher



KIM FLOTTUM
Editor

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INNER COVER

There's a story about C.C. Miller, the author of several books on beekeeping, most notably '50 years Among The Bees,' who while attending a beekeeper's meeting with several hundred in attendance commented on the vast amount of silver in the audience. It is a comment still heard when ever beekeepers gather. There's just not enough young people getting into the business.

And this isn't limited to beekeeping. Nearly every arm of agriculture makes the same claim. Lack of opportunity, lack of desire, prohibitive start-up costs . . . all are cited as reasons for the dearth of youth in our farm culture.

There's a lot of truth to this. Farms, and farmers are declining in numbers, although farming isn't changing much – we still produce lots of food and fiber (and honey), but we're doing it on less land and with fewer people.

That's why, when you see something that goes against the norm, that argues with this conventional wisdom, you notice. And I noticed something recently.

There's a group that holds an annual all-day workshop near here. They've been doing it for nearly 20 years, and it's become a pretty big event. Nearly three hundred interested people show up for a day of how-to workshops, famous speakers, contests and conversation.

I've been to nearly all of them since I've been here, eight of 10 I think, and after awhile you begin to notice some patterns. Some are predictable and are evident at most gatherings. But some, one in particular actually, stand out as unique to a place, a time, a face.

Early on in this relationship I noticed a group who were always together. An older (by my definition a decade ago) man and four or five middle school/high school age boys. Over the years, a couple of the boys quit coming, but some still did, always with the man who, I guessed was a father or uncle.

A few years ago the boys came alone. I didn't notice for awhile, but soon it was evident. Then, only a couple of the now college age kids came. Then, only one.

But this year, there was a change. A major change. The lone survivor wasn't alone this year. He, his wife and their first child were there, sitting in the audience, attending the workshops and looking at the displays. They spent the whole day together, taking turns with the baby and the stroller and the diaper bag.

Yes, there's still a lot of silver out there in the audience. But there's a sprinkling of baby powder, too. And that's not a bad foundation for a future.

•

In the January and February issues we published articles examining wooden equipment, beginner's kits, and bee supply catalogs. We did a pretty good job of what we wanted to do. But, we didn't do everything we probably could have. But to do everything would have been really, really difficult. So we took the easy way out and accomplished only 90% or so of what could have been done. What else, you ask, should have been done?

Well, we only looked at *some* of the businesses in this industry that publish catalogs, and sell beginner's kits. Our goal, which I strongly feel we accomplished, was to make you aware of the differences in the wooden equipment produced in this country. There are differences, that's obvious. What we didn't say, and should have, is that although we looked at manufacturers (for the most part), many, many outlets buy and resell wooden equipment to beekeepers, everyday, in every state. And although they weren't mentioned the equipment they sell is the equipment we looked at. Though not advertised these outlets, distributors, dealers and businesses don't hide it, either. All you have to do is ask.

In a similar vein, beginner's kits were examined, not for who makes them, but what's in them. Some equipment, by our standards, does not prepare a new beekeeper for the task at hand. Our goal here was not so much to convince you, but to encourage catalog producers to see our point, and why. Further, a business that sells a top shelf kit rather than a how-cheap-can-I-make-it kit should shout it from the roof tops (hive covers?) They are at a definite advantage over their competition, and a satisfied first-time customer is a repeat customer.

Finally, we wanted you to come away from these articles just a bit skeptical. Ask questions, the right questions, and you won't be disappointed when you buy – no matter where you buy. Consider price, freight, quality, fitness, service, knowledge and the experiences of other customers, and most of all your own.

Kim Flottum

Traditions

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Bee Culture

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Publisher . . . . . **John Root**

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Editor . . . . . **Kim Flottum**

Production Coordinator . . . . . **Kathy Summers**

Photo Reproduction . . . **Moonlight Graphics**

Circulation & Advertising . . . . . **Dawn Feagan**

Publications Assistant . . . . . **Mary Weigley**

Contributors . . . . . **Richard Bonney**
Roger Morse
Richard Taylor
Mark Winston
Clarence Collison
Ann Harman
B.A. Stringer

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MAILBOX

Do Bees Move Eggs?

At the recent American Federation meeting in Portland, one of the workshop leaders said that if you should put a cell bar with plastic cell caps (like those used to accept grafted larvae in queen rearing) in a queenright hive the queen would lay eggs in these cups. Although I don't recall his saying that the bees would draw out and finish the queen cells, the slide that was projected on the screen showed a half dozen or more finished cells. He also said that if the cell bar with plastic cups were placed in a colony and the queen simultaneously removed, that the bees would take eggs from worker cells and place them in the cups from which queens would be reared.

When I challenged the statement, the group was told by the leader that he had observed this behavior in his observation hive many times and that it was not uncommon.

Frankly as a beekeeper for over 60 years I've seen literally thousands of natural queen cups but have never felt that the queen laid in any of them except under the swarming or supercedure impulse.

Over the years I have read of infrequent cases where the moving of worker eggs by bees was claimed, but I generally dismissed the claims as poor observation, leaking queen excluders, failure to recall the transfer of a comb which possibly contained worker eggs, the belief that a vertical emergency cell must have resulted from an egg being transferred from a worker cell to the vertical cell, or from mixing the possibility of two laying queens in the hive (a report in recent years indicates this is far more common than many of us, myself included, thought possible).

I don't believe that either of the two instances I am reporting have happened. Because I didn't think they would happen I have never set up an observation hive with the necessary cell bars and cups to check for this behavior.

I have a younger brother who, as a teenager, would often settle differences of opinion with me by saying, "I am not positive, but I would stake my life on it." In the present situation I am not positive, but it would take some compelling evidence to convince me otherwise.

I am soliciting correspondence either supporting or challenging the two claims I have presented. Start out with your name, address, years experience as a beekeeper, most colonies at one time and any other pertinent information. Respond particularly to the previously stated reasons for discrediting these claims. Personal experiences only, but feel free to give me the names and addresses of others who claim these experiences. I will try to contact them. A citation from commonly available bee books, magazines and/or publications would be helpful.

I am not positive, but . . .
Walter Peterson, 6603 S. Conklin
Greenacres, WA 99016

Wooden World Comments

The article in the January, 96 issue of *Bee Culture* by Richard Bonney, "Wooden World II" is a very worthy article for anybody involved in beekeeping, novice as well as commercial. If I had this article 12 years ago it would have saved me a lot of confusion and time, as that is when we got our first hive of bees, which was a complete beginners kit from The Walter Kelley Co. As we expanded I bought some new equipment at a public auction which turned out to be equipment from a couple of different companies. Then is when I discovered what Richard points out. Standard equipment varies slightly from one company to the next, enough that the bees will build lots of burr comb if it is mixed. To solve the problem I buy my wooden supplies from one company.

I have tried wax coated plastic foundation and agree whole heartedly with Richard. In my experience keep the plastic out of the hive, the sheets of pure wax (wired with hooks) can not be beat.

The subject about nailing the frames is also an important but often neglected one. The ninth and tenth nail driven in the end of the top bar are very important as Richard explains. It prevents the top from being pulled off when removing a propolized frame.

Over the years I have become "sold" on the divided bottom bar for brood as well as super frames. The advantage is the divided bottom holds the sheet of wax in place at the bottom and also if there is a slight variation in the frames or wax sheets it lets the wax go on through and does not tend to bulge the sheet in the middle.

Last but not least, thanks for a great magazine.

Keep up the good work.

Albert Hilty
Bowling Green, MO

Mail Order Hints

I enjoy your journal very much and am renewing my subscription.

You are doing a wonderful job.

A few years ago I bought an extractor from a company called Apicom. They sell some mighty fine equipment and stand behind their product. I could not be more pleased with the way they did me. I have done business with some fine companies through this magazine. A while back I was disappointed when I shipped some wax to MN. I was quoted one price and before my wax got there it went down. After paying high shipping cost it wasn't worth shipping up there. Please let your readers know that the price over the phone will likely not be the price they receive. It's a new lesson for me. Thanks for a nice job with the journal.

Monte Abbot

Continued on Next Page

MAILBOX

Quality Problems

The article entitled Woodenworld II, January 96 missed my gripe.

You get several supers of frames nailed up and when installing foundation, find half of the frames in a twist. This was found in several successive orders.

Another is the slitting of bottom bars for nailing. Of my last order, only 10% were slit deep enough to utilize.

Their foundation managers have to be unqualified in my eyes. Their concern being the numbers at end of shift, whether meeting specifications or not.

John Schneider
Smithton, IL

More Southern Exposure

Thanks for a wonderful magazine! I've been a hobby beekeeper since 1993 and a subscriber to *Bee Culture* since 1994. Your magazine is where I turn when I need advice and a connection to other beekeepers. Keep up the good work and I look forward to future issues.

I would like to see more articles about beekeeping in the south. We feel a little left out. Maybe something from those many Extension people in the south. After all, aren't most bees up North just transplanted Southerners?

Cheryl Wilkinson
Arley, AL

Better Communication

An article Kendal Smucker wrote in March Mailbox prompted me to put in my bit for what it is worth. I agree with him that many researchers probably could help beekeepers if they would share their findings more and in terms we could understand.

I have gone to many bee meetings only to wonder what I had learned if anything even when the speaker had a good program but was to deep for my thick head.

I have been going to many meetings lately, trying to learn more about both tracheal and *Varroa* mites, hoping someone can give me an answer that will work. I hear all the time to follow label directions so as not to cause resistant mites.

What I want to know is, is it more important to have unresistant mites or live bees? I really don't think the bees care one way or the other when dead.

Willie Williams
Lexington, OH

Observation Hive Hints

My observation hive kit has two defects worth alerting your readers to. First, and most serious, is the spacing between the glass panes.

If you look down on frame number 2, say, of a 10-frame hive, you will see about 3/8" space between the top bars of frames 1 and 2. If a bee is crawling up on frame no. 2, she will have that much space through which to move. But that space was not created by the end bars of frame no. 2 but by the combination of those bars on frames 1 *and* 2. If that frame no. 2 is installed in an observation hive, then, the space on each side of the top bar between it and the glass must be 3/8", not the 3/16" provided by the frame's own end bars. The grooves for the glass in the kit I used are wide enough for the frame, 1-1/2", but not the 1-7/8" required to duplicate the spaces provided by a full size hive arrangement. There is no practical way to correct this error so anyone buying an observation hive or kit will be very sorry if they don't ascertain in advance that the space between the two glass grooves is 1-7/8"

The second error concerns vertical spaces. Happily, they are correctable. The design did not respect bee space so the bees always built burr comb between the two (superimposed) frames and sometimes below the bottom one. The solution was simple enough though drastic: Saw 7/8" off the end pieces of the "brood chamber" and 1/2" off the "super." These changes provided spaces of 3/8" between the two frames, below the bottom one and above the top one.

Dan Hendricks
Mercer Island, WA 980040

Needs More Information

I would like to put my two cents worth in about your November 1995 editorial. I agree with you completely about the hundreds of hours of study and research that gets done about bees and never gets out to the average beekeeper.

I am fairly new to beekeeping, so I know I have a lot to learn. I subscribe to several beekeeping publications, and have purchased and read more than a few books on bees and beekeeping. I belong to several beekeeping organizations at the local, state and national level, and attend as many of their meetings as I can. I am gaining a wealth of valuable knowledge from all of this and as a result have had the opportunity to speak to some of the "top" people in beekeeping. What bothers me is that I will always ask people a question or two about a particular subject pertaining to bees that I have not found anything written about. Such as "has any research been done about how temperature and humidity effects a hive, the effects of mites on honey production, etc." Or, "how exactly does menthol in a hive reduce the mite population?" and I am always told there has been lots of research done on that subject. Where is this information? We need to get this information to the average beekeeper so we can all benefit from it. Even research that fails has value, but we need to be aware of it.

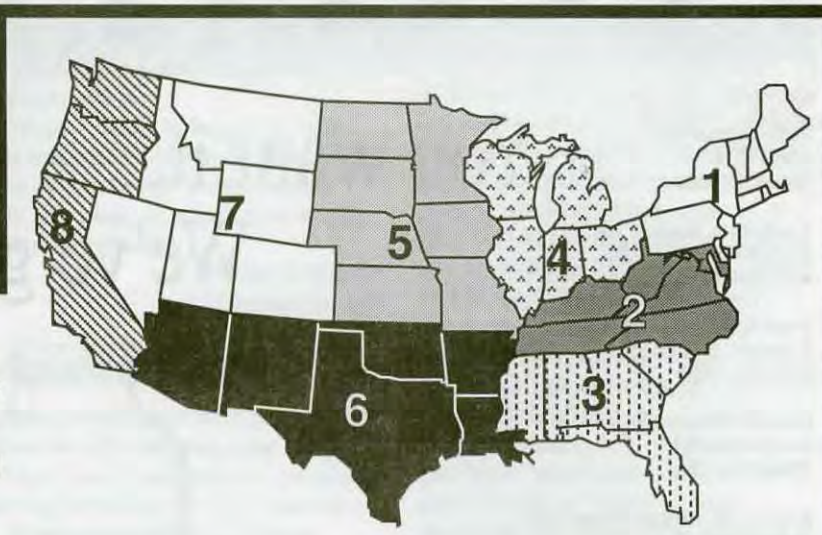
How thankful I am beekeepers from the past took time to try new ideas and write about them. A.I. Root tried several ways to overwinter bees both inside and outside, and he wrote about his failures and his successes. Dr. C.C. Miller wrote about his trials with swarm control, what worked and what did not prevent swarming. This was all new information at the time, but it sure helped me see what ideas worked and what did not, even if it was written almost 100 years ago.

Thanks to all researchers who provide information to us "Common Beekeepers". Keep the information flowing. Now, if I could only find where the research is that answers all of those little questions of mine.

Rick Mace
Valley City, OH

APRIL Honey Report

APRIL 1, 1996



REPORT FEATURES

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

	Reporting Regions								Summary		History	
	1	2	3	4	5	6	7	8			Last	Last
Extracted honey sold bulk to Packers or Processors									Range	Avg.	Month	Yr.
Wholesale Bulk												
60# Light	62.50	47.19	60.00	57.88	45.60	43.40	50.00	45.50	36.00-69.00	47.98	48.03	41.49
60# Amber	60.00	51.94	60.00	57.56	47.50	40.37	47.50	43.75	34.00-58.00	45.61	46.26	39.97
55 gal. Light	0.72	0.65	0.76	0.94	0.78	0.56	0.68	0.69	0.52-1.01	0.67	0.70	0.57
55 gal. Amber	0.69	0.65	0.74	0.92	0.77	0.58	0.65	0.65	0.42-0.78	0.62	0.67	0.53
Wholesale - Case Lots												
1/2# 24's	22.64	24.05	22.00	23.67	23.55	23.05	25.50	23.73	19.75-25.00	22.50	22.97	20.14
1# 24's	33.61	34.07	33.50	35.83	35.16	34.50	32.10	33.23	16.20-37.90	32.57	34.09	30.10
2# 12's	29.87	29.64	30.00	30.76	31.20	31.85	34.50	30.35	28.50-33.80	30.89	31.85	28.25
12 oz. Plas. 24's	29.03	29.25	30.00	31.56	24.72	27.80	27.95	27.53	24.72-38.40	29.02	29.61	26.95
5# 6's	32.24	34.88	34.50	33.99	34.80	28.55	31.50	32.00	21.00-36.95	31.78	32.43	30.16
Retail Honey Prices												
1/2#	1.45	1.54	1.61	1.55	1.18	1.61	1.29	1.33	0.98-3.50	1.52	1.48	1.33
12 oz. Plastic	1.82	1.90	2.20	1.91	1.57	1.71	1.75	1.78	1.38-2.50	1.74	1.85	1.60
1 lb. Glass	2.12	2.31	2.27	2.15	2.19	2.01	1.95	2.16	1.19-2.75	2.00	2.16	1.79
2 lb. Glass	3.51	3.89	3.54	4.01	3.17	3.23	3.25	3.57	2.89-4.00	3.43	3.61	3.08
3 lb. Glass	4.48	5.06	4.66	4.76	4.30	4.04	4.50	4.87	3.50-5.80	4.59	4.65	4.45
4 lb. Glass	5.51	5.74	6.00	6.35	5.48	5.34	5.45	5.60	4.95-6.30	5.62	6.11	5.54
5 lb. Glass	7.05	7.56	6.83	7.58	6.24	6.08	6.95	7.64	5.50-9.75	7.08	6.92	6.62
1# Cream	2.60	3.23	2.97	2.13	2.12	2.73	2.75	3.07	1.58-3.95	2.57	2.51	2.19
1# Comb	3.48	3.30	3.50	3.81	2.35	4.43	4.50	3.16	1.95-5.00	3.35	3.73	3.24
Round Plastic	3.10	2.50	4.00	3.38	2.83	4.13	3.41	2.75	1.70-5.00	3.05	3.20	3.04
Wax (Light)	2.18	1.67	2.65	2.83	2.25	1.63	1.90	2.20	1.00-3.95	1.88	2.11	1.66
Wax (Dark)	1.75	1.52	1.76	2.15	2.00	1.26	1.85	2.04	0.75-3.25	1.54	1.69	1.35
Poll. Fee/Col.	29.78	26.33	33.67	32.50	28.00	15.00	35.00	30.25	10.00-55.00	30.25	34.74	30.86

MARKET SHARE

House cleaning this month. Need reporters in region 7, retail and wholesale. Same for region 3. Bulk sales beginning to slow as price resistance starts to build. Imports from Argentina, etc. slow to get here keeping supplies low. China production down, probably less than last year – producers out of business from too-low prices and export quality standards. U.S. prices will remain high through end of year, at least.

Region 1

Prices still creeping up at both wholesale and retail levels. Demand steady to just a bit lower because supplies adequate, if not abundant. Colony conditions appear average for cluster size and condition. Treatment beginning in March for mites. Some areas of high losses reported due to mites, and poorly timed treatment last fall.

Region 2

Prices steady to down a bit as weather warms, but supplies very low until first harvest. Demand steady to a bit lower, keeping prices steady. Colonies in generally good condition as early pollen helps build up. Losses in the 20-30% range, higher for smaller operations.

Region 3

Prices, especially for bulk way up. Retail steady as demand softens. Colony conditions strong with early flows, but last year's supplies nearly gone.

Region 4

Prices rising sharply as supply nearly gone and demand steady to increasing. Wholesale sales slowing with price increases, retail about the same. Colony conditions mixed, with very heavy losses reported in many areas. Careful treatment last fall results in low losses, though.

Region 5

Prices steady to up a bit especially bulk. Demand for bulk slowing, retail steady to slowing. Colony losses to mites very high, especially in northern area.

Region 6

Prices generally up, especially bulk, but sales slower than anticipated and supplies generally alright. Colony conditions mixed, but those who treated better off than those not.

Region 7

Prices steady, real steady. Demand steady to decreasing a bit, but wholesale prices increasing a bit. Colony conditions mixed, sorted out by northern and higher altitude areas vs. southern and low areas – bad, and good, respectively.

Region 8

Prices all over the map. Wholesale up, or down, depending on local demand. Retail strong, along with demand. Supplies generally short all over. Colony conditions for locals generally good migrating losses are much higher on average.

Guest Editorial by Steven Tuttle

Mite Solution Q & A

A considerable bit of controversy has surrounded the product called 'Mite Solution'. Below are those most often asked questions, and my answers concerning this product.

Q. What is "Mite Solution™?"
A. "Mite Solution" is made from the extract of leaves of a sub-tropical bush. The leaves are still used by the local population to rid themselves of mites, lice and other insects, as a poultice for treating cuts and abrasions, and as a tea for treating various stomach problems. The active ingredient has not yet been synthesized. It has a pH of between 7.2 and 7.4 (water is 7.0). A very small amount of the extract is mixed with a carrier (petroleum jelly, for instance), to produce the product.

Q. How was "Mite Solution™" discovered?
A. I had been experiencing colony losses of around 50% for several years due to mites when I met someone familiar with the plant, and its ability to treat people for various problems – including mites and lice.
I obtained some extract and performed the following test. Anyone can do this.
I collected some mite-infested bees and put them in a small container. I then introduced a very small amount of the extract into the container, *not on the bees.* Mites fell from the bees almost immediately, and died. The bees appeared unharmed.

Q. Is "Mite Solution" a registered pesticide?
A. No, Mite Solution" has not completed the registration process. However it is not sold, nor advertised as a pesticide. The tests and studies performed thus far have met with EPA and FDA approval in that it does not contaminate honey, is safe for humans to use and, in fact, reduces mite populations in a colony. Application of this product, like application of water to a thirsty colony, promotes good health, and healthy bees are better able to deal with stresses in the colony.

Q. Can I use this product during a honey flow?
A. We do not suggest using any product in a colony during a honey flow when that honey is to be harvested.

Q. How is the product applied?
A. "Mite Solution" can be spread on a plastic mat at the entrance of a colony, or applied to mouse guards at the entrance of a colony. Bees must come in contact with it to have its healthful effects.

Q. Why haven't other scientific agencies tested this product?
A. We have submitted the product to several state and federal agencies, who have not yet completed studies. As with any project, they need personnel and funding to conduct research. We have not been able to supply these, so will wait until they finish.

Q. Where has this product been tested?
A. Our own research, plus the reports and results of hundreds of trial users, on thousands of colonies have convinced us, the FDA and the EPA that this product has merit.

New For You

Seeley, T.D. *The Wisdom of the Hive.* Harvard University Press, Cambridge. ISBN 0-674-95376-2. 295 pages. Illustrated. 1995.

The Wisdom of the Hive is the carefully selected title for a new book by Thomas Seeley. It focuses on the "complex process of food collection" by honey bees. Over the past 15 years Seeley has researched and shown how bees in a colony exploit the best food sources that are available to them in an area covering at least 36 square miles. What is remarkable is that there is a simple system of scouting followed by an efficient system of directing the foraging force to take advantage of new sources of food as they are discovered. Seeley leads you through the process step by step.

The book is divided into three parts. Part 1 is made up of three chapters that provide background in biology and biological theory that is prevalent today. Seeley asks why evolution has favored the formation of more complex forms of life. The answer is that more complicated animals and highly evolved societies are better able to cope with such problems as foraging, which he sets about to demonstrate.

I suggest that you start to study this book by turning to page 58 and a series of six colored plates that are maps of a single colony's foraging sites over a period of six days. Each plate records the dances observed for one day as performed by the nectar and pollen foraging scouts. What is remarkable is how the bulk of the foraging force works in a different area each day taking advantage of the best sources of food that are available and that are discovered by the scouts. Each plate is accompanied by a paragraph that considers the weather and the changes that are taking place in the foraging behavior.

Part 2 of this text starts with a chapter on equipment and techniques that are used to study honey bee behavior. In his preface, Seeley makes it clear that the honey bee is easily studied because the formal, rigid organization of its nest is such that it can be assembled and disassembled with ease. Seeley's favorite tool is a small, two-frame, glass-walled observation hive that may contain only a few thousand bees but which repeated experiments show operates in the same manner as does a larger unit with 10 times as many bees. By taking a single hive into the Adirondack Mountains of New York State, where there are no other honey bees, he can undertake experiments without the forces exorted by other bees foraging in the same area.

Chapters 5 through 9 summarize 15 years of experiments by Seeley, his associates, and students. The first of these chapters deals with how a colony acquires information about a food source, how the information is shared, how the scouts transmit information about the profitability of a food source, and finally how this is judged by the bees that are recruited to exploit the source.

Subsequent chapters deal with the coordination of nectar collecting and processing, the regulation of comb building, and the regulation of pollen and water collection. Each of

Contined On Page 213

Bee Cool Hive Ventilator, GDS Manufacturing, P.O. Box 663, Williston, VT 05495

The Bee Cool Hive Ventilator (BCHV) operates on the principal that beehives need continuous inside air replacement to keep internal temperature and humidity at optimal levels for brood rearing, nectar dehydration and water use. If an optimal temperature can be maintained fewer bees will be required for water gathering, ventilation (fanning) and other maintenance chores. This, claims the manufacturer, leads to increased honey production because fewer bees are maintaining the internal environment, and are, instead, intent on making honey.

Hive ventilation is important, and the standard Langstroth hive is not the best at promoting a good internal environment. Over the years various systems have been produced that increase internal ventilation, most of them working on the passive, or conductive principle. That is, warm, moist air rises. Some systems have sensors that open or close external ports to allow warm, moist air to escape at a faster than normal rate. While others have redesigned the interior and increased the number or size of escape vents. These still work on the convective principle. There are, undoubtedly, other designs.

The main difference between these and the BCHV is that it is an active system. When the temperature (and thus, humidity?) reaches a certain level inside, a small, solar powered fan switches on and actively removes internal air out the top drawing in external air from the bottom. Convective air flow essentially ceases when outside conditions exceed 90°F, so bees must fan. This does not occur with this active system.

Preliminary tests indicate increased honey production from colonies equipped with this device, and there is a small tax incentive for using solar power if you own your business.

The unit is well designed and ruggedly constructed so it should last many years of somewhat careful use.

Roger Morse

Research Review

"The number of breweries that use honey in their beer is beyond counting."

The number of companies and people making honey wine (mead) and honey beer is exploding. The January 1996 issue of *Inside Mead*, the quarterly publication of the American Mead Association, lists 20 firms that make and market mead, and I am aware of at least one more. The number of breweries, large and small, that use honey in their beer is beyond counting.

The reason for this great interest is in large part the new technology in mead making, ultrafiltration, pioneered by Robert Kime of Cornell University's Agricultural Experiment Station at Geneva, New York. Ultrafiltration of the honey-water mixture prior to the fermentation removes the protein that otherwise causes new mead to turn cloudy. It also reduces the aging time. Most important is the fact that the mead made using ultrafiltration has a fine flavor that competes well with many of the light table wines on the market.

Ultrafiltration involves passing a liquid, in this case the honey-water mixture that is to be fermented, through membranes that remove certain compounds (particles) according to their size. You may vary the size particle to be removed by selecting different membranes. The proper cutoff for making mead is 50K. The flow design allows for a sweeping action that self-cleans the membrane surface.

History

Alcoholic beverages made with honey are not new. It is generally agreed that diluted honey was probably used in the first alcoholic beverage made by our ancestors 10,000 or more years ago. In the beginning of our history, there were very few sweet fruits, and the grains that are used in beer and whiskey making today were still small, unselected and not available in quantity. An even greater problem for our forbearers is that they had no equipment to press the fruits or to convert the starch in the grain into sugar that could be fermented.

On the other hand, an upside-down honey bee nest in a hollow tree has been waterproofed with propolis by the bees and makes a perfect fermentation vessel. Almost no knowledge or technology is necessary. It is only necessary to fill the upside-down nest with water, and the fermentation will take place naturally producing a 10 to 12 percent alcoholic beverage within about two weeks. The water will drive the bees away and force them to build a new nest elsewhere.

The first alcoholic beverages made by people were murky and probably a bit bitter because of the dissolved pollen, brood and comb parts. There was probably also some acetic acid present that may have given it a vinegarish taste. You can still find honey beer being made in wooden barrels in many parts of Africa using techniques that are probably 10,000 years old. I have tasted this stuff, which is drinkable, but it is not my preferred beverage by far.

Mead in North Europe

It is impossible to know if it was the British, the Polish or the Scandinavians who made the first mead about a thousand years ago. People from these three areas were constantly feuding and raiding one another and no doubt wherever it was discovered, the information spread rapidly to the other areas.

It was learned at that time that by boiling the honey-water mixture, one could precipitate the protein in the honey that otherwise caused the new mead to become cloudy even though it may have been crystal-clear soon after it was made. In several European countries, and even in a few American meaderies, mead is still being made by this thousand-year-old technique today. The problem with boiling is at least twofold. The sugar fructose in the honey is delicate and is clearly damaged by high temperatures. But this fact is well-known in the beekeeping community, and the direct heating of honey by steam or electricity should be avoided at all cost.

The second major problem with boiling the honey-water mixture is that a long aging time is required. It is my experience that mead made in this manner should be aged for five to eight *years*, which is scarcely practical in today's world.

The New Technology

It has been demonstrated by Kime and his associates that passing the honey-water solution through an ultrafiltration membrane prior to the fermentation resulted in a crystal-clear product after the fermentation. There is no need for the lengthy aging and stabilization period that is used in making conventional mead by the boiling method; however, it is my opinion that aging for a year is desirable. This in part depends on the type of honey used and whether or not fruit juice is added.

The problem with ultrafiltration is that the equipment that is used is costly, so much so that it is not prac-

tical for home mead makers. I have heard that some companies may sell ultrafiltered honey-water to home mead makers, but I have not been able to find any details.

Further Information

There are several sources of information for those who wish to investigate mead and beer making with honey. I suggest a good place to start is with the journals that carry a number of ads that give further information. *Inside Mead* (4 issues per year) and *Meadmaker's Journal* (5 issues per year) are available from the American Mead Assn., P.O. Box 4666, Grand Junction, CO 81502 for $20 a year. The January 1996 issue of *Inside Mead* lists the known mead making companies. Some of these meaderies ship their products to private residences. Articles in these journals cover a wide range of interests. BC

Roger Morse is Estension Specialist in Apiculture, Cornell University, Ithaca, New York.

NEW ... Cont. From Pg. 211

the chapters that review research concludes with the summary, which is useful and helps you to understand the message.

Part 3 contains two chapters of overview. Near the end Seeley states that we might view a colony of bees as a bag of tricks that is "an almost bewildering bundle of special-purpose, tailor-made tricks, evolved through natural selection to solve the various problems faced by a colony." I recommend this book highly because of its clarity, ease of understanding, and the way in which the inner workings of a hive are exposed and explained.

Roger A. Morse

? DO YOU KNOW ?

Pollination & Other Bees

Clarence Collison

In recent years there has been increased interest in several species of wild bees for the pollination of specific crops in which climatic conditions or crop characteristics prevent the honey bee from being an effective pollinator. In addition, the devastating impact mites have had on honey bee colony numbers have drastically reduced the number of colonies available for pollination. This has forced some growers to look for alternative pollinators to meet their needs. Even though there are about 3,500 species of wild bees in North America, they will not replace honey bees as our primary pollination specialist in the near future.

How well do you understand crop pollination and the management of various species of wild bees for pollination? Please take a few minutes and answer the following questions to determine how well you understand these important topics. The first fifteen questions are true or 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. ___ Hornfaced bees and blue orchard bees forage at lower temperatures than honey bees.
2. ___ The blue orchard bee or orchard mason bee (Osmia lignaria) is native to the United States.
3. ___ Bumble bees have annual colonies with queens and workers overwintering in the temperate climates.
4. ___ Leafcutter bees, bumble bees and honey bees provide parental care during brood rearing.
5. ___ Bumble bees are excellent pollinators of blueberry, cranberry and red clover since they have longer tongues than honey bees.
6. ___ Hornfaced bees (*Osmia cornifrons*) nests in hollow reeds, tubes and holes in wood.
7. ___ Bumble bees, like honey bees, recruit each other to food sources with communicative dances.
8. ___ Bumble bees are good pollinators of greenhouse tomatoes.
9. ___ The shaggy fuzzyfoot bee (*Anthophora pilipes villosula*) is managed for the pollination of alfalfa in the western part of the United States.
10. ___ Bees of the genus *Osmia* work faster than honey bees.
11. ___ Most apple varieties are self-fruitful.
12. ___ Alfalfa leafcutter bees and honey bees are susceptible to chalkbrood disease.
13. ___ The majority of species of wild bees are solitary and nest in the soil.
14. ___ Bumble bees tolerate bad weather and often forage during rain and strong winds.
15. ___ Bees of the genus *Osmia* pack and carry pollen back to the nest on their hind legs.

(Multiple Choice Questions- 1 point each)

16. ___ Bees that are known for cutting holes at the base of the flower petals of blueberries and other flowers, then stealing the nectar without coming in contact with the flowers sexual parts.
    A) Hornfaced Bees
    B) Carpenter Bees
    C) Bumble Bees
    D) Honey Bees
    E) Shaggy Fuzzyfoot Bees
17. Alkali bees are managed for the pollination of _____.
    A) Apples
    B) Blueberries
    C) Cranberries
    D) Almonds
    E) Alfalfa
18. Name the three types of blueberries grown in the United States. (3 points).
19. Some species of wild bees buzz-pollinate certain crops. Describe the mechanism of buzz-pollination and name one crop that benefits from this behavior. (2 points)
20. Several wild bee species nest gregariously. What is meant by this phrase? (1 point)
21. Why are honey bees more effective in the pollination of cucumbers and watermelons than they are squash and pumpkins? (2 points)

ANSWERS ON PAGE 239

Mark Winston

The Business of Research

Those of you who regularly read this column have figured out by now that I am a strong supporter of "bottom-line" research with societal relevance. However, I did not begin my academic career that way, and in fact buried deep beneath my exterior advocacy of applied research lies a secret persona I call "Academic Man." My first two undergraduate years were spent at one of the bastions of American ivory-tower intellectualized education, the University of Chicago. Our credo was to follow the "Life of the Mind," and an exciting Saturday night at the U. of C. was to spend the evening arguing about which university in the world had the best academic library.

I left after two years, transferring to the more real-world environment of Boston University. However, I still retain some admiration for a well-turned academic phrase, and I still value research for its own sake rather than only to solve a problem. While I believe that universities should be useful institutions, I believe the best way to be useful is to train students to think independently and with originality. Universities should not be manufacturing centers for technicians limited in their capabilities to doing only what they are told. Society is well-served by university graduates who consider the relevance of their work, but it is not well-served by graduates who are limited to performing techniques, and that only under someone else's direction.

The issue of how to train students to be original thinkers has become increasingly problematic in modern universities, for a simple reason. The current funding environment for Canadian university research requires that most of our grant applications to government agencies receive matching industry funding before they will be considered. In other words, we need to convince a business, commodity group or beekeeper/grower organization that our work is important enough to them to provide us with at least half of the dollars to conduct that work. The plus side of this funding formula is that it forces us to come up with projects that are of economic value to society. The down side is the danger that university research will become limited to end-user, immediate product-development work, and we'll miss all the basic research that used to be the foundation for commercial applications.

This trend is especially troubling for honey bee and pollination research, because beekeeper and grower organizations do not have much in the way of surplus funds to invest in research. In Canada, the quantity of research conducted that might benefit beekeepers has dropped by more than half just in the last year, and it's probably going to get worse, primarily because the beekeeping industry traditionally has not been able to provide much funding to support research.

I, like my colleagues, am becoming adept at balancing my mandate to educate students to become original thinkers with the reality that I won't be educating any thinkers at all, original or otherwise, unless industry is willing to foot part of the bill. The new funding reality has directed me to consider different types of projects than I usually might do, and has forced much of my laboratory's research into molds that are fundable. I find that I no longer think as much about what projects might be interesting and potentially important to conduct. Rather, I limit my thinking to projects that industry might fund.

Although industry funding provides some real limitations to what we can do, it is possible to direct students toward original research that both educates them and fulfills society's orders to do relevant research. However, my students' projects have subtly shifted in recent years in the crucible of industry involvement, and they have had to learn the importance of compromising their idealized projects when faced with funding realities. I involve my students in grant writing and negotiations with industry so that they can experience firsthand the give and take of real-world fund raising.

I don't know if the quality of our research projects has been improved by industry involvement or not, but it has been changed. For example, one of my students wanted to conduct a project to examine the use of the orchard bee *Osmia* as an alternative pollinator for apples. Beekeepers and growers are aware that honey bee colonies have not been as available for pollination as they were in pre-*Varroa* days, and both are concerned about shortages of honey bees for commercial pollination. However, the apple-grower organizations that we approached for funding were interested, but broke. The beekeepers

". . . my students' projects have subtly shifted in recent years in the crucible of industry involvement, and they have had to learn the importance of compromising their idealized projects when faced with funding realities."

had mixed feelings, and were not particularly enthusiastic about supporting research that, if successful, would provide alternatives to the honey bee.

The end result of these negotiations was that my student switched both her approach and the crop. Now, she will be working on blueberries, since blueberry growers in British Columbia have had a few good years recently, and had funds to invest in this project. The scope of the study also changed dramatically, so that now she will be comparing the efficacy of four bee species as managed pollinators, and testing methods of improving the pollination effectiveness of honey bees by removing pollen from colonies prior to and during blueberry bloom. In this case, lack of funding by apple growers, and objections by beekeepers, forced us to propose a very different study than we had conceived originally. Only time will tell whether the blueberry project will prove as worthwhile as the original apple project, but it is clear that funding from industry dictated what we will do in the end.

Another project in my laboratory that is being influenced by industry funding involves the pesticide neem. There is considerable interest among beekeepers in neem, because some preliminary studies have suggested that it might be useful against honey bee pests and diseases. One of my students has begun a project to evaluate the safety of neem for use in bee colonies as well as its effects on parasitic mites and bee diseases. However, we need dollars for his project, as for any research, and we conducted negotiations with a number of companies involved in neem sales in North America. One company was very interested, but backed out in the end because of legal concerns involving some hotly contested neem patent issues that are now moving through the courts. We finally concluded an agreement with an Australian-based company that hopes to supply neem to the North American market, but the "price" of this agreement is that we must use their product for tests, and also must negotiate with this group first should any patent or license potential result from this work. In this case, the industry involvement did not directly affect the immediate research we want to conduct, but may have some implications as to when and how widely the results get disseminated if we are successful.

I am about to embark on negotiations for another project, and perhaps the strongest evidence I can provide concerning the impact of industry funding on research is this: I can't tell you much about it. All I can tell you is that it involves using honey bees as a model system to test certain types of new human drugs, there is a collaborator from another university involved, and preliminary research in our laboratories has led us to believe that pharmaceutical companies may be very interested in this project. It also, by the way, is an exciting project because of what we may learn about honey bee biology, and this work ultimately might provide real breakthroughs in management for honey production and pollination.

You can see from this example the bind that university researchers are in today. Society has given us the mandate to educate and to stimulate, to provide exciting new knowledge using open discourse and free exchange of ideas. At the same time, we are not being provided with the funding to fulfill this mandate, but instead are being told to turn to industry, and accept the limitations on discussion and project direction that come when private business has an interest in university research. Previous funding came largely from government, and while industry funding was desirable, it was not required. Today, industry money is a necessary component for most grants, and our universities have established university-industry liaison offices, developed model contracts, and engaged patent attorneys to deal with the complex issues that arise when industry funding enters the university world.

I honestly don't know what I think of all this. My laboratory still seems the same to me: My students continue to discuss, argue and excite each other while pursuing their ideas. They continue to be interested in blending the pursuit of new knowledge with service to society by taking that knowledge and developing commercial applications. What I fear the most is that tomorrow's funding to maintain my laboratory may force us to become more secretive.

I wonder what discussions are taking place during late-night bull sessions at my old alma mater, the University of Chicago. Do students still wonder about where the best libraries are, or do they trade information about patent rights, license agreements and rumors of high-level deals that their professors are negotiating? We need to remember that "useful" research does not mean "secret," and that a university system in which an increasing proportion of research is tied up in contracts with private industry has lost something of what a university should be. In the end, the strongest defense our society has against research mediocrity is to encourage our students to expand their thinking beyond contract work and into the realm of the truly novel. The ivory tower never was a good model for universities, but the corporate office of a patent lawyer is not a good model, either. BC

Mark Winston is a professor and researcher at Simon Frazer Univ., Burnaby, B.C., Canada.

PROPER POLLINATION

Using a written contract is good business.

The phone rings at 10:30 at night. This follows . . .

"Hello, this John Grower, over in Lewistown. I have a 25-acre cucumber patch that I need bees for this summer, and my regular guy went out of business this winter. He said you had bees and I should call. Do you rent your bees? When can you get them here? How much do you charge? I can't afford much, you know, but I need real strong bees. Whaddaya say?"

Or . . .

"Hi, this is (a long time friend and neighbor who has kids in school the same age as yours, and belongs to the same church), and I've got a problem and you were the first person I thought of. You know those 50 apple trees I planted a few years back? Well . . ."

Either of these calls could put you in the pollination business – immediately – if you say yes without further thought. So, before you bite off more than you can chew, consider some of these not-so-visible aspects of getting into the business of pollination.

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Below is a list of questions you should be able to answer before you get involved in this business. There are probably others particular to your local area or season or regulations or . . . Find out as much as you can before you say, "Sure, no problem, I can do that easy!"

ABOUT YOU

- Are you seeking customers in order to increase your income?
- Do you have sound bee equipment that can stand moving (old bottom boards especially)?
- Do you actually have enough bees to do the job?
- Can you move bees – do you have a truck?
- Do you need somebody to help?
- Can you move at a moments notice in the middle of the night without warning?

YOUR RESPONSIBILITIES

- How many colonies can you commit?
- What is their strength? What did you agree to?
- Who will measure your colonies' strength?
- What happens if your colonies are weaker than you promise? Stronger?
- Can you get replacements?
- Are they healthy?
- How much will you charge? For weak colonies? For strong colonies?
- When do you get paid?
- Do you have insurance? For your truck? For liability for your bees? For your help?
- How fast can you move them out? In the middle of the night at a moment's notice?
- What do you know about the crop?

GROWER RESPONSIBILITIES

- Where is the crop? Where can you unload? Can you get in, in the middle of the night?
- When is delivery? When is removal?
- What about pesticides? How much notice will you get?
- Do you have to make extra moves? Do you get paid more?
- In-field location considerations:
  - irrigation – timing and runoff
  - tractor turnarounds
  - staging areas
  - ditches and colony accessibility
  - competing floral sources
  - flight path facing away from roads and workers
  - shade, low spots, flooding, vandalism
  - water sources

•

You can answer all (or almost all) of these questions with a good pollination contract. Even if you don't actually use one (remember your friend from church) going over one with him will bring to light many things neither of you probably thought about. And, it may give you some ideas on how to make the job easier for you and more productive for him.

For the grower you don't know, a pollination contract will show that you know and understand your side of the business, and are aware of the responsibilities both of you have regarding this business transaction.

Ultimately, you are providing a service for this grower – whether good friend or simply business. As such, you have the responsibility to provide what you say you will, when you say you will, the way you say you will. The other side then, should do the same, and once you have met your obligations, provide payment in full and on time.

A good pollination contract (see the sample, next page) will, in the long run save you money, labor and grief. Consider one this year. BC

Sample Pollination Contract

POLLINATION AGREEMENT

This agreement is made _____, 19___, between _____, and _____.

1. TERM OF AGREEMENT. The term of this agreement shall be for the 19 ___ growing season.

2. RESPONSIBILITIES OF THE BEEKEEPER:

a. The beekeeper shall supply the grower with _____ hives (colonies) of honey bees to be delivered to the _____ as follows:

(Fill in the appropriate line or lines and cross out those that do not apply)

Approximate date of introduction _____. Number of days after written notice from the grower _____.

Time in relation to the following amount of bloom _____

_____

DESCRIPTION OF LOCATION(S): _____
(For additional space attach a separate sheet dated and signed by both parties)

_____

The beekeeper shall locate said bees in accordance with directions of the grower, or, if none are given, according to his judgement in providing the maximum pollination coverage.

b. The beekeeper agrees to provide colonies of the following minimum standards:

Disease-free colonies with a laying queen as evidenced by brood

_____ frames with brood

_____ frames covered with adult bees

_____ pounds of honey stores or other food

_____ story hives

The beekeeper agrees to open and demonstrate the strength of colonies randomly selected by the grower.

c. The beekeeper agrees to maintain the bees in proper pollinating condition by judicious inspection and supering or honey removal as needed.

d. The beekeeper agrees to leave the bees on the crop until:

(Fill in the appropriate line or lines and cross out those that do not apply)

Approximate date of removal _____. Number of days of written notice from grower _____.

Time in relation to amount of crop bloom _____

Other _____

3. RESPONSIBILITIES FOR THE GROWER:

a. The grower agrees to provide a suitable place to locate the hives. The site must be accessible to a truck and/or other vehicles used in handling and servicing the colonies. The grower shall allow the beekeeper entry on the premises whenever necessary to service the bees, and the grower assumes full responsibility for all loss and damage to his fields or crops resulting from the use of trucks or other vehicles in handling and servicing such colonies of honey bees.

b. The grower agrees not to apply pesticides toxic to bees to the crop while the bees are being used as pollinators nor immediately prior to their movement into the field or orchard if the residue would endanger the colonies.

c. The following pesticides, other agricultural chemicals and methods of application are mutually agreed to be suitable while the bees are on the crop:

_____

_____

_____

d. The grower also agrees to properly dispose of all pesticide solutions in such a manner that bees will not be able to contact the material while searching for a water source.

e. The grower agrees to give the beekeeper a 48-hour notice if hazardous materials not listed on this contract need to be applied. The cost of moving the bees away from and back to the crop to prevent damage from toxic materials shall be borne by the grower.

f. The grower agrees to pay for _____ colonies of bees at the rate of $_____ per colony. Payment shall be made to the beekeeper as follows: $_____ per colony on delivery and the balance on or before _____ of said year. Additional moves or settings shall require $ _____ per hive per move.

g. The grower agrees to provide adequate watering facilities for the bees if none are available within one-half mile of each colony used in pollinating the crop.

Signed: _____ Date: _____

Address _____ Phone - Day: _____ Night: _____

Signed: _____ Date: _____

Address _____ Phone - Day: _____ Night: _____

_____

A Grower's Dozen Do's

Notice unexpected colony removal.
Notice rain water accumulation.
Turn entrances toward the field, away from roads.
Establish flight paths and locations away from dwellings, parking lots, vehicular and foot traffic.
Avoid shady locations and low spots.
Provide "drives" for bee trucks and specific, enlarged "bee drops" in the field.
Inform beekeeper of scheduled irrigations and schedule changes that may occur.
Discourage drifting by marking hives, spacing hives irregularly, or providing landmarks in the field.
Choose "staging" areas carefully. High densities of homes won't tolerate hundreds of hives nearby.
Avoid visibility of hives when possible.
Avoid excessively traveled roads over flight, especially at passenger level (so bees do not get killed).
Avoid pesticide losses to your beneficial pollinators, including honey bee

POLLINATING CUCUMBERS

Kim Flottum

The common cucumber, *Cucumis sativus* is a member of the cucurbit family. It is monoecious (male and female flowers on the same plant), and requires insect assisted transfer of pollen from the staminate (male) flower to the pistillate (female) flower to set fruit. Although other insect pollinators are capable of this transfer, in a large commercial field there are never enough of them to do the job. It has been recognized for years that honey bees are efficient, and necessary to produce a crop.

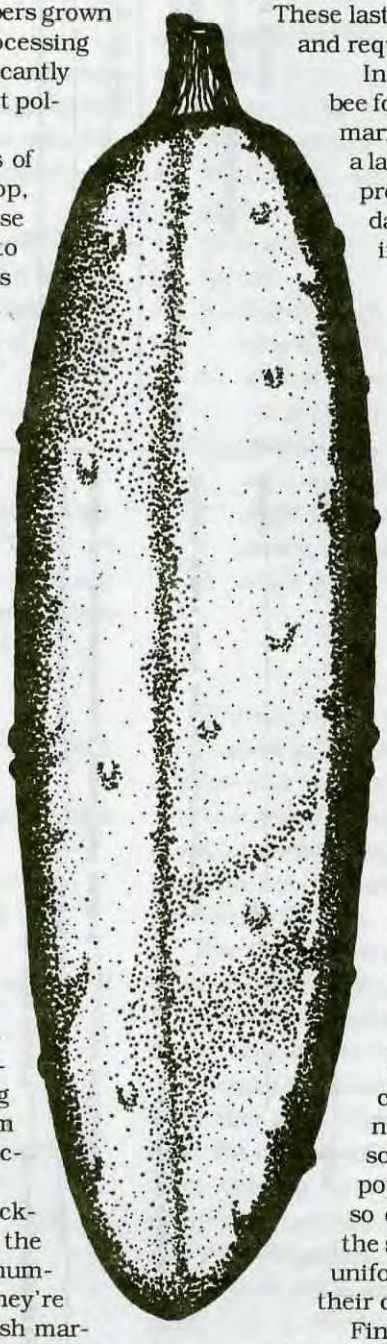
There are basically two types of cucumbers grown – those for fresh market, and those for processing into pickles. They are grown under two significantly different management practices, which affect pollination requirements.

The most common cucumber, in terms of visibility, is the traditional fresh market crop, grown on about 60,000 acres each year. These typically have 36" between rows, and eight to 12" between plants. This allows pickers enough space to work as they sort through the vines several times a season searching for the right sized fruit. This produces about 14,500 plants/acre, yielding between 12 and 25 thousand pounds of fruit, depending on harvest size and weather.

Processing cukes, those turned into pickles, are grown on about 110,000 acres in the U.S. and constitute the majority of pollination contracts. Processing cukes are generally grown commercially, in large, monoculture situations. They are also grown at much higher plant densities than fresh market crops. Spacing is usually 20" between rows and three inches between plants. This produces over 100,000 plants per acre.

There are significant differences between fresh and processing cucumber cultures that affect your pollination strategy. About 90% of the plants in a processing field are gynoecious, or female-only, the remaining are monoecious, supplying the male, pollen-bearing flowers. However, because of the incredible density, these plants only produce a couple of fruit per plant. Further, processing cukes are most often machine harvested in a single pass, destroying the plants. Because of this, rapid and uniform pollination is required for maximum production.

The window between pollination and picking is fairly small – only five to ten days if the weather cooperates. It's clear that a great number of bees must be brought in and do what they're supposed to in a hurry. By comparison, fresh market cukes go 15-18 days from pollination to picking, producing a much larger fruit, and eight to 10 per plant over a much extended season.



When contracting with a grower, you need to know what type of crop is being produced – and how many acres are being grown. Also, you need to be aware of any insecticide sprays that will be applied. Cucumbers are the victims of several minor pests – aphids, mites, leafhoppers and leaf miners. But they also have the striped and spotted cucumber beetles and the vine borers. These last three can build to economic numbers and require pesticide applications to control.

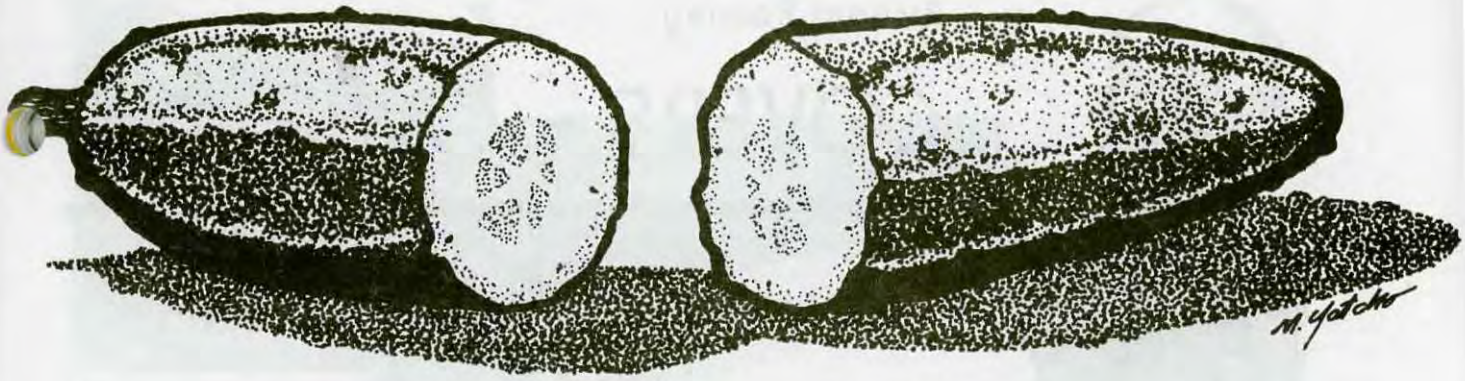
In case your grower isn't aware, honey bee foraging on cucumber flowers occurs primarily between 9:00 a.m. and 3:00 p.m., so a late evening spray is least likely to cause problems. Also, cuke flowers only last a day, so flowers opening the next morning *should* be safe.

Ultimately the grower will decide how many colonies will be rented for the job. However, the resultant crop will reflect the fruit set accomplished by your bees. You obviously have no control over the weather, soil or cultural conditions. But if asked, there are some general guidelines established for successful pollination that you can pass along, and some precautions you can stress to get the best job done.

First, cucumbers are *not* a good crop for bees. In fact, if left for any amount of time (two-four weeks) they will probably need feeding, or at least be lighter than when delivered. If there are more attractive crops, or weeds, in the vicinity of the field bees will naturally be drawn to them, forsaking, at least to some degree the crop at hand. Simply put, optimum pollination requires no distractions.

Second, researchers have shown that some delay in bringing bees to a field has little effect on production, especially on a slicing crop because of the duration of stay. On processing crops however, timing is critical. Bees need to be in the field right at first flush so a uniform crop is set. A maximum population of bees needs to hit the field so every plant produces a fruit of about the same size. Growers are paid by size and uniformity, so you're timely arrival, and their cooperation will benefit both.

Finally, how many colonies? Recommendations vary, but in general slicing crops require



fewer colonies per acre than processing crops. One colony per acre is the recommendation for the first, three for the latter. A colony, here, is meant to be *at least* five frames of brood and five frames of bees. With pickles, brood is far less important because they are on the crop such a short time. Brood is more important for slicers because they need a continuous supply of bees. But recent research has shown that three per acre for fresh market crops increased yields over one, and six per acre in processing increased yields over three.

How much to charge? Well, how much does it cost – in time and labor, opportunity cost (how much honey could they make during the same time in another location or is another pollination crop available at more money?). And general aggravation (is the grower easy to work with, the field easy to get to). And, does it cost twice as much to bring twice as many colonies, or only half again as much?

There is no doubt these growers need bees to produce a crop. And, if you're professionally minded, basing some part of your income and budget on pollination business is a smart idea. After all, $.80 honey may not be around by October, but a written contract for how ever many colonies at a set price is money in the bank – just ask a banker!

Know your costs, know your limitations and strengths and know the people you'll be working for. You can make money pollinating cucumbers this year.

Richard Bonney

COVERS - OVER ALL

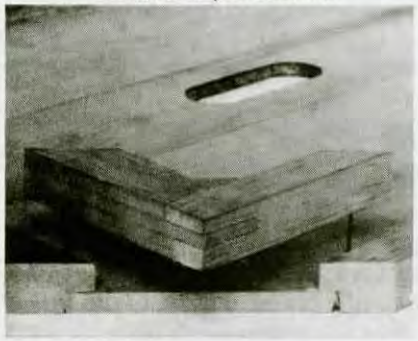
"Don't take your covers for granted"

We tend to take covers for granted. Why is that? Probably because most catalogs don't offer many choices. In most catalogs, and consequently for most of us, the standard configuration is the inner cover and telescoping outer cover combination. Some beekeepers use the one-piece migratory cover, but we will come back to that. Although the number of hives having migratory covers may be large, the number of beekeepers using them is relatively small.

Should we take covers for granted? No. Definitely not. Although there is only one basic style of inner and outer cover generally available, there are variations in design and construction. Some of these variations are insignificant, while others can lead to greater or lesser problems as we maintain and work our hives.

But first, why do we have two separate pieces of equipment, an inner cover and then an outer cover? We can best answer that by looking at the inner cover. What is its function? I see at least two purposes. First, it makes the hive easier to open.

Inner cover construction should be jointed wood, not stapled masonite.

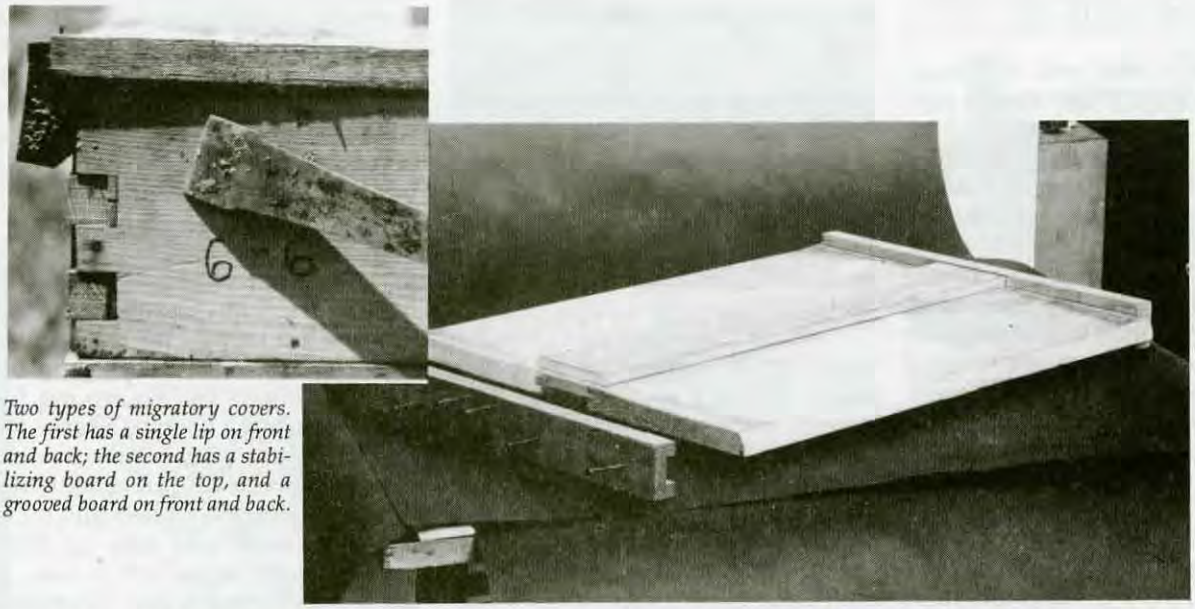


The inner cover is relatively easy to remove, even when heavily propolized. Because it fits flush on the top box of the hive, it is possible to slip the hive tool in horizontally between the box and the cover, working from all sides as necessary to break any propolis seal that the bees have made. If you put the outer cover directly on top of the hive without an inner, it can be very difficult to break the resulting seal without creating a large disturbance in the colony and perhaps damaging some of the wood in the process. A hive tool cannot be slipped up in there easily because of the overhang of the outer cover which gives the telescoping effect.

Then, when placed in its normal position with the rim *up*, the inner cover gives a buffer zone, an attic, a hangout space for idle bees. And bees do have idle time, even in the busiest of seasons – resting, sleeping, or just waiting for signals that nectar has become available out there in the wide world. Think how many times you have opened a busy hive in the active season and found the inner cover loaded with bees. At times, that buffer is also something of a dead-air space that helps insulate the hive against extremes of heat and cold.

Some beekeepers don't believe

A typical telescoping outer cover (l), and wooden inner cover, with the rim up, making hive tool removal easy.



Two types of migratory covers. The first has a single lip on front and back; the second has a stabilizing board on the top, and a grooved board on front and back.

the bees need or should have this space available to them, and they close off the hole in the center of the inner cover. I asked an old timer once why he did this. His reply – because his father did it that way. Another beekeeper of my acquaintance has inner covers with no holes cut in them at all. It turns out that he makes the covers himself and can't be bothered with cutting the holes. In both instances, the bees do all right.

Most inner covers are manufactured with a solid rim around the four sides. But some inners have a notch in one of the short sides of the rim, which allows the bees to have an upper entrance to the hive. The cover is normally placed so that this notch is at the front of the hive. The route for the bees is up through the hole in the center of the inner cover, across the cover to the notch in the rim, through the notch and then down the face of the hive for an inch or two to clear the overhang of the outer cover. This of course assumes that the outer cover is a normal loose fit, and requires that it be pushed all the way forward to maximize that clearance. An outer cover is meant to fit loosely. This allows it to be removed and replaced with ease and minimal disturbance to the colony. If the cover fits snugly, it could easily bind, especially when extremes of weather cause the wood of the hive to shrink or swell.

When it comes time to buy covers, there are points to consider. As stated earlier, all covers are not equal. To my mind, the only proper inner cover has a rim on one surface only. Many manufacturers now make these covers with a rim on each surface. The January article "Woodenware II" dealt with this to some extent. I won't go into it again here other than to remind you that an inner cover with a rim on both sides may cause you to violate bee space. With a rim on the underside of an inner cover, we have a minimum one-quarter-inch space between the undersurface of the cover and the top of the hive body. Then, the construction of most hive bodies and supers gives some additional space from the top of the hive body to the top of the frame bars – most being in the range of three-sixteenths to five-sixteenths of an inch. Bee space is generally considered to be in the range of one-quarter to three-eighths of an inch, but with this rim arrangement we have the possibility of as much as nine-sixteenths of an inch from the top of the frame bars to the under surface of the inner cover. The bees are almost certain to fill that space with burr comb in which they store honey. As a result, the inner cover will be securely fastened to the frames below – a mess for the bees and the beekeeper to clean up every time the cover is removed. It will be difficult to clean up without exposing the mess to the bee yard which can easily trigger robbing behavior in times of dearth.

Going back to outer covers, we usually don't dwell much on dimensions when we buy them, although we should give dimensions a little thought. One set of dimensions has already been mentioned indirectly – the interior width and length. A sloppy fit is desirable for the outer cover, at least an extra one-quarter to three-eighths inch, front to back and side to side. The other dimension of some importance is the interior height. It must be deep enough so that the outer cover telescopes well down around the inner cover and the hive body or super below. This is of special concern in the Winter for those beekeepers who use an insulating board between the inner and outer covers. These boards are typically one-half to one inch thick, resulting in the outer cover sitting one-half to one inch higher than normal on the hive. If the overhang is not sufficiently deep, then wind, rain and snow could blow up under the cover and seep into the hive. Worse yet, the cover is no longer as securely in place and could blow off more easily in gusty Winter winds. A weight placed on top of the cover will help with this, of course. In fact, a weight is a good idea even without the insulating board.

Just about all telescoping outer covers on the market come with metal sheathing over the top and down onto the sides for an inch or so. Covers can be purchased from some sources without the metal, but using them this way is questionable. This metal is intended to make the cover completely weathertight from above. It is analogous to the shingles on a roof and does, in fact, keep the weather out if it folds down far enough on the sides. Without this protection, rain, snow and the ex-

Continued on Next Page

COVERS ... Cont. From Pg. 223

tremes of heat and cold will cause the wooden cover to deteriorate rapidly.

In the January article, "Woodenware II," I discussed materials commonly used for manufacturing inner covers and the problems inherent in using masonite and interior-grade plywood. In my experience, these materials tend to absorb moisture, sag, and, in general, deteriorate prematurely. Some manufacturers use these same materials for the under surface of the outer cover, the layer under the metal sheathing, and these same problems apply here as well, though perhaps to a lesser degree. Given a choice, I would elect to buy or build outer covers with solid wood throughout.

With migratory covers, we ignore most of this. These covers have their own reason for being, and that reason supersedes many of the concerns about weather, fit, durability and bee space that we voice when thinking of the telescoping cover combination. The migratory cover is primarily of interest to the migratory beekeeper who owns and moves large numbers of hives regularly. His concerns are more on the order of pallet and truck loading, hive weight and number of individual pieces of equipment to handle when working his many hives. Of course, some backyard operators use this cover style, too. There is no reason not to, given an understanding of its shortcomings relative to weathertightness, durability and stability.

A basic migratory cover has the same lateral dimensions as a hive body – 16 1/4 x 19 7/8 inches. This cover is not intended to overhang the hive body. It may be made of a single piece of material such as plywood or chipboard or it may be made of solid wood – two or three pieces – cleated together with cross members. Made with these lateral dimensions, space can be maximized as hives are loaded onto pallets or trucks. The hives can be placed cheek by jowl with no interval between, as would be required if telescoping covers with their overhangs on all four sides were used. Furthermore, a hive with a migratory cover can be more securely strapped than can one with a relatively loose-fitting telescoping cover.

Some migratory style covers do overhang, but only front and back. A simple cleat or cross member is fastened onto the ends of the cover, hanging down an inch or more to give stability to the cover. Hives with such covers can still be packed tightly side to side, but less so front to back.

I cannot recommend the migratory-style cover for general use in a small backyard operation because of the inherent problems of weathertightness and durability. However, any beekeeper might profitably have one or two around for temporary duty – hiving a swarm, for instance, or as a replacement while a regular cover is being reconditioned or painted. They are easily and inexpensively made and take up little storage space when not in use. A sheet of plywood of proper dimension will suffice for such temporary use, and if a rim is added to the two sides and one end, the same piece of equipment can double as a temporary bottom board. Not at the same time, of course. BC

Richard Bonney is an Extension Educator for the state of Massachusetts. He is a regular contributor to these pages.

TREES

B.A. Stringer

Trees Are The Ultimate Nectar Producers

Trees are bee forage on a grand scale, the ultimate three-dimensional diner for our flying friends. Trees in bloom are truly the most effective sources of nectar and pollen because of the sheer numbers of flowers produced at one time. For the ground area they cover, trees supply proportionally greater amounts of potential baby bees and full honey supers than the low-growing forage plants.

We think of a tree's form as having a trunk capped by a foliage canopy. Some trees assume this shape naturally, while others persist in shrubby, multi-stemmed shapes unless pruned into line. Small trees are still quite large for a home garden, and all trees are deceptively small at planting. They grow . . . and grow, so make sure you know how big and how fast, so that all your surprises will be pleasant ones! Trees are the largest landscaping plants, representing a commitment to your piece of the Earth. Their life spans differ: Many flowering trees are old at 20 years, while there are others that will mature with your grandchildren.

The Catalpa (*Catalpa bignonioides*) is used as a two-fold nectar source by bees, which are attracted to nectar secreted from nectaries both in the blossoms and on the leaves. An elegant, hardy, deciduous tree that is native to the southeastern United States, it blooms in late Spring, a time when few other trees are in flower. The large, showy, upright clusters of flowers appear in June and July. Each blossom in the floral pyramid is bell-shaped, frilled at the edges, and large enough for honey bees and bumblebees to crawl right inside. There are yellow and purplish-brown markings on the flowers which act as nectar guides.

Nectar guides are spots or lines on a flower which, by their position or direction, indicate where the nectar is to be found. These markings are present only in those flowers that are visited by insects during the daylight hours. In contrast, moth-pollinated flowers, lacking nectar guides, frequently have a strong fragrance to lure their pollinator visitors.

Catalpas look like tropical trees, with their large leaves and luxuriant floral display, but they are well-adapted to extremes of climate and differences in soils. They grow as tall as 50 feet, depending on the climate and soil, and do best in fertile, well-drained soil with some protection in very windy sites. Because they rarely establish a leading shoot during young growth, they need shaping for future form.

The leaves of Catalpa are like great green valentines, but they give off a disagreeable odor when crushed. On the undersides of the leaves, in the angles between mid-rib and side-ribs, and also in the forks of side-ribs, there are yellowish, shiny spots. If you look closely, you can see drops of nectar contained in tiny pits at these places. Lured by the fragrance of the leaves, honey bees are attracted to the nectar in these extra-floral nectaries before, during and after the tree is in bloom. After the fallen flowers carpet the ground, long bean-like seed pods called 'Indian Beans' or 'Indian Stogies' form on the tree, often hanging on all Winter. Comparatively small trees with gracefully upcurving branches, Catalpas are spectacular in bloom and useful as shade trees or specimen trees.

Willow

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Blooming early in the Spring, Willows (*Salix spp.*) are valuable contributors to colony buildup as they are reliable sources of pollen and, in good weather, also nectar producers. Male and female flowers are borne on separate trees. Both kinds are capable of secreting nectar in warm, favorable weather, but only the male flowers yield pollen. Willow flowers are tiny, with no petals or sepals, crowded into clusters called catkins. Pussy Willows *(Salix discolor)*, contain about 140 flowers in a pistillate (female) catkin and about 270 flowers in a staminate (male) catkin. Appearing on the bare branches before the leaves, the silky catkins can be pearl-grey, greenish-yellow, or even pink. When the male flowers open, the catkin becomes a fuzzy mass of yellow anthers well-worked by bees for the pollen.

There are over 150 species of Willows in North America, all of them deciduous and fast-growing, with invasive root systems. They usually prefer damp soil and thrive on stream or pond banks. Weeping Willows, *S. babylonica*, grow very large (30-50 feet) and are best planted as single specimens. In order to allow enough room to walk under the drooping branches, stake the young Weeping Willow and prune it high. In drier con-

TREES ... Cont. From Pg. 225

ditions, Hankow Willows, *S. matsudana*, outshine other varieties. Twisted Hankow Willow grows to a 40-foot pyramid in spiraling configurations which are particularly striking when silhouetted against a plain background.

Lindens or Limes or Basswoods – these are all common names for trees in the *Tilia* genus which are extremely popular with bees. There is an audible hum in the vicinity when the trees are in bloom and producing abundant nectar and dull yellow pollen. Honeydew is also secreted by aphids colonizing the trees in Summer, and is collected by bees, darkening the honey. Commonly used as street trees because of their generally manageable size and low maintenance, Lindens have sometimes fallen from favor because of the honeydew mess and the sooty mold that feeds on it. Linden trees may reach towering heights in particularly favorable sites, so be sure of the variety before you buy. In April and May, the small, fragrant, pale-yellow flowers in drooping clusters offer their sweet nectar, attracting clouds of bees. The flowers secrete nectar on the inner sides of the sepals, mainly in the morning, when a shower of nectar may sometimes be shaken out of the flowers. Older flowers tend to have more plentiful, sweeter nectar than those just opened.

The American Linden or Basswood, *T. americana*, can grow as tall as 60 feet and as wide as 25 feet at the lower limbs. This stately tree needs space and time to reach its potential. For a shorter, wider shade tree, consider Little-leafed Linden, *T. cordata*, which becomes a dense pyramid to 50 feet. This species is often used as a lawn or street tree. The Crimean Linden, *Tilia euchlora*, is a hybrid which is not susceptible to honeydew and its attendant troubles. It flowers later than most Lindens and grows slowly to about 35 feet in height by 30 feet in width. Its foliage is less dense than other Lindens, resulting in a pleasantly dappled shade beneath the tree. While these trees are long-lived, they are also slow-growing, often needing 10 or 15 years until first bloom.

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Catalpa

Horse-chestnuts, *Aesculus spp.*, have a common name that belies their beauty. They are so-called because there is a clearly marked horseshoe under the leaf axils. Like a floral Christmas tree, the pyramidal blossom candles shine against the deep green foliage. The flowers are male and female and hermaphrodite all on the same cluster, and marked with yellow nectar guides that darken to red as the flower ages. During the four-week bloom of Horse-chestnuts, watch for their distinctive brick-red pollen in the corbiculae of bees returning to the hive. (Sometimes the pollen dusts the entire bee.) The petals of Horse-chestnut flowers remain full and attached long after the stamens have shriveled and nectar secretion has ceased. Although these flowers still look very attractive, bees no longer visit them.

The Common Horse-chestnut, *Aesculus hippocastanum*, bears creamy white flowers and grows a stately 60 feet with a 40-foot spread. The hybrid Red Horse-chestnut, *A. x carnea*, is a smaller tree, to 40 feet, easier to fit into home landscaping. During late Spring, it is covered with red to pink blooms, busily visited by bees. The chestnuts, or conkers, of these species are very attractive in their spiny coats, but are not edible for people. The cool nights and shorter days of Fall turn the foliage of these trees golden. Another close relative is the California buckeye, *A californica*, which blooms later and has a disagreeable reputation of poisoning bees. Although bumblebees appear to be more affected than honey bees, avoid placing hives anywhere near these trees. The genus name *Aesculus* is actually the Latin name for a kind of Oak bearing edible nuts, but was taken by Linnaeus to name these plants, which are neither Oaks nor edible!

Maple

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Blooming in late Spring, Hawthorns (*Crataegus spp.*) produce masses of white or pink flower clusters over the entire thorny tree. Although they are usually well-worked for nectar and the pale whitish pollen, the nectar flow is unpredictable for undetermined reasons, as production seems unrelated to soil, water or temperature conditions. In England, Hawthorn honey has been described as being very high quality, dark amber, and having an exquisite, nutty flavor. These trees, variously known as Quickthorn, May or Hawthorn, are at home in almost any soil and growing conditions, and are even salt-tolerant. Although there are many double-flowered varieties available, select the single-flowered ones for usefulness to bees.

The Hawthorn native to Europe and North Africa, commonly called English Hawthorn (*C. laevigata*), grows to about 20 feet with a similar spread. You may like to plant 'Crimson Cloud' (Superba) for its bright-red, single flowers with white centers and brilliant red fruit. Growing about five feet taller, Washington Thorn (*C. phaenopyrum*) is native to the southeastern United States. It is very popular for several deserving reasons: It has a light, open structure, clusters of white flowers, shiny red fruit, and

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glossy green leaves that turn bright orange and red in Autumn. It is altogether a very attractive tree at all seasons and is widely planted.

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Maples, *Acer* species, produce nectar freely and supply valuable early pollen for the Spring hive. Nectar is secreted by a fleshy disc in the center of the flower which is easily accessible to bees and other insects. Spring weather is often unpredictable so, while there may be an excellent nectar flow, the bees may be unable to take advantage of it because of inclement conditions. However, in some favorable years, bees may gather a surplus of Maple honey. There are over 100 species of Maples in the Northern Hemisphere, ranging from small shrubs to tall trees, usually deciduous. They produce paired, winged seeds, similar in form to propellers, which spiral to the ground when ripe. Most Maples do best with periodic deep watering to support the extensive leafy canopy.

Preferred for landscaping, Japanese Maples, *A. palmatum*, are easy to incorporate into most gardens because of their many varieties. Slow growing to only 20 feet, these trees are the most dainty and airy of all Maples. They display year-round appeal as the Spring growth is bright red, Summer leaves are delicate green (or bronze in some varieties), Fall foliage glows fiery red, orange or yellow, and the Winter branches form attractive patterns. There are plenty of Japanese Maples with noteworthy features to attract your eye and flowers for your bees – different growth forms fit in any garden situation, red or green foliage to suit your color scheme, and red, green or black bark for the Winter framework. Look around your nursery and public gardens to see which do best in your area. Another very attractive species, native to the eastern part of this country, the Scarlet Maple, *A rubrum*, grows at a moderate rate to about 40 feet. True to its name, the tree has red buds, twigs and fruit, showy flowers and scarlet Fall foliage. Different varieties of Scarlet maple grow into diverse tree shapes, from tall columnar to round-headed to pyramidal.

Horse Chestnut

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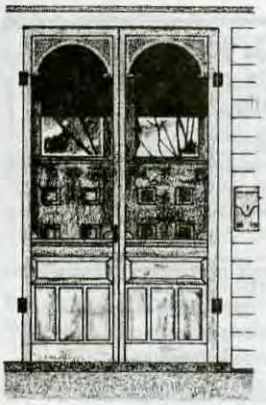
The bloom of fruit trees may produce significant amounts of nectar and pollen for colony buildup in the early Spring. Concurrently, as bees are often essential pollinators for fruit tree flowers, there is a mutually beneficial relationship between the bees and the blossoms. However, even commercial pollinators with hive sets in large orchards of these flowers do not expect a surplus from most of these crops, as the nectar and pollen are generally used within the hive for colony buildup. Because there are hundreds of different varieties of fruit trees, let's just hit the high points of the Spring pollination parties in your backyard fruit blossoms.

Apricots bloom very early and are heavy nectar yielders in suitable weather. Peaches and Almonds also flower early, supplying nectar and pollen which is used immediately for brood rearing. Plums are very hardy and secrete high-sugar nectar even in cold temperatures. About 30 percent of Plums are self-sterile, requiring cross-pollination to set fruit, and so are highly dependent on honey bees. Cherries are important for nectar and pollen and need cross-pollination. Flower or Japanese Cherries (single-flowered varieties) are worked as well. Pie Cherries are self-fertile and bloom later but are also a source of nectar and pollen. Pears are a good source of high-protein pollen, but the nectar is so low in sugar that bees prefer to work the Dandelions under the trees instead! Apples are frequently considered valuable nectar producers because they bloom a bit later than the other fruits, when colonies are stronger in the Spring and more able to utilize the resource. Ornamental Crabapples and single flowering Crabs are also used for nectar and pollen.

Fruit trees in your yard and bees in your apiary lead to fruit on the trees and honey in the hive at season's end. Whether your garden is large or small, there are trees you can grow for beauty and the bees. BC

B.A. Stringer grows her plants, and writes about them from her home in Blodgett, Oregon.



Ann Harman

Home Harmony

Spring Cleaning The Ole' Recipe Box

Usually, "Spring Cleaning of the Recipe Shoebox" takes place on a mild, muddy Spring day. However, this year, a blizzard followed by several snowstorms inspired me to alternate "shoebox cleaning" with jigsaw puzzles (the bigger, the better). If you recall, this "Recipe Shoebox" is a real shoebox, previously occupied by a new pair of sneakers, but now relegated to a repository for snippets of paper and miscellaneous leaflets with honey recipes. Since these items are collected from assorted places during the year and tossed into the box, there is no rhyme or reason to the collection, as you will soon see.

Here's one item: Do NOT feed hummingbirds honey in any form; use only granulated sugar dissolved in water, 4 parts water to 1 part sugar.

SAN FRANCISCO CHOPS

In my mailbox, along with interesting mail, advertising circulars and some bee magazines, I occasionally find some recipes. Usually they are in a packet with a thousand pieces of paper informing me that I can receive an endless flood of recipes just by saying "Yes" on some postcard. I generally sift through the packet and save the recipes that interest me. Here is one that I modified by using honey instead of brown sugar. The recipe is very good and easy to make. I served the chops with some flat noodles, cooked, then tossed with some of the sauce.

4 pork chops, 1/2- to 3/4-inch thick
1 tablespoon oil
1 clove garlic, minced

Sauce:
2 tablespoons oil
4 tablespoons dry sherry or broth
4 tablespoons soy sauce
2 tablespoons flavorful honey
1/4 teaspoon crushed red pepper
2 teaspoons cornstarch
2 tablespoons water

Trim fat from chops. If you want them to cook quickly, you can use boneless chops and pound them to 1/4-inch thickness. Heat oil in skillet and brown chops on both sides. Remove chops and add a little more oil if needed. Sauté garlic quickly, being careful not to burn it. Combine oil, sherry or broth, soy sauce, honey and red pepper. Return chops to skillet. Pour sauce over them. Cover tightly. Simmer over low heat until chops are tender and cooked through, about 30 to 35 minutes. Add a little water, 1 to 2 tablespoons, if needed to keep sauce from cooking down too much. Turn chops once. Remove chops to platter. Mix cornstarch in the water and stir into sauce in pan. Cook and stir until thickened and transparent. Pour over chops and serve. Makes 4 servings.

Great American Recipes

SPICY STIR-FRIED PORK

Farmer-oriented newspapers are a great source of recipes. Some lend themselves to honey substitutions, and some do not (but they are still good recipes). The shoebox generally contains a healthy assortment of items snipped or torn from the pages of those newspapers. If you save newspaper recipes, it is a good idea to copy them instead of trying to save the piece of newspaper. That stuff just does not keep well at all! In this next recipe, you can add vegetables in addition to the sweet pepper if you wish. Canned water chestnuts, fresh broccoli cut into bite-sized pieces, or leftover peas are good additions. If you have a few Chinese mushrooms, you can use those, too. In fact, you can substitute chicken for the pork. The basic sauce recipe is excellent with either meat.

12 ounces pork tenderloin or boneless pork sirloin
1/2 cup chicken broth
1/3 cup frozen orange juice concentrate, thawed
2 tablespoons soy sauce
1 tablespoon cornstarch
1 tablespoon honey
1/4 to 1/2 teaspoon crushed red pepper
1 tablespoon olive oil or cooking oil
2 cloves garlic, minced
2 teaspoons grated fresh ginger root
1 large red or green sweet pepper cut into thin strips
1 cup sliced onion
2 cups hot cooked rice or pasta

Trim fat from pork and partially freeze it. Thinly slice across the grain into bite-sized strips. For sauce: In a small bowl, stir together chicken broth, thawed orange juice concentrate, soy sauce, cornstarch, honey and crushed red pepper. Set aside. To cook: Pour oil into a wok or 12-inch skillet. Preheat over medium-high heat. Stir-fry garlic and ginger root for 15 seconds. Add sweet pepper strips and onion (and any other veggies). Stir-fry about 3 minutes or until vegetables are crisp-tender. Remove vegetables from wok. Add the pork to the hot wok. Stir-fry for 2 to 3 minutes or until pork is no longer pink. Push pork from center. Stir sauce; pour into center. Cook and stir until thickened and bubbly. Return vegetables to wok. Stir meat and vegetables together to coat with sauce. Cook and stir for 1 to 2 minutes or until heated through. Serve immediately over hot cooked rice or pasta. Makes 4 servings.

Delmarva Farmer

BLUE MOON

How about something to drink? Although this recipe is wonderful with fresh berries and fresh peaches, it is almost as good out-of-season with frozen berries and canned peaches.

I am not certain where I obtained the booklet this recipe appeared in, but the recipes are really good. They

Continued on Next Page

HOME ... Cont. From Pg. 231

were created by teens as part of a "Students Against Drunk Driving" recipe contest. I threw the booklet back into the shoebox so I can use some other recipes in future articles.

1/2 cup fresh-squeezed orange juice
1/2 cup fresh or frozen blueberries
1/2 cup chopped fresh or canned peaches
1 scoop vanilla ice cream
1 scoop orange sherbet
2 tablespoons honey
1 cup crushed ice
lime and/or orange cartwheel slices

In blender, combine all ingredients except citrus slices; blend until smooth. Garnish with citrus slices. Makes 3 cups (two 12-ounce or three 8-ounce servings).

Sunkist Mock Cocktails
Sunkist Growers, Inc.

WAFFLES

Where this next recipe came from is a mystery. It is handwritten on a piece of notebook paper. The notebook paper also has a mystery phone number with no area code or person's name attached and the notation "black spray paint". Wonder what that's all about?

Anyway, the waffles are delicious. One nice thing about this recipe is that you can make the batter the night before and have a quick waffle breakfast the next morning. I combined a small bit of maple syrup I had left with some mild wildflower honey, warmed them gently to mix and poured that over the waffle. Yum!

1 cup milk
1 cup water
1/4 cup butter
1/4 cup honey
2-2/3 cups whole wheat flour
3 eggs
1 package (1/4 oz) yeast
1-1/2 teaspoons salt

Heat milk, water, butter and honey to 120°F. In a bowl combine flour, egg, yeast, salt and the warmed mixture. Mix on low with electric mixer to moisten, then on medium-high for one minute. Cover and refrigerate several hours or overnight. Stir down occasionally. Your waffle maker will indicate the quantity to use.

A few recipes are left in the shoebox for another time. Perhaps I'll pull a few out or perhaps they will wait until the next fit of shoebox cleaning. However, I would prefer that it not be accompanied by another blizzard.

Starting a colony of bees from a package is a simple but uniquely satisfying experience. The hard part is acquiring all the necessary equipment (brood chambers, bottom board, top cover, frames, foundation, drawn comb, smoker, hive tool, overalls, hat, veil, etc.) and a package of bees. Once you have all the pieces, putting the packaged bees in your boxes is child's play.

Richard Taylor

Bee Talk

"Bee Bee Tree seed problems, and more on Varroa."

First, I want to talk about the Evodia, or Bee Bee tree, seed distribution. In a word, it was something of a disaster.

Here is what happened. We wrote about this remarkable honey plant in the January issue, noting that any readers wanting some seeds could send us a stamped and addressed envelope. We had a big jar full of seeds, supplied to us through the kindness of Mr. James McCaskill from St. Louis, and I expected that maybe a dozen or so readers would respond.

Well, from that point on, everything seemed to go wrong. Our address got left off that month's "Bee Talk," and readers who didn't know that it could be found on the Q. & A. page had no idea where to write. Notwithstanding this, the requests built up to an avalanche. So many came pouring in over the next few weeks that the post office had to set up a special box to hold them all, and day after day, I carted them home in grocery bags. Our abundant supply of seeds was soon gone, even with only the tiniest amount being sent to each beekeeper requesting them. Then came further bad news. I discovered that the regional postal distribution center seems to put all letters through some sort of rollers, and people were sending us back pulverized seeds. Perhaps that happened to all of them; I have no way of knowing at this point. Then, when the February issue of the magazine came out, and the supply of seeds had long been exhausted, I discovered to my horror that the offer of seeds was again being made, this time in the Q. & A. section. This produced a fresh avalanche of requests, bigger than the first, which still continues.

It has been a daunting experience. I had no idea so many people even looked at these pages. Live and learn. All I can say now is that if our own Evodia tree blooms this Summer and produces a huge crop of seeds, as it did the Summer before last, then we shall again have seeds to send out, though I believe we'll turn the mailing job over to someone who will do a better job of it. This is a wonderful honey plant, and I would like to see it widely distributed. For years, the seeds were being distributed by an arboretum in Philadelphia, but not many people knew about this source, and apparently those who did were not always able to get the seeds to grow.

Meanwhile, the little garden in our yard, near our Evodia tree, is filled with little Evodia seedlings which sprang up like weeds and are about to enter their second year of growth. We'll be potting these up and taking them here and there to bee meetings to be raffled, auctioned or given as door prizes – whatever – and I look forward to this. But please do not ask us to ship seedlings. We just don't have time to get into that.

And now, to another subject.

This past Autumn appears, from the reports I have been getting, to have left bees in much of the country in the worst condition in the history of American beekeeping. I hope that turns out to be wrong, but I am not optimistic. Colonies throughout the Midwest and the East were devastated by parasitic mites. There is no point in asking anymore whether your bees might have *Varroa*. It is ubiquitous, and it can strike with devastating swiftness. My own experience was apparently typical. I got a huge honey crop, and the honey flows were continuing right into the late Summer. I had never seen my bees doing so well. I got the last of the honey harvested, then went around to my apiaries in October to do the Apistan strips, only to find all the colonies in severe decline. I am not accustomed to having Winter losses. My bees usually come through Winter almost one hundred percent. But now I find myself wondering, in mid-February, whether any will survive.

Too many beekeepers have been slow to wake up to what's going on. I still get letters saying much the same thing; sometimes I know what the letter is going to say as soon as I have read the first line. They say that they have been keeping bees for years, but can't understand what happened this year. The bees had made a good crop, and still had ample stores in the hives, but when the owner went around to check them in the Fall, the bees were gone, just a few dead ones left. Some reported finding yellow jackets in the hives and speculated that they had killed off their bees. Of course the yellow jackets were only taking advantage of hives being rendered increasingly defenseless by mites.

Fortunately, this problem has a solution, but we have to know what we are up against and know how and when to take steps to deal with it.

Here is what you have to do:

First, find out as soon as you can whether you are having severe Winter loss. If so, then get your orders off early for package bees to replace them. I think the suppliers of package bees are going to be overwhelmed this Spring, and late orders might just not get filled at all. I already sent in my order, with cash pre-payment,

in January, just to be on the safe side.

Next, you should assume that, unless you take preventive steps – something I did not know enough to do last year – your bees are going to get *Varroa* mites this Summer. And once you find them in one colony, you can be sure they are in every colony in your apiary. If you fail to take precautions, then the buildup of the *Varroa* might be slow, so that you do not even suspect that anything is wrong; but then, come Fall, you will pay dearly.

How can you tell if your bees have *Varroa*? There are many methods of testing, but the simplest, I think, is to uncap a patch of drone brood. If there is *Varroa* there, you'll see it, and you will not need to check the rest of your colonies.

But even without testing, you should treat with Apistan in the Spring, as well as late Summer, especially late summer. Get the strips in as early as you can in the Spring, then be certain to remove them when the first supers go on. Some beekeepers have wondered why it is important to get the strips out of the hives before supering for honey, since Apistan is supposed to be toxic only to the Varroa mites, not to the bees or to people. The answer is, first, that no pesticide of any kind should ever be in a hive that is storing honey in supers, just on general principles; and second, that the directions require their timely removal.

And that brings us to the next point. The law, with respect to any pesticide, is that it can be used only for the purposes described on the label, and must be used in strict accordance with the directions given. And the directions call for the removal of the strips before supering for honey.

One important matter that the directions have not made clear, however, is that the bees must come into actual and frequent contact with the strips in order for them to be effective. They do not, like moth crystals, exude pesticide into the hive. Thus, they do no good at all if they're just laid over the top bars in a hive. Nor do they do any good if they are inserted between combs where the bees will not be in fairly constant contact with them, even if such insertion would be in accordance with the directions. Do not, therefore, insert them between certain combs, depending on where those combs are in relation to the others. Instead – and this is of the utmost importance – ascertain where the approximate center of the brood nest is, or the center of the Winter cluster, and be sure that the strips go right down in there. As for the number of strips to use, two will usually be adequate, but a very populous colony, occupying two full-depth hive bodies about equally, will perhaps require four. It all depends on colony strength and where in the hives the bees are concentrated.

Come late Summer, you will need to repeat this procedure with fresh strips, since the Apistan strips lose their effectiveness after one application. They are, again, unlike moth crystals, which work by evaporation. The fluvalinate of the Apistan strips is rubbed off by the bees rubbing up against them.

I look forward to Spring with considerable apprehension. The mite problem will be licked in time by resistant strains of bees, but in the meantime, beekeepers who are not keeping up with things are going to find themselves out of business. BC

Comments and questions are welcomed. Use address below (not Medina) and enclose a stamped, addressed envelope for response.

Richard Taylor is a philosopher and lifelong beekeeper who lives in the Finger Lakes region of New York. You can reach him at Box 352, Interlaken, NY 14847.

Questions?

Apistan Timing

Q The directions for using Apistan strips say to remove them from the hive after 28 days, and not to have them in the hive during a honey flow. But are the bees not subject to attack by mites during a honey flow? Why could you not leave the strips in the brood nest at all times?

Fillmore Emerson
Forrest Hill, CA

A Apistan strips are a means of effectively controlling *Varroa* mites. They cannot be depended on to eradicate mites from a colony altogether. There is no need to leave them in the hive longer than the recommended time in order to achieve effective control. By law, they are supposed to be used in exact accordance with the directions. There is no point whatsoever in having the strips in the hive during a honey flow, and there is the danger that honey would thereby become contaminated. This must, by all means, be avoided.

Brood Matters

Q I started five colonies with new queens ordered April 1. I made nucs using one frame of brood, one frame of honey and one frame of drawn comb. Only two survived, and in June still had not drawn out all 10 frames of foundation in their new hives. Three more queens were ordered on May 20 and put in hives with three frames of brood and bees and some honey, two frames of drawn comb and the rest foundation. These all made it, and two had all the foundation drawn out and were storing honey after only two weeks. I was following the advice of a book. Does the number of bees to use depend on timing?

Andy Moore
Sweetwater, TX

A It appears the reason you fared so much better the second time is that you started with more brood. I think that to make up a nuc, you need three combs with brood in them, not just one. It is like building a fire: If you get three pieces of wood going together, they burn just fine, but you have an awful time trying to keep just one burning.

Natural Controls?

Q We are about to take up beekeeping but are discouraged about all the chemicals beekeepers use. Are there alternatives? Are there herbal treatments? We strongly favor organic approaches to health for us and bees. Perhaps some of your readers can offer suggestions.

Kerry Parton
13328 Hunt
Riley, MI 48041

A I share your misgivings about the use of drugs and chemicals, but it is important to see things in a good perspective. At present, Apistan strips are the only scientifically proven and approved means of controlling *Varroa* mites. They are nontoxic to bees and pose no threat to people, especially if used only when there are no honey supers on the hives. Tracheal mites appear not to be a serious problem provided populations are kept low using vegetable oil or menthol. American foulbrood is also not likely to be a problem unless your bees are in an area where there is a history of this disease. Hence, you can probably forego preventive treatment. Several herbs and natural vegetable oils are being tried for the control of parasitic mites, and they show great promise, but until we have established their usefulness, or have developed bees that are resistant to mites, which is sure to happen in time, then we will probably have to rely on Apistan strips.

Good Crop?

Q A lot of beekeepers got big honey crops last Summer even though the colonies were dwindling from *Varroa*. Someone in our bee club suggested that the queen sensed the stress brought on by mites and ceased laying, whereupon the bees shifted their attention from brood rearing to making honey. Does that make sense?

Bonnie Pierson
North Ridgeville, OH

A I doubt that bees "sense" things in the way this comment suggests. Even under normal conditions, the hive population is a factor in the rate of the queen's egg laying. You do not find a lot of eggs and brood in weak hives, even when there are no mites or other conditions of stress. The effect of *Varroa*, in my experience, is quite sudden. A hive that is very strong and gathering lots of honey one week is in collapse three weeks later.

Questions are eagerly welcomed. Send them to: Dr. Richard Taylor, Box 352, Interlaken, New York 14847 (not to Medina), enclosing a stamped, addressed envelope for response.

Answers!

Richard Taylor

?Do You Know? Answers

1. **True** Hornfaced bees and blue orchard bees are effective pollinators of early season crops since they forage at lower temperatures than honey bees. Honey bees rarely fly when the temperature is below 55° F and flight seldom intensifies until the temperature reaches 70°F. Hornfaced bees and blue orchard bees fly at temperatures as low as 45°.
2. **True** *Osmia lignaria*, the blue orchard bee, is native to the United States, occurs from coast to coast and is easily trapped and managed for early season pollination.
3. **False** In the temperate climates, bumble bees have annual colonies. A bumble bee colony begins each spring as a solitary overwintering queen. In the spring she emerges from her overwintering site, starts visiting flowers and looking for a nest site for her future colony. She is responsible for rearing the first generation of worker brood by herself. Males and new queens are produced mid to late summer. New queens mate and seek an overwintering site. The workers, males, and old queen eventually die.
4. **False** Only honey bees and to a much lesser extent, bumble bees provide parental care during brood rearing. Nurse honey bees provide each larva 3,000+ visits during its development. Bumble bee workers help the queen tend the brood and keep it warm. Leafcutter bees provision the cells with pollen and nectar, lay an egg, and then plug the cell. No parental care is provided.
5. **True** Honey bees have relatively short tongues in comparison to bumble bees. This gives bumble bees an advantage in visiting deep flowers such as blueberries, cranberries and red clover. The crops have often been referred to as bumble bee crops.
6. **True** Hornfaced bees readily accept man-made nesting materials. They can be induced to nest in bamboo canes, hollow reeds, cardboard tubes, and in holes drilled in wood blocks.
7. **False** Unlike honey bees, bumble bee foragers cannot recruit each other to food resources. This means a bumble bee colony is less likely to be diverted away from the crop to a more rewarding competing bloom. Bumble bees, however, exhibit less floral constancy than honey bees.
8. **True** Bumble bees are excellent pollinators of greenhouse tomatoes. They do not fly against windows like other bees, and they are less likely to forage outside the greenhouse when the windows are open.
9. **False** The shaggy fuzzyfoot bee is an effective pollinator of apples, blueberries and other early season fruits. Alfalfa pollination for seed production in the western United States relies on alfalfa leafcutter bees, alkali bees and to a lesser extent honey bees.
10. **True** Bees of the genus *Osmia* forage faster than honey bees. A single hornfaced bee can visit 15 flowers a minute.
11. **False** Most apple varieties are self unfruitful and a few are cross unfruitful. Trees of the same variety are vegetatively propagated and genetically the same, thus their flowers are self-sterile.
12. **True** Both honey bees and alfalfa leafcutter bees are susceptible to chalkbrood disease. Even though both species suffer from the same disease, chalkbrood in leafcutter bees is caused by the fungus *Ascosphaera aggregata* and honey bees *Ascosphaera apis*.
13. **True** There are about 3,500 kinds of wild bees in North America. While a few species are social, the majority are solitary and most species nest in the soil.
14. **True** Bumble bees will forage when conditions are not suitable to honey bees. Bumble bees will tolerate bad weather, work longer hours even after sunset, and at lower temperatures than honey bees.
15. **False** *Osmia* bees and leafcutter bees, unlike most species of wild bees, pack and transport pollen back to the nest on the ventral surface of the abdomen.
16. B) Carpenter Bees
17. E) Alfalfa
18. Highbush, Lowbush, Rabbiteye
19. In buzz-pollination, the bee creates a vibration that releases the pollen from inside tiny, tube-like anthers. Honey bees cannot accomplish this because they are unable to vibrate their bodies to shake pollen loose. Crops benefiting from buzz-pollination include: blueberries, tomatoes, chili peppers, eggplant and cranberries.
20. Nesting gregariously means that even though each female has her own separate nest, they have the tendency to nest together in one location.
21. In the vine crops, pollination must take place on the day flowers open. Pumpkin and squash flowers normally open at day break and pollination is most effective in early morning, primarily before 9:00 a.m. In cucumbers and watermelons, the flowers are open during the day and pollination is most effective during late morning and early afternoon. Honey bees are not as effective in pollinating squash and pumpkins since they do not normally forage early in the morning and the flowers close by noon.

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

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

Gleanings

APRIL, 1996 • ALL THE NEWS THAT FITS

Fund Raising The Focus
IBRA HAS NEW DIRECTOR

The Chairman and Council of the International Bee Research Association (IBRA) are pleased to announce that Richard Jones has been appointed, and has taken up his duties as the Association's Director.

A qualified teacher with a Master's degree from Birmingham University, he was a head teacher before moving into public relations and fund raising as Development Director at Atlantic College. This is an international sixth form college to which entry is on merit. Such policy requires continuous search for scholarship and sponsorship support and necessitated working in an international environment on a worldwide basis. It is this expertise that he brings to IBRA so that its financial base may be strengthened.

IBRA has a staff of eight and is justly proud of its role as the world's leading agency for the dispensing and dissemination of information on all aspects of bees, beekeeping and related subjects. The Director's role is to maintain the high standards established over the last 47 years and to ensure that the Association continues to develop as a focus for all apicultural developments into the 21st century. This will be done through its regular publications, contract and consultancy work and the organization of symposia and conferences.

Bees On Radar With . . .
TINY, TINY ANTENNA

British scientists have built a radar transponder so small it can be carried by a bee in flight.

The world's smallest antenna weighs just three milligrams and is 16 millimeters high. The breakthrough in miniaturizing the device is that it does not need a battery. It picks up the operating power it needs from the incoming signal.

Entomologists said the antenna could be used to improve the knowledge about bees' foraging and pollinating habits.

This could allow beekeepers to site their hives more efficiently.

The first test flights were made last summer.

"We fitted the transponders in the morning and took them off when the bees came back to the hive at night," said Dr. Joe Riley who works at the Natural Resources Institute radar unit in Malvern, Worcester.

The trials showed the bees could fly normally with the antenna superglued to their backs but had trouble re-entering the hive.

The antenna – technically called a harmonic generating tag – was developed with a $100,000 grant from Britain's Overseas Development Agency.

"The tag reflects a harmonic of the radar signals which can be detected against strong competing echoes from the ground," Riley said.

"The insects are then tracked by a radar scanner with two dishes, one to send the signal out and one to receive it," he said.

The researchers weren't originally looking to help the beekeeping industry when they began the project.

They had been assigned the task of creating the antenna so the tsetse fly could be tracked in a program aimed at controlling the pest in Zimbabwe.

The benefits to beekeeping were realized during the first flight tests.

Alan Harman

Coop Effort Pays Off
ALABAMA & OHIO SHARE TEW

Auburn University has retained Dr. James E. Tew to assist with the extension apiculture program in Alabama on a contractual basis. Dr. Tew, a native of Dothan, Alabama, has been responsible for beekeeping extension and applied research programs at The Ohio State University for the past 18 years. In Auburn's service, Dr. Tew will respond to county requests for bee (or other stinging insect) information, periodically write fact sheets, assist state and county beekeeping groups, and work with other Auburn faculty in developing an Africanized honey bee educational plan. The cooperative project is an innovative arrangement between Auburn University and The Ohio State University.

One of the first major activities of the new bee project was a one-day beekeeping workshop held at Auburn University this past February 10, 1996. The seminar, intended to help new beekeepers get started and update established beekeepers on current issues, had approximately 125 participants. A companion meeting is planned for September 13-14, 1996 in southern Alabama.

Dr. Tew has expressed an eagerness to perform the various components of this cooperative project and asks that either Ohio or Alabama beekeepers feel free to contact him on any beekeeping matter. He can be reached at: Dr. James E. Tew, Department of Entomology, OARDC/The Ohio State University, Wooster, OH 44691-1030, Ph. (216) 263-3684, FAX (216) 262-2720, Email: Tew.1@osu.edu.

MEAD LEADER KILLED

On Friday, January 5, 1996 at around 3:55 a.m., travelling north on I-25 from Albuquerque, NM to Boulder, CO, pioneer mead enthusiast Susanne Price was killed in a violent car crash. Her car apparently went off the road under icy conditions, and as it came back on was struck on the driver's side by a bus. Susanne died on impact. No one else was injured.

Those who knew Susanne are still in shock. She loved life very deeply, and her caring and genuine empathy had brought much joy and inspiration into our world. We will wish Susanne's spirit the best, and realize deep in our hearts that it is us who will feel the pain, as she no longer will experience the suffering of want or fear. Susanne has now merged back to where our energy which flows through our bodily vehicle came.

Donations in Susanne's name for the American Mead Association can be sent to P.O. Box 4666 in Grand Junction, CO 81502. The April 96 *Inside Mead* will be dedicated in her memory. Proceeds will be used to continue the efforts and projects Susanne helped establish through the AMA, including refinement of a mead judging criteria, and the establishment of an annual award to be entitled, "Susanne Price Meadmaker of the Year."

Big Brands Not Popular

PRIVATE LABEL SALES JUMP

If marketers of big brands hope to escape the battle with private-label rivals by venturing overseas, they'd better think again. A report from Euromonitor in London documents the rise of private-label goods in Europe. (The chart here details some of the findings.) While the pace of growth varies sharply from country to country, the upward direction is consistent. And Euromonitor forecasts private-label sales in Europe will jump another 23% in real terms between 1995 and 2000.

US $million	1990	1995
Germany	45,342	71,908
UK	46,701	63,832
France	38,544	46,509
Switzerland	11,239	15,541
Spain	5,765	12,062
Italy	5,907	9,307
Netherlands	7,698	8,004
Belgium	4,313	5,543
Austria	1,475	3,101
Denmark	1,405	2,541

HONEY BOARD DEVELOPS NEW COOKBOOK

The National Honey Board will be developing a new low-fat cookbook this year. The new cookbook will replace "Sweetened with Honey – The Natural Way," which is expected to be sold out this year.

The new cookbook will contain over 100 delectable low-fat honey recipes plus full-color, mouth watering photographs. The cookbook will be sold at supermarket checkout stands throughout the country in February 1997. Additional copies will be available to the honey industry through the National Honey Board.

"Sweetened with Honey – The Natural Way" is expected to be available until late 1996 but supplies are limited. To order a single copy of the Honey Board's current cookbook, send a check or money order for $2.50 to: National Honey Board - Dept. BK, P.O. Box 7760, Marshfield, WI 54449.

For orders of 10-99, the cost is $1.75 each. For 100 or more cookbooks, the cost is $1.25 each. If you wish to purchase multiple copies send check or money order to: Cookbook, National Honey Board, 390 Lashley St., Longmont, CO 80501.

(Note: Colorado residents, please include 3% sales tax.) Please allow 4-6 weeks for delivery.

A BASKET OF BEES

Woven reed baskets with gooseneck openings, have been a traditional method employed to trap fish throughout Polynesia. Noting the similarity between these fish-traps, and the bee baskets of Africa, our Managing Director, Mr. Bill Lee, thought he'd place a few baskets around the beeyard here in Dailua Beach, Hawaii, and lo and behold, shortly thereafter (2nd week of February) a swarm began to take hold, first on the neck, and then up into the basket. The flower pot water catch-base is hot-glued on to protect the top of the basket from rain. The baskets just wave gently in the wind, which doesn't seem to upset the swarm! Although Bee Supply Co., has no ambitions to place more fish traps in trees, it sure makes it easy to ship a basket of bees!

METRIC WOES

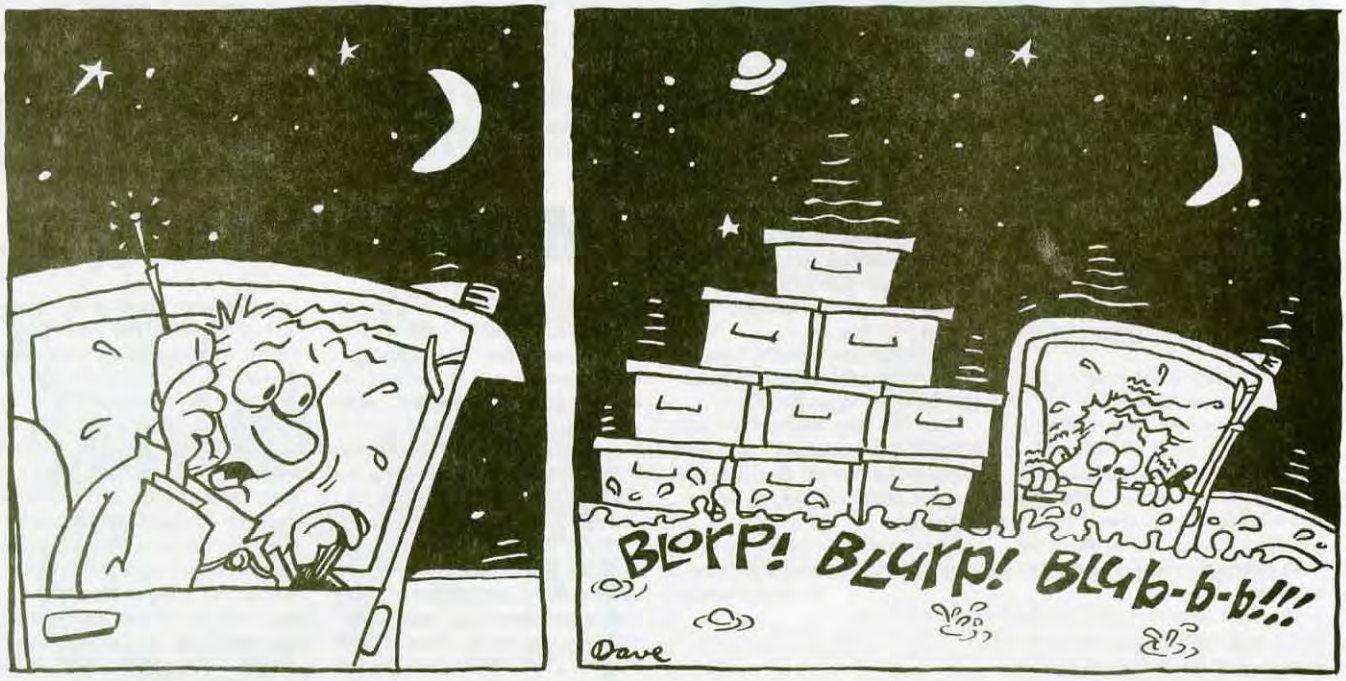
Farmers in New Zealand have their problems, too. A visitor there returned recently with this story.

A bank officer heard the following explanation for a farmer's recent troubles:

- "It all started back in '87 when they changed from pounds to dollars. My overdraft doubled.
- "Then they brought in kilograms instead of pounds – my wool clip dropped by half.
- "Then they changed rain to millimeters and we haven't had an inch of rain since.
- "They brought in Celsius and it never got over 40 degrees. No wonder my wheat wouldn't grow.
- "Then they changed acres to hectares and I ended up with half the land I had.
- "By this time, I've had it and decided to sell. I put the place in the agent's hands and then they changed from miles to kilometers. Now, I'm too far out of town for anyone to buy the place."

The Delmarva Farmer

Smokey Dents



"Hello Triple-A? Do you make orchard calls? You do! Great! Please Hurry!!!

1996 WHO'S WHO

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF AGR.
ALABAMA Frank Little 5720 Belle Ridge Trail Irondale, AL 35210 Ph. (205) 956-0526	Dept. of Agr. & Indus. P.O. Box 3336 Montgomery, AL 36109-0336 Ph. (334) 240-7225 FAX: (334) 20-7168	Dr. James Tew OARDC/Dept. Ent. 1680 Madison Ave. Wooster, OH 44691 Ph. (330) 262-3684 FAX: (330) 262-2720	Dr. James Tew OARDC/Dept. Ent. 1680 Madison Ave. Wooster, OH 44691 Ph. (216) 262-3684 FAX: (216) 262-2720	Alabama Development Off. 401 Adams Ave. Montgomery, AL 36130 (205) 242-0400	Mr. Jack Thompson 1445 Federal Drive P.O. Box 3336 Montgomery, AL 36109-0336 Ph. (205) 242-2656
ALASKA Fletcher Miller Box 140173 Anchorage, AK 99508 Ph. (907) 338-4694	Mr. Doug Warner AK Dept. of Nat. Resources P.O. Box 949 Palmer, AK 99645-0949 Ph. (907) 745-7200	Wayne Vandre Cooperative Extension Ser. 2221 E. No. Lights Blvd., Ste. 118 Anchorage, AK 99508-4143 Ph. (907) 279-6575	Wayne Vandre Cooperative Extension Ser. 2221 E. No. Lights Blvd., Ste. 118 Anchorage, AK 99508-4143 Ph. (907) 279-6575	Dept. of Commerce & Econ. Dev. P.O. Box 110800 Juneau, AK 99811-0800 (907) 465-2500	Mr. John Cramer P.O. Box 949 Palmer, AK 99645-0949 Ph. (907) 745-7200
ARIZONA Al Briggs 2765 N. Scottsdale Rd. Scottsdale, AZ 85257 (602) 496-0939	AZ Dept. of Agr. 1601 N. 7th Street Phoenix, AZ 85006-2299 Ph. (602) 542-4373	D. Timothy J. Dennehy Ent. Dept., UA Tucson, AZ 85721 Ph. (602) 621-7124 FAX: (602) 621-1150	Dr. Eric H. Erickson Carl Hayden Bee Res. Ctr. 2000 E. Allen Road Tucson, AZ 85719 Ph. (602) 670-6481, EXT. 104 FAX: (520) 670-6493	Director of International Trade 3800 N. Central Ave. Suite 1500 Phoenix, AZ 85012 (602) 280-1371	Mr. Keith Kelly 1688 West Adams, Phoenix, AZ 85007 Ph. (602) 542-4373
ARKANSAS Anna Coy Rt. 1, Box 157A Jonesboro, AR 72401 Ph. (501) 932-0034	Mr. Ed Levi & Betty Scharf AR State Plant Board No. 1 Natural Resources Dr. Little Rock, AR 72205 Ph. (501) 225-1598 FAX: (501) 225-3590	Dr. Don Johnson P.O. Box 391 Little Rock, AR 72203 Ph. (501) 671-2000, Ext. 2229 FAX: (501) 671-2303	Mr. Gerald Wallis U of AR Dept. of Ent Agri Bld. Fayetville, AR 72701 Ph. (501) 575-7689 FAX: (501) 575-2452	International Marketing 1 State Capitol Mall Little Rock, AR 72201 (501) 682-1121	Mr. Gerald King P.O. Box 1069 Little Rock, AR 72203 Ph. (501) 225-1598
CALIFORNIA Cathy Brandi 1518 Paradise Ln. Los Banos, CA 93635 Ph. (209) 826-8065	Dave Luscher CA Dept. of Food & Agr. 1220 N. Street, Rm A-357 Sacramento, CA 95814 Ph (916) 654-0768 FAX: (916) 653-2403	Dr. Eric Mussen Dept. of Entomology University of CA - Davis Davis, CA 95616 Ph. (916) 752-0472 FAX: (916) 752-1537	Dr. Rob Page Dept. of Entomology University of CA - Davis Davis, CA 95616 Ph. (916) 752-5455 FAX: (916) 752-1537	CA State World Trade Commission 1121 L St. Suite 310 Sacramento, CA 95814 (916) 324-5511	Mr. Henry J. Voss 1220 N. Street, Suite 409 Sacramento, CA 94271-0001 Ph. (916) 654-0433
COLORADO Mrs. Helen Jones 401 N. Albany Yuma, CO 80759	Mr. Leslie A. Zermuehlen CO State Dept. of Agr. 700 Kipling St., Suite 4000 Lakewood, CO 80215-5894 Ph. (303) 239-4140 FAX: (303) 239-4177	Dr. Whitney Cranshaw Entomology Dept. CSU Fort Collins, CO 80523 Ph. (970) 491-6781	Dr. Whitney Cranshaw Entomology Dept. CSU Fort Collins, CO 80523 Ph. (970) 491-6781	International Trade Office 1625 Broadway Suite 680 Denver, CO 80202 (303) 892-3850	Dr. Robert G. McLavey 700 Kipling Street Suite 4000 Denver, CO 80215 Ph. (303) 239-4100
CONNECTICUT Donald Nyce 55 Mungertown Rd. Madison, CT 06443 (203) 245-1965	Carol R. Lemmon CT Agr. Exp. Station 123 Hunting St. P.O. Box 1106 New Haven, CT 06504 Ph. (203) 789-7236 FAX: (203) 789-7232	Dr. Louis Magnarelli CT Agr. Experiment Sta. 123 Huntington St., P.O. Box 1106 New Haven, CT 06504 Ph. (203) 789-7241 FAX: (203) 789-7232	Dr. Louis Magnarelli CT Agr. Experiment Sta. 123 Huntington Street New Haven, CT 06504 Ph. (203) 789-7241	International Division 865 Brook St Rocky Hill, CT 06067-3405 (203) 258-4256	Mr. Jack R. H. Blum 165 Capitol Ave., Rm. 273 Hartford, CT 06106 Ph. (203) 566-4667

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF AG...
DELAWARE John S. Tulloch P.O. Box 473 Odessa, DE 19730 Ph. (302) 378-1917	Mr. Robert Mitchell DE Dept. of Agr. 2320 South DuPont Highway Dover, DE 19901 Ph. (302) 739-4811 FAX: (302) 697-6287	Dr. Dewey Caron Entomology Dept. University of Delaware Newark, DE 19717 Ph. (302) 831-2526 FAX: (302) 831-3651	Dr. Dewey Caron Entomology Dept. University of Delaware Newark, DE 19717 Ph. (302) 831-2526 FAX: (302) 831-3651	Delaware Development Office 99 Kings Highway P.O. Box 1401 Dover, DE 19903 (302) 739-4271	Mr. John F. Tarburton 2320 South DuPont Highway Dover, DE 19901 Ph. (302) 739-4811
FLORIDA Robert Kelley 115 Patten Heights Lakeland, FL 33803	Mr. Laurence P. Cutts FL State Dept. of Agr. P.O. Box 147100 Gainesville, FL 32614-7100 Ph. (904) 372-3505 FAX: (904) 955-2301	Dr. Tom Sanford University of Florida P.O. Box 110620 Gainesville, FL 32611-0620 Ph. (352) 392-1801, EXT. 143 FAX: (352) 392-0190	Dr. Tom Sanford University of Florida P.O. Box 110620 Gainesville, FL 32611-0620 Ph. (352) 392-1801, EXT. 143 FAX: (352) 392-0190	Div. of Intl. Trade & Dev. Collins Building 107 W. Gaines, Room 366 Tallahassee, FL 32399-2000 (904) 488-6124	Mr. Robert Crawford The Capitol Tallahassee, FL 32399-0810 Ph. (904) 488-3022
GEORGIA P.N. Williams 528 Bridge Avenue Forest Park, GA 30050 Ph. (404) 366-6404	Mr. Tom Kowalski GA Dept. of Agr. Agriculture Building, Capitol Sq. Atlanta, GA 30334 Ph. (404) 651-9486 FAX: (404) 656-3644	Dr. Keith Delaplane Dept. of Entomology University of Georgia Athens, GA 30602 (706) 542-8954 FAX: (706) 542-3872	Dr. Keith Delaplane Dept. of Entomology University of Georgia Athens, GA 30602 (706) 542-8954 FAX: (706) 542-3872	Dept. of Industry, Trade & Tour. P.O. 1776 Atlanta, GA 30301 (404) 656-3581	Mr. Thomas T. Irvin Capitol Square Atlanta, GA 30334 Ph. (404) 656-3600
HAWAII Lee Ong Chun 2115 N. School St. Honolulu, HI 96819 Ph. (808) 841-6440	Dr. Thomas W. Culliney HI Dept. of Agr. 1428 S. King Street Honolulu, HI 96823-2159 Ph. (808) 973-9529	Ronald Mau 3050 Maile Way, UH, Manoa, Gilmore Hall 307-D Honolulu, HI 96822 Ph. (808) 956-7063	Dr. Patricia Couvillon University of Hawaii 1993 East West Rd. Honolulu, HI 96822 Ph. (808) 956-4761	Dept. of Business, Economic Dev. & Tourism P.O. Box 2359 Honolulu, HI 96804 (808) 587-2750	Dr. Calvin W.S. Lum 99-762 Moanalua Rd. Aiea, HI 96701 Ph. (808) 487-5351
IDAHO Golden Millet 1 Box 8 Bee Marsing, ID 83639	Michael Cooper ID Dept. of Agr. 2270 Old Penitentiary Rd. Box 790 Boise, ID 83701 Ph. (208) 332-8620 FAX: (208) 334-2283	Hugh Homan Extension Service Dept. University of Idaho Boise, ID 83843 Ph. (208) 885-7542		Department of Commerce 700 W. State St. State House Mail Boise, ID 83720-2700 (208) 334-2470	Dr. W.G. Nelson P.O. Box 790 Boise, ID 83701 Ph. (208) 334-3240
ILLINOIS Rita Taylor Rt. 2, Box 249 Pleasant Plains, IL 62677 Ph. (217) 626-1319	Mr. Scott Frank Illinois Dept. of Agr. P.O. Box 19281 Fairgrounds Springfield, IL 62794-9281 Ph. (217) 782-4944 FAX: (217) 524-7702	Mr. Scott Frank Illinois Dept. of Agr. P.O. Box 19281 Fairgrounds Springfield, IL 62794-9281 Ph. (217) 782-4944 FAX: (217) 524-7702	Dr. Gene Robinson Dept. of Ent., 320 Morrill Hall 505 S.Goodwin Ave. Urbana, Il 61801 Ph. (217) 333-2910 FAX: (217) 244-3499	Vacant	Dr. Arnold Taft P.O. Box 19281, State Fairgrounds Springfield, IL 62794-9281 Ph. (217) 782-4944
INDIANA Tracy Hunter 3440 Handcock Ridge Rd. Martinsville, IN 46151 Ph. (317) 537-9430	Kathleen M. Prough Dept. of Nat. Resources 402 W. Washington, Rm W.290 Indianapolis, IN 46204 Ph. (317) 232-4120 FAX: (317) 232-2649	Entomology Department Purdue University W. Lafayette, IN 47907 Ph. (317) 494-9162	Bill Fischang Entomology Department Purdue University W. Lafayette, IN 47907 Ph. (317) 494-9162	Department of Commerce One North Capitol Ave. Suite 700 Indianapolis, IN 46204-2288 Ph. (317) 232-8845	Mr. James R. Moseley 1140 Agricultural Adm. Bldg. West Lafayette, IN 47907-1140 Ph. (317) 494-8392
IOWA Margaret Hala 1988 Vine St. Marshalltown, IA 50158 Ph. (515) 752-2981	Mr. Robert Cox IA Dept. of Agr. Wallace Building Des Moines, IA 50319 Ph. (515) 281-5736 FAX: (515) 242-5015	Mr. Robert Cox IA Dept. of Agr. Wallace Building Des Moines, IA 50319 Ph. (515) 281-5736 FAX: (515) 242-5015		International Trade Dept. of Economic Development 200 E. Grand Ave. Des Moines, IA 50309-1819 (515) 242-4700	Mr. Dale M. Cochran Wallace Building Des Moines, IA 50319 Ph. (515) 281-5322

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KANSAS Joli Winer 8833 Quivera Rd. Overland Park, KS 66215 Ph. (913) 492-1670	Mr. Gary R. Ross KS Dept. of Agr. 901 S.Kansas Ave. Topeka, KS 66612-1281 Ph. (913) 296-2263 FAX: (913) 296-0673	C. Michael Smith Entomology Dept. 123 Waters Hall, KSU Manhattan, KS 66506 Ph. (913) 532-6154 FAX: (913) 532-6232	Dr. Orley Taylor University of Kansas Dept. of Entomology Lawrence, KS 66045 Ph. (913) 864-4051 FAX: (913) 864-5321	Kansas Dept. of Commerce 400 SW 8th St. Suite 500 Topeka, KS 66603-3957 (913) 296-3483	Mr. Phillip Fishburn 109 SW 9th Street Topeka, KS 66612-1280 Ph. (913) 296-3558
KENTUCKY James Davis 371 Caney Church Rd. Stamping Ground, KY 40379-9644 Ph. 502-857-2272		Dr. Thomas Webster Community Research Service Kentucky State University Frankfort, KY 40601 Ph. (502) 227-6351 FAX: (502) 227-6381	Community Research Service Kentucky State University Frankfort, KY 40601 Ph. (502) 227-6351 FAX: (502) 227-6381	Office Of International Marketing KY Cabinet for Economic Dev. Capitol Plaza Tower, 24th Floor Frankfort, KY 40601 (502) 564-2170	Mr. Ed Logsdon 500 MERO STREET Frankfort, KY 40601 Ph. (502) 564-4696
LOUISIANA Steve Bernard 1051 Frank Castille Breaux Bridge, LA 70517 Ph. (318) 228-7535	Mr. Jimmy Dunkley P.O. Box 3118 Baton Rouge, LA 70821-3118 Ph. (504) 925-7772 FAX: (504) 925-3760	Dr. Dale Pollet, Ent. Specialist LA Cooperative Extension Service LA State Univ. 202 B Knapp Hall Room 202L Baton Rouge, LA 70803 Ph. (504) 388-2180 FAX: (504) 388-2478	Dr. Thomas Rinderer 1157 Ben Hur Rd. Baton Rouge, LA 70820 Ph. (504) 767-9280 FAX: (504) 766-9212	LA Dept. of Economic Dev. P.O. Box 94185 Baton Rouge, LA 70804-9185 Ph. (504) 342-5361	Mr. Robert F. Odom P.O. Box 631 Baton Rouge, LA 70821-0631 Ph. (504) 922-1234
MAINE Bill Truesdell RR 2, Box 26 Bath, ME 04530 Ph. (207) 443-1498	Anthony Jadczak ME Dept. of Agr. Division of Plant Industry Augusta, ME 04333 Ph. (207) 287-3891 FAX: (207) 287-7548	Anthony Jadczak ME Dept. of Agr. Division of Plant Industry Augusta, ME 04333 Ph. (207) 287-3891 FAX: (207) 287-7548	Anthony Jadczak ME Dept. of Agr. Division of Plant Industry Augusta, ME 04333 Ph. (207) 287-3891 FAX: (207) 287-7548	Dept. of Economic & Com. Dev. State House, Station 59 Augusta, ME 04333 (207) 289-2656	Mr. Bernard W. Shaw Deering Building (AMHI) State House, Station 28 Augusta, ME 04333 Ph. (207) 289-3871
MARYLAND Wayne E. Esaias 6971 Mink Howwow Rd. Highland, MD 20777 Ph. (301) 854-3180	Mr. I. Barton Smith, Jr. MD Dept. of Agr. 50 Harry S. Truman Parkway Annapolis, MD 21401 Ph. (410) 841-5920 FAX: (410) 841-5835	Gordon Allen-Wardell University of Maryland Entomology Department College Park, MD 20742 Ph. (301) 405-3953 FAX: (301) 314-9290	Gordon Allen-Wardell University of Maryland Entomology Department College Park, MD 20742 Ph. (301) 405-3953 FAX: (301) 314-9290	Dept. of Economic & Com. Dev. 100 Community Place Crownsville, MD 21032 (301) 514-7000	Mr. Robert L. Walker 50 Harry S. Truman Parkway Annapolis, MD 21401 Ph. (301) 841-5880
MASSACHUSETTS Ted Shylovsky 192 Boston Post Rd. Sudbury, MA 01776-3102 Ph. (508) 443-7195	Mr. Alfred R. Carl, Jr. Dept. of Entomology University of MA Amherst, MA 01003 Ph. (413) 545-1257 FAX: (413) 545-2115	Richard Bonney Dept. of Entomology University of MA Amherst, MA 01003 Ph. (413) 545-2115 FAX: (517) 353-4354	Richard Bonney Dept. of Entomology University of MA Amherst, MA 01003 Ph. (413) 545-2115 FAX: (517) 353-4354	MA Office of Business Dev. 100 Cambridge St. Boston, MA 02202 (617) 727-3206	Mr. Jay Healy 100 Cambridge Street Boston, MA 02202 Ph. (617) 727-3002
MICHIGAN Jack Griffes 7056 Samaria Rd. Ottawa Lake, MI 49267 (313) 856-8845	Mr. Michael G. Hansen Pesticide & Plant Pest Mgt. 4032 M-139, Bldg. 116 St. Joseph, MI 49085 Ph. (616) 428-2575 FAX: (616) 429-1007	Dr. R. Hoopingarner Michigan State University Entomology Department E. Lansing, MI 48824-1115 Ph. (517) 353-8136 FAX: (517) 353-4354	Dr. R. Hoopingarner Michigan State University Entomology Department E. Lansing, MI 48824 Ph. (517) 353-8136 FAX: (517) 353-4354	Marketing & Market Dev. Div. P.O. Box 30017 Lansing, MI 48909 (517) 373-1058	Mr. Bill Schuette 611 W. Ottawa Box 30017 Lansing, MI 48909 Ph. (517) 373-1050
MINNESOTA Fred Holte Rt. 1 43480 Andee Harris, MN 55032 (612) 689-1065	Blane White MN Dept. of Agr. 90 West Plato Boulevard St. Paul, MN 55107-2094 Ph. (612) 296-0591	Dr. Marla Spivak Dept. of Entomology University of MN 219 Hodson Hall St. Paul, MN 55108 Ph. (612) 624-4798 FAX: (612) 625-5299	Dr. Marla Spivak Dept. of Entomology University of MN 219 Hodson Hall St. Paul, MN 55108 Ph. (612) 624-4798 FAX: (612) 625-5299		Dr. Thomas J. Hagerty 90 W. Plato Boulevard St. Paul, MN 55107 Ph. (612) 296-5000

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF AGR.
MISSISSIPPI Harry R. Fulton P.O. Box 5207 Mississippi State, MS 39762 Ph. (601) 325-3390	Harry R. Fulton MS Dept. of Agr. P.O. Box 5207 Mississippi State, MS 39762 Ph. (601) 325-3390 FAX: (601) 325-8397	Dr. James Jarratt P.O. Box 9775 103 Clay Lyle Building Mississippi State, MS 39762 Ph. (601) 325-2085 FAX: (601) 325-8837	Dr. Clarence Collison Head, Ent. Dept. Mississippi State, MS 39762 Ph. (601) 325-2085 FAX: (601) 325-8837	Dept. of Economic & Com. Dev. P.O. Box 849 Jackson, MS 39205 (601) 359-3448 or 359-3797	Mr. Jim Buck Ross P.O. Box 1609 Jackson, MS 39215 Ph. (601) 354-7050
MISSOURI Don Moore 14 Kathryn Dr. St. James, MO 65559 Ph. (573) 265-8706	Michael Brown MO Dept. of Agr. P.O. Box 630 Jefferson City, MO 65102 Ph. (573) 751-5505 FAX: (573) 751-0005	Ray Nabors U. of MO Extension Apiculturist P.O. Box 1001 Caruthersville, MO 63830 (573) 333-0259 FAX: (573) 333-0259		Intl. Business Dev. 307 W. High Street, Room 770, P.O. Box 118 Jefferson City, MO 65102 (314) 751-4241	Mr. John L. Saunders P.O. Box 630 Jefferson City, MO 65102 Ph. (314) 751-3359
MONTANA Les Wienke 720 Knapp St. Wolf Pint, MT 59201 Ph. (406) 653-1628	MT Dept. of Agr. P.O. Box 200201 Helena, MT 59620 Ph. (406) 444-2944 FAX: (406) 444-5409	MT Dept. of Agr. P.O. Box 200201 Helena, MT 59620-0201 Ph. (406) 444-2944 FAX: (406) 444-5409	MT Dept. of Agr. P.O. Box 200201 Helena, MT 59620 Ph. (406) 444-2944 FAX: (406) 444-5409	Dept. of Commerce 1424 Ninth Ave. Helena, MT 59620 (406) 444-3923	Mr. Leo A. Giacometto P.O. BOX 200201 Helena, MT 59620-0201 Ph. (406) 444-3144
NEBRASKA Jerry D Bishop 311 W. 28th Ave. Bellevue, NE 68005-5323 Ph. (402) 291-1843	Steve Johnson NE Dept. of Agr. P.O. Box 94756 Lincoln, NE 68509 Ph. (402) 471-2394 FAX: (402) 471-6892	Dr. Marion D. Ellis 202 Plant Industries Lincoln, NE 68583-0816 Ph. (402) 472-2123 FAX: (402) 472-4687	Dr. Marion D. Ellis 202 Plant Industries Lincoln, NE 68583-0816 Ph. (402) 472-2123 FAX: (402) 472-4687	International Division P.O. Box 94666 301 Centennial Mall South Lincoln, NE 68509-4666 (402) 471-3111 or 1-800-426-6505	Mr. Larry Sitzman 301 Centennial Mall South P.O. Box 94947 Lincoln, NE 68509 Ph. (402) 471-2351
NEVADA Bill Goff 14060 Edmands Dr. Reno, NV 89511 Ph. (702) 851-1888	Mr. John O'Brien NV Dept. of Agr. 350 Capitol Hill Ave. Reno, NV 89502 Ph. (702) 688-1180 FAX: (702) 688-1178	Mr. John O'Brien NV Dept. of Agr. 350 Capitol Hill Ave. Reno, NV 89502 Ph. (702) 688-1180 FAX: (702) 688-1178	Mr. John O'Brien NV Dept. of Agr. 350 Capitol Hill Ave. Reno, NV 89502 Ph. (702) 688-1180 FAX: (702) 688-1178	Dept. of Economic Development Capitol Complex Carson City, NV 89710 (702) 687-4325	Mr. Thomas W. Ballow 350 Capitol Hill Avenue P.O. Box 11100 Reno, NV 89510 Ph. (702) 688-1180
NEW HAMPSHIRE Michael Bayko 69 Bean Road Merrimack, NH 03054 Ph. (603) 424-5477	Dr. Siegfried E. Thewke NH Dept. of Agr. State Lab Bldg., Lab D, Hazen Dr. Concord, NH 03301 Ph. (603) 271-2571 FAX: (603) 271-1289	David Sorensen P.O. Box 367 Conway, NH 03818 Ph. (603) 447-5922 FAX: (603) 447-1035	Stanley Swier College Life Sc. & Agr. Univ. of NH Durham, NH 03824 Ph. (603) 862-1733 FAX: (603) 862-1713	Dept. of Resources & Econ. Dev. Office of Business & Ind. Dev. Intl. Trade, P.O. Box 856 Concord, NH 03302-0856 (603) 271-2591	Mr. Stephen H. Taylor Caller Box 2042 Concord, NH 03302-2042 Ph. (603) 271-3551
NEW JERSEY Herb Pabst P.O. Box 1515 West Caldwell, NJ 07007-1515 Ph. (201) 226-3863	Mr. Grant Stiles Div. of Plant Ind. CN 330 Trenton, NJ 08625-0330 Ph. (609) 984-2263 FAX: (609) 633-2550	Entomology Dept. Rutgers University New Brunswick, NJ 08903 Ph. (908) 932-9341	Entomology Dept. Rutgers University New Brunswick, NJ 08903 Ph. (908) 932-9341	Dept. of Commerce & Econ. Dev. 153 Halsey Street, 5th Floor P.O. Box 47024 Newark, NJ 07101 (201) 648-3518	Mr. Arthur R. Brown, Jr. CN330 Trenton, NJ 08625 Ph. (609) 292-3976
NEW MEXICO Elizabeth Crowder 12 Sparrow Hawk Rd. Bosque, NM 87006	Ms. Marjorie Lewis NM State Dept. of Agr. P.O. Box 30005 Las Cruces, NM 88003 Ph. (505) 646-3207 FAX: (505) 646-5977	Lloyd English New Mexico State Univ. Box 3AE Las Cruces, NM 88003-0001 Ph. (505) 646-2546 FAX: (505) 646-8085	Lloyd English New Mexico State Univ. Box 3AE Las Cruces, NM 88003-0001 Ph. (505) 646-2546 FAX: (505) 646-8085	Economic Dev. Dept. Trade Div. – Montoya Bldg. 1100 St. Francis Drive Santa Fe, NM 87503 (505) 827-0380	Mr. Frank A. DuBois P.O.Box 3189 Las Cruces, NM 88003 Ph. (505) 646-3007

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF AGR.
NEW YORK Judith A. Doan 1263 Redman Rd. Hamlin, N1Y 14464 Ph. (716) 964-3121	Mr. Robert J. Mungari NY State Dept. of Agr. & Markets 1 Winners Circle, Capital Plaza Albany, NY 12235 Ph. (518) 457-2087 FAX: (518) 457-1204	Dr. Roger A. Morse Cornell University 2130 Comstock Hall Ithaca, NY 14853 Ph. (607) 255-7723/5443 FAX: (607) 255-0939	Dr. Nick Calderone Cornell University Dyce Lab, 2130 Comstock Hall Ithaca, NY 14456 Ph. (607) 255-7723/5443 FAX: (607) 255-0939	Dept. of Economic Dev. 1515 Broadway, 51st Floor New York, NY 10036 (212) 827-6100	Mr. Richard McGuire One Winners Circle Capitol Plaza Albany, NY 12235 Ph. (518) 457-4188
NORTH CAROLINA Irvin E. Rackley NC State Beekeepers Association 2431 Leggett Rd. Rocky Mountain, NC 27801 Ph. (919) 446-5487	NC Dept. of Agr. Div. of Plant Industry Raleigh, NC 27611 Ph. (919) 733-3610 FAX: (919) 233-8394	Dr. John Ambrose NC State University P.O. Box 7626 Raleigh, NC 27695-7626 Ph. (919) 515-1660 FAX: (919) 515-7296	Dr. John Ambrose NC State University P.O. Box 7626 Raleigh, NC 27695-7626 Ph. (919) 515-1660 FAX: (919) 515-7296	Department of Commerce International Trade Division 430 North Salisbury Street Raleigh, NC 27611 (919) 733-7193	Dr. Richard McDonald NC Dept. of Agriculture Div. of Plant Industry Raleigh, NC 27611 Ph. (919) 733-3610
NORTH DAKOTA C. Nix P.O. Box 396 Valley City, ND 58072 Ph. (701) 845-0584	Ms. Judy Carlson ND Dept. of Agr. 600 E. Blvd., 6th Floor Bismarck, ND 58505-0020 Ph. (701) 328-4997 FAX: (701) 328-4567	Phillip Gogoza ND State University Dept. of Entomology, Hultz Hall Fargo, ND 58105 Ph. (701) 237-7581 FAX: (701) 231-8557		ND World Trade, Inc. 1833 E. Bismarck Expressway Bismarck, ND 58504 (701) 221-5336	Ms. Sarah Vogel 600 East Boulevard, 6th Floor State Capitol Bismarck, ND 58505-0020 Ph. (701) 224-2231
OHIO Jim Thompson 8227 Eby Rd. Smithville, OH 44677 Ph. (216) 669-3352	Mr. Gordon Rudloff OH State Dept. of Agr. 8995 East Main Street Reynoldsburg, OH 43068-3399 Ph. (614) 728-6200 FAX: (614) 728-6226	Dr. James Tew OARDC/Dept. Ent. 1680 Madison Ave Wooster, OH 44691 Ph. (330) 263-3684 FAX: (330) 262-2720	Sue Cobey Dept. of Entomology 1735 Neil Ave. Columbus, OH 43210 (614) 292-0465	OH Dept. of Development International Trade Division P.O. Box 1001 Columbus, OH 43266-0101 (614) 466-5017	Mr. Fred L.Dailey 65 S. Front Street Columbus, OH 43215 Ph. (614) 466-2737
OKLAHOMA Harold St. Clair 10416 N. 127th East Avenue Owasso, OK 74055 Ph. (918) 272-1317	Mr. Sancho M. Dickinson, III OK Dept. of Agr. 2800 North Lincoln Blvd. Oklahoma City, OK 73105 Ph. (405) 521-3864 FAX: (405) 522-4584	Prof. Ken Pinkson OK State Univ. 127 NRC Stillwater, OK 74078 Ph. (405) 744-5531 FAX: (405) 744-6039	Prof. Ken Pinkson Ent. Dept OK State Univ. Stillwater, OK 74078 Ph. (405) 624-5527 FAX: (405) 744-6039	OK Dept. of Commerce International Trade & Invest. 6601 Broadway Extension Oklahoma City, OK 73116 (405) 841-5217	2800 North Lincoln Oklahoma City, OK 73105 Ph. (405) 521-3868
OREGON Phyllis Shoemake 1874 Winchester NW Salem, OR 97304 Ph. (503) 364-8401	State Apiary Inspector OR Dept. of Agr. 635 Capitol Street, N.E. Salem, OR 97310-0110 Ph. (541) 986-4620	Dr. D.M. Burgett Oregon State University Entomology Department Corvallis, OR 97331 Ph. (541) 737-4896 FAX:(541) 737-3643	Dr. D.M. Burgett Oregon State University Entomology Department Corvallis, OR 97331 Ph. (503) 737-4896 FAX: (541) 737-3643	Dept. of Economic Dev. One World Trade Center 121 SW Salmon, Suite 300 Portland, OR 97204 (503) 229-5625 800-448-7512 (OR)	Mr. Bruce Andrews 635 Capitol Street, NE Salem, OR 97310-0110 Ph. (503) 378-4152
PENNSYLVANIA Yvonne Crimbring R.D. 1, Box 315 Canton, PA 17724 Ph. (717) 673-8201	Mr. James Steinhauer Dept. of Agriculture 2301 North Cameron St. Harrisburg, PA 17110 Ph. (717) 787-5609 (717) 783-3275	Mary Ann Frasier 501 ASI Bldg. Dept. of Ent. PA State Univ. University Park, PA 16802 Ph. (814) 865-4621 FAX: (814) 865-3048	Dr. Scott Camazine Dept. of Ent. PA State Univ. University Park, PA 16802 Ph. (814) 865-4621 FAX: (814) 865-3048	Department of Commerce Office of International Dev. 464 Forum Bldg. Harrisburg, PA 17120 (717) 787-7190	Mr. Boyd E. Wolff 2301 North Cameron Street Harrisburg, PA 17110-9408 Ph. (717) 772-2853
RHODE ISLAND Bernard Bieder 140 Coldbrook Rd. Warwick, RI 02888 Ph. (401) 463-8654	Dr. Kerwin E. Hyland Univ. of RI Biological Science Center, B-114 100 Flag Rd. Kingston, RI 02881 Ph. (401) 874-2650 FAX: (401) 874-4256		Marcia Morreira Univ. of RI Kingston, RI 02881 Ph. (401) 874-2259 FAX: (401) 874-2259	Dept. of Economic Dev. 7 Jackson Walkway Providence, RI 02903 (401) 277-2601	Mr. John Lawrence 22 Hayes Street Providence, RI 02908 Ph. (401) 277-2781

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF AG
SOUTH CAROLINA William L. Baker 2663 Ford St. Sumter, SC 29150	Fred Singleton Dept. of Plant Industries 204-B N. Gum St. Summerville, SC 29483 Ph. (803) 821-3234	Dr. Mike Hood Clemson University 305 Long Hall Clemson, SC 29621 Ph. (803) 656-0346 FAX: (803) 656-5065	Dr. Mike Hood Clemson University 112 Agricultural Servicenter Clemson, SC 29621 Ph. (803) 656-0346 FAX: (803) 656-5065	State Development Board International Division P.O. Box 927 Columbia, SC 29202 (803) 737-0400	Mr. D. Leslie Tindal P.O. Box 11280 Columbia, SC 29211 Ph. (803) 734-2210
SOUTH DAKOTA Judy Gulleson Box 52 Britton, SD 54430 Ph. (605) 448-5163	Mr. Robert Reiners SD Dept. of Agr. Foss Building Pierre, SD 57501 Ph. (605) 773-3796 FAX: (605) 773-3481	Murdick McLeod South Dakota State Univ. Ag Hall Rm. 230, Box 2207A Brookings, SD 57007 Ph. (605) 688-4603 FAX: (605) 688-4602		Governor's Off. of Econ. Dev. 711 East Wells Ave. Pierre, SD 57501-3369 (605) 773-5032	Mr. Brad Berven 445 Capitol Avenue Sigurd Anderson Building Pierre, SD 57501 Ph. (605) 773-3375
TENNESSEE William D. Lane 5801 Vassar St. Memphis, TN 38119 Ph. (901) 683-7494	Gary Haun Plant Ind. Field Office 3211 Alcoa Hwy. Knoxville, TN 37920 Ph. (423) 594-6098 FAX: (423) 594-8900	Dr. John Skinner University of TN Box 1071 Knoxville, TN 37901-1071 Ph. (423) 974-7138 FAX: (423) 974-8868	Dr. John Skinner University of TN Box 1071 Knoxville, TN 37901-1071 Ph. (615) 974-7138 FAX: (423) 974-8868	Dept. of Economic & Com. Dev. Export Promotion Office 320 6th Ave. North Nashville, TN 37243-0405 (615) 741-8570	Mr. L.H. Ivy P.O. Box 40627, Melrose Station Nashville, TN 37204 Ph. (615) 360-0100
TEXAS John Thomas 805 Vine St. Bryan, TX 77802 Ph. (409) 846-5068	Mr. Paul Jackson TX A & M University College of Agriculture College Station, TX 77843-2475 Ph. (409) 845-9713/9714 FAX: (409) 845-0983	Rodney Holloway Texas A&M University Dept. of Ent. - Rm. 411 Heep Ctr. College Station, TX 77843-2475 Ph. (409) 845-3849 FAX: (409) 845-6251	Mr. Paul Jackson TX A & M University College of Agriculture College Station, TX 77843-2475 Ph. (409) 845-9713/9714 FAX: (409) 845-0983	Dept. of Commerce International Trade Division P.O. Box 12728, Capitol Station Austin, TX 78711 (512) 472-5059	Mr. Rick Perry, Commissioner P.O. Box 12847, Capitol Station Austin, TX 78711 Ph. (512) 463-7476
UTAH William Jones 286 Andrew Lane Murray, UT 84107 Ph. (801) 358-2033	Mr. Edward Bianco UT State Dept. of Agr. P.O. Box 146500 350 North Redwood Road Salt Lake City, UT 84114-6500 Ph. (801) 538-7184 FAX: (801) 538-7189	Jay B. Karren Utah State University Extension Service Logan, UT 84322-5305 Ph. (801) 797-2514 FAX: (801) 797-1575	Dr. William Nye Utah State Univ. Dept. of Entomology Logan, UT 84332 Ph. (801) 750-2524	Div. of Comm. & Econ. Dev. 324 S. State Street, Suite 500 Salt Lake City, UT 84111 (801) 538-8700	Mr. Cary G. Peterson 350 N. Redwood Road Salt Lake City, UT 84116 Ph. (801) 538-7101
VERMONT David Howells 155 Dorr Dr. Rutland, VT 05701 Ph. (802) 773-7168	Mr. Steve Parise VT Dept. of Agr. 116 State Street Montpelier, VT 05602-2901 Ph. (802) 828-2431 FAX: (802) 828-2361			Dept. of Economic Development 109 State Street Montpelier, VT 05609 (802) 828-3221	Mr. George Dunsmore 120 State Street Montpelier, VT 05620-2901 Ph. (802) 828-2430
VIRGINIA Rick Fell VA Tech, Price Hall Blacksburg, VA 24060 Ph. (540) 231-7207	Frank Fulgham P.O. Box 1163 Richmond, VA 23218 Ph. (804) 786-3515 FAX: (804) 371-7793	Dr. Richard Fell Virginia Tech Univ. Entomology Department Blacksburg, VA 24061 Ph. (540) 231-7207 FAX: (540) 231-9131	Dr. Richard Fell Virginia Polytechnic Univ. Entomology Department Blacksburg, VA 24061 Ph. (540) 231-7207 FAX: (540) 231-9131	Dept. of Economic Development P.O. Box 798 Richmond, VA 23206-0798 (804) 786-3791	Dr. Clinton V. Turner P.O. Box 1163 Richmond, VA 23209 Ph. (804) 786-3501
WASHINGTON Jeff Hoit P.O. Box 3383 Arlington, WA 98223 Ph. (509) 865-2279	Mr. James Bach USDA State Apiarist P.O. Box 42560 Olympia, WA 98504-2560 Ph. (360) 902-2068 FAX: (360) 902-2094	Dr. Dan Mayer 24106 N. Bunn Rd. Prosser, WA 99350 Ph. (509) 786-2226 FAX: (509) 786-9370	Dr. Steve Sheppard Ent. Dept. FSHN 166 WSU Pullman, WA 99164-5504 Ph. (509) 335-6382 FAX: (509) 335-1009	Dept. of Trade & Economic Dev. Market & Targeted Ind. Dev. 2001 6th Ave., Suite 2600 Seattle, WA 98121 (206) 464-1743	Mr. Jim Jesernig P.O. Box 42560 Olympia, WA 98504-2560 (206) 902-1800

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF AGR.
WEST VIRGINIA John Campbell 102 First St. Parsons, WV 26287 Ph. (304) 478-3675	Mr. Matthew E.Cochran WV Dept. of Agr. Plant Industries Division Charleston, WV 25305 Ph. (304) 558-2212 FAX: (304) 558-2435	Mr. Matthew E.Cochran WV Dept. of Agr. Plant Industries Division Charleston, WV 25305 Ph. (304) 558-2212 FAX: (304) 558-2435	Dr. James Amrine WV University P.O. Box 6108 Morgantown, WV 26506 Ph. (304) 293-6023 FAX: (304) 293-3740	Governor's Off. of Community and Industrial Development State Capitol, Room M-146 Charleston, WV 25305 (304) 348-0400	Mr. Gus R. Douglas State Capitol Building Charleston, WV 25305 Ph. (304) 348-3550
WISCONSIN Karen Buch 6408 Brouillard Mill Rd. Potosi, WI 53820 Ph. (608) 763-2031	Ms. Anette Phibbs WI Dept. of Agr. P.O. Box 8911 Madison, WI 53708-8911 (608) 224-4575 FAX: (608) 224-4656	Dept. of Entomology University of Wisconsin 237 Russell Labs Madison, WI 53706 Ph. (608) 262-1762	Dept. of Entomology University of Wisconsin 237 Russell Labs Madison, WI 53706 Ph. (608) 262-1762	Dept. of Development P.O. Box 7970 123 West Washington Ave. Madison, WI 53707 (608) 266-1018	Mr. Alan T. Tracy P.O.Box 8911 Madison, WI 53708 Ph. (608) 266-7100
WYOMING Peggy Miller Box 388E Sue Dubois, WY 82513	Mr. Hank Uhden WY Dept. of Agr. 2219 Carey Avenue Cheyenne, WY 82002-0100 Ph. (307) 777-6574 FAX: (307) 766-5549	Michael Brewer P.O. Box 3354 Univ. Stn. Laramie, WY 82071 Ph. (307) 766-4261 FAX: (307) 766-5549	Dick Nunamaker USDA, ARS, ABDRL P.O. Box 3965 Laramie, WY 82071 Ph. (307) 766-3624 FAX: (307) 766-3500	Department of Commerce International Trade Office Herschler Bldg., Floor West Cheyenne, WY 82002 (307) 777-6412	Mr. Don Rosoton 2219 Carey Avenue Cheyenne, WY 82002 Ph. (307) 777-6569
CANADA					
ALBERTA Gertie Adair 16715-113th Ave. Edmonton, Alberta T5M 2X2 Ph. (403) 489-6949 FAX: (403) 487-8640	Mr. Kenn Tuckey Provincial Apiculturist R.R. #6, 17507 Fort Rd. Edmonton, Alberta T5B 4K3 Ph. (403) 422-1789	Doug Colter Ext. Service Alberta Agr. & Food Box 415 Falher, Alberta T0H 1M0 Ph. (403) 837-2211	Dr. Don Nelson Agriculture Canada Box 29 Beaverlodge, Alberta T0H 0C0 Ph. (403) 354-2212		
BRITISH COLUMBIA Patrick Rooney 78024-2606 Commercial Dr. Vancouver, BC V5N 5W1 Ph. (604) 877-7758	Mr. Paul van Westendorp BC Ministry of Agr. & Fisheries 17720 57th Ave. Surrey, British Colum. V3S 4P9 Ph. (604) 576-5639	Kerry Clark Apiculture Specialist B.C.M.A.F.F. 1201 103rd Ave. Dawson Creek, B.C. V1G 4J2 Ph. (604) 784-2231	Dr. Mark Winston Dept. of Biological Sciences Simon Fraser University Burnaby, B.C. V5A 1S6 Ph. (604) 291-4459		
MANITOBA Don Dixon Man. Dept. Ag. 201-545 Univ. Cres Winnipeg, Manitoba, R3T 5S6 Ph. (204) 945-3861	Mr. Don Dixon, Dept. of Agr. 201-545 University Cres Winnipeg, Manitoba, R3T 5S6 Ph. (204) 945-3861	D. R.W. Currie Dept. of Ent. Univ. of Manitoba Winnipeg, Manitoba R3T 2N2 Ph. (204) 474-6022			
NEW BRUNSWICK Ruth McKinney RR 2 Fredericton, NB E3B 4K3 (506) 357-5444	Heather Clay NB Dept. of Agr. P.O. Box 6000 Frederickton, NB E3B 5H1 Ph. (506) 453-2666				
NOVA SCOTIA Earl Blades P.O. Box 550 Truro, B2N 5E3 Ph. (906) 895-1571	Mr. Dick Rogers NS Dept. of Agr. & Marketing Plant Industry Branch Kentville, Nova Scotia, B4N 1J5 Ph. (902) 679-6029	Mr. Dick Rogers NS Dept. of Agr. & Marketing Plant Industry Branch Truro, Nova Scotia, B4N 1J5 Ph. (902) 679-6043			
ONTARIO Patricia Westlake RR #3 Bayfield, Ont. NOM 1G0 Ph. (519) 565-2622	Mr. Douglas McRory Ont. Ministry of Agr. & Food R.R. #5, Box 1030 Guelph, Ontario, N1H 6N1 Ph. (519) 767-3595	Mr. Douglas McRory Ont. Ministry of Agr. & Food R.R. #5, Box 1030 Guelph, Ontario, N1H 6N1 Ph. (519) 767-3127	Dr. Cynthia Scott-Dupree Dept. Envir. Biology University Guelph, Ontario N1G 2W1 Ph. (519) 824-4120, ext. 3565		

ASSN. CONTACT	INSPECTION	EXTENSION	UNIV. CONTACT	GOV. TRADE OFFICE	DEPT. OF R.
PRINCE EDWARD ISLAND Geoffrey Paynter P.O. Box 1114 Charlottetown, PEI C1A 7M8	Mr. Chris Prouse Dept. of Agr. P.O. Box 1600 Charlottetown, PEI, C1A 7N3 Ph. (902) 368-5621	Mr. Chris Prouse Dept. of Agr. P.O. Box 1600 Charlottetown, PEI, C1A 7N3 Ph. (902) 368-5621			
QUEBEC Roger Doyon 57 Perras, Napierville CO St. Remi, Quebec	Dr. Jules Simard Apiary Insp. Vet. Service 499, Calixa-Lavallee, suite 200 Joliette, Quebec, J6E 7E2 Ph. (514) 752-6848	Jocelyn Marceau 120 A. Ch. Dec Roy Deschambault, Quebec GCA 1S0 Ph. (418) 286-3351			
SASKATCHEWAN Mr. John Gruszka Sask. Dept. of Agr. 800 Central Avenue Prince Albert, Sask. S6V 6G1 Ph. (306) 953-2790	Mr. John Gruszka Sask. Dept. of Agr. 800 Central Avenue Prince Albert, Sask. S6V 6G1 Ph. (306) 953-2790	John Gruszka Sask. Dept. of Agr. 800 Central Avenue Prince Albert, Sask. S6V 6G1 Ph. (306) 953-2790			
PUERTO RICO Gregorio Rivera P.O. Box 471 Lares, PR 00669	Plant Quarantine Program Dept. Agriculture P.O. Box 10163 Santurce, PR 00908 Ph. (809) 722-5301	Dr. Daniel G. Pesante Department Animal Science P.O. Box 5000 Mayagilez, PR 00681 Ph. (809) 265-3854	Dr. Daniel G. Pesante Department Animal Science P.O. Box 5000 Mayagilez, PR 00681 Ph. (809) 265-3854		Kermit Troche Dept. Agriculture P.O. Box 10163 Santurce, PR 00908 Ph. (809) 722-2638

GOVERNMENT AGENCIES

•Bee Research Laboratory. Dr. Hachiro Shimanuki, Rm. 209A, Bldg. 476, BARC-East, Beltsville, MD 20705. (301) 504-8205, FAX (301) 504-8736.

•Honeybee Breeding & Genetics & Physiology Research Lab. Dr. Thomas Rinderer, Research Leader, 1157 Ben Hur Rd., Baton Rouge, LA 70820. (504) 767-9280, FAX (504) 766-9212.

•Honey Bee Research. Research Leader, 2413 East Hwy. 83, Weslaco, TX 78596. (210) 969-4870.

•Bee Biology & Systematics Laboratory. Utah State University, Logan, UT 84322-5310. (801) 750-2520.

•Carl Hayden Bee Research Center. Dr. Eric H. Erickson, Center Director, 2000 E. Allen Road, Tucson, AZ 85719. (602) 670-6709.

•Honey Market News. Linda Verstrate, USDA-AMS, Fruit & Vegetable Div., 2015 So. 1st St., Rm. 4, Yakima, WA 98903. (509) 575-2494 FAX (509)457-7132.

•Biosystematics Research Centre. Dr. R. J. T. Trottier, Dir., Rm. B149, K. W. Neatby Bldg, Ottawa, Ontario, Can. K1A OC6. (613) 996-1665.

•Agriculture Canada. Dr. D. L. Nelson, Research Sta., Research Branch, Agr. Canada, Box 29, Beaverlodge, Alta., Can. TOH OCO. (403) 354-2212.

American Mead Association
P.O. Box 4666
Grand Junction, CO 81502
(303) 442-9111

American Apitherapy Society
Kate Chatot,
Office Coordinator
P.O. Box 54
Hartland Four Corners,
VT 05049
Ph. (802) 436-2708

INTERNATIONAL ORGANIZATIONS

•International Bee Research Association. Director, 18 North Road, Cardiff, CF1 3DY, UK. Telephone: (0222) 372409, Fax (0222) 665522, Telex: 262433 G (quote B8390).

•Apimondia. International Federation of Beekeepers' Associations — President, Raymond Borneck, Rue Du Creux, Montbarrey, France, 3y; General Secretary, 101 Corso Vittorio Emanuele Rome, Italy 00186, (6) 65-12286. Periodical: Apiacta (quarterly).

INDUSTRY ORGANIZATIONS

•American Bee Breeders Association. Fred Rossman, P.O. Box 905, Moultrie, GA Phone or FAX (912) 985-7200

•American Beekeeping Federation. Sec.-Treas., Troy Fore, P.O. Box 1038, Jesup, GA 31545 (912) 427-8447

Ladie's Aux. of ABF. Carol Keuhl, Secretary, 220 Loup City, NE 68853, Ph. & FAX (308) 745-0154.

Amer. Honey Queen. Patty Sundburg, Box 1126, Columbus, MT 59019, Ph. & FAX (406) 322-5780.

•American Honey Producers Association. Jerry Stroope, Rt. 3, Box 258, Alvin, TX 77511. Ph. (713) 996-1523, FAX (713) 996-9484.

•Apiary Inspectors of America. Barton Smith, Jr., 50 Harry S. Truman Parkway, Annapolis, MD 21401 (410) 841-5920.

•Eastern Apicultural Society of North America, Inc. Sec. Loretta Surprenant, Box 330A, County Home Rd, Essex, NY 12936, (518) 963-7593.

• Western Apicultural Society of North America. Nancy Stewart, 2110 X Street, Sacramento, CA 95818 (916) 451-2337, FAX (916) 451-7008.

•National Honey Board. Chairman, Bob Smith, 390 Lashley St., Longmont, CO 80501-1421 (303) 776-2337

•Mid-U.S. Honey Producers Marketing Assn. Gary Reynolds, Box 363, Concordia, KS 66901, (913) 243-3619;

•National Honey Packers & Dealers Association. Richard Sullivan, 5 Ravine Dr., P.O. Box 776, Matawan, NJ 07747. Ph. (908) 583-8188, FAX (908) 583-0798.

•Professional Apiculturists Assn. Marion Ellis, 301 Centennial Mall South, P.O. Box 94756, Lincoln, NE 68509 (402) 471-2394.

•The Canadian Honey Council. Linda Gane, Box 1566, Nipawin, Sask. S0E 1E0 (306) 862-3844

•Can. Assn. of Prof. Apic. Dr. G. Otis, Dept. of Env. Bio., Univ. of Guelph, Guelph, Ont. N16 2W1, (519) 824-4120

Regional Associations

ALABAMA

- **ETOWAH CO BEEKEEPERS** — James Walker, 419 Cove Creek Rd., East Gadsden, 35903
- **JEFFERSON CO BEEKEEPERS** — Jimmy Carmack, 1123 Springville Lane, Birmingham, 35215
- **RACK & GUM ASSOCIATION** – John Schulta, 2809 Cedar Lake, Adamsville, 35005
- **SO ALABAMA BEEKEEPERS ASSN** — Richard Leber, 1139 Seven Hill Dr., Mobile 36695-9672
- **WIREGRASS BEEKEEPERS ASSN** — Roy Guy, 1175 Enon Rd., Webb 36376

ALASKA

- **COOK INLET BEEKEEPERS** — Jerry Fries, 1331 Gram C W, Anchorage 99518
- **INTERIOR AK BEEKEEPERS** — Stephen Peterson, 1153 Donna Dr., Fairbanks, 99712
- **SOUTH CENTRAL AK BEEKEEPERS** — John Liska, 15524 Old Glenn Hwy., Eagle River, 99577

ARIZONA

- **BKPRS OF CENTRAL** — Frank Bock, 2449 E., Hazelwood, Phoenix, 85016
- **SABA** — Ed Lusby, 3832 E. Golf Links Rd., Tucson 85713
- **SRR & B BEEKEEPERS** — Robert Miller, P.O. Box 2266, Mesa, 85214

CALIFORNIA

- **ALAMEDA CO BEEKEEPERS ASSN** — Stan Umlauft, P.O. Box 5155, Bay Point 94565-0655
- **BEEKEEPERS ASSN, SO CA** — P.O. Box 5021, Hacienda Hts., 91745
- **HUMBOLDT BEEKEEPERS ASSN** — Bob Hitte, 44 Wagon Jack Lane, Arcata, 95521
- **LOS ANGELES CO BEEKEEPERS** — Charles Duncan, 2210 Wilshire Blvd., #344, Santa Monica, 90403
- **MARIN CO. BKPRS. ASSOC.** — 124 Pine St., San Anselmo 94960
- **MT. DIABLO BEEKEEPERS** — Stan Umlauft, P.O. Box 5155, Bay Point 94565-0655
- **NEVADA CO** — Randy Oliver, Box 2315, Nevada City, 95959
- **ORANGE CO** — Chris Hansen, 1251-B North La Loma Cir, Anaheim, 92806
- **SACRAMENTO AREA BEEKEEPERS** — Nancy Stewart, 2110 'X' St., Sacramento 95818
- **SAN FRANCISCO HOBBY BEEKEEPERS** — Leonore Bravo, 47 Levant St., San Francisco 94114
- **SANTA CLARA VALLEY BEEKEEPERS** — Jeffrey Warnock, 686 Corbett Ave., San Francisco 94414
- **SONOMA CO BEE CLUB** — Ging Lowe, 748 Ely, Petaluma, 94954
- **VENTURA BEEKEEPERS** — Don Schram, 3612 Nyeland Ave., Oxnard, 93030

COLORADO

- **NORTHERN CO BEEKEEPERS** — W.B. Belden, Jr., 5922 Venus Ave., Fort Collins, 80525

CONNECTICUT

- **BACKYARD BEEKEEPERS** — Ed Weiss, 3 Whipstick Rd., Wilton 06897
- **EASTERN CT BEEKEEPERS** — Timothy Grilley, P. O. Box 571, E. Lyme, 06333
- **HAMPDEN CO BEEKEEPERS** — Linda Canders, 108 S. Water St., Warehouse Point, 06088
- **WESTERN CT BEEKEEPERS ASSN** — Austin Knox, 295 Pumpkin Hill, New Milford, 06776

DELAWARE

- **SUSSEX CO BEEKEEPERS** — Karen Hall, 10th & Arch St., Seaford, 19973

FLORIDA

- **CENTRAL FL BEEKEEPERS** — Luella Bell, 1058 S. Ridgewood Ave., Deland, 32720
- **ESCAROSO BEEKEEPERS ASSN** — Sylvia Bullard, 9801 Lyman Dr., Pensacola, 32534
- **N CENTRAL FL BEEKEEPRS** — Tom Cutts, 1741, NW 7th Ave., Gainesville, 32601
- **NE FL BEEKEEPERS** — Catherine Fleming, 3238 Bessent Rd., Jacksonville, 32218
- **PALM BEACH CO BEEKEEPERS** — Rosa Durando, 10308 Heritage Farms, Lake Worth, 33463
- **POLK CO BEEKEEPRS** — David G. Tschida, 4929 Wales St., Lake Wales, 33853
- **TAMPA BAY BKPR ASSN** — Janis Stockdale, 21703 Bell Lake Rd., Land o'Lakes 34639-4427
- **TUPELO BEEKEEPERS ASSN** — Bert or Vernon Gwaltney, 925 E. 25th St., Panama City 32405

GEORGIA

- **CHEROKEE CO BEE CLUB** — B.J. Weeks, 155 Roy Haynes Dr., Ball Ground, 30107
- **COASTAL EMPIRE BKPRS. ASSOC.** — Greg Stewart, 221 Larchmont Dr., Savanna, 31419
- **EASTERN PIEDMONT BK ASSN** — Lonnie Collier, 7725 W. County Line Rd., Lula, 30554
- **CHATTAHOOCHEE BK ASSN** — Jim Ellis, P.O. Box 4556, Columbus, 31904-0556
- **COASTAL EMPIRE BEEKEEPERS** — Greg Stewart, 221 Larchmont Dr., Savannah, 31419
- **METRO ATLANTA BEEKEEPERS** — Durant Warwick, 4453 Inlet Rd., Marietta, 30066
- **NORTHEAST MT. BKPRS ASSN** — Lewis Smith, 360 Grant St., Clarkesville, 30523
- **NORTHWEST GA BEEKEEPERS** — Lathaniel Dunaway, Rt. 1, Trion, 30753
- **SOUTHEASTERN GA BEEKEEPERS** — Bob Rowell, Rt.1, Box 147, Nahunta, 31553
- **TARA BEEKEEPING** — Robert Davis, 210 Indian Creek Rd., Locust Grove, 30248
- **TALLAPOOSA BASIN BEEKEEPERS** — Bobby Lovins, 36 Bee Lane, Bremen, 30110

HAWAII

- **BIG ISLAND BEEKEEPERS** — Walter Patton, 27-703 Kaieie, Papaikou, 96781

IDAHO

- **IDAHO BEEKEEPERS ASSOC** — Golden Millet, 1 Box 8 Bee, Marsing, 83639
- **IDAHO HONEY IND. ASSN** — Scott Hamilton, 2522 Southside Blvd., Nampa 83686

ILLINOIS

- **COOK-DUPAGE BEEKEEPERS** — Charles Williams, 22W424 Teakwood Drive, Glen Ellyn 60137
- **CTL EASTERN IL BEE ASSOC** — Andy Blum, 1453 Co. Rd. 3600N, Paxton 60957
- **ILLIANA BEEKEEPERS** — Kathy Wright, P.O. Box 83, Kansas, 61933
- **LAKE COUNTY BEEKEEPERS ASSOC** — Lynne Davis, 42835 N. Crawford Rd., Antioch, 60002
- **NORTHERN IL BEEKEEPERS** — Lynn & Rob Roseman, 16504 Kunde Rd., Union, 60180
- **STATELINE BEEKEEPERS ASSN** — Nancy Ingram, 8334 N. Broadway Rd., Apple River, 61001
- **WABASH VALLEY BK ASSOC** — Sue Jones, Rt. 2, Box 332, Robinson, 62454
- **WESTERN IL BEEKEEPERS** — Lane McKinley, R.R. 1, Box 330, Viola, 61486

INDIANA

- **MICHIANNA BKPRS ASSOC** — Noah Schrock, P.O. Box 442, Middlebury 46540
- **NW INDIANA BK ASSN** — Lizz Shudick, 727 West 50 North, Valparaiso 46383
- **RIVER VALLEY BEEKEEPERS** — David Maikranz, RR2, Box 64, Oakland City, 47660
- **WHITE RIVER VALLEY BKPRS** — Janet Pfaff, 2734 S. 130 W, Huntingburg, 47542
- **WABASH VALLEY BEEKEEPERS** — Alice Apple, 1224 W. 6th, Jasper, 47546

IOWA

- **CENTRAL IOWA BKPRS** — Tim Laughlin, 605 H Ave., Grundy Center, IA 50638
- **EAST CENTRAL IA BKPRS. ASSOC.** — Terry Dahms, 3086 Sycamore Trl. NE, Iowa City, 52240
- **IOWA HONEY PRODUCERS** — Bob Shepherd, 917 N. Iowa Ave., Washington, 52353
- **SE IOWA BEEKEEPERS** — Ray Tull, 712 Oak St., Donnellson, 52625

KANSAS

- **CENTRAL KANSAS BEEKEEPERS** — Anita Mead, Rt. 1, Box 90, Belle Plaine, 67013
- **FLINT HILLS BEEKEEPERS** — E.E. Shaw, 9 South Mechanic St., Emporia, 66801
- **NORTHEASTERN KS BEE ASSN** — Joli Winer, 8909 Lenexa Dr., Overland Park, 66214

KENTUCKY

- **BLUE GRASS BKPRS. ASSN** — James Davis, 317 Caney Church Rd., Stamping Ground, 40379-9644
- **DARK HONEY PRODUCERS** — Stanley Bishop, 574 S.R. 290, MdKee, 40447
- **DIX RIVER BKPRS ASSN** — Dennis Rachford, 3035 Skyline Dr., Stanford, 40484
- **ESTILL CO BKPRS ANNS** — Edison Joe Estes, Star Route, Irvine, 40336
- **GREEN VALLEY BK ASSN** — Sherri Coleman, 4523 Sutherland Rd., Owensboro, 42303
- **GREENUP CO BEEKEEPER ASSN** — Carl Crabtree, Argillite, 41121
- **HEART OF KY BK ASSN** — Halcyon Holt, 944 Belvoir Dr., Frankfort, 40601
- **KENTUCKIANA BK ASSN** — Ray Williams, 2725 Sheila Dr., Louisville, 40220
- **LAKE BARKLEY BKPS ASSN** — Charles Humphrey, 435 Lakeview Dr., Paducah, 42003
- **LINCOLN TRAILS BK ASSN** — Joe Perry, 167 Santa Fe Trail, Elizabethtown, 42701
- **NORTHEAST KY BKPRS ASSN** — Thomas Crabtree, 232 W. Greenhill Rd., Ashland, 41102
- **NORTHERN KY BKPR ASSN** — Wilbur Hudson, 1525 Connor Rd., Hebron, 41048
- **OLDHAM CO BKPRS ASSN** — Robert Stevens, 3511 Arrowood Ct., Lagrange, 40031
- **WHITLEY COUNTY BKPRS** — Eddie Wells, P.O. Box 181, Corbin, 40702-0181
- **WILDERNESS RD BKPRS ASSN** — James Patton, Rt. 2, Box 70, East Bernstadt, 40729

LOUISIANA

- **ACADINA BKPRS ASSN** — Ralph Miller, 2318 Ridge Rd., Duson, 70529
- **ARK-LA-TEX BEEKEEPING** — Lee Glegg, 912 Booth Dr., Shreveport, 71107
- **BEEKEEPERS OF SE LA** — John Roberts, 2300 Riverland Dr., Chalmette, 70043
- **CAPITAL AREA BKPRS** — William Reid, 886 East Versailles Dr., Baton Rouge, 70819
- **HILL COUNTRY BKPRS ASSN** — Clarence Morris, 13464 Old Bonita Rd., Bastrop, 71220
- **RIVER REGION BKPRS ASSN** — James Pearson, 653 Grovewood Dr., Gretna, 70056
- **BKPRS OF TANGITAMMINGTON** — Peter Finger, P.O. Box 482, Pearl River, 70452

MARYLAND

- **ANNE ARUNDEL CO BEEKEEPERS** — Jon Clulow, 871 Swift Rd., Pasadena, 21122
- **ASSN OF SOUTHERN MD** — Jerry Worrell, 3575 Ferry Landing Rd., Dunkirk, 20754
- **BOWIE-UPPER MARLBORO BKPRS** — Paul G. Graninger, USDA BARC-East, Bldg. 177C, Beltsville, 20705
- **CARROLL CO BKPRS** Stephen McDaniel, 4964 Wentz Rd., Manchester 21102
- **CTL MARYLAND BEEKEEPERS** — Richard Greaves, 14 Murray Hill Circle, Baltimore, 21212
- **HAGERSTOWN VALLEY APIAN SOC** — Frank Kovac, 10901 Easterday, 21773
- **MONTGOMERY CO BKPRS** — George W. Imire, Jr. 12705 Circle Dr., Rockville, 20850
- **SUSQUEHANNA BEEKEEPERS** — Jim Zink, 4316 Federal Hill Rd., Street 21154

MAINE

- **CENTRAL MAINE BK ASSN** — Ed Branagan, RFD 1, Box 2620, E. Corinth 04427
- **TRI-COUNTY BKPRS** — Roger Snow, Maple Street, Box 627, Stockton Springs 04981
- **WESTERN ME BK ASSN** — Bruce Clark, RR 1, Box 1600, New Vineyard, 04956

MASSACHUSETTS

- **BARNSTABLE CO BEEKEEPERS** — Jean Kennedy, 575 Willow St., West Barnstable, 02668
- **BRISTOL CO BEEKEEPERS** — Albert Cyr, 332 Main St., Acushnet, 02743
- **ESSEX CO BEEKEEPERS ASSN** — Secretary, P.O. Box 10, Topsfield, 01983
- **FRANKLIN CO ASSN** — Ralph Whiteman, Martindale Rd., Bernardston, 01337
- **HAMPDEN CO BKPRS** — Robert Cosby, 375 Kings Highway, West Springfield 01089
- **NORFOLK CO BEEKEEPERS** — Ellis Hayden, Jr., 62 Main St., Norfolk 02056
- **NORTHERN BERK BKPRS** — Jeff Burdick, 6 South County Road, Florida, 01247
- **PLYMOUTH CO BKPRS** — Frederic Magee, 148 Turnpike St., West Bridgewater, 02379
- **WORCHESTER CO BEEKEEPERS** — David Dion, 40 Hough Street, Sutton, 01590

MICHIGAN

- **CRANBROOK BEE CLUB** — Larry or Sue Yates, 705 Collidge, Birmingham, 48101
- **HOLLAND AREA BEEKEEPERS** — Paul Fredrickson, 1103 W. 32nd S., Holland, 49423
- **JACKSON CO BEEKEEPER ASSN** — Kenneth Losey, 6962 Folks Rd., Horton, 49246
- **SAGINAW BAY BEEKEEPERS** — John Kern 12740 E. Curtis, Frankenmuth, 48134
- **SOUTHEASTERN MI BEE ASSOC** — Ann Kerwin, 17516 Birchcrest, Detroit 48221

- **SOUTH[illegible]ST MI BEEKEEPERS** — Don Hiatt, [illegible]rum, Miles, 49120
- **SUPERIOR BEEKEEPERS ASSN** — Robert M. Slee, Box 23, Goetzville, 49736

MINNESOTA

- **CENTRAL MN BEEKEEPERS ASSN** — Rt. 1, Box 45, Ponsford, 56575
- **LAKES REGION BEEKEEPERS,** — Russell Hofman, Richville 56576
- **MN HOBBY BEEKEEPERS ASSOC** — John Miller, 255 E. Plato Blvd., St. Paul, 55107
- **MN HONEY PRODUCERS** — Fred Holte, R1 4348 Andee, Harris, 55032
- **NO CENTRAL BEEKEEPERS ASSN** — P.O. Box 294, Brainerd, 56401

MISSISSIPPI

- **CENTRAL MS BKPRS ASSN** — Del Sparks, 173 Plummer Circle, Jackson, 39212
- **GULF COAST BKPRS ASSN** — David Kilbern, 2910 Duncan Ave., Pascagoula, 39581
- **MS DELTA BKPRS ASSN** — Huburt Tubbs, P.O. Box 3, Webb, 38966
- **SOUTHEAST MS BKPRS ASSN** — Don Rushton, 37 Northeast, Laurel, 39440

MISSOURI

- **BOONE REGIONAL BKPRS** — Doris Lyons, 8209 Dusty Rhodes Ln., Columbia 65202
- **DALLAS CO BEEKEEPERS** — Inge Foster, Rt. 1, Box 105, Urbana, 65767
- **EASTERN MO BKPR ASSN** — Ken Corbin, 1776 Golden Lake Ct., Chesterfield, 63017
- **JEFFERSON CO BKPRS** — Jean Davis, 7320 Brugess Ford Rd., Cedar Hill, 63016
- **MID-MO BEEKEEPERS** — David James, Rt.1, Jadwin, 65501
- **MIDWESTERN BKPR ASSN** — Ed Fisher, 4005 NE 132nd St., Smithville 64089
- **MISSOURI VALLEY BKPRS** — Denny Weller, 40 New Mele Dr., Wentzille, 63385
- **OZARK BKPRS ASSOC** — Mary Jane Kelly, 5938 W. Farm Rd. 94, Springfield, 65803
- **OZARK MOUNTAIN BKPRS** — Eddie Rosencrans, 212 Newbury Rd., Reeds Spring, 65737
- **SEMO HONEY PRODUCERS** — Ray Batton, 3032 N. 14th, Poplar Bluff, 63901
- **SO CENT BEEKEEPERS** — Marge Kilton, RR 2, Box 2746, Alton, 65606
- **SOUTHWEST MO BEE ASSOC** — Marilyn Spencer, Rt.1, Box 254-A, Rocky Comfort, 64861
- **TWO RIVERS BKPRS ASSN** — Gerry Lee, 9637 Ridge Ave., Overland, 63114
- **WEBSTER CO BKPRS ASSN** — Keith Nutting, Rt.1, Box 588, Fair Grove, 65648

MONTANA

- **EASTERN MT BEEKEEPERS** — Gorvan Leduc, 2026 Wilkins Rd., Laurel, 59044

NEBRASKA

- **EASTERN NE HONEY PRODUCERS** — John Rudebusch, RR 1, Box 41, Randolph, 68771
- **NE BKPRS ASSN** — Jerry D. Bishop, 311 W. 28th Avenue, Bellevue, 68005-5323

NEW HAMPSHIRE

- **KEARSARGE BEE ASSOC** — Paula A. Morse, 38 Water St., Bradford 03221-9123
- **MERRIMACK VLY BEEKEEPERS** — Robert Salvage, 3 Birchwood Rd., Windham, 03087
- **PAWTUCKAWAY BKPRS** — Ron Panneton, RR 1, Box 795 Mountain Rd., Pittsfield 03263

NEW JERSEY

- **CENTRAL JERSEY BKPRS** — Liz Rodrigues, 157 Five Point Rd., Colts Neck, 07722
- **ESSEX CO BKPRS** — Marian E. Chandler, 85 Deerfield Rd., W. Caldwell, 07006
- **MORRIS CO BEEKEEPERS** — Roha Duve, R.D. 1, Box 258-B, Washington, 07862
- **NE BEEKEEPERS ASSOC, NJ** — Alfred E. Cundall, 390 Jackson Ave., Township of Washington, 07675
- **NW JERSEY BKPRS. ASSN.** — Gary L. Bradshaw, 32 Hewitt Rd., Stockton, 08559
- **SOUTH JERSEY BKPRS** — Patricia C. Schuler, P.O. Box 228, Richland 08350
- **SUSSEX CO BKPRS SOC** — Marilyn Cosh, 175 Sally Harden Rd., Wantago, 07461

NEW YORK

- **CHAMPLAIN VALLEY BKPRS** — Loreta Surprenant, Box 300A Co Home Rd, Essex, 12936
- **CHAUTAUQUA CO BEEKEEPERS** — Robert B. Dahlgren, 2902 Stone Rd., Falconer, 14733-7932
- **FINGERLAKES BK ASSN** — Richard Taylor, Box 352, Interlaken 14847
- **LONG ISLAND BKPRS** — Richard Blohm, 30 Cherry Lane, Huntington, 11743-2945
- **S ADIRONDACK BEEKEEPERS** — Rick Green, 15 Gretel Terrace, Ballston Lake, 12019-9108
- **SOUTHEASTERN BEEKEEPERS CLUB** — Kathleen Smith, 239 Wisner Ave., Middletown, 10940
- **SOUTHERN TIER BKPRS** — Hervey W. Heywood, 2804 Ellis Creek Rd., Barton, 13734
- **SULLIVAN CO BKPRS ASSN** — Ruth Duncan, RR 1, Box 376 Goldsmith Rd., Jeffersonville, 12748
- **WESTERN NY HONEY PRODUCERS** — Robert Y. Harbison, 2493 Sweet Home Rd., Amherst, 14228

NORTH CAROLINA

- **ALAMANCE CO BEEKEEPERS** — Donald Moore, 3634 Stoney Crk Church Rd., Elon College, 27244
- **ANSON CO[illegible]PRS ASSN** — Harvey Tucker, 201 M[illegible]es Lake Rd., Wadesboro, 28170
- **BUNCOMBE CO BEEKEEPERS** — Wayne A. Lewis Sr., P.O. Box 7051, Asheville, 28802
- **BURKE CO BKPRS ASSN** — Rev. L.N. Puette, 2733 Wilson Dr., Connelly Springs, 28612
- **CARBBARRUS CO BKPRS ASSN** — Robert Safrit, 737 Irish Potato Rd., Concord, 28025
- **CAROLINA COASTAL BKPRS.** — 167 Stonewall Jackson Rd., Wilmington, 28412
- **CATAWBA VALLEY BEEKEEPERS** — Bobby Glenn, 303 Travis Dr., Newton, 28658
- **CHATHAM CO BKPR ASSN** — Henry Outz, Jr., 2847 Austin Chapel Rd., Pittsboro, 27312
- **COASTAL PLAIN BKPRS ASSN** — Hazel Anderson, Rt. 1, Box 380, Macclesfield, 27852
- **COLUMBUS-BRUNSWICK BKPRS** — Sylvia Martin, Rt. 2, Box 306, Chadbourn, 28431
- **CRAVIN-PAMLICO BKPRS.** — Fred Hugh, Sr., 5320 Trenwoods Dr., New Berlin, 28562
- **CUMBERLAND CO BKPRS ASSN** — James Thagard, Rt. 5, Box 358A, Fayetteville, 28301
- **DAVIDSON CO BKPRS ASSN** — Paul Wright, 607 East 1st Street, Lexington, 27292
- **DAVIE CO BEEKEEPERS ASSN** — William C. Phelps, 666 Pine Ridge Rd., Mocksville, 27028
- **DURHAM CO BEE CLUB** — Ellis Selph, 2502 Winton Rd., Durham, 27707
- **FORSYTH CO BEEKEEPERS ASSN** — Ronnie Hawks, Rt. 2, Box 148, Pinnacle, 27043
- **GASTON CO BKPRS ASSN** — John Hayes, 222 Lakeview Dr., Belmont, 28012
- **GREENSBORO BEEKEEPERS** — Duane Bryant, 1904 Dowing St., Greensboro, 27410
- **GUILFORD CO BKPRS** — John Godfrey, 6304 Sable Lane, Greensboro, 27406
- **HENDERSON CO BKPR** — C. Worsham, 2134 W. Main St., Hendersonville, 28792
- **IREDELL CO BKPRS** — Bobby Davidson, 419 Cooper Farm Rd., Statesville, 28677
- **JACKSON CO BKPRS ASSN** — Fred Harris, Box 154, Cullowhee, 28723
- **JOHNSTON CO BKPRS ASSN** — Lloyd Reynolds, 2283 Wilson Mills Rd., Smithfield, 27577
- **LEE CO BKPRS ASSOC** — Richard Angel, 1142 Swann Station Rd., Sanford, 27330
- **LINCOLN CO BKPRS ASSN** — David Noles, P.O. Box 186, Lincolnton, 28092
- **MACKLENBURG CO BEEKEEPERS** — William Skelton, 2040 Providence Rd., Charlotte, 28211
- **MACON CO BKPRS ASSN** — Lon Peden, 636 Big Rdige Rd., Franklin, 28734
- **MOORE CO BKPRS ASSN** — Bill Lathan, 902 Pinebluff Lake Rd., Aberdeen, 28315
- **ORANGE CO BEEKEEPERS ASSOC** — John Wallace, 5401 Leesville Rd., Durham, 27703
- **PAMLICO CO BKPRS** — Susan Herring, 6789 St. Julian Way, Fayetteville, 28314
- **PERSON CO. BKPRS. ASSN.** — Ed Johnson, 2039 Thee Hester Rd., Roxboro, 27573
- **RANDOLPH CO BEEKEEPERS** — George Byrum, 3661 Old Lexignton Rd., Asheboro, 27203
- **RICHMOND CO BKPRS ASSN** — Sam Yates, Rt. 1, Box 270, Rockingham, 28379
- **ROBESON CO BKPR ASSN** — M. Brewington, P.O. Box 2168, Pembroke, 28372
- **ROWAN CO BEEKEEPERS ASSN** — Pam Deal, 8711 Mooresville Rd., Salisbury, 28147
- **STANLEY CO BKPRS ASSN** — Lowell Perry, 24620 Stand Dr., Albermarle, 28001
- **SURRY CO BEEKEEPERS ASSN** — Cecil Gilley, Rt. 3, Box 295, Pilot Mountain, 27041
- **TRANSYLVANIA CO BKPR** — Rick Queen, 305 Davidson River Rd., Pisgah Forest, 28768
- **TRI-CO BEEKEEPERS ASSOC** — Fred Hughes, Sr., 5320 Trentwoods Dr., New Bern, 28562
- **WAKE CO BKPR ASSN** — Roger Sanders, 2120 Steward Rd., Fuquay Varina, 27526
- **WATAUGA CO BKPRS** — Joe Howser, 117 Highland Park Lane, Boone, 28607
- **WAYNE CO BKPRS ASSN** — Jimmy Ray Mitchell, 2133 Dobbersville Rd., Mt. Olive, 28365
- **WILSON CO BEEKEEPERS ASSN** — Harvey Denton, Rt. 2, Box 50-B, Bailey, 27087

OHIO

- **ASHTABULA BEEKEEPERS** — Bill Loudon, 86 Stockwell St., Painesville, 44077
- **BUTLER CO BEEKEEPERS** — Alex Zomchek, 14 Carrie Circle, Oxford, 45056
- **CAMBRIDGE-NOBEL BK ASSN** — Roger Seaton, 9488 Liberty Rd., Cambridge 43725-9023
- **CARROLL CO BKPRS** — Jack Leggett, 7190 Roswell Rd., Sherrodsville, 44675
- **CENTRAL OH BKPRS** — David Casdorph, 4111 Maize Rd., Columbus, 43224
- **CLARK CO BKPRS** — Rolland Anderson, 1312 N Lowry Ave, Springfield, 45504
- **COLUMBIANA & MAHONING CO BKPR** — Doug Yukich, 11251 Mahoning Ave., NE, Alliance, 44601-9210
- **COLUMBIANA CO BEEKEEPERS** — Grace Hamilton, Rt. 1, Lisbon, 44432
- **CUYAHOGA COUNTY BEE ASSN** — William Conley, 292 Fowles Rd., Berea, 44017
- **EAST CENTRAL BKPRS** — Ralph McLeod, 1st Main St., Kirkerville, 43033
- **GEAUGA BEEKEEPERS ASSN** — Mary Cluts, 9799 Pekin Rd., Novelty, 44072
- **GREENE CO BEEKEEPERS** — O. K. Simison, Rt. 1, Spring Valley, 45370
- **HIGHLAND CO BEE[illegible]ERS** — Jim Higgins, 3801 U.S. 50, Hillsboro 45133
- **HOCKING CO BKPRS** — Annette McClain, 20193 St. Rt. 328, New Plymouth, 45654
- **JEFFERSON CO BEEKEEPERS** — Joe Kovaleski, 167 Rosslyn Blvd., Steubenville 43952 (614) 264-7656
- **KOKOSING VALLEY BEEKEEPERS** — Gertrude Rasor, 500 North Ridge Hts., Dr., Howard, 43028
- **LAKE CO BKPRS ASSN** — Mark Rinderman, 116 Hawthorne Dr., Painesville, 44077
- **LAWRENCE CO BKPRS** — Margaret Reid, 15754 St. Rt. 775, Willow Wood, 45696
- **LORAIN CO BKPRS ASSN** — Jean McAudy, 2420 Brownhelm Sta. Rd., Vermilion 44089
- **MARION CO BKPR ASSN** — Henry Perry, 440 Avondale Ave., Marion 43302
- **MAUMEE VALLEY BKPRS** — Robert D. Smith, 238 E. 5th St., Perrysburg, 43551
- **MEDINA CO BEEKEEPERS** — Kim Flottum, 7011 Spieth Rd., Medina 44256
- **MIAMI CO BEEKEEPERS** — Robert Newmann, 183 S. Dorsett Rd., Troy, 45373
- **MORROW CO AREA BKPRS** — Arthur Korody, 4084 Co. Rd. 115, Mt. Gilead, 43338
- **MUSKINGUM CO BKPRS** — Dennis Moffitt, 185 Homestead Dr., New Concord, 43762
- **NW OH BKPRS** — Zelma Cox, 1623 W. Wayne, Lima 45805
- **PORTAGE CO BEEKEEPERS** — Peggy Kaminski, 1459 E. Howe Rd., Kent, 44240
- **RICHLAND CO BEEKEEPERS** — Ralph Mitchell, Brokaw Rd., Rt. 2, Butler, 44822
- **ROSS CO BEEKEEPERS ASSN** — Fred Weaver, 27 Courtland Dr., Chillicothe, 45601
- **SOUTH CENT. BK ASSN** — Fred Ginther, 570 Liberty Hill Rd., Chillicothe, 45601-9275
- **SOUTHWESTERN OH BEE ASSN** — Karen Berry, 5186 Batavia Rd., Cincinnati, 45244
- **STARK CO BEEKEEPERS** — Mrs. Fran Muller, 1927 6th St. SW, Canton 44706
- **SUMMIT CO BKPRS** — Cheryl Beyer, 6423 Olde Eight Rd., Peninsula, 44264
- **TRI-COUNTY BEEKEEPERS ASSN** — Dave Heilman, 1680 Madison Ave., Wooster, 44691
- **TRUMBULL CO BEEKEEPERS** — Sheila Terrill, 10044 Ridge Rd., Kinsman, 44428
- **WARREN CO BEEKEEPERS** — Oscar Brown, 7154 Hopkins Rd., Maineville, 45039

OKLAHOMA

- **CENTRAL BEEKEEPERS ASSN** — Glenn Gibson, Box 368, Minco, 37059
- **CENTRAL OK BK ASSN** — Robert Wagner, 2928 S. Oak Dr., Midwest City 73130
- **DEEP FORK VALLEY BKPR ASSN** — J.H. Allison, Rt. 1, Box 386 B, Henrietta, 74437
- **EAST CENTRAL BEEKEEPERS ASSN** — Betty Allred, Rt. 7, Box 248, Ada 74820
- **FRONTIER COUNTRY BKPRS ASSN** — Chuddie Smith, P.O. Box 34, Guthrie, 73044
- **GREEN COUNTRY BKPR** — Shirley Wright, Rt. 1, Box 55A7, Locust Grove, 74352

- **NORTH CENTRAL BEEKEEPERS** — Joe Green, Box 1983, Stillwater, 74076
- **NE OKLAHOMA BEEKEEPERS** — Dr. James R. Sipes, 7760 E. 24th St., Tulsa, 74129-2402
- **NW BEEKEEPERS ASSN** — Leonard Morris, 905 E. State, Fairview, 73737
- **SW OK BEEKEEPERS ASSN** — Eva Bell Ritter, HC 64, Box 57, Marlow, 73055
- **WESTERN AR/ESTRN OK BK ASSN** — Danny Self, Rt. 1, Box 1325, Arkoma 74901

OREGON

- **CENTRAL OREGON BKPRS** — Bob Morgan, 3800 Benson Rd., The Dalles, 97058
- **COOS CO** — Steve McGuire, 541-396-3318
- **EASTERN OR BKPRS** — Dave Lefore, Rt. 3, Box 207E, Milton-Freewater, 97862
- **KLAMATH COUNTY** — Ken Crow, 541-882-1893
- **LANE CO BEEKEEPERS** — James Sheridan, 1885 Norkenzie Rd., Eugene, 97401
- **METROPOLITAN AREA BKPRS** — Chuck Sowers, 4390 Lords Lane, Lake Oswego, 97304
- **SOUTH COAST BKPRS ASSN** — Joann Olstrom, 6134 Maple Court, Reedsport, 97467
- **SOUTHERN OR** — George Steffensen, 1634 Fish Hatchery Rd., Grants Pass, 97527
- **TILLAMOOK COUNTY** — Gregg Cline, 503-842-6323
- **WILLAMETTE VALLEY** — Gene Garner, 1375 South 2nd, Springfield, 97477

PENNSLYVANIA

- **2 C'S & A BEE ASSOC** — Carol Z. Smith, 2915 15th St., Altoona, 16601
- **ALLEGHENY MTN. BKPRS. ASSN.** — Edward McCreary, RD. 2, Box 74, Bedford, 15522
- **ARMSTRONG-INDIANA BKPR** — Charlie Lyon, 207 Fairground Rd., Ford City, 16226
- **BUCKS CO BEE ASSN** — Josef Ridgway, 2728 Red Gate Drive, Doylestown, 18901
- **CAPITAL AREA BK ASSN** — Maria Contino, 6087 Rockland Dr., Harrisburg, 17112
- **CENTRAL WSTRN PA BEE ASSN** — Nancy Paffenroth, Unionville Rd., Evans City, 16033
- **CENTRE CO. BKPRS. ASSOC.** — Richard A. Walker, 398 Walker Hollow Rd., Bellefonte, 16023
- **CHESTER COUNTY BK ASSN** — Tim Sterret, Westown School Box 1799, Westown 19395-1799
- **CLARION CO BEEKEEPER ASSN** — R. W. McHenry, Front St., Box 176, Sligo, 16255
- **FRANKLIN CO BKPR** — Lloyd Benedict, 2183 Anthony Hwy., Chambersburg, 17201
- **LACKAWANNA CO BEEKEEPERS** — Esther Ziegler, Rt. 1, Dalton, 18414
- **LANCASTER CO HONEY PRODUCERS** — Loren Sadler, 1035 Red Run Rd., Stevens, 17578
- **LEHIGH VALLEY BKPRS** — Richard Olson, 6935 Central Rd., Germansville, 18053
- **MONTGOMERY CO BKPR** — Joseph Duffy, 309 Cliveden Ave., Glenside, 19038
- **NORTHWESTERN PA BKPRS** — Jeff Allio, RD 3, Nickleplate Rd., Cochranton, 16314
- **POTTER CO BEEKEEPERS ASSN** — Lloyd Tyler, Rt. 3, Coudersport, 16915
- **SCHUYKILL CO BEEKEEPERS** — Rick Freeman, RD. 2, Box 24A, Auburn, 17922
- **SUSQUEHANNA BKPRS ASSN** — Jerald Ely, RR 6, Box 6215, Montrose, 18801
- **VENANGO CO BEEKEEPERS** — Eva Montogomery, RD. 5, Box 14, Franklin, 16323
- **WAYNE CO BEEKEEPERS ASSN** — John Roethel, RD 2, Box 281, Hawley 18428
- **YORK CO BEEKEEPERS** — Judy Brenneman, RR 7, Box 7553 Spring Grove, 17362

RHODE ISLAND

- **BRISTOL CO BKPR ASSN** — Bruce Holden, 11 Field Lane, Barrington, 02806
- **KENT COUNTY** — Kent Cameron, 256 Buttonwoods Ave., Warwick 02886
- **NEWPORT COUNTY** — Steven Amble, 136 Cedar Ave., Portsmouth, 02871
- **PROVIDENCE CO BKPR ASSN** — Salvatore Bucacci, 23 Gillen St., Providence, 02904
- **WASHINGTON COUNTY** — Ron Bachand, 33 Jeannette Court, Exeter, 02822

SOUTH CAROLINA

- **MID-STATE BEEKEEPING ASSN** — Ronald D. Hill, 325 Lockshire Rd., Columbia 29212
- **YORK CO BEEKEEPERS ASSN** — Ms. I. T. Hepp, 2896 Lake Wylie Dr., Rock Hill, 29732

TENNESSEE

- **ANDERSON CO BEEKEEPERS** — Sara Martin, 190 Melton Hill Dr., Clinton, 37716
- **BLOUNT CO BEEKEEPERS** — John Gee, 173 Hamil Rd., Friendsville, 37737
- **CHEROKEE BKPR ASSN** — Ms. David Robinson, Rt. 4 Box 353, Decatur, 37322
- **COLUMBIA BKPRS** — Lona Vaughn, 3455 Neeley Hollow Rd, Columbia, 38401
- **DICKSON CO AREA BKPR** — Elaine Smith, Rt. 1, Box 74C, Cumberland Furnace, 37051
- **DUCK RIVER BKPRS ASSN** — Elaine Holcombe, P.O. Box 303, Shelbyville, 37160
- **FRANKLIN CO BEEKEEPERS** — James Duncun, Rt. 2, Winchester, 37398
- **LOUDON CO BEEKEEPERS** — Jim Goodman, 8633 Hwy. 11, Lenoir City, 37771
- **MEMPHIS AREA BKPR** — Rockey Starnes, 1387 Central Ave. #611, Memphis 38104
- **MONROE CO BKPRS ASSN** — James Hagermeyer, 5337 Hwy. 411, Madisonville, 37354
- **NASHVILLE AREA BKPRS** — Danny Ryan, 3029 McCanless Rd., Nolensville, 37135-9439
- **OVERTON CO BEE ASSN** — Ronald Johnson, 317 University St., Livingston, 38570
- **SEVIER CO BKPR ASSN** — John R. Kelley, 613 Sandy Point Lane, Sevierville, 37862
- **STONES RIVER BKPR** — George Cooksey, 2407 Braxton Bragg Dr., Murfreesboro, 37130
- **SUMNER CO BEE ASSOC** — Wayne Vantrease, 285 Vantrease Rd., Gallatin 37066
- **WASHINGTON CO BKPR** — K. Saylor, 207 Paul Saylor Rd., Jonesboro, 37659
- **WEAKLEY CO BEE ASSN** — A. M. Walker, Dresden, 38225
- **WILSON CO BKPR ASSN** — Glenda Reed, 1077 Jackson Hts. Rd., Goodlettsville, 37072

TEXAS

- **ALAMO AREA BEEKEEPERS ASSN** — David S. Grinnan, 168 Four Bears Tr., Kerrville 78028
- **ANGELINA ASSN** — George A. Berry, Rt. 9, Box 5160, Lufkin, 75901
- **BRAZOS VALLEY ASS'N** — Gordon Brynildsen, 3011 Durango, College Station, 77840
- **CAPITOL AREA BKPR** — Kim Lehman, 1106 Radam Circle, Austin, 78745-3018
- **COLLIN CO HOBBY BKPR** — Barbara Corbin, 37 Graham Lane, Lucas, 75002
- **CONCHO VALLEY ASSN** — Maureen Lane, P.O. Box 60541, San Angelo, 76906
- **EAST TEXAS BKPR ASSN** — Richard Counts, 16239 Audrey Lane, Arp, 75750
- **EL PASO ASSN** — Steven Cameron, 7820 Santa Clara, El Paso, 79915
- **ERATH CO BEE ASSOC** — Karena Eccles, Rt. 1, Box 159, Glen Rose, 76043
- **FORT BEND ASSN** — Gene Debons, 2435 Wren Meadow, Richmond, 77469
- **GALVESTON CO ASSN** — Margie Coplin, 3512 Jack Beaver Rd., Santa Fe, 77517
- **GOLDEN TRIANGLE ASSN** — R. C. Lawson, 1855 Fox Rd., Vidor, 77662
- **HARRIS CO ASSN** — Herb Barrier, 12318 Thornbriar, Pearland, 77581-2022
- **HEART OF TX BEEKEEPERS** — Ann G. Hill, 303 W. Chantilly, Waco, 76706
- **HILL CO. BEEKEEPERS ASSN** — August A. Lutz, Sr., 916 Monroe, Kerrville, 78028
- **HOUSTON BKPRS ASSN** — Herschel D. Womac, 11215 Tyne Court, Houston, 77024
- **MONTGOMERY CO BKPRS** — Milton Howard, 10683 Joann, Willis, 77378-6428
- **NORTH CTRL TX BEEKEEPERS** — Virgil I. Woodfin, 200 S. Park, Iowa Park, 76367
- **PERMIAN BASIN ASSN** — Dean Brittingham, 2312 North Adams, Odessa, 79761
- **PROG BK ASSN OF S TX** — Jack Padget, P.O. Box 1041, Orange Grove, 78372
- **RED RIVER VALLEY ASSN** — Larry Graverholz, P. O. 2501, Wichita Falls, 76307
- **RIO GRANDE VALLEY ASSN** — Henry Graham, Rt. 1, Box 99, Donna, 78537
- **SOUTH PLAINS BEEKEEPERS** — James Colson, P.O. Box 2247, Lubbock, 79408
- **TEXOMA ASSOC.** — Russell Green, P.O. Box 164, Ector, 7543[illegible]
- **TRINITY VALLEY ASSN** — Mr. Hutchinson, 1802 St. Francis Ave., Dallas, 75228
- **TRI-CO AREA BEEKEEPERS** — Dean Futch, 904 Chalk St., Copperas Cove, 76522
- **VICTORIA CO BEEKEEPERS** — Rex Bennetson, 1308 S. Laurent, Victoria 77901
- **WALKER CO BEEKEEPERS** — Steve Laube, 3008 Powell Rd., Huntsville, 77340
- **WILLIAMSON CO** — Rt. 3, Box 60, Georgetown, 78626

UTAH

- **WASATAH BKPRS ASSN** — William Jones, 286 Andrew Lane, Salt Lake City, 84103

VIRGINIA

- **BLUE RIDGE BKPR ASSN** — Steve Barber, 739 31st. NW, Roanoke, 24017
- **CENTRAL VA BKPR EAST** — Sylvia Newland, 9002 Gayton Rd., Richmond, 23229
- **CENTRAL VA BEEKEEPERS WEST** — Guy Miller, 2025 Spottswood Rd., Charlottesville 22902
- **GLOUCESTER BKPR ASSN** — Carmen Stanford, 6399 George Wash Mem Hwy, Glocester, 23061
- **HALIFAX BEEKEEPERS ASSN** — E. Donald Chandler, P. O. 265, Virgilina, 24598
- **LOUDOUN BKPRS. ASSN.** — Richard L. Hays, Sr., P.O. Box 1030, Purcelville, 22132
- **MT. EMPIRE BK ASSOC** — Edwin Wilson, 190 Dogwood Drive, Wytheville, 24382
- **NASA-LANGLEY APIC CLUB** — Raymond Wilson, 403 Calthrop Neck Rd., Yorktown, 23693
- **NELSON CO. BKPRS.** — Michael Lachance, P.O. Box 298, Lovingston, 22949-0298
- **NORTHERN PIEDMONT BKPRS** — Ann Harman, 1214 North Old Poes Rd., Flint Hill, VA 22627
- **NORTHERN VALLEY BKPRS. CLUB** — Gary Deoms, 20 N. Loundoun St., 2nd Flr., Frederick Co. Crthse., Winchester, 22601
- **NORTHERN VA BEEKEEPERS** — Pearl Liles, 2451 S. Culpeper St., Arlington, 22206
- **PIEDMONT BKPRS ASSN** — Elsie Blanks, 577 Honey Bee Rd., Long Island, 24569
- **POWHATAN BKPR ASSN** — Faye Clarke, 2802 Hill Top Lane, Powhatan, 23139
- **RICHMOND BEEKEEPERS ASSN** — Robert Falconer, 4440 Honey Lane, Glen Allen, 23060
- **SHENANDOAH VLY BKPRS** — Alden Dodge Rader, Jr., Rt. 1 Box 591, Stuarts Draft, 24477-9616
- **SOUTHWEST PIEDMONT BKPRS** — Harry Litte, 612 Forest Street, Martinsville 24112
- **TIDEWATER BKPR ASSN** — William J. Saunders, 1036 Windswept Circle, Chesapeake, 23320
- **TRI-CITY BEEKEEPERS ASSN** — Mozell Seay, Chesterfield, 23832
- **VA COMM. BKPR ASSN** — C.L. Burgess, 1900 Memorial Ave., Lynchburg, 24501

VERMONT

- **BENNINGTON CO BEEKEEPERS** — J. Ash, P.O. Box 723, Bennington, 0520
- **VERMONT HONEY PROMOTION** — Cindi McTaggert, RR 1, Box 2330, Manchester Center, 05255

WASHINGTON

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- **CLARK CO BEEKEEPERS ASSN** — Pamela Crone Wenzloff, 16810 NE 40th Ave., Vancouver, 98686
- **COLUMBIA BASIN BKPR** — Richard Roos, Rt. 1, Box 1310-A, Benton City, 99320
- **COWLITZ CO BKPR ASSN** — Eva Davis, 3956 Columbia Hts Rd., Longview, 98632
- **INLAND EMPIRE BKPR** — Rae Bateman, 12028 E. Boone Ave., Spokane 99206
- **MT BAKER BKPR ASSN** — Patrick Harman, 4540 Sand Rd., Bellingham, 98226
- **NORTHWEST DIST BKPR** — Jeanne Kneebone, 923807 5th Avenue West, Bothell, 98021
- **OLYMPIA BKPR ASSN** — Cheryl Randall, 2511 26th Ave. NE, Olympia, 98506
- **PIERCE CO BKPR** — Dianne Knowles, 13204 McCutcheon Rd., E. Orting, 98360
- **PUGET SOUND BEE ASSOC** — Frank Fitzpatrick, 18541 Marine View Dr. SW, Seattle, 98166
- **SKAGIT VALLEY BKPR** — Judy Pefley, 2329 Cavanaugh Lake Rd., Mt. Vernon, 98273
- **WHIDBEY ISLAND BKPR** — Karen Datin, 5159 500th Ave. West, Oak Harbor, 98277

WISCONSIN

- **BROWN CO BKPR** — Thomas Cashman, 1418 Chicago St., Green Bay, 54301
- **CHIPPEWA & EAU CLAIRE BEEKEEPERS** — Fern Eggen, 4733 Stardusk Dr., Rt. 7, Chippewa Falls, 54729
- **DODGE CO BEEKEEPERS** — Peter Graetz, W 1997 Lincoln Rd., Oconomowoc, 53066
- **MANITOWOC CO BKPR** — Henrietta Mack, 6529 N County Rd. W, Reedsville, 54230
- **MARATHON CO BEEKEEPERS** — Dean Kaatz, 500 Forest St., Wausau, 54403-5568
- **POLK-BURNETT BEEKEEPERS** — Phillip Larson, 917 Prentice St, Clayton, 54004
- **ROCK CO BEEKEEPERS** — Stan Kresal, P.O. Box 163, Milton 53563
- **RUSK CO BEEKEEPERS ASSN** — Eleanor Albrecht, Rt. 1, Box 214, Glen Flora, 54526
- **SAUK-COLUMBIA COS BKPR** — Daniel Licht, S 6566 Hwy PF, N. Freedom, 53951
- **SHEBOYGAN CO BKPRS** — Mrs. Elaine Schuman, 126 Grafton Ct., Kohler, WI 53044
- **ST CROIX CO BEEKEEPERS** — Bob Olson, 1237 Willow Ave., New Richmond, 54017

- **TAYLOR- [illegible]RK BEEKEEPERS** — Florette Kol[illegible]580 Cte, Medford, 54451
- **WAPUACA CO BEEKEEPERS** — Stan Jakubek P.O. Box 54, Iola, 54945

WEST VIRGINIA

- **CABELL-WAYNE BKPR** — Gabe Blatt, 3554 Haney's Branch Rd., Huntington, 25704
- **EASTERN PANHANDLE BKPR ASSN** — Bea Atkins, Rt. 3, Box 30-A, Martinsburg, 25401
- **HAMPSHIRE CO BEEKEEPERS** — Mark Bell, HC 86, Box 149, Purgitsville, 26852
- **KANAWHA VALLEY BK ASSN** — Gordon Mead, 20 Shady Lane, Winfield, 25213-9613
- **MARION CO BEEKEEPERS ASSN** — Tom Kees, Rt. 5, Box 93A, Fairmont, 26554
- **MID OHIO VALLEY BKPR** — Clifford Leeson, Rt. 2, Box 353-A, Washington, 26181
- **MORGANTOWN AREA BKPR** — Charlie Metz, P.O. Box 58, Wadestown, 26589
- **TRI STATE BEEKEEPERS ASSN** — Don Snider, 7 Meadow Dr., Wheeling, 26003

CANADA

- **ALBERTA BKPR ASSOC** — Gertie Adair, 16715-113th Ave., Edmonton, Alb T5M 2X2
- **ALGOMA BKPRS ASSN** — Mary Eaton, RR 5, Echo Bay, Ontario P0S 1C0
- **ASSOC DES AGRICULTEURA-PQ** — Robert Villeneuve, 58 Est Colombiere, Quebe G1L 1R1, Que.
- **ASSOC DES APIC PROF PQ** — Roger Doyon, 57 Perras, Napierville CO, St Remi, Que
- **BK ASSOC. OF REG NIAGARA** — Laurence Schneider, 3894 Forks Rd. Ed, Port Colborne, Ont L3K 5V5
- **BRANT DIST BEEKEEPERS ASSN** — Kenneth Crabbe, Rt. 3, Scotland, Ont
- **CAPITAL REG BKPRS ASSN** — Karen Hoffman, Box 43033 Victoria N PO, Victoria BC V8X 3G2
- **CARLETON CO BEEKEEPERS** — John Baird, Rt. 1, Woodstock, NB
- **CENTRAL BKPRS ASSN** — Ruth McKinney, NBBA Bee Store, RR 2, Frederickton E3B 4X3, BC
- **CENTRAL CARIBOO BKPRS ASSN** — Emile Bouchard, RR 4 Site 11 Comp 11, Williams Lake, BC V2G 4M8
- **CENTRAL ONT. BKPRS ASSN** — Christine Bashford, RR 1, Reaboro, Ont. K0L 2X0
- **CHILLIWACK BKPRS ASSN** — M. Gouwenbert, 5839 Kamp Rd., RR 2, Agassiz, BC V0M 1A0
- **COMOX VALLEY BKPRS. ASSN.** — Dave Anderson, RR 2 Site 256 Comp 5, Courtenay, BC V9N 5M9
- **COWICHAN BKPRS ASSN** — J. E. Jones, 4080 Lanchaster Rd., RR 2, Duncan BC V9L 1N9
- **DUFFERIN CO BKPRS ASSN** — Norm Clowes, 5 York St., Orangeville L9W 1L7, Ont.
- **EASTERN ONTARIO BKPR ASSN** — D. Dodge, 39 Homer Dr. Nepean, Ont K5H 5E8
- **ESSEX/KENT/LAMBTON BKPRS** — Joe Muehmer, 36 Victoria Ave., Box 122, Ridgetown, Ont. N0P 2C0
- **FT ST JAMES BKPRS CLUB** — Dave Hemenway, Box 808, Fort St James, BC V0J 1P0
- **GOLDEN HORSHOE BK ASSN** — Vince Mevison, RR 1, Branchton, ONT N0B 1L0
- **GRAND RIVER BK ASSN** — Vince Nevidon, RR 1, Branchton, Ont. N0B 1L0
- **HONEY PRODUCERS ASSN** — Lorne Baird, Site 128, Comp 28 RR 1, Port Alberni, BC V9Z 7L5
- **KALOWNA BKPR** — Douglas Clower, 2203 Woodlawn St., Kalowna, V1Y 2T1BC
- **KAMLOOPS DIV BCHPA** — John Niblock, 345 Pemberton Trrace, Kamloops, BC V2C 1T2
- **KING'S ST. JOHN BKPRS** — Blair Williams, Ph. (506) 763-2902
- **LA FED DES API DU QUEBEC** — Jean-Pierre Chapleau, 555 Boul Roland Therrien, Longuevil, Que. J4H 3Y9
- **LIMESTONE BKS GUILD** — Bill Kirby, Box 4017, Yarker K0K 3N0 ONT.
- **MAPLE RIDGE DIV OF BCHPA** — Louise Sawyer, 21758 128TH ST RR 2, Maple Ridge, BC V2X 7E7
- **MARITIME BKPRS ASSN B** — Linda Donovan, 191 Salisbury Rd., Moncto E1E 1A6 BC
- **MDSX/OXFD/ELG BKPRS ASSN** — Glen Mcleon, RR 2, 776 Cromarty Dr., Dorchester, Ont. N0L 1G5
- **MUSK-PARRY SOUND BKPRS** — Don Bath, Longlands Gen. Del., Dwight, Ont. P0A 1H0
- **NANAIMO BKPRS ASSN** — Lloyd Erikson, 6671 Harwood Dr., Nanaimo BC V0R 2H0
- **NELSON BEEKEEPERS** — Dave Johnson, RR 3, S21, C9 (Harrop), Nelson V1L 5P6 BC
- **NEW BRUNSWICK BKPRS ASSN** — Earl Gilbey, 64 Keswick Ridge Rd., Yourk Co, NB 30H 1W0
- **NO FRASER BKPRS ASSN** — Richard Wakely, 11453 284th St. RR %, Ruskin, BC V2X 8Y6
- **N OKANAGAN DIV BCHPA** — Patrick Connell, Box 524, Vernon, BC V1T 6M4
- **NOVA SCOTIA BKPRS** — Joanne Moran, RR 2, Berwick, Nova Scot B0P 1E0
- **ORILLA & DIST BKPRS ASSN** — Bill Kinghorn, RR 1, Severn Bridge, P0E 1N0, Ont.
- **OTTAWA VALLEY DIST BKPRS** — George Benson, 156 Pleasant Park, Ottawa, Ont
- **PEACH RIVER SO BKPRS** — Gordon Parslow, Box 873, Dawson Creek, BC V1G 4H8
- **P E ISLAND BEE CO-OP ASSN** — John Burhoe, P.O. Box 1114, Charlottetown C1A 7M8
- **PERTH DIST BEE [illegible]ERS ASSN** — Lorne Klopp, Zurich, O[illegible]
- **POWELL RIVER BKPRS.** — Caroline Stoddart, RR1 Whalen Rd., Powell River, BC V8A 4Z2
- **PRINCE GEORGE BKPRS ASSN** — Erich Franz, 4353 Baxter, Prince George, BC V2M 5Y3
- **QUESNEL BKPRS. ASSN.** — Bud Carson, RR 3 West Creek, Quesnel, BC V2J 3H7
- **QUINTE BEEKEEPERS ASSN** — Danny Clarke, RR 4, Stirling K0K 3E0, Ont.
- **RANY RIVER BKPRS ASSN** — Richard Nelson, RR 1, Stratton, P0W 1N0 ONT.
- **RICHMOND BKPRS ASSN** — R. Bundock, #32 - 4700 Francis Rd., Richmond, BC V7C 4V6
- **SAGADAHOC CO BKPRS ASSN** — Ron Riendeau, 9 North Street, Topsham 04086
- **SASK BEEKEEPERS ASSN** — Leo Monseles, Box 154 Stn Main, Saskatoon, Sask. S7K 3K4
- **SAULT STE MARIE BKPRS** — Mary Eaton, RR 5, Echo Bay P0S 1C0, Ont.
- **SHUSWAP BKPRS. ASSN.** — Bob Gardner, 2181 9th St., SE, Salmon Arm, BC V1E 4M9
- **SMITHERS BKPRS. CLUB** — Bob Blackburn, RR 1 Slack Rd., Smithers, BC V0J 2N0
- **SO FRASER BKPRS ASSN** — Penny Anderlini, 955 248th St., Aldergrove, BC V4W 2B8
- **SO. OKANAGAN DIV OF BCHPA** — Sue Harvey, Box 375, Osoyoos, BC V0H 1V0
- **SQUAMISH BKPRS ASSN** — Stein Hoff, P.O. Box 2139, Squamish, BC V0N 3G0
- **SUDBURY & DIST BK ASSN B** — Richard Dediana, 301 Hyland Dr., Sudbury, 10 P3E 1S2
- **SURREY BKPRS ASSN** — C. Buckoke, 1936 176th Street, Surrey, BC V4P 1M6
- **TERRACE BKPG ASSN** — Martin De Hoog, 5233 Soucie Ave, Terrace BC V8G 4X7
- **THUNDER BAY BK ASSN** — Jeannette Momot, RR 6, Thunder Bay, Ont, P7C 5N5
- **TORONTO DIST BK ASSN** — John Campbell, 208 Mill St., Richmond Hill, 10 L4C 4B4 ONT
- **UNITED COUNTRY BK ASSN B** — Marcel Levac, RR 1, Green Valley K0C 1L0, Ont.
- **UPPER OTTAWA VALLEY BK ASSN** — Bill Murray, RR 1, White Lake, Ont. K0A 3L0
- **VANDERHOOF BKPRS CLUB** — George Labrash, RR 1 Site 18 Comp 2, 920 Oak Avenue, Vanderhoof, BC V0J 3A0
- **WELLINGTON CO BK ASSN** — Jim & Cecelia Smith, RR 4, Fergus, Ontario N1M 2W5
- **W. KOOTENAY DIV OF BCHPA** — Dave Johnson, RR 3 Harrop, 726 Ogilvie Rd., Nelson, BC V1L 5P6

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Beekeeper & Photographer

Richard Dalby

This is the story of James Ambrose Cutting (1814-1867), a New England inventor with ties to both beekeeping and photography. As a farm boy, Cutting became interested in beekeeping. Being of an inventive nature, he set about trying to improve such hives as were then in use. On June 24, 1844, Cutting was granted United States Patent No. 3638 covering a beehive. Many different hives were patented in the years before Langstroth's great discovery of the so-called bee space in 1851. Despite their oftentimes elaborate construction, such hives are today of little more than antiquarian interest, for the simple fact that, by modern standards, none of them worked very well. Nonetheless, James Ambrose Cutting made enough money from the sale of his patent to leave his humble origins and move to Boston. There he engaged in various business ventures with little success and soon found himself destitute.

In time Cutting turned his attention to photography, which was then in its infancy. As in any city of any size of that time, Boston was full of upstart photographers catering to the public's demand to be photographed. Cutting and a business partner set up their own photography studio. Soon Cutting turned his inventive faculties to improving on the dominant photographic process in use just then, the daggerreotype (named after Louis J.M. Daguerre, its French inventor). The daguerreotype process produced a picture (positive image) on the silvered surface of a copper plate.

Cutting was not the first to observe that a thin collodion negative on glass will appear as a positive – or picture – when placed on a black backing. But he apparently was the first to see the potential of this photographic process, which he strove to improve. In 1854, he received a number of patents covering this new process and several improvements thereto. Professional photographers liked the new process – soon known as the ambrotype – because it was easier and less expensive than the daguerreotype. And ambrotypes could be finished and delivered at the time of the sitting. It is hardly surprising that soon the ambrotype had virtually replaced the daguerreotype as a portrait medium.

There is disagreement on the derivation of the term "ambrotype." One source holds that Cutting took the term from his middle name, Ambrose. Another holds that the word was suggested by one Marcus Aurelius Root, a prominent Philadelphia photographer and friend of Cutting's partner. Root supposedly derived the term from the Greek word *ambrotos*, which signifies "immortal" or "imperishable," the term apparently referring to the relative stability of the finished picture.

There is no disagreement, however, on the fact that the ambrotype soon became very popular. And for a time, Cutting seems to have prospered financially. It is said that he defended his patent rights with great vigor, prosecuting those who used his ambrotype process without first securing a license. (One source states that Cutting made little from his patents because most photographers ignored them, believing that he was not entitled to them. Other sources hold that he disposed of his patent rights for a good sum of money and subsequently established an aquarium and aquarial garden in Boston.) Cutting continued to experiment and in March of 1858, he and a partner received a patent for a photolithographic process which seems to have had a good deal of merit. But, as is typical with new technologies, advancements in photography soon rendered Cutting's ambrotype process obsolete. In 1856, a professor at Kenyon College in Ohio received a patent on a new photographic process which came to be known as the tintype. Instead of glass, the tintype image was printed on a thin sheet of black iron, thus eliminating the inherent weight and fragility of the ambrotype's glass image. And the tintype was yet again cheaper. Its surface was not fragile; it could be sent through the mail, or even carried about in a pocket with no damage. Little wonder that by 1860, the tintype was all the rage, while the ambrotype was largely forgotten. Portraits of Civil War soldiers are likely to be tintype produced in great quantities by itinerant photographers with a wagon for a darkroom. And that famous portrait of New Mexico badman Billy the Kid complete with Winchester and six-gun is a tintype.

As the ambrotype faded from fame, James Ambrose Cutting faded with it. But in the history of photography, his name is still linked with the photographic process he perfected and made famous. And had it not been for that beehive he patented, he may never have made it to Boston and photographic fame.