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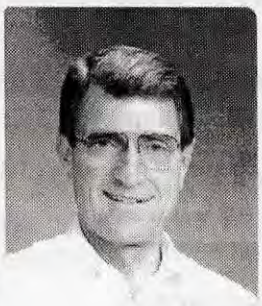
THE MAGAZINE OF AMERICAN BEEKEEPING

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

SEPTEMBER 1999 VOLUME 127 NUMBER 9

FEATURES



JOHN ROOT
Publisher

KIM FLOTTUM
Editor

COVER

Honey, honey bees, beekeeping, beekeepers . . . no matter the language, beneath it all we are much more alike than different.

cover designed by Crystal Garten

Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

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

Associate Publisher ..... ***Robert Stanners***

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

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

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

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

Summer Intern ..... ***Crystal Garten***

Contributors

Richard Bonney • Roger Morse
Richard Taylor • Mark Winston
Clarence Collison • Ann Harman
James E. Tew • Malcolm T. Sanford

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INNER COVER

When was the last time you went into a restaurant, ordered a rare steak, and actually got one? More likely it was at least medium, and probably well done – in spite of what you wanted. No red centers allowed.

How about a gallon of fresh-squeezed, right-from-the-apple cider? Nope, it's been pasteurized. Nothing fresh allowed.

How about an over-easy, runny-yolk egg for breakfast, along with bacon that still bends when you pick it up? Fat chance.

There are hundreds of examples. Probably thousands, where somebody, somewhere has decided what's best for our health and well-being. We can, of course, choose to ignore these public rules at our own risk, in the privacy of our lives. I don't think the rare-meat police will show up at your door, ordering another 10 minutes on the grill or you'll get 90 days in jail and a fine to be determined by the court. Not yet anyway.

But the mentality that drives these government agencies – protecting us from our daily hubris – is a necessary evil in a society that is driven by profit. Cutting corners, shoddy or reduced quality control, supplier collusion, price fixing – all manner of fraud are the reasons we do more harm than good to our fellow man. Greed has a price, and it's usually measured in someone else's suffering.

Those same agencies also stay vigilant over the things we do to ourselves, in spite of ourselves. And here lies an irony of sorts, and it lies in the middle of a beeyard.

When *Varroa* first arrived in this country and was running through colonies like a hot knife through soft wax, a cry arose throughout the land by those who had lost, those who were losing and even those who hadn't yet lost . . . "Give us something to stop this red(ish brown) menace now!"

And in the proverbial blink of an eye a chemical company with some answers, and scientists with the questions got together and Apistan happened. It worked. Beekeepers used, abused, violated and substituted . . . but it worked for 10 or more years. And we learned to live with yet another pesticide in our lives . . . more or less protected from ourselves.

Almost immediately, though, from distant corners came the first call for a second choice, an alternate means of killing those creatures that were killing our bees. And lots of things were tried, tried again, tried different ways, at different times by different people. But nothing, it seemed, worked as well. Or was as safe, from the perspective of the agencies that watch these things.

When the first signs of fluvalinate resistance began to appear in the U.S. *Varroa* population a couple of years ago two different messages were heard almost immediately. The first was the apocalyptic voice of doom . . . now we're surely at the mercy of this beast. We know what it can do, and now there's nothing to stop it. Which, if the worst case had come to be would have been correct. But it didn't. True, resistance showed up, in pockets here and there, but even after two years it had not caused a complete meltdown. But for those whose hives housed Apistan-proof mites the end was in sight. And even though (all, some, just a little – take your pick) of the problem was caused by abuse, the cry still came through loud and clear – we need another chemical, now!

So again a chemical company had some answers, scientists had the questions . . . and CheckMite+ came to be.

Though some question the science that allowed an organophosphate to get an emergency use permit, and others question the politics that pushed it through, there was no doubt of the need for another weapon. So it is today in nearly every state.

Almost immediately the second message came through . . . from scientists, Extension Specialists and beekeepers in general . . . "This stuff is NOT as benign as what we had! We have to actually be careful!"

Well, they're right, it's not as benign as what we had. But what we had was not as benign as most think it was either. These chemicals are pesticides. They kill pests. And the people who monitor these things were right up front with all of that information. Right from the start. They knew that a pesticide is a pesticide. In small amounts it takes care of small pests. Abused, it will take care of large or larger pests. Fact of life. And death.

So now we have two chemicals to use to control *Varroa*. One is bad, the other just a bit badder. Those that weren't careful with the first probably aren't going to be careful with the second, or so experience tells us.

The agencies and the people who run those agencies have a right, and the responsibility to monitor the use of all of the substances we put in beehives. Just like the rare meat and soft egg police. But there are mil-

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Big Brother Should Be Watching; Plan Ahead

KEEP IN TOUCH

Write: Editor, 623 W. Liberty St., Medina, OH 44256
FAX: 330-725-5624
EMAIL: KIM@AIROOT.COM

MAILBOX

Life With AHB

For whose living above the north Texas area, wondering what AHB life is like, I have a story for you. I've been a beekeeper since 1978 and have enjoyed working the bees, doing what I can to help them help themselves with swarm management, medication for various mites and AFB. I am a hobby beekeeper.

Ten is the most ambitious number of colonies I've worked. I've had five of them in my back yard for 14 years until last fall. Now I have two colonies 20 miles from here in the countryside. I can't go out daily and look at the bees, at the wonder of their organization that would be just fine without our intervention. Having our county under quarantine for several years for the AHB, I was under the impression that if you kept your colony strong, you should have no problem. My three Italian colonies were strong until an African blitzkrieg. I found there was a behavioral problem with bee turf for the hives extending 10 times as far as previously. Additionally with neighbors and our family getting stung often, I looked into the hives to discover late in the fall, and after a freeze, many drones and a lot of brood. I have been told by fellow beekeepers in Tucson, Arizona, that AHB swarm into December. Domestic bees in our area quit swarming normally in June. So between the behavior and late brood rearing, I thought something was wrong. The colonies had been strong.

My Arizona beekeeping contact said that in their setting, the swarms were fist size, land on the outside of a colony away from the entry. They were not perceived as a threat by the guards and were left alone. At night, the swarm workers go into the hive quickly, fighting their way along until they get to the queen and kill her. Their own queen enters; they guard her till she is accepted and the conversion begins with the laying of AHB eggs. (A new domestic queen could have also been impregnated by an AHB drone.) But very quickly, our pollinators turned into a nightmare. I contacted neighbors, apartment complex dwellers, and a day care near by and explained that AHB had arrived, what to do (based on Texas A&M AHB materials) and that I would be eradicating them.

I contacted the president of the local beekeeping association and got input as well as from AI Root. The association president had exterminated over 60 AHB colonies in the past 10 months he said. I exterminated the three AHB converted hives (with an Alfred Hitchcock experience, having them bounce off windows to try to get in where I was.) This was after I had used gasoline fumes with a plugged colony at night, followed the next day by Dawn dish detergent and water. Even so, neighbors were stung. It is not the AHB's fault that it is not suitable for an urban environment. Its reaction to stinging pheromone and loud noises are part of its make up.

With my two Buckfast colonies in the country, I put a drone-queen entrance excluder on the hives in hopes that even if the queen was killed by AHB workers from a swarm that the queen could not enter. At the least, I would lose a hive rather than have to deal with AHB problems. I would guess that, like Canada, where many beekeepers kill their bees in the fall because of the high cost of wintering them and the difficulty surviving extremely cold temperatures (my experience as a beekeeper in Edmonton, Alberta), more will be killing the bees in the fall and buying new packages of domestic bees each spring which ensured one is working with domestic bees, especially near urban environments. Marking queens can also help. We do have some beekeepers working the AHB in the country, but it is not as useful with the droughts we have had in the last several years. I share this article in hopes that it might encourage other southern US hobby beekeepers who might consider leaving the hobby because of the AHB. I share this also because of the importance of beekeepers letting neighbors know what is going on so that there is no needless suffering or even death.

Finally, I share this to dialogue with other southern U.S. beekeepers to see how they have continued in a wonderful hobby beset by this new danger.

Alan Williams
Midland, TX

Other Hive Products

I really enjoy reading your magazine, it's very informative with the articles that you print.

I was wondering if you have ever had an article or if you're intending to write an article about other hive products besides liquid, comb honey and wax.

I'm interested in using propolis, pollen and venom. I would like to see an article on how to collect these products, recipes and directions on how to prepare them, what use these products are for and who to sell them to.

This is my third Spring keeping bees, and I think I'm doing ok with the honey and wax department. I'm sure that there are other hobbyists just starting out that would like to use other products, if not right away, maybe in a few years from now and I think that this information would help them as well as myself in recycling these products that bees make.

Thank you for your time in just reading this and I look forward to seeing an article about hive products.

Ron McDade

Continued on Next Page

MAILBOX

Academia!

Concerning Mark Winston's column in the June issue – those in the academia "culture" know what it's all about, and those outside this "culture" I'm sure could care less. Please ask Dr. Winston to stop prancing around like a typical self-absorbed Doctor of Philosophy and continue to educate us with what we have in common – *Bee Culture*!

Rex Bristol
Burkburnett, TX

Communication

How well do beekeepers communicate with other segments of the honey industry? With members of Congress? With neighboring producers? With government bureaucrats? Is the message clear when attempts are made to communicate? As members well know the answers are: "Not very well." On a score of one to 10, I would say three.

We can and should do better. If beekeepers are smart enough to produce commercial crops, they are certainly sharp enough to communicate.

During the course of a year, beekeepers are fairly ingenious with alibis or reasons why they haven't written their congressman or failed to follow through with support for an activity that he/she voted for at a recent bee meeting. Most of the excuses are boring. One correspondent wrote that 90% of what I wrote was over his head. Consequently, he couldn't help. This type of excuse is: "Laziness supreme."

On one occasion I responded to the Honey Board's suggestion that they welcomed suggestions or recommendations. My short message was: "Create an office of an ombudsman." No response, even though the short letter was sent to all Honey Board members. By telephone a board member responded: "I don't know what you mean about an Ombudsman." Perhaps, no dictionary was available. Creating an office of an Ombudsman is still my recommendation.

A really routine excuse for not *writing Congressmen is: ". . . I wrote* him but he didn't answer my question." What these excuses say, in reality, is that their letter wasn't well enough written to get a reasonable response. With a little research, one can easily learn how to write reasonable letters to members of Congress that will be answered.

The existing dialogue between beekeepers and the National Honey Packers and Dealers Association (NHP&DA) is indeed strange. The bottom line from NHP&DA seems to be: ". . . pay the one cent tax (1½ cents if referendum is approved) and we may buy your honey if your price is cheaper than imports." The bottom line from U.S. beekeepers might say this: ". . . paying the tax is a pleasant thing. It is nice that we can create a promotional or advertising externality for you worth approximately $3 million." There is a crying need for a sincere exchange of ideas between producer and dealer. Producers need to go back to the drawing board and re-examine the basic economic problems of commodity promotion. It is my view that if producers would carefully read the several economic papers written by Dr. John Nichols, Texas A&M, they would immediately ask for a complete overhaul of the Honey Board, or vote for termination.

The Bee Press, in the main, does a nice job of publicizing Entomological news, but fail to address political and economic issues. Both social sciences need to be understood especially if one deals with the government. Usually, the rank and file taxpayer tells us he don't want to be involved in politics. Concerning economics he is likely to say: ". . . they can't make up their mind." Consequently, it is extremely difficult to spark interest in politics and economics. It naturally follows that our editors hesitate to publicize these sciences.

The subjects must be addressed if we plan to deal with bureaucratic Washington. Economists and political scientist inhabit all offices in D.C. In the past our message (from the honey industry) failed to fully explain our economic story. Economists in the Office of Management and Budget (OMB) routinely examine the economic value of the commodities each year before making up the President's budget. Our industry's value to the economy, in their view, is the value of the honey crop. This causes us to be listed in the "small potatoes" group instead of rating our real value to the national economy in the billions (pollination value).

The value of honey bees that has been established by entomologists is sound, but, it is an intangible figure. Economists have a tendency to forget intangibles or discount their value (out of sight out of mind). If our line comes up for GAO attention in Congress, a major problem follows. To understand what data is needed, one needs a little knowledge of economics, especially so, if a Ph.D. economist is among the congressmen who might oppose our efforts.

All of the issues I have mentioned will be addressed at the upcoming Albuquerque convention. If you need additional data about economics, please contact us. Fax & Phone 405.352.4944.

Glenn Gibson
Minco, OK

Pollen Cleaning

A kind bee friend gave me a copy of the April issue in which Ralph and Kathy LeFevre (location not listed), new pollen collectors, in a letter to the editor (page 13), complained about "how much work it was to clean the pollen of debris." I don't think they got their money's worth in the replay proffered. I propose the following:

One, use a self-cleaning pollen trap to eliminate most of the work.

Two, after collected, the pollen is dried.

Three, it is then frozen for at least 24 hours at 0°F, to kill the ever present wax moth egg.

Four, it is then passed through a 16-mesh aluminum-screen sifter, measuring about 15 inches square. This removes all of the pollen dust. The larger debris is picked out with stainless steel tweezers.

MAILBOX

Five, the pollen pellets are dried on shallow trays in a warm room, using a dehumidifier, if necessary, and stored in glass bottles – not necessary to keep in freezer or refrigerator – until disposed of through sale or consumption. The pinch test: press pellets between two fingers. If they do not stick together, they are dry enough.

By the way, I've been collecting pollen for the past 17 years and have been selling it from my front door for many years, having experimented with 11 different trap configurations. My 10 hives carry seven pollen traps made by David S. Martin, RD 1, Box 489, Port Trevorton, PA 17864 which, I believe, sell for $42 postpaid and come with a money back guarantee (he doesn't have a phone or use electricity, being Mennonite). They are the best out there, for the hobbyist, in my humble opinion. During the honey flow, they are left in position, being easily turned off externally. He calls it the "Superior" pollen trap. I fully agree!

John Iannuzzi
Ellicott City, MD

A Lesson To Skunks

Mark Heading's article on skunks getting into his bees seems like a lot of extra work. As for moving your bees some place else, well what's to say there's no skunks there.

I don't have skunk problems in my bees for long. I keep steel traps set in front of my hives. That is a young skunk's first and last lesson on how to get bees.

Also you will be surprised at the amount of raccoons and opossums that will get into your bees.

I know a lot of people hate us trappers, but if that's what it takes to keep my bees.

Skunks do a lot of good, all they have to do is stay out of my bees and they're not bothered by me.

John Keller
Piedmont, OH

Rite-Cell Foundation

In the July, 1999 issue, page 40, I read with great interest the article by Bob Horr, "Plastic Foundation, A Simple Side-by-Side Test." While I will agree with the majority of Mr. Horr's overall evaluation of plastic foundations, there are some facts about *Rite-Cell Foundation* that as the manufacturer, we would like to correct or clarify.

1. Mann Lake Ltd. Only uses the finest rendered beeswax available to coat Rite-Cell Foundation. Because that wax is extremely clean it is often difficult to see the wax against the white of the plastic. We do realize that the coating down the center of the sheet is heavier, however, if one was to take a fingernail and run it down the beveled edge of the sheet you will undoubtedly scratch up beeswax along the entire length of the sheet. The sole purpose of adding the beeswax coating is to give the plastic the scent of the hive quickening the acceptance by the bees therefore the amount of wax is essentially irrelevant.
2. The cell depth of Rite-Cell was inaccurately stated as 0.0905, the correct depth should be .105 which makes it the deepest cell available prompting many queens to start laying before they start to draw the cells.

Another comparison that could be made over time is wax adhesion. Because Rite-Cell is a frosted surface the beeswax adheres much better to our foundation and remains intact during the extracting process. It should also be mentioned that an unwaxed sheets used by most commercial beekeepers, bees actually take to Rite-Cell quicker than other unwaxed brands because of that texture.

On another note in an article in the July issue, page 46, Rick Green recommends using treated lumber to make entrance reducers, inner covers and bottomboards. I would like to caution readers against using traditional treated lumber because it contains chromated copper arsenate (CCA) which can have adverse effects on bees and can accumulate in wax (Kalnins & Detroy, 1984; Kalnins & Erickson, 1986). A good alternative would be purchasing untreated wood and applying a copper napthenate which is available from Mann Lake Ltd. In a premix pint container for each application.

I appreciate the opportunity to clarify the attributes of our product to you readers and we will continue to enjoy the many fine authors contributing to your magazine.

Jack Thomas, Vice President
Mann Lake Ltd.
Hackensack, MN

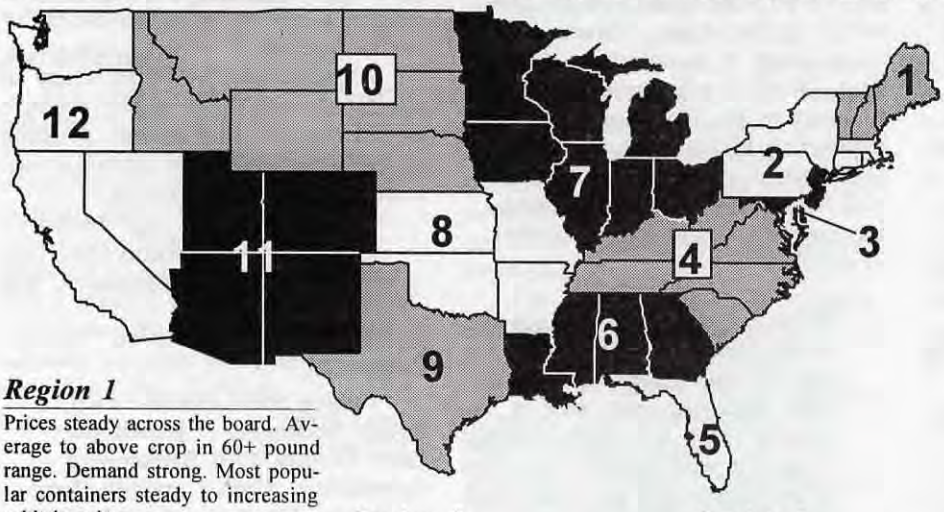
Novice

I enjoy the magazine as a novice beekeeper. I joined the Lake County (OH) Beekeepers Association when I started three years ago. I had purchased a hive set many years ago, however, never got any bees. The help I received from the association was very helpful. Bill Louden from the association sanitized my hive units for me with his old gas stove and advised me on getting started. Bill has since passed away so the only way I can really repay his good will is to pass the information along in his memory to others. The nuc I got from Roy Hendrickson three years ago is still doing fine along with the one from last year. The information on care of bees from the association meetings has been of great value. J. Michael Haas, our president of lake County Bee Association helped me do a better job of setting up my hives, by putting my bottomboards on a chimney cement block, the fit being perfect. I also put plastic under the block to prevent anything from coming up from below. Since I am retired I try to make things easy for myself. I took an old barbecue unit and made it a portable work unit by putting a plywood sheet over it, added some guide rails to accommodate two supers. I cut the lower ends of an old full body hive to allow me to use my smoker better when taking the honey frames without making the bees too mad. Works for me. I would also like to give credit to those brave bee inspectors like Gordon Droeske, who get up close and personal.

Carl Robinson, Sr.
Painesville, OH

Continued on Page 14

JANUARY - REGIONAL HONEY PRICE REPORT



Region 1

Prices steady across the board. Average to above crop in 60+ pound range. Demand strong. Most popular containers steady to increasing a bit in price.

Region 2

Prices have declined across the board since last month. Average to good 90+ crops average with decent demand. Popular sizes price steady.

Region 3

Bulk prices up, wholesale down, retail steady. An average 50-60 pound crop, but demand dropping. Popular sizes steady to dropping a bit in price.

Region 4

Prices at wholesale up a bit, bulk and retail steady. About an average 70 or so pound crop. Demand increasing and most popular sizes steady to increasing.

Region 5

Wholesale prices steady but both bulk and retail down. Mixed results on the 80-100 pound average but demand slow.

Region 6

Prices up, just a little since last month across the board, but mostly at wholesale. An average to somewhat reduced crop below the 80 pound range. Demand O.K., but not great. Popular sizes holding their own.

Region 7

Bulk and wholesale prices up a bit from last month, but retail has dropped. An average crop, right at (about) the 85 or so pound average is reported, but with mixed demand. Popular container prices slipping.

Region 8

Bulk prices down but wholesale and retail steady. Only average or below the 85 pound average crop this season. Demand strong though, and popular container prices same or increasing a bit.

Region 9

Prices dropped across the board since last month. Mixed crop report, but more above than below the 100 or so pound average. Popular container prices dropping this season to sell.

Region 10

Bulk and wholesale prices up a bit. Retail steady. A good crop, at or above the 100 pound average reported, demand steady to declining though. Popular container prices down however.

Region 11

Bulk and wholesale prices dropped since last month but retail steady. Crop at or a bit above the 75 pound average but popular container prices dropping.

Region 12

Bulk and wholesale prices down but retail steady. Crop at about the 80 or so pound average, demand increasing however. Popular container prices steady to decreasing.

	Reporting Regions												Summary		History	
	1	2	3	4	5	6	7	8	9	10	11	12			Last	Last
Extracted honey sold bulk to Packers or Processors													**Range**	**Avg.**	**Month**	**Yr.**
Wholesale Bulk																
60# Light (retail)	67.63	67.50	65.00	74.67	75.00	66.33	61.25	58.00	73.52	77.50	90.00	65.25	42.00-105.00	69.14	70.59	57.00
60# Amber (retail)	63.81	53.58	60.00	69.50	65.00	63.00	57.90	62.50	70.72	62.00	76.50	63.50	38.50-105.00	65.22	68.63	55.33
55 gal. Light	0.57	0.60	0.67	0.65	0.57	0.52	0.62	0.67	0.70	0.61	0.69	0.65	0.41-1.50	0.59	0.68	0.78
55 gal. Amber	0.57	0.58	0.56	0.56	0.63	0.57	0.61	0.60	0.61	0.56	0.59	0.62	0.39-1.50	0.54	0.68	0.76
Wholesale - Case Lots																
1/2# 24's	29.59	29.95	32.78	34.47	22.00	27.83	29.49	32.78	34.34	32.78	25.75	29.85	20.00-48.00	30.33	29.23	31.87
1# 24's	42.04	39.49	42.60	43.95	42.50	42.50	41.72	39.92	42.71	43.20	41.08	46.19	26.40-58.50	42.90	43.04	45.12
2# 12's	36.57	34.45	31.34	42.28	48.00	38.30	38.20	40.48	35.54	35.00	34.60	36.06	3.50-52.58	37.95	39.66	36.50
12 oz. Plas. 24's	36.22	35.78	37.12	35.49	42.00	36.40	37.42	34.74	37.19	37.60	39.50	35.93	26.40-48.00	36.97	36.06	34.60
5# 6's	39.43	37.48	41.36	48.67	41.36	45.58	39.00	39.00	39.47	41.25	36.45	37.08	31.50-52.00	40.59	42.13	37.55
Retail Honey Prices																
1/2#	1.81	1.58	2.83	2.17	1.28	1.62	1.74	1.49	1.95	1.59	2.35	1.83	0.95-3.69	1.84	1.90	1.88
12 oz. Plastic	2.20	2.01	2.33	2.51	2.10	2.10	2.13	2.23	2.33	2.32	2.36	2.12	1.39-3.35	2.24	2.27	2.08
1 lb. Glass	2.76	2.22	3.45	3.07	2.40	2.26	2.56	2.60	3.54	2.45	2.94	2.82	1.58-5.99	2.77	2.84	2.84
2 lb. Glass	4.45	3.90	4.36	5.22	4.75	3.91	4.31	4.63	4.96	4.26	4.25	4.02	2.24-6.30	4.55	4.69	4.20
3 lb. Glass	5.89	4.70	6.10	6.51	6.10	6.18	5.78	6.44	5.50	7.14	5.58	5.62	3.74-8.50	6.05	6.70	5.56
4 lb. Glass	7.43	6.73	7.92	7.86	7.92	6.53	8.05	7.92	7.00	10.00	7.85	8.19	5.49-10.50	7.76	8.08	6.00
5 lb. Glass	8.88	8.67	9.38	9.77	9.38	8.08	9.19	10.99	9.07	7.90	8.87	8.09	6.49-12.50	9.14	10.28	8.56
1# Cream	3.24	3.24	3.60	3.62	3.60	2.75	2.94	3.12	4.06	4.78	4.28	2.92	1.99-5.50	3.30	3.45	2.78
1# Comb	4.12	3.69	4.08	4.13	4.08	4.50	4.11	4.00	4.79	4.08	5.48	4.66	1.95-6.00	4.28	4.30	3.98
Round Plastic	3.77	3.15	4.21	4.06	4.21	4.00	3.36	3.73	5.50	4.21	4.13	3.87	2.75-6.00	3.87	3.82	4.06
Wax (Light)	1.48	1.96	1.38	2.04	1.38	1.80	1.18	1.25	2.00	1.40	1.50	2.00	1.10-5.65	1.49	2.54	3.00
Wax (Dark)	1.18	1.41	1.18	1.65	1.39	1.48	1.13	1.00	1.00	1.30	1.25	1.50	1.00-5.50	1.14	2.27	2.20
Poll. Fee/Col.	36.91	39.25	25.00	36.00	25.50	36.67	40.33	40.00	27.50	37.63	54.00	37.33	20.00-55.00	37.88	36.55	38.00

THE WISE GUY

I read with great interest more and more articles on agriculture and how poorly the agricultural economy is doing. The money people of this country are deeply concerned that all of the equity in the agricultural area has been drained out, and farmers will soon be in a negative position both in cash and in equity. Does this seem new? Let's use our heads here. The price you get for your product is x. The price on the shelf is xxxx. Someone is getting three x's while you are getting one. What can you do about getting more x's? Tell your buyer you want another x or else? Go to another buyer and try to get more x's? Or you may try to get all of the x's by dealing with the marketing as well as the producing.

This is all old ground that we have plowed before, but it is said you must tell people seven times before they remember what it was you told them. If you want to control your income and your future, you must have some influence over the price you get for your product. Pollination has taught us cash flow, plus we are dealing with the end purchaser. Another interesting thing is since I have started the pollination business, the income to me has gone up! Which is far different from the value of honey, where again, most people depend on others to market their product. GET off your butt and solve your own problems there because no one else will. As long as you are willing to give your product away, they will take advantage of you.

So, again, get ready to deal with the buying public. Find your clients first, then sell to them. Do not try to sell all things to all people unless you want to go the direction of retailing from your own shop. Mark Winston's article in the July 1999 *Bee Culture* is great. It speaks of the Australian honey market and how some products are sold. The article is well worth your time. These are the types of articles you need to search out and read because if you do not, you must depend on someone else to sell your product. When you become dependent on someone else, you have the same results as addicts who deal drugs have. You lose your ability to control your future!

Again, marketing or selling should be only one more step in the production of honey. You should know your floral source. When extracting, keep those sources separate and sell them that way. As per the Mark Winston article, if you find a good blend of your honeys then use that and brag about the blend. Don't use blends like packers use today to blend U.S. honey with foreign honey to make a low-price product. Go the other way, quality. TELL your clients the benefit of your blend or your floral source. Don't just put "honey" on the label and hope it sells! That is the way it has been done for years, and as you can see, that way has not worked. Using generic promotion has decreased consumption, has helped to sell cheap honey, and has worked against quality honey.

If you would like, I will sell you three proven marketing ideas for $25, which is far cheaper than the 1 cent per pound the honey board has charged. If you wish to purchase, send the money to The Anti Dumping Fund of the American Honey Producers, 517 Jay St., Bruce, SD 59220, along with a self-addressed, stamped envelope, and I will gladly send you the three excellent marketing ideas. It will be up to you to make them work. Let's sell our quality honey to quality clients and raise the level of marketing our product.

Wise Guy

?DO YOU KNOW?

What You See

Clarence Collison
Mississippi State University

To effectively manage honey bee colonies, it is important for the beekeeper to have an understanding of basic bee biology and being able to determine current colony conditions when examining the brood nest. Failure to realize when colony conditions are not optimal for colony development and survival may result in the beekeeper making inappropriate management decisions.

Please take a few minutes and answer the following questions to find out how familiar you are with basic bee biology.

The first nine 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. ___ All three castes of honey bees have four life stages in their life cycle.
2. ___ The larval stage is the longest developmental stage in the life cycle of the honey bee.
3. ___ Fertilized and unfertilized honey bee eggs are similar in appearance.
4. ___ Within the brood nest under optimum conditions, you would expect to have 4x as many capped worker brood cells and 2x as many worker larvae as fertilized eggs.
5. ___ Honey bee larvae lack legs, eyes and antennae.
6. ___ Supersedure queen cells are normally smaller than emergency queen cells.
7. ___ In the deep south, brood rearing is continuous throughout the year.
8. ___ Royal jelly is fed to only larvae that are being reared to become queens.
9. ___ Nurse bees begin visiting cells as soon as eggs are laid.
10. Prior to laying an egg in a cell, explain the queen's pre-oviposition behavior in selecting the cell. (2 points).
11. Worker honey bees have approximately a 21 day life cycle which varies with nutrition, broodnest temperature and race. Please indicate which day of the 21 day cycle the following events occur. (7 points).
    - A. ___ capping of brood cell
    - B. ___ egg hatches
    - C. ___ larva sheds its skin for the first time
    - D. ___ larva stretches out on its back with its head toward the cell opening (prepupa)
    - E. ___ sixth and final shedding of the skin
    - F. ___ fifth molt into the pupal stage
    - G. ___ larva spins a cocoon
12. What is the primary function of molting during the larval stage of honey bee development? (1 point).
13. Name two ways in which absconding is different than swarming. (2 points).
14. Name two stimuli used by guard bees to recognize intruders and robbers. (2 points).
15. Please list two ways in which honey bees reduce the temperature in the hive when it becomes too warm. (2 points).

ANSWERS ON PAGE 52

Roger Morse

Research Review

"I sometimes think that opinions about what to do about foreign introduced plants are as many as are the plants themselves."

Salt cedar, purple loosestrife, Brazilian pepper, star thistle, melaleuca and a long list of other imported plants are on a U.S. Department of Agriculture hit list. The federal government hopes to reduce the numbers of these plants, which they call invasive. In many parts of the country, this attack on selected introduced plants is receiving strong public support because some of these plants are toxic, crowd out desirable species, take up too much water, and/or have adverse effects on the animals that live in the area by changing the foods and nesting materials available to them.

The problem for beekeepers is that all of the plants I have listed above, and more, too, that are on the hit list, are good honey and/or pollen plants. Some beekeepers produce tons of honey from each of these plants. In other areas where they are not so common these plants are excellent sources of pollen and nectar that bees use to build and maintain their populations.

Salt cedar

Some time in the next year or so, the government plans to release a Chinese leaf-eating beetle to attack salt cedar to reduce its population. This has been said by some to be the largest and most controversial biological weed control project ever undertaken. This small tree or bush is sometimes called tamarisk. There are actually more than one species involved, but the chief offender is apparently *Tamarix ramosissima.*

Tamarisks, which may grow to be 15 to 30 feet tall, were brought into the United States over a century ago as windbreaks and to control erosion. These plants apparently sink their roots deeper than do most native species that grow along riverbanks. One of the groups opposed to controlling salt cedars points out that there is a rare and endangered bird, the willow flycatcher, that uses salt cedar bushes as nesting sites. Reducing the number of salt cedars will probably have a bad effect on the bird's population.

Of greater concern to many of the ecologists opposed to the project is the worry that any insects brought into the United States from abroad might attack and harm plants other than those targeted. Many plant-feeding insects are host-specific, that is, they eat only certain plant species, but there is always the danger that they may attack others. According to the report I cite below, this controversy has already prompted a five-year-long debate on the subject, and the final decision concerning when and where to release the salt-cedar-chewing insects will probably continue for another year. Opponents emphasize that once a decision to release an insect is made, it cannot be taken back.

Purple loosestrife

While I was reviewing papers on salt cedar, I also checked on a plant with which I am more familiar, purple loosestrife, which is now under attack from several insects that were purposefully introduced as control agents. This plant has rich, showy purple flowers, and blooms from late June through early September. It produces a mild-flavored, slightly darkish honey. When a jar of purple loosestrife honey is held up in the sunlight, it has a pretty greenish tinge, a color I have never seen in any other honey. Mature plants may have as many as 30 stems and grow to a height of more than six feet.

Purple loosestrife is a native of Eurasia. The seeds were apparently brought to North America in soil used for ballast in some of the first ships to come here from Europe. It is known that it was well-established along the East Coast by 1800. The plant spread westward along canals and with waterway traffic and is now found in nearly all northern states and southern Canadian provinces. It has been in the Pacific Northwest for only 20 or so years, and beekeepers there may not be so familiar with the great potential this plant may have. Isolated plants have been found as far south as Texas, but it is apparently not in Georgia or Florida.

I have always thought a field of purple loosestrife in flower to be a pretty site. However, there are other opinions. A 1989 Fish and Wildlife leaflet from the U.S. Department of the Interior states, "The impact of this weed on North American wetlands has been disastrous." The problem is that certain ducks cannot use "the stiff loosestrife stems for nest construction." Muskrats do not care to eat the stems or roots. White-tailed deer will eat the young loosestrife plants but not those that are older.

An anonymously written 1998 four-page brochure from Cornell University with the title *Biocontol Insects Feast on Purple Loosestrife* also states that the plant is "invading and degrading wetland habitats all across North America." According to this brochure, four European insects, including one root-mining weevil, one flower-feeding weevil and two leaf-feeding insects have been

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RESEARCH ... Cont. From Pg. 13

introduced and are doing a good job of reducing purple loosestrife populations. As was explained to me, the object is to reduce the number of purple loosestrife plants by using these insects but to still retain some so that the insects have a food reserve and thus continue to live and attack these plants and thereby keep their numbers low.

Opinions: I sometimes think that opinions about what to do about foreign introduced plants are as many as are the plants themselves. One extreme is to point out that we and our honey bees are foreign and that we should welcome newcomers. Certainly most of our major sources of pollen and nectar, including white Dutch clover, which is the greatest honey plant on earth, are all foreigners. At the other extreme are those who are worried about losing species and believe that we should be more concerned about this loss of diversity. This is not a battle that will go away, but it will have an effect on honey production. BC

Malakoff, D. *Plan to import exotic beetle drives some scientists wild.* Science 284:125. 1999.

MAILBOX ... Cont. From pg. 9

Almonds or Honey

I was visiting with a fellow beekeeper and we were discussing the severe depression the bee industry is now facing. There is no demand for our honey along with poor prices, mites, hive beetle. Then my fellow beekeeper shot out those famous words, "think where we would be without the Honey Board"?

I always become very irritated when I hear this. The question should have been, "think where we would be without the Almond Board"? The bee industry would have certainly folded without the almond pollination subsidizing our honey production. Now, the question becomes, are the beekeepers supporting the wrong promotion act? By supporting the Honey Board we are promoting the world's supply of generic honey to be consumed in the U.S.A. Also, the Honey Board has not even considered appropriating one dime for bee research. It only takes a unanimous vote by the board members to approve it. All along the Honey Board could have used our money for bee research. This would have made more sense to me than the thousands of dollars the Honey Board spent on phone surveys and other efforts

Now, by supporting the Almond Board we are actually promoting a great tasting product that was grown in the U.S.A. Something the Honey Board cannot (by law, ed.) boast. Also, the thing that will shock you is that the Almond Board has actually donated over $100,000 for bee research. This figure should be embarrassing to our industry. I believe that the promotion of almonds presents a much better chance for beekeepers' survival than the generic promotion of honey! Think about it, the more almonds consumed means more orchards planted which results in an increased demand for bees to pollinate.

So, let's all get out there and buy almonds, put them on your table and eat a handful every day. I for one would prefer my honey Board tax to go to the Almond Board. In doing so we will create a stronger bee industry!

Lyle Johnston
Rock Ford, CO

No Treated Lumber

Like Rick Green, (July, *Home Made*), I'm a beekeeper who builds some of my own bee equipment, in part because I can do it cheaper, and also because I can build it sturdier. However, I would like to point out that building bee equipment from pressure treated lumber is a dangerous practice. Sure, the industry says pressure treated wood is safe, but there are years of evidence that says it just ain't so. Consider . . .

Pressure treated lumber is made by putting wood into a pressure tank filled with a mixture of arsenic pentoxide, chromic acid, and cupric oxide plus secret "inert" ingredients, in proportions that vary with the particular product and manufacturer. This mix is referred to as chromate-copper-arsenate or CCA. The chromium in CCA occurs in the highly toxic hexavalent form. In addition, copper and chromium together have a synergistic toxic effect.

The ability of CCA's ingredients to cause disorders of the nervous system, damage to various organs, cancer, and birth defects is well documented.

Leaching of CCA from pressure treated wood has long been recognized, both during its useful life and after its disposal. Sawing pressure treated lumber exposes the sawyer to the risk of inhalation of toxic sawdust, and leaves piles of the poisonous stuff lying around. According to OSHA, CCA-treated wood should not be sawed, sanded, or otherwise machined, if at all possible. If you do, they recommend using local exhaust ventilation or wearing a NIOSH-approved respirator with high efficiency (HEPA) filters.

Worse yet, if sawdust or scraps are burned, the smoke is highly toxic. According to the Environmental Protection Agency, inhalation can cause respiratory irritation, and skin, lung and liver cancer, digestive disturbances, peripheral nervous system damage, and kidney and blood damage.

A 1984 study of the impact of CCA treated wood on honey bees found the bees had elevated arsenic levels and poor Winter survival when kept in CCA treated hives. I would have to believe that honey and wax under a CCA treated inner cover would have both arsenic and chromium in it.

Beekeepers, play it smart. Protect your health and keep your honey clean – make your hive out of untreated wood.

Ben Davis
Walden, VT

Mark Winston

Beekeeping In The New Millennium - Apimondia 1999

"The September 1999 Apimondia meeting in Vancouver, British Columbia, Canada, provides an excellent opportunity to ponder the future of beekeeping in a world where what we know today may have little bearing on where we will find ourselves tomorrow."

Any date with a "zero" at the end provides pause for human reflection, and the beginning of a new millennium is a marvelous opportunity to consider where we have been and where we are going. For beekeeping, we have progressed through the last few millennia from pulling honeycomb out of wild colonies through log and skep hives and eventually to Langstroth equipment. Today, our societies are undergoing change at an unprecedented rate, with scientific and technological progress stimulating advances in fields as diverse as molecular biology and ecology, information transfer and environmental awareness. The September 1999 Apimondia meeting in Vancouver, BC, Canada, provides an excellent opportunity to ponder the future of beekeeping in a world where what we know today may have little bearing on where we will find ourselves tomorrow.

The first and perhaps most obvious trend for the future is that beekeeping will become increasingly global, through both trade and expanding information technology. Today, a phenomenal amount of honey is moved globally, and trade patterns shift rapidly as world markets become more sophisticated and demanding. Parochial beekeepers will not survive in this competitive environment, and only those who pay attention to global trends and current market demands will prosper. Computers and information will continue to proliferate, and immediate access to diverse information about honey production, diseases and pests and prices will become critical to those who make their money from producing, buying and selling honey.

Consumers will have considerable influence on the beekeeping business, demanding a pure product, and tomorrow's technology will provide an unprecedented ability to tell pure from impure. Honeys worldwide often are found contaminated with legal and illegal pesticides or adulterated with corn syrup and honey analogs, and until recently we did not have the technological ability to detect many of these impurities. Today, we can detect infinitesimal quantities of contaminants, and techniques to elucidate ever-smaller amounts of undesirable substances are improving almost daily. Honey trading in the future will demand absolute purity. We as beekeepers should welcome this trend, as the only thing separating honey from sugar is consumer perception that honey is a pure, natural and healthful product.

Looking ahead to even only the next few years, the diseases and pests we know today will become resistant to most treatments and cures we currently use. We will have to invent new ones. Beekeepers have fallen into the same trap that seduced many in agriculture to overuse synthetic chemical pesticides, but we can expect the future to bring us in line with the Integrated Pest Management techniques that are making inroads throughout global agriculture. We will have to learn to tolerate low levels of pests rather than attempt to eradicate them, stop using heavy and continuous doses of antibiotics, and move toward multiple and environmentally friendly management paradigms. This will become particularly important as consumers become more demanding and less tolerant of pesticide-heavy management methods that leave even small residues in our products.

Science and technology will have other impacts on beekeeping, especially on pollination. For example, my own laboratory has been involved in developing honey bee queen pheromones as attractants to lure honey bees to blooming crops, and this product (Fruit Boost) is now being used to increase yields and grower profit in some bee-pollinated crops. Many laboratories worldwide have been investigating the use of other bee species for pollination, and we can expect more diverse and mixed management systems for crop pollination as we begin to move through the next millennium.

We also will know bees better in the next millennium. We have made exceptional advances in just

Continued on Next Page

"If I had one wish for the next millennium, it would be this: that bees help us to retain our connection to an increasingly distant natural world."

the last few years in understanding the biology of this marvelous organism, the honey bee. We know, for example, that there are subgroups in every colony organized according to whom their drone father was, and we have learned recently that each of these groups behaves differently. Thus, our view of bee colonies is no longer one of a homogeneous whole, but rather a subtle assemblage of interwoven groups, each working at somewhat different tasks. We also are beginning to understand the biological links between genes, hormones and behavior, and with this knowledge we can better select bees for different environments or tasks such as pollinating particular crops.

Science will affect beekeeping indirectly as well, particularly biotechnology. Transgenic bees are unlikely to ever become part of our industry, mostly because beekeeping is not of enough economic importance to justify a multinational company's interest in the expensive task of mixing genes from other organisms into bees. However, transgenic crops already have become a tremendous force in agriculture, and we're only just beginning to comprehend their impact on bee management. Honey production may diminish, honeys may contain substances unhealthy for bees or people, or consumers may not want to purchase honey that comes from recombined crops.

How we learn about bees and beekeeping also will undergo a revolution in the coming years. Information already is available in an unfiltered form through the internet and the World Wide Web, and beekeepers will need to become more discriminating about what they read and decide to believe. A considerable amount of information that can be found today through the Internet, if followed, would bankrupt most commercial beekeepers, and we can expect beekeepers who get burned by Internet misinformation to learn quickly how to discriminate between the substantial and the flimsy. Tomorrow's beekeepers, and even some of today's, will use Global Information Systems to find their yards, satellite-transmitted disease and pest recommendations to make treatment decisions while in their apiaries, and even e-mail from the beeyard to send a message home saying they'll be late for dinner.

However, many things will remain the same for beekeepers in the next millennium. Queens won't get any better, no matter how much we select them. We might produce queens with somewhat different qualities, but I doubt we will ever produce queens that will head colonies producing more honey than those we see world-wide today. Beekeepers will continue to work long hours performing heavy labour; honey supers won't get any lighter, and the work day needed to produce a crop won't get any shorter. Beekeeping will remain a farming profession, and it will always be a job demanding hard work, long hours, and heavy lifting to make a decent income.

For those of us who fear change, it is comforting to know that bees will always be a part of nature, and beekeeping will remain an important touchstone to retain contact with the natural world. Thomas Huxley put it well in his book *Man's Place in Nature:*

The question of questions for mankind, the problem which is more deeply interesting than any other, is the ascertainment of the place which man occupies in nature and of his relations to the universe of things.

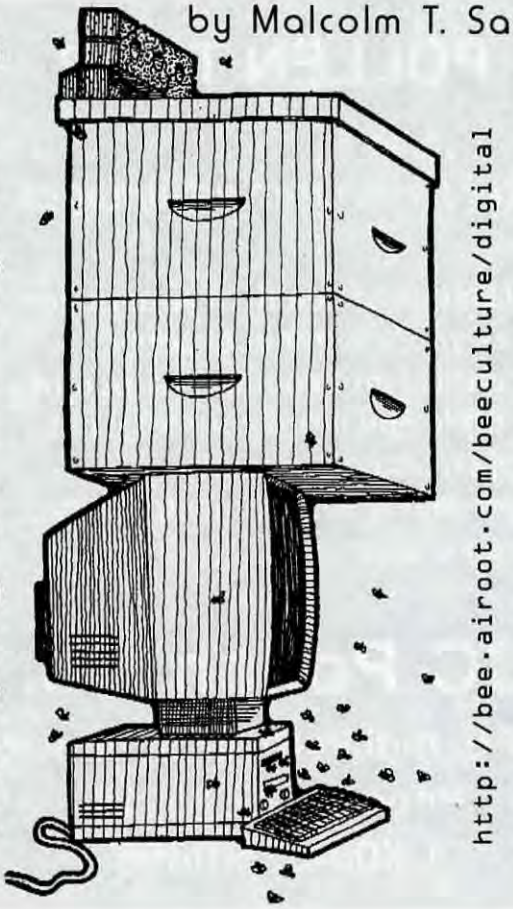
Bees help us to remember who we are and where we came from, and in many ways this is the most important lesson we are reminded of every day we keep bees. Bees provide an income for many of us, but beyond income lies an extraordinary creature. If I had one wish for the next millennium, it would be this, that bees help us to retain our connection to an increasingly distant natural world. I hope we never lose our sense of wonder at the inexpressible complexity of this tiny organism that has brought thousands of us together, the bee. BC

Adapted from the opening address of the 1999 Apimondia meeting, Vancouver, British Columbia, Canada.

Beekeeping In The Digital Age

by Malcolm T. Sanford

Internet Down Under



Last month I described beekeeping in **New Zealand** as found on the World Wide Web. Another country far removed from U.S. apiculturists is Australia. Like New Zealand, there is presently one site that can be described as an entry point to beekeeping down under. The Honeybee Australis page has the URL: **http://www.honeybee.com.au/.** The .com suffix indicates a commercial site. From examination of the page, it is not readily apparent who is developing it. An e-mail message from Mr. Rod Palmer reveals that he is the site's author, and it is sponsored by the C.E. Palmer & Co., an outfit specializing in queenrearing and formulating protein honey bee feed. This, like the New Zealand page, is a labor of love by Mr. Palmer, who says he receives no financial assistance from either the government or other entities at the present time.

The Honey Bee Australis page features a graphic of the continent and contains eight main links or categories. The first is **general beekeeping information**, which features a **who's who** in Australian beekeeping. This large compilation of beekeepers and scientists includes a small biography of each person along with their interest and history in beekeeping. Information about the industry in general has been published in a large, comprehensive document, **The Economic Value and Environmental Impact of the Australian Beekeeping Industry**. The reason for this publication is: "The industry finds itself under increasing pressure on a number of fronts. The area of native forest is declining. Governments, responding to community pressure, are conserving more of what remains. Traditional access by beekeepers to conserved forests is being questioned because honey bees are not native to Australia, and beekeepers are being denied access to some of their most valuable floral resources. Also, the industry is under threat from a number of exotic pests which have caused extensive damage to honey bees overseas. Agriculture, while providing floral resources, also competes when land is cleared and chemicals are used on crops." A list of **coming events** is also found here as are **associations, Australian governmental** contacts, and **other links** of interest.

Prominently linked off the home page, called the "front page" on this site, is a **what's new** section. This includes the latest edition of ***Honey News***, a publication of the Australian Honey Bee Industry Council. The June/July 1999 issue contains information on beekeeping meetings, establishment of a new beekeeping association and various crop reports along with stocks on hand by various packers. In addition, there is a report on *Apis Dorsata* Detection in Sydney. "A load of computer motherboards was loaded on a Singapore Airlines flight in Penang Malaysia and landed in Sydney on 29th May. Dead bees were noticed on the consignment at Sydney by staff at the bond store. There was no comb found. It would appear that the bees were killed by the compulsory insecticide spraying of the cargo. Examination of the bees showed no external mites. It would seem that we have again been lucky in having this potential threat averted." The conclusion is that quarantine measures are so far holding. Other concerns include introduction of the Asian honey bee (*Apis cerana*) and bumble bees (*Bombus vosnesenskii*), thought to be from California. Further items in the what's new section include urban beekeeping **guidelines in Queensland** and the **Australian Honey Bee Improvement Program**. The latter is composed of two parts, descriptions of closed population breeding and use of a "proven cleaning gene," responsible for **hygienic behavior**.

The **advertiser's index** of the Australis front page contains sections on beekeeping equipment, queen bees, supplementary protein feeding and consultants. The latter category is represented by one organization, **Bees 'n Trees**. This could be a harbinger of things to come as the craft becomes more like other branches of modern agriculture around the world. Bees & 'n Trees Consultants in Australia has set up a monitoring program to assist apiarists to know what, and when to feed their hives to maximize production. Any beekeeper contracting services receives a written report, with recommendations on a feeding program for an identified specific situation. Recommendations are based on Protein ***Content and Amino Acid Profiles of honeybee-collected pollens*** by Peter Stace. The volume contains information about the nutritional values to honey bees of some of the major pollens utilized by Australian beekeepers, with special reference to Northern N.S.W. and Southern Queensland. Such a recommendation, according to Bees 'n Trees, could increase the honey production by over 30% from any identified honey flow. The library link references an **article** by Charlie Stevens of

Condamine Apiaries, Warwick Queensland about their evolution of supplementary feeding from sugar syrup to protein cakes. Australian beekeeping has been greatly influenced by pioneering work done in this area by **Graham Kleinschmidt** at Queensland Agricultural College.

Images of Australian beekeeping are also found linked to the Australis front page. These include portraits of a beekeeping family and photographs of bee blower use in the bush, bees foraging on both wet supers and the native plant, Yapunyah, and a consignment of queens ready for shipment. Other links include a live beekeeper chat function, facts about honey and other aspects of beekeeping, **honey recipes**, and a **library** of beekeeping information.

The latter has a pointer to the **Rural Industries Research & Development Corporation** home page. This governmental entity supports honey bee research. Its stated goal is to improve the productivity and profitability of the Australian beekeeping industry. Objectives include increasing profitability by improving hive husbandry and management practices, continuing honeybee access and research into melliferous resources on both public and freehold land, developing agricultural and horticultural crop pollination and biological controls using honeybees, improving methods of extracting, storing and transporting honey, increasing the use of honey in the food industry, determining therapeutic values of specific floral species, and improving communications between the R&D section, the honey industry and associated industries. A list of other **Australian governmental entities** is also found on the site.

A special kind of honey bee is found in Australia on Kangaroo Island. The area was declared a bee sanctuary in order to protect the genetic purity of the Ligurian bee, which was introduced to the Island in 1881. The island is also free of several bee diseases, which exist on mainland Australia and overseas. These diseases do not affect the quality of honey, but would have a devastating effect on the population of Ligurian bees and the world market for queen bees from Kangaroo Island. The diseases are transmitted by infected honey or other bee products coming into contact with bees. Thus, these are prohibited from being brought to Kangaroo Island. **The Kangaroo Island home page** lists a couple of beekeeping outfits, including **Hog Bay Apiary**. This nifty site includes a detailed **history** of beekeeping on the island, a list of nectar **sources** (SUGAR GUM <*Eucalyptus cladocalyx*>, CUP GUM <*Eucalyptus cosmophylla*>, and other eucalypts), and unique **environmental conditions** found there. The rest of the country is also under a quarantine for introduced bee products and bees. A link to **Agriculture West Australia** concentrates on surveillance and preparedness, and includes a comprehensive list of pests and diseases that might be introduced.

Beyond the eucalypts mentioned above, other specialty kinds of honey are produced in Australia. World famous leatherwood is advertised **by Derwent Valley Apiaries** in Tasmania. Leatherwood (*Eucryphia lucida*), named because of its leathery leaves, grows to a height of up to 100 feet. These trees are unique to the west coast of Tasmania, which also boasts the cleanest air in the world. Then there is the "**powered by honey**" site by Capilano honey. The company features several **products**, including clear honey, creamed honey, floral varieties, mint jelly, glucose syrup, golden syrup and molasses. One can also send an **electronic postcard** from this site. Capilano honey is also a sponsor of **Susie O'Neill**. Powered by honey, this golden girl of the Atlanta Olympics, is Australia's most outstanding female swimmer since the 1972 Munich Olympics. Commercial pollination is also carried on by beekeepers in Australia. A prime example is **Hill Grove farm**, which **contracts for pollination** of melons and other fruits and vegetables.

Again, as is the case for most World Wide Web sites, the best advice for those who want to see more information about Australian beekeeping should visit the site. The beekeeping information from both New Zealand and Australia as described in the **previous column** current column reveals how the digital age is inexorably shrinking the globe we live on. BC

Dr. Sanford is Extension Specialist is Apiculture, University of FL. He publishes the APIS Newsletter:
http://www.ifas.ufl.edu/~mts/apishtm/apis.htm

The Latshaw Instrument

A New, Made In The U.S., Instrumental Insemination Apparatus

Susan Cobey & Joe Latshaw

The ability to control honey bee mating enables the development and maintenance of selected stocks with economically valued traits. Instrumental insemination (I.I) is a beekeeping tool which has been underutilized since its development over 50 years ago. Its use has been largely limited to the scientific community, and it is only now beginning to be considered an essential skill among commercial queen producers. The need and interest to develop stocks that have better survival in the presence of mites, as well as increased honey production and other desirable traits, is recognized.

To encourage the use of I.I among beekeepers, there is a recent trend toward the development of instruments that are economical and basic in design. Several new, simplified instruments include the Laidlaw-Goss PreSet Instrument, the Kühnert-Laidlaw Simplified Apparatus and the Jordan-Pollard Instrument. A new, made-in-the-United States device, the Latshaw Instrument, also meets this goal.

The Latshaw Instrument utilizes the "Flexible Insemination Technique" developed by M.E. "Tilly" Kühnert of Germany. This technique was originally developed for use with the Kühnert-Laidlaw Simplified Apparatus. A pair of fine forceps are hand- held and used to lift the sting, eliminating the use of a sting hook. The sting is lifted in such a way to expose and enlarge the vaginal opening into which the syringe tip is inserted. The technique is easy to learn, and with practice, inseminations can be more time-efficient compared to the classical insemination procedure.

The instrument also has a modified ventral hook which clips onto the queen-holding tube, similar to the Kühnert-Laidlaw Simplified Apparatus. The ventral hook is easily positioned when the queen is anesthetized. The operator can then maneuver the queen by grasping the sting with fine forceps. The sting structure and venom sac are lifted and the syringe tip inserted to deliver the semen. The use of forceps has the advantage of enabling the operator to make fine adjustments of the queen if necessary.

This new instrument is designed to alleviate some of the difficulties faced by beginners. Proper alignment is crucial for the successful insemination of queens. The Latshaw instrument is preset with regards to the crucial angles of the queen holder and syringe. With conventional instruments, the task of aligning the instrument can be problematic for the new owner.

All the essential movements necessary for the insemination procedure are smooth and accurate. The syringe holder is micro-controlled by a rack-and-pinion assembly and machined with very low tolerances, enabling precision. Easily adjustable, textured knobs are controlled by the operator's fingertips. The queen-holding tube is held in place by double O-rings to facilitate the proper insertion of the glass tip. These features eliminate any play of movement and provide accuracy in manipulation. This eliminates the problem of some instruments which are constructed with parts that are fragile or do not wear well, which can make the procedure difficult and frustrating to learn.

The Latshaw Instrument is made from solid aluminum with a hard, protective plating. Its small size and low height require less working space, allowing the use of a wide range of microscope types. Designed for travel, the instrument is provided with a lightweight, protective carrying case. It can be quickly assembled, requiring only the removal of one piece which does not change the alignment of the instrument. Versatile, the instrument also has the advantage of being easily adjusted for the left-handed user. It is also flexible in that the rack-and-pinion assembly can be rotated 180 degrees for ease of semen collection.

When choosing an instrument,

Designed for travel, the instrument is packed in a light weight, protective carrying case. It is quickly disasembled, requiring only the removal of one piece which does not change the alignment of the instrument.

Joe Latshaw inseminating a queen with his new instrument. A pair of fine forceps are hand held and used to lift the sting, eliminating the use of a sting hook.

one must consider the various types of syringes available. The Harbo large-capacity syringe is favored because this enables the collection of large quantities of semen in easily detachable tubes. This is an advantage for shipping and storing semen as well as providing efficiency when large numbers of queens are inseminated. The easy detachability of the glass tips is also an advantage. The syringe that accompanies the Latshaw Instrument is modeled after the Harbo syringe and shares its advantages. The standard semen dosage of eight microliters per queen has been taken into account in the design of the syringe. One full turn of the syringe knob delivers eight microliters of semen. This is also calibrated in increments of single microliters for specialized uses.

The Latshaw Instrument adds a level of sophistication to the simplified technique. It combines the use of the flexible insemination technique with a micro-manipulated syringe. This offers the beekeeper another choice and hopefully will encourage and enable more beekeepers to establish their own stock improvement programs. BC

For information and instrument availability, contact S. Cobey, 7417 Hayden Run Rd., Amlin, OH 43210. USA. Phone (614) 777-9687. Fax (614) 292-5237. E-mail cobey.1@osu.edu

The International Bee Research Association: 50th Anniversary

Eva Crane

January 24, 1999, marked the fiftieth anniversary of the foundation of the International Bee Research Association. In this article Dr. Eva Crane, who has been Honorary Life President of the Association since 1985, summarizes its history and achievements during the half-century.

During the Second World War, bee scientists and beekeepers in many different countries were cut off from each other, and after it ended in 1945, they had an urgent need for information about new research and developments that could help them in their own research and beekeeping. The British Beekeepers' Association had set up a research committee, but this type of work was outside its scope and finances. So, at the instigation of several members of the committee, the Bee Research Association was formed on 24 January 1949.

At the 13th International Beekeeping Congress in Amsterdam in August 1949*, the first to be held after the war, Graham Burtt and I presented a report on the newly formed BRA, whose members were already some 600 bee scientists, beekeepers and others with a special interest in research on bees and beekeeping.

To mark its 25th anniversary, the Association published *Bee Research Association, 1949-1974: a history of the first 25 years.* Professor Karl von Frisch had been president from 1962 to 1964, and in the introduction to the book, he commented: "One great service rendered by the association is that, within its own special field, it seeks out and fosters ... contacts, and many individuals have thus been led out of their isolation. In doing this, the association not only helps and sustains the individual, it expands his horizons and those of others, leading to an increase in mutual understanding.' Enterprises undertaken before 1974 are still continued, although the emphasis has shifted in line with new needs of beekeeping and bee research, and with new advances information technology.

At a BRA members' meeting during the 25th International Beekeeping Congress in 1975, one member proposed that the word 'International' should be included in the name of the association, since its membership, character and work were international. This proposal was supported unanimously at the meeting, and later by the council, and the necessary formalities were completed at a meeting held on 25 March 1976 in the lecture room of the Linnean Society in London. Here, on 1 July 1858, Charles Darwin and Alfred Russel Wallace had 'made the first communication on their views on the origin of species of natural selection.'

Publication of journals

The journal *Bee World* had been passed on to us by the Apis Club in 1950, and the association has published it for 49 years.

Apicultural Abstracts, started in 1950 to report new developments and research findings, was published first in *Bee World,* and from 1962 as a separate journal. In that year *Journal of Apicultural Research* was also started at the request of members in different countries, and it has now published refereed research papers related to bees and beekeeping for 37 years. Since 1993 Dr. Tom Rinderer (USDA) has been editor of the *journal.*

The year 1969 saw the beginning of computer operation of the association's information services. The fact that we were so early in the field was due largely to the initiative of Professor Gordon Townsend at the University of Guelph, Canada, who was then chairman of BRA council. With the cooperation of that university, abstracts in current and earlier volumes of *Apicultural Abstracts* were entered in the University's computer system. In 1976 William Dawson published *Index to Apicultural Abstracts 1950-1972*, under author and subject, by Eva Crane and G F Townshend. As far as is known, this was the first computer-generated cumulative index of an abstract journal to be published.

From 1961, financial support for *Apicultural Abstracts* was received from the Commonwealth Agricultural Bureau, and from 1973 the journal was produced in the CAB computer-operated system. More recent developments within CAB (now CAB International) led to the phasing out of our financial support by 1994. CABI has continued to process records for *Apicultural Abstracts* within its system, and these have been put on disk quarterly for each issue. However, it is now more cost-effective for IBRA to do this in-house, and the change will be made in 1999. Page 139 of No. 3 *Bee World* gives more details.

Library and special information services

The IBRA library, which from the start incorporated the library of the Apis Club, has been built up over the decades by the addition of new books, beekeeping journals and reprints of relevant publications in scientific

*At this Congress, the formation of a permanent International Federation of Beekeepers' Associations was discussed, and this came into being at Apimondia a few years later.

journals. In addition, some members and others have given or bequeathed their own collections of early books, and a list of gifts up to 1974 is on page 102 of the *BRA History*. The IBRA library, which was named the Eva Crane IBRA Library in 1987, is now probably the most important and valuable library on bees and apiculture in the world, and it is widely used. Any duplicate material received has been passed on, for instance to branches of the IBRA library which were set up in North and South America, Africa and Asia from 1959 onward.

With the aid of its library, BRA was able to locate special information requested by members. This was done at first through cumulative indexes to subject (UDC) and to author, and later by computer searches using keywords and search profiles.

Publication of books

IBRA has published or co-published a number of books, and a subvention was obtained toward the cost of production of many of them. The following are among the more important:

- 1952 Dorothy Hodges, *The pollen loads of the honey bee* (latest reprint 1994)
- 1953 C R Ribbands, *The behavior and social life of honey bees*
- 1958 H.M. Fraser, *History of beekeeping in Britain*
- 1962 H.A. Dade, *Anatomy and dissection of the honey bee*
- 1962 D.J. Campbell and G P Henderson, *The Bee World: index to Volumes 1-30 (1919-1949)*
- 1971 Dorothy Galton, *Survey of a thousand years of beekeeping in Russia*
- 1974 BRA, *Bee Research Association, 1949-1974: a history of the first 25 years*
- 1975 Eva Crane (ed.), *Honey: a comprehensive survey (in cooperation with Heinemann)*
- 1978 Eva Crane, *Bibliography of tropical apiculture*
- 1979 IBRA, *British bee books: a bibliography 1500-1976*
- *1979 *Beekeeping in rural development (Commonwealth Secretariat)*
- *1980 *Eva Crane, A book of honey (Oxford University Press)*
- *1982 W. Drescher and Eva Crane, *Technical cooperation activities:beekeeping. A directory and guide (German Agency for Technical Cooperation)*
- *1983 Eva Crane, *The archaeology of beekeeping* (Duckworth)
- 1983 Eva Crane and Penelope Walker, *The impact of pest management on bees and pollination*
- 1984 Eva Crane, Penelope Walker and Rosemary Day, *Directory of important world honey sources*
- 1984 Eva Crane and Penelope Walker, *Pollination directory for world crops*
- *1986 IBRA, *Tropical and subtropical apiculture* (FAO)
- 1986 Margaret Adey, Penelope Walker and P T Walker, *Pest control safe for bees*
- 1986 Jane Ramsey, *A directory of nectar and pollen sources found in Canada and the northern United States*
- *1990 Eva Crane, *Bees and beekeeping: science, practice and world resources* (Heinmann Newnes)
- 1992 Andrew Matheson (ed.). *Living with Varroa* (Conference proceedings)
- 1994 W Kirk, *A color guide to the pollen loads of the honey bee*
- 1996 Andrew Matheson (ed.) *Forage for bees in an agricultural landscape* (Conference proceedings)
- 1996 Andrew Matheson (ed.) *Bumble bees for pleasure and profit* (Conference proceedings)
- *1997 Andrew Matheson, *Practical beekeeping in New Zealand 3rd edition* (GP Publications)
- 1997 Pamela Munn and Richard Jones, (eds) *Varroa: fight the mite* (Conference proceedings)
- 1998 Pamela Munn (ed.), *Beeswax and propolis for pleasure and profit* (Conference proceedings)

In press:

- 1998 Richard Jones and Pamela Munn (eds.), *Habitat management for wild bees and wasps* (Conference proceedings)
- *1999 Eva Crane, *The world history of beekeeping and honey hunting* (Duckworth)
- 1999 Leslie Goodman, *Form and function in the honey bee*

From the outset, IBRA worked to help beekeepers and bee scientists in different countries to overcome the language barriers between them. With the cooperation of multilingual members and publishing organizations in a number of countries, 11 volumes of the *IBRA dictionary of beekeeping terms* were published between 1951 and 1993, giving translations of over a thousand bee-related terms between English and 19 other languages: Arabic, Chinese, Czech, Danish, Dutch, Finnish, French, German, Hindi, Hungarian, Italian, Japanese, Norwegian, Polish, Portuguese, Romanian, Russian, Spanish, Swedish. These volumes enable one to translate a term in any of the languages into any other.

IBRA published a series of bibliographies, many annotated, from 1963 onward. Most were on subjects of topical importance or interest. The most recent is No. 48 Unifloral honeys 1992-1996, and others range from Varroa, tracheal mites and plant oils 1990-1996 (No. 41) to Africanized bees 1990-1996 (No. 44)

Improvement of tropical beekeeping

In 1976, on the initiative of a member in Lebanon, Sheik Najib Alamuddion — and thanks to his financial support — IBRA organized the first International Conference on Apiculture in Tropical Climates, in London. This proved to be a seminal development in many ways, and it led to a great extension of IBRA's services to developing countries. Further conferences in the same series have since been held every four years: in India, Kenya, Egypt, Trinidad and Costa Rica, and the *Proceedings* are published in full. The next conference will be in Thailand in 2000. At the 1976 Conference, the Overseas Development Administration (UK) was presented by Tecwyn Jones: He quickly recognized the value of IBRA's work, and played an important part in it for the next 17 years. He served as Chairman of Council from 1983 to 1993, and is now in charge of BioNET-INTER-

*By IBRA or a Director or past Director, but published elsewhere.

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IBRA ... Cont. From Pg. 23

NATIONAL Consultative Group, based in the UK.

In 1978 the International Development Research Council in Canada funded IBRA's preparation and publication of the *Bibliography of tropical apiculture*, which provided a solid foundation for further beekeeping development in many developing countries. Special funding from the ODA enabled IBRA to appoint an Information Officer for Tropical Beekeeping, Margaret Nixon from 1980 to 1983, and then Dr. Nicola Bradbear: The post was continued until 1993, after this funding had ceased.

International meetings

In 1974, members in 15 countries organized special meetings to mark the 25th anniversary of the association. In addition to the six International Conferences on Apiculture in Tropical Climates, IBRA has organized a number of others, including the five whose *Proceedings* are listed above.

Encouraging historical research

Starting in the 1950s, the association assembled a Collection of Historical and Contemporary Beekeeping Material (Chapter 11 in the *BRA History*). Items from the collection have been used for research and for educational displays, but it has not yet been possible to obtain funds for a fuller permanent display.

IBRA has had an important role in encouraging historical research on bees and beekeeping, especially after vessels excavated in Greece and Spain were identified as ancient hives. There have been many finds from more recent centuries, mostly in Britain and Ireland, France, Greece and Spain.

Premises and people

In 1961 the Bee Research Association launched an international appeal for funds with which to purchase premises for headquarters. Sir David Bowes Lyon inaugurated the Appeal at a meeting in the Hall of the Wax Chandlers' Company in London, and in 1966 we were able to purchase Hill House near Gerrards Cross in Buckinghamshire, England. This move initiated a period of great expansion for the association, during which increasing grant-support was obtained: from the UK Development Commission, the Royal Society, the Commonwealth Agricultural Bureaux and other sources.

In 1986 council accepted an invitation from University College, Cardiff, part of the University of Wales, to purchase one of its buildings for headquarters. The move, made in September, was financially advantageous because the market value of Hill House had increased greatly since we purchased it 20 years earlier, and investment of capital from its sale increased IBRA's income considerably. But as a result of moving to another area, IBRA lost a number of long-standing staff members, including Penelope Walker, Rosemary Day, Annette Crownshaw and Inge Allen, who between them had been responsible for much of the work on IBRA's publications and in its library. Two long-term members of staff worked at both Hill House and Cardiff: David Lowe from 1973 to 1998 (editor of *Apicultural Abstracts* from 1984) and Karl Showler, administrative officer from 1970 to 1987. At Cardiff, Dr. Pamela Munn has been editor of *Bee World* since 1988, and Salma Zabaneh, Librarian since 1986.

I had been director of the association since its foundation in 1949. When I retired at the end of 1983, I was succeeded by Dr. Margaret Adey, who had a background in environmental sciences and had done research on plant-bee relationships. When she moved to another post in 1987, Vince Cook was appointed; he had been head of the Ministry of Agriculture National Beekeeping Unit. He died suddenly in 1988 and was replaced temporarily and at short notice by David Francis (1988-1990), who had held appointments relating to United Nations rural development programs. In 1991 Andrew Matheson, apicultural consultant to the New Zealand Ministry of Agriculture, was appointed. After he had to return to New Zealand at the end of 1995 he was succeeded by Richard Jones who had been development director at Atlantic College, an international centre situated in Wales.

During the association's 50 years, its members have been drawn from over a hundred countries. Many of them played an important part in the association's affairs — working on a voluntary basis, without payment — as well as in the advancement of beekeeping and bee research. Some have been regional representatives in their own countries, and others participated in a specific part of IBRA's work such as abstracting; many made gifts of money, or helped to find new sources of financial support, or donated publications or items of equipment. Others provided useful suggestions and ideas, especially during their visits to the association's headquarters or IBRA visits to different parts of the world. As voluntary publications secretary, Betty Showler was in charge of book sales from 1970 to 1985. Of all the association's voluntary officers, the record for long service is held by Judge David Smith, who was appointed honorary secretary in 1963 and still holds this office. He was one of the authors of *British bee books*, the bibliography published by IBRA in 1979.

An appraisal

As the chairman's report to the members' meeting in October explains (page 165) council has decided that "in view of the continued annual financial losses" severe cuts must now be made in IBRA's expenditures. The finale of the association's half-century has thus become a very sad one, and it is worth trying to identify factors which have led to the present situation.

The association's history falls into three separate parts. From 1949 to 1965 the association owned no premises, and much of its work was done without payment. The annual expenditure never exceeded £10,000, and there was an average annual net surplus of £271. Between 1966 and 1985 the association occupied Hill House — purchased as a result of an international appeal for funds — and the annual expenditure grew to £226,802; the balance between annual income and expenditure fluctuated between about +£8,000 and -£6,000, with a small average net loss (£311). From 1986 to 1998 the association's premises were at Cardiff, and their lower cost made extra working income available from invested capital. In the 12 years completed so far, the annual expenditure has been lower (£158,917 in 1997),

but there has been an average annual loss of about £26,000; in 1997 it was £34,548.

In spite of our present difficulties in maintaining an adequate income, IBRA is still a valued and influential association. When the association was founded in 1949, no other organization in the world was attempting to provide a scientific information service on apiculture and honey bees — or on non-*Apis* bees, many of which are important pollinators and by request were soon included in our frame of reference. The following outside changes have had a significant impact on the association's financial well-being in the years since 1949.

- From the 1950s onward, travel between countries became increasingly easier and more rapid. Many more international meetings could be held, and present-day beekeepers and scientists can much more easily meet each other and exchange information in person.
- During the 1960s and 1970s, early developments in computer operation were of great assistance to IBRA, and the use of e-mail has now increased the number of paid requests to the library for information.
- Recent advances in information technology have led to online availability of much new material from sources other than IBRA, thus reducing the number of individuals and institutions relying on IBRA journals and library material in hard copy.
- Since the 1980s the amount of government and other funding for research on agriculture and related subjects has greatly decreased. This has affected IBRA both directly and indirectly. Direct funding for IBRA activities — which had grown from £4,250 in 1966 to £85,128 in 1986 — dropped to £1,277 (contract income) in 1997. Indirectly, reduced government funding in many countries now supports fewer bee research workers; also the world spread of the *Varroa* mite, wide availability of imported honey and other social and economic factors have lead to a substantial decline in the number of beekeepers in affluent regions. Both these changes have reduced the number of potential IBRA members.
- When the association was started, it was maintained by enthusiasm, voluntary (unpaid) help and financial support, largely from within the UK. The proportion of voluntary work is now much less and, although IBRA is increasingly used and valued worldwide, there are many obstacles to the provision of core funding for its headquarters in the UK from other countries.
- In 1997 and 1998 the state of the world markets resulted in a substantial decrease in the value of our investments, and in the income derived from them.

I should especially like to see the following projects implemented, although all need funds which are not at present available. The first is completion of the computerized Library catalogue, by the addition of all the publications which have no computer entry through the *Apicultural Abstracts* system. The second is to input the texts of rare publications that are not obtainable online from other sources: for instance, early beekeeping books, and other documents such as theses, from different countries. The third project is a substantial extension of the IBRA World Wide Web site in such a way that IBRA can be reimbursed *for each use of it.*

A members' meeting will be held during the 36th International Apicultural Congress in Vancouver, Canada (13-18 September 1999). The 50th Annual General Meeting of IBRA is fixed for 2 October 1999, and I very much look forward to meeting members there. Meanwhile, members and others who have suggestions for remedying the present situation should send them without delay to Richard Jones, the director.

Whatever happens in the future, IBRA has been a much loved institution for half a century, and one which — in its own specialized sphere — built a bridge that spanned the period between the end of the Second World War and the developments which now allow the wide transmission of information through electronic technology. BC

Eva Crane, *Honorary Life president of IBRA, Woodside House, Woodside Hill, Gerrards Cross, Bucks SL9 9TE, UK*

Detecting Varroa

Roger Morse

There are a number of good techniques to detect *Varroa* mites in your bees. The problem is to interpret what the finding of a given number of mites means. In the fall, when there is little or no brood, the meaning of the numbers will be different from the spring when your colony populations are expanding. You are interested in two questions. When do you treat for *Varroa* and, do your bees have any resistance to the mites? This paper discusses the techniques and points to the pitfalls in the methods we use. However, the question of what a given number of mites in your hives means is left dangling because I don't know and I can't find anyone to give me clear and concise instructions! We know too little about how *Varroa* populations grow.

The Asian honey bee mite, *Varroa jacobsoni*, causes the most serious of all bee diseases. It was first found in the United States in 1987. We have good chemicals to control *Varroa* mites and the development of honey bees resistant to the mites is underway. The most difficult aspect of *Varroa* control is to determine how many mites are present in your hives and when you should treat to control them.

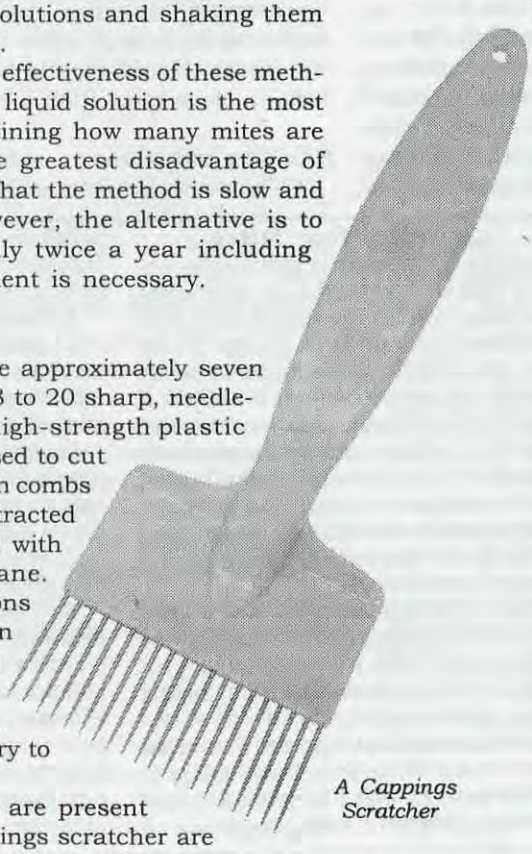
Methods of detecting Varroa

There are a number of methods of detecting *Varroa* and determining the level of infestation in your hives. These include uncapping brood and removing the larvae and/or pupae from their cells to expose the mites (most of the mites will be on the drone brood), the ether roll, placing sticky boards on the bottomboards to collect mites (sometimes with special bottomboards), smoking bees to force them to drop off of the mites onto sticky boards, surveying the hive debris on the bottomboard, and placing adult bees in solutions and shaking them to free and count the mites.

There is variation in the effectiveness of these methods and shaking bees in a liquid solution is the most accurate method of determining how many mites are present (see side bar). The greatest disadvantage of using shaking solutions is that the method is slow and some bees are killed. However, the alternative is to treat bees routinely, usually twice a year including sometimes when no treatment is necessary.

Cappings scratcher

Cappings scratchers are approximately seven inch long tools that have 18 to 20 sharp, needle-like teeth molded into a high-strength plastic handle. They are usually used to cut and/or break the cappings on combs of honey that are being extracted and that have been missed with an uncapping knife or plane. Szabo (1989) gave instructions about their use. He wrote, in the first American paper on the subject, that he had observed scratchers being used successfully in Hungary to check for *Varroa*.



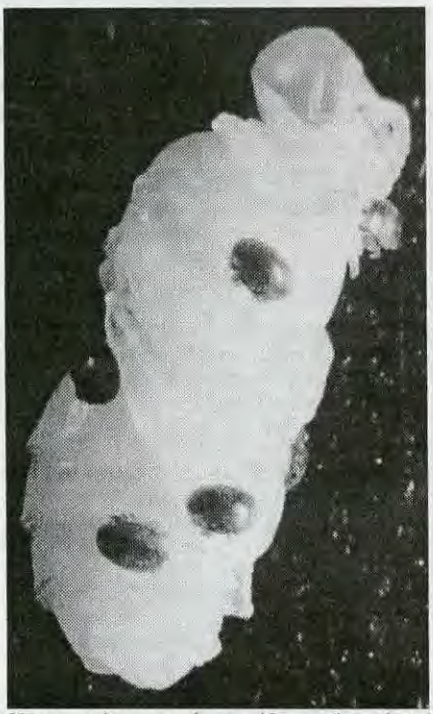
A Cappings Scratcher

To determine if *Varroa* are present or not the teeth of the cappings scratcher are inserted into the brood in a manner to suggest that the brood cappings are being lifted off. The teeth of the scratcher are slid parallel to the tops of the cappings. In this manner, 20 or 30 pupae may be lifted from their cells at once. The *Varroa* are exposed on the pupae where they may be seen and counted. You may also then bang the comb on a piece of white paper and if more *Varroa* are present in the cells where the pupae have been removed they will fall from the cells. I have used this technique successfully on drone brood to check for *Varroa*.

The problem with this technique is that it does not give us a good quantitative determination as to how many *Varroa* are present though certainly if more than one *Varroa* mite is seen on each drone pupae there is cause for concern. However, the method is fast and if the drone pupae have only a few *Varroa* on them you might believe the infestation rate in your hive is low.

Ether roll

The most popular method to detect *Varroa* mites has been to brush about one third



Varroa mites on a larva. (Camazine photo)

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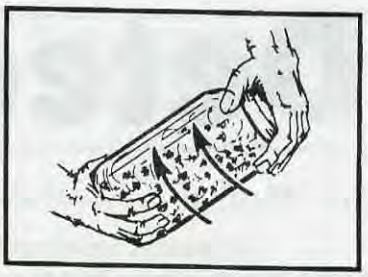
Remove 300 or so bees from brood nest area.

Cap, and spray ether jar for two seconds.



Shake jar for two to five minutes. Mites let go of bees and stick to inside of jar.

of a pint of worker bees into a one or two quart glass jar and to squirt ether into the jar. The cap is put into place and the jar is shaken and rolled. Under these circumstances the bees are killed, as are the mites which then leave the bees and may be seen stuck on the glass, inside the jar. The ether roll is another European idea that was observed in Turkey by Burgett and first written about in this country by Burgett, Krantz and Capizzi (1987).

Calderone and Turcotte (1998) recommend the following procedure in an effort to standardize the use of the ether roll and to use it in the most effective manner. A predetermined volume or weight of bees, collected with a vacuum device, is placed in a quart and a half glass jar. The bees are sprayed with a two second burst of car starting fluid (primarily diethyl ether). The cover is quickly placed on the jar, which is "shaken vigorously for 10 seconds, then rolled three complete turns on its long axis." The mites clinging to the inside of the jar may be counted. To determine your accuracy with the ether roll, which varies from person to person, the bees may next be placed in alcohol and shaken as they are with the soapy water technique (see side bar).

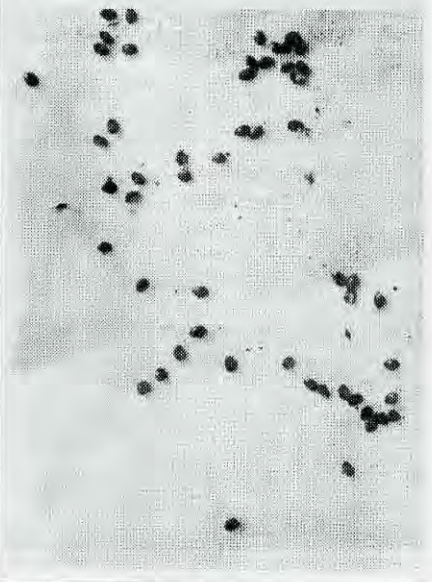
Delaplane and Hood (1997) were obviously dissatisfied with the ether roll technique as a quantitative measure of the number of *Varroa* present in a colony because of the variability they found. Still, finding only no mites with the ether roll is comforting while finding more than a dozen suggests treatment is needed. The time of year is important with spring counts being more accurate than when the colonies have more bees in the summer.

When removing bees for ether roll, be sure to get only workers and drones.

Caution: Ether is a toxic substance and care should be exercised in its use. I have been told by a few people that they have been made ill through over exposure to the fumes. Moreover, the fumes tend to excite nearby bees so move away from a colony when spraying.

Shaking solutions

The most accurate method of determining the num-



Counting Your Mites

Probably the best method of determining the number of mites on your bees is to use the so-called soapy-water technique. You start with a one or two quart wide-mouth glass jar. You put a pint of water and a level tablespoonful of a liquid or dry laundry detergent into the water. Any one of a number of different detergents may be used. Some foam more than others and foam makes the procedure more difficult as it must be washed away before the bees and the mites can be counted. However, what is most important is to standardize your own techniques so that you may compare the data from one time or place with that from another.

The next step is to sweep about 200 worker bees from the brood nest into the jar. It is best to take these bees from *three* frames. You may buy and use a soft bristle bee brush or a brush made with a handful of grass or weeds; a head of goldenrod works wonderfully well as a brush. The cap is placed on the jar and the jar is shaken for one minute. This will dislodge 80 to 90 percent of the mites. If the jar is shaken for 30 minutes on some kind of shaking machine you will probably free all of the mites on the bees, including those feeding between of intersegmental membranes on the underside of the abdomen.

You then pour the bees, mites and soapy water over a piece of cotton cloth (bed sheeting works best) that is in a pan that is used to collect the soapy water. The mites will remain on the top of the cloth along with the bees. The bees may be picked off and counted. The last step is to count the number of mites to determine the number of mites per 100 bees. It is advisable to rinse the bees once or twice with the soapy water that collects under the sheeting to make certain you have washed all of the mites off the bees.

What does the number of mites per 100 bees mean? There is no precise measure of what is a light or a heavy mite load. Certainly, finding fewer than five mites per 100 bees with the shaking technique indicates the infestation is not too serious. The importance of higher numbers must be interpreted in light of the time since the last treatment, the number of other colonies in the vicinity and the time of year.

ber of mites present on your bees is to brush some bees into a glass jar with about a pint of hot water, soapy water, or alcohol (De Jong, Roma and Goncalves 1982). The jar is shaken and the mites are dislodged and may be counted. Alcohol is the favorite of bee researchers but in my experience soapy water is nearly as accurate and certainly easier to obtain.

Sticky boards and 8-mesh hardware cloth covered bottomboards

Sheets of sticky paper that fit into a bottomboard have been tested both to determine the number of *Varroa* present in a hive and as *Varroa* mite control devices. It is known that a given number of mites fall onto the bottomboard each day though it is not so clear as to why this occurs. It is most likely as a result of grooming, both self grooming and the grooming of others. Most of the mites that fall to the bottomboard in this manner attach to another bee and return to the brood nest area. Smoking a colony after the sticky board has been put into place will cause even more mites to drop off of the bees and onto the bottomboard. Tobacco smoke is especially effective in this regards though the use of various materials that may be placed in a smoker to produce this effect are still under study.

The sticky board is covered with a piece of 8-mesh hardware cloth so that the bees will not come into contact with the sticky stuff and be caught themselves. Sanford (1999) reviewed what had been done both in Europe and the United States. He concluded that using sticky boards "slowed *Varroa* population development, but cannot be relied on as a single, effective treatment for these mites." Delaplane and Hood (1997) wrote that "bottom board inserts are the more reliable survey method for making treatment decisions."

You may make your own sticky board by spreading Vaseline or some other light-weight grease over a piece of white paper or wax paper that will not absorb the grease.

***Varroa* distribution in a hive**

A recent study by Calderone and Turcotte (1998) shows that *Varroa* mites are not equally distributed on bees throughout a hive. The infestation rate among bees in the honey supers is about half of that found on bees from the brood nest. There are also significant differences in the number of mites on bees from comb to comb within the brood nest.

As a result of these observations, it is stated that *Varroa* population estimates will be most accurate if taken in the spring or late fall when the bees are in one or two supers when most of the mites are on the adult bees. If you count *Varroa* mites in the summer when the colonies are supered it is best to collect the bees you sample from three or more combs in the brood nest. It is always possible to inadvertently collect a queen when collecting bees from the brood nest and it is best to find her before the sample is taken.

The bees in Brazil

We believe we are close to developing and using European honey bees that are resistant to or tolerant of *Varroa* mites. Where will these bees come from? They may come about as a result of special bee breeding programs or they may develop from feral colonies in your own backyard. The answer to this question may come in part from examining what has happened in Brazil. However, to determine the level of infestation you need a good *Varroa* detection technique.

Varroa mites are everywhere in Brazil but the Africanized bees there have a high degree of resistance to them. The mites were found in that country about ten years before they were found in the U.S. No beekeeper in Brazil treats bees for *Varroa*. Under the most severe circumstances researchers find about three mites per 100 bees, a level that can be tolerated. This was not always the case.

When the *Varroa* mites were first found in Brazil beekeepers would usually find about 60 mites per 100 bees but rarely more. The number was determined using the shaking solution technique. Apparently, Africanized honey bees already had some natural resistance to *Varroa* when the mites were introduced into that country. It is not clear why this was true but it may have been the fact that Africanized honey bees naturally show a greater degree of hygienic behavior as regards most bee diseases. However, most important is the fact that there were no colonies killed by *Varroa* in Brazil as has been the case with North America bees that have their ancestry in Europe.

Because no treatments were made in Brazil the more susceptible colonies of Africanized honey bees were weaker and produced fewer drones, if they produced any at all. This changed the genetic makeup of the remaining bees since drones from the more susceptible colonies were not available for mating. As a result of this change, the bees in Brazil became increasingly resistant to the mites. This selection has continued to the present and today we find only about three *Varroa* mites per 100 bees. This is what we call evolution at work — the fittest survive.

We know there is great variation among North American bees and that some tolerate *Varroa* more than others. The feral (wild) colonies of honey bees are virtually gone in North America because of *Varroa* but a very small number remain. It is among those feral bees that remain that we hope natural resistance may arise. This, together with the efforts of several bee breeders to select resistant stock should some day give us the stock we need and relieve this great problem. BC

References

Burgett, D. M., G. W. Krantz & J. Capizzi. *An effective field detection method for Varroa jacobsoni, the Asian honey bee brood mite.* OR State Univ. Pest Information Leaflet 46. 2 pages. 1987. Reprinted in The Speedy Bee 16(11): 2. 1987.

Calderone, N. W. & R. M. Turcotte. *Development of sampling methods for estimating levels of Varroa jacobsoni infestation in colonies of Apis mellifera.* Journal of Economic Entomology 91: 851-863. 1998.

De Jong, D., D. De Andrea Roma & L. S. Goncalves. *Comparative analysis of shaking solutions for the detection of Varroa jacobsoni on adult honey bees.* Apidologie 13: 297-306. 1982.

Delaplane, K. S. & W. M. Hood. *Effects of delayed acaricide treatment in honey bee colonies parasitized by Varroa jacobsoni and a late season threshold for the southeastern U. S.* Journal of Apicultural Research 36: 125-132. 1997.

Sanford, M. T. *Varroa control: bottom boards and breeding.* Apis 17(6): 1-4. 1999.

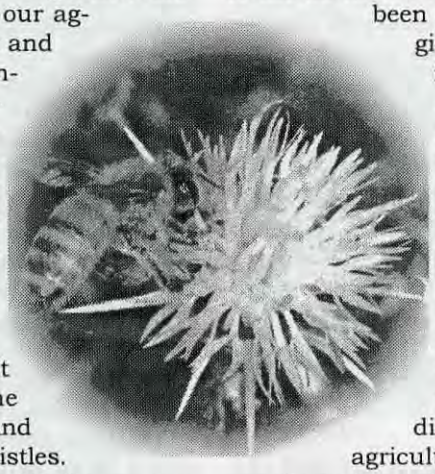
Szabo, T. I. *The cappings scratcher: a tool for detection and control of Varroa jacobsoni.* American Bee Journal 129: 403-404. 1989.

Ban Star Thistle?

Dr. Lynn Royce & B.A. Stringer

Yellow star thistle is a source of premium honey in several western states, but it is rapidly becoming one of California's worst noxious weeds. Some beekeepers are concerned that landowners may ban honey bee colonies from star thistle areas because the honey bee pollination is viewed as a contributing factor to the weed's spread.

Could banning bee colony placement on or near star thistle infested properties help to contain the dispersal of this plant? Honey bees, in gathering nectar and pollen from star thistle, will certainly pollinate the flowers, but the insects have no role in physical distribution of the seeds. Honey bees are a crucial link in the agricultural production chain. Without them, we would get limited production of crops from alternate pollinators, but yields would be severely reduced. Through direct pollination of fruit, vegetable seed, forage seed and flower seed, honey bees affect most of our agriculture, all the way through to meat and dairy production. Part of honey bee management is ensuring healthy, honey-laden colonies for overwintering in order to provide early pollination of Spring crops, such as almonds, and star thistle is often a vital part of this annual cycle. Far more effective than disallowing bees, there are several controls for star thistle which do not adversely affect bees and their keepers.



What is this plant, and where did it come from? Yellow star thistle has the botanical name of *Centaurea solstitialis*, and is closely related to knapweeds and thistles. It is native to southern Eurasia and the Mediterranean basin, where it is not a problem because it has many natural enemies which attack the plants. Since its introduction to this country by ranchers who imported contaminated grain and alfalfa seed in the mid- 1800s, it has become well established in Idaho, Washington, Oregon and California. Recent estimates from the California Department of Food and Agriculture indicate that about 20 million acres, or 22 percent of the state, are covered with the weed.

Yellow star thistle is a Winter annual or occasionally a biennial which sends down a long (6-8') taproot and grows up to 6 feet tall. A rosette of lobed leaves in Fall increases in size until Summer, when tall, branched stems grow and produce flowers. The stems and leaves are covered with fine, white hairs that give the plant a gray-green appearance, while the flower head bracts bear long, sharp spines, giving the plant its name. Dense stands of star thistle can produce enormous numbers of seeds annually, and a very high proportion of the seeds germinate.

Until the stems are produced, the plant can be used as forage for cattle, sheep and goats, but is toxic to horses. Once established, star thistle quickly becomes dominant in an area, displacing native plants as well as the coexisting native animals such as deer, quail, rabbits, skunks and raccoons. Beekeepers bring honey bee colonies to star thistle areas for the high-quality nectar and pollen which contribute to a premier honey.

Yellow star thistle is an aggressive colonizer of disturbed areas, such as overgrazed pastures and by road construction zones. While animals, wind and water account for some dispersal, the main force behind its spread is man. Use of contaminated hay or seed, especially in uninfested areas, along with the widespread transport of seeds in gravel or soil, and recreational land use (ATVs and 4WDs), have been found to be the major contributors to this weed's dispersal. In nature, the seeds rarely fall more than 2 feet from the parent plant.

There are control methods to manage, contain, and eradicate star thistle from a site, and best results have been gained by using two or more strategies together. Controls include mowing, insect feeding (biological control), livestock grazing, plant competition, prescribed burns, herbicides and manual removal. As seeds buried in the soil can survive up to 10 years, attention to control must be systematic and persistent over a number of years. The most promising biological controls, the hairy weevil, the bud weevil and the gallfly, are available to landowners and land managers through a distribution program coordinated by the county departments of agriculture.

If you have star thistle on your property, will banning the placement of honey bees on or near your land help limit the spread? In a word, no. There is an abundance of natural pollinators utilizing yellow star thistle whether or not honey bees are present. People, not bees, are responsible for its spread. Use of cultural control methods and some other insect helpers will be far more beneficial without harming your relationship with your beekeepers.

For recommendations for site-specific management, and more background on yellow star thistle, check these publications:

Yellow Star Thistle Biology and Control, University of California Division of Agriculture and Natural Resources Publication 21541 (1996) available from University of California Communications Services — Publication Division of Agriculture and Natural Resources, 6701 San Pablo Ave., 2nd floor, Oakland, California 94608-1239. Cost $5. E-mail anrpubs@ucdavis.edu

Biological Control of Weeds in the West (1996). Western Society of Weed Science. BC

Dr. Lynn Royce works in Extension Entomology, Oregon State University. B.A. Stringer is a freelance honey plant writer living in Blodgette, Oregon.

Southern Stroll

An overview of beekeeping in the Southeast United States

The recent EAS meeting in Tennessee featured a series of talks on Southern Beekeeping. This region of the U.S. is too often ignored in the beekeeping literature in general, and particularly in the journals that focus on producing timely articles on seasonal management. This is partly due to the fact that the two U.S. journals are in the Northern areas of the country, and partly due to the declining beekeeper populations of Southern states.

So, with the information provided by these Southern experts, perhaps we can shed some light on some of the differences, and some of the similarities of southern beekeeping, and what goes on everywhere else.

Three primary differences, eluded to by all of the speakers, that are important are the length of the bee season, the availability of many unique floral sources, and the (almost always) opportunity to produce queens and package bees early enough in the season to be useful anywhere in the U.S.

Our southern stroll started in Mississippi with Clarence Collison. His state has about 850 beekeepers, but only 50 or so are commercial. The weather is conducive to keeping bees throughout the Winter though, and several large operations bring bees south for splits and queen production. The coldest month is January, with low temperatures in the 45-55° range, so cleansing flights and foraging are possible all year long. As a result, beekeepers only leave 30-40 lbs. of honey on.

Early Spring plants include Hazel Alder and the Maples in January, which leads to swarming in March, ahead of their northern counterparts- still asleep in the cold.

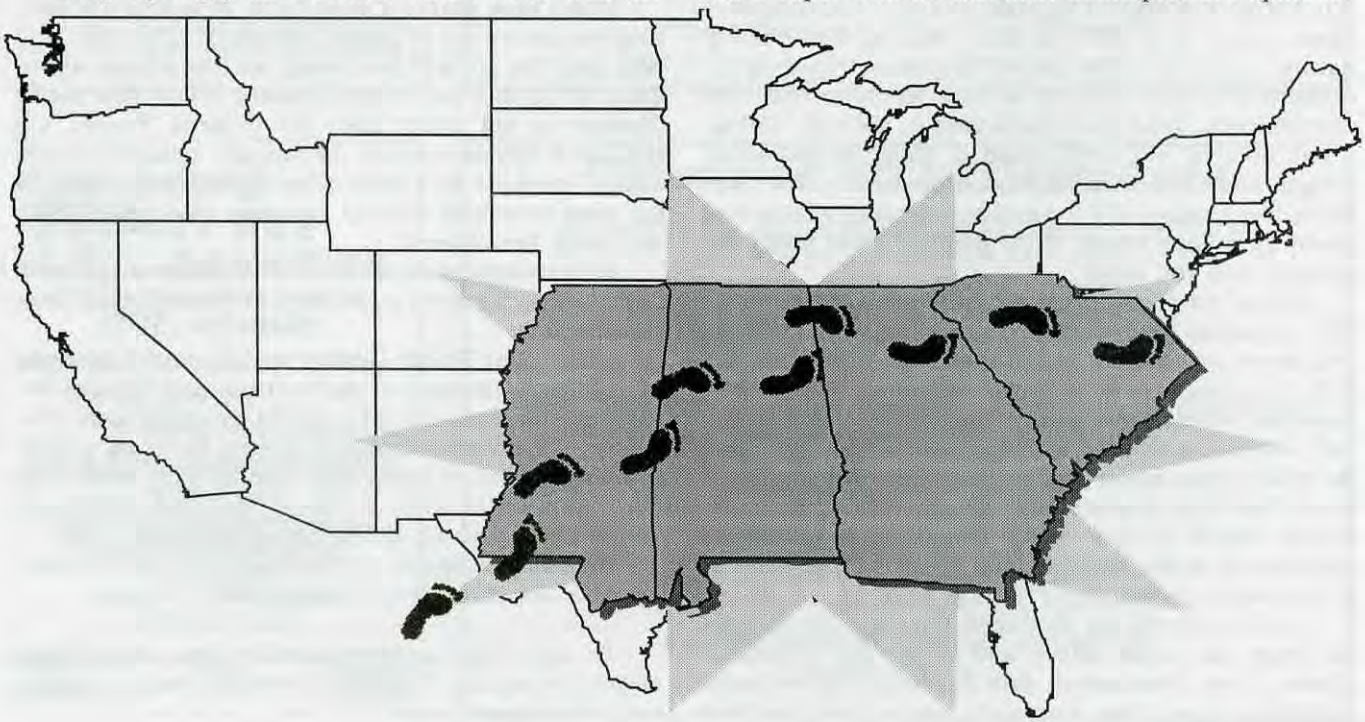
Next on the itinerary, heading east, was Georgia with Keith Delaplane. His first distinction was that Georgia produces nine district varietal honeys, native to the state. But the major production area of the state is the queen and package business.

In November these businesses start with making the equipment necessary for the job- boxes, cans, screens and all the rest. In December the Maples start, which gets brood rearing going.

Yellow Jasmine comes along then which can cause a problem. The nectar, when brought back to a colony causes queen rearing problems because it's toxic and queen cells will die when fed. Canola is becoming a major early crop, and even though it granulates rapidly, most of it is turned into bees. Spring titi starts in March, which contribtes to build up, and, more importantly, the queen business.

Drones start to fly in March, and the first grafts take place then. The work goes then to the queen cell starting colonies, to the finishers and on to the mating nucs. Once queens are ready, early packages are prepared, the first for even more mating nucs, but most to ship to the more southern customers, then north.

For beekeepers, swarm control is important early, and those that overwinter in two deeps typically reverse while those using one (about half the beekeepers here) add a super with an excluder. Some produce splits for



sale, using four or five frame units, putting frames in buyer's equipment.

In April tulip poplar begins producing, along with several clover varieties, black berries, privet, and the king of crops – Gallberry. However, changing practices in the tree industry are causing problems with this crop. In the past, tree plantations burned the understory for weed control, and gallberry would come back in a strong flush. Now, rather than burning, many land owners are spraying herbicides and the gallberry is slow to come back. Some don't recover at all.

Other crops include Sourwood, produced in the mountain regions, and not in the lower areas, but even there this crop overlaps with Sumac, darkening and changing the flavor of this exquisite crop.

The boll weevil has been eradicated from Georgia due to the concerted efforts of the Eradication Program. Reduced pesticide use and increased cotton yields have enabled beekeepers and cotton growers to work together for surplus honey and more cotton.

Georgia is the largest state east of the Mississippi and has significant intrastate migratory beekeeping for both honey crops and pollination. Rental prices for colonies, however, tends toward the low side- $15-$30/set- and there is quite a bit of price resistance on the part of growers. Delaplane summed up by saying that concept was changing however, and the future seemed better.

Mike Hood, the Extension Entomologist for Beekeeping in South Carolina discussed some of his state's beekeeping attributes next. Of the 2000 or so beekeepers in his state only 12-15 are commercial sized. There are about 25,000 colonies there, spread out between the midlands and the coast, and they help handle the largest apple crop in the S.E. U.S. Granny Smith apples have definitely found a home.

Yellow Jasmine, a toxic plant for bees, is the state flower, a somewhat sore point with local beekeepers. But the number one producer, starting about April 20th and running for three to four weeks is Tulip Poplar. A dark, strong honey, it is dependable and much in demand locally.

The coastal area of the state is mild, and even supports some migratory outfits for buildup. Maples start in January for buildup, followed later by blackberries. Sourwood honey is made here also, but only in three or four counties in the mountains.

Small hive beetle seems to do well in the coastal areas here and was first discovered in Nov. 1996. Several projects are underway studying this pest looking for control, understanding biology and developing honey bee resistance traits.

Jim Tew, who lives in Ohio, but has some Extension responsibilities in his home state of Alabama was next. His overview of the state gave a somewhat different perspective- starting with the fact that although goldenrod used to be the state flower, somebody there changed it to Canola.

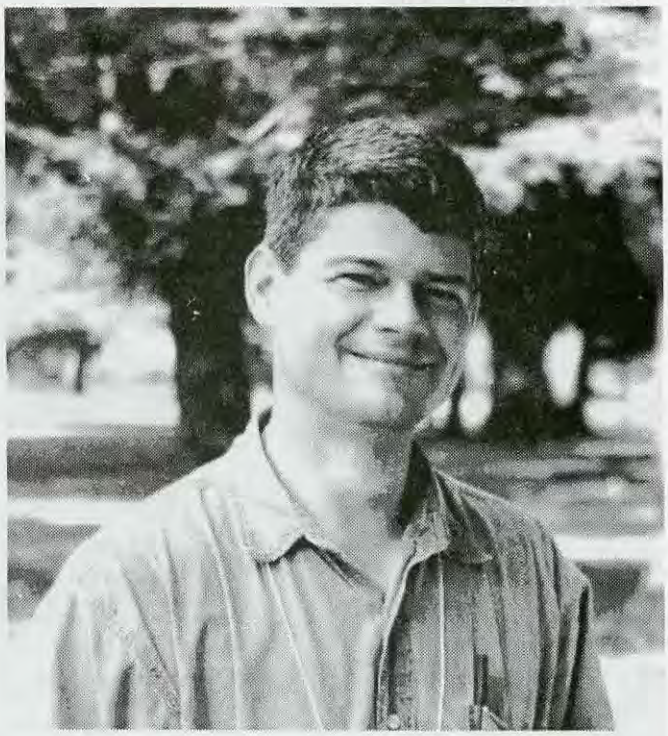
Beekeeper problems in the state...well, he said, Chiggers were bad, especially in the areas of pine forests, which cover a lot of the state. But pine straw (not, as his now-northern friends called it- needles) makes a good, if short-lived fuel. In the hardwoods sections of the state beekeepers used gloves more often than not to avoid black widow spider bites, not bee stings.

Clarence Collison, director from Mississippi, the newest member state of EAS

One nearly mythical honey plant that the state has a tap on is Tupelo, of Ulee's Gold fame (actually, long, long before the movie Tupelo was famous). But, another uncommon beekeeper tool, machetes or chain saws- are needed to get through the swamps where it grows.

Alabama has a closed border law, which means no bees on comb can enter the state. This has brought about some controversy, as the state's agriculture has changed and more crops needing pollination are grown. This has stretched the state's beekeeper's capability to meet the demand and growers are looking across the

Keith Delaplane, Georgia



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Mike Hood, Extension Entomologist from South Carolina

Jim Tew, Extension from Alabama and Ohio

border to get more bees.

Once a strong queen and package state this business, though not gone has diminished over the years.

Honey crops include the state flower, Canola, along with cotton and many of the clovers. Alabama honey, says Tew, is unique in flavor, even when produced from typical plants, and has a strong local demand.

Other aspects of southern beekeeping were discussed, and many were more or less duplicated due to similar crops and weather patterns. Florida, certainly a major force in the region didn't have a say here, but some interesting facts did come out. Most interesting, that state averages one newly introduced pest/month. Fortunately, not all are on bees. The state's huge (usually) citrus crop (consisting of orange, grapefruit, tangelos and tangerines), usually sold as Orange Blossom honey was mentioned, as were the tupelo and gum (several species) crops. Summer titi which causes purple brood when bees collect the nectar and pollen, needs to be avoided by bees and beekeepers. And the small hive beetle, *Varroa* and tracheal mite problems, somewhat different than caused in the north were discussed. A semi-tropical environment can be both a blessing and a curse it seems.

Timing, length of the bee season, the unique floral sources of honey, and the queen and package industry-all are in the south and easily distinguish this region from any other in the world. An interesting trip if you get the opportunity, and critical for the success of beekeeping in the U.S. BC

James E. Tew

Bee Culture's Beeyard

The Skunks Are Winning The Battle (and the War)

It's the first few days of August in the bee yard. It's a good bee day with the perfunctory clouds, blue sky, mild temperature and bees flying everywhere. So far, with this project, I have won far more than I have lost, but I am still not winning as much as I had hoped.

The Skunks are Winning a Lot, too

Some of you may recall that I had a murderous attitude toward a marauding skunk that has been harassing my yard since the earliest days of this effort. Mr. skunk had zeroed in on my tri-plex nuc and was relentless in his nighttime visits. You may recall from earlier articles that I positioned cement blocks in front of the colony in an attempt to dissuade the critter. It seems to have worked for that particular hive. Who amongst you would be surprised to learn that the animal has moved on to other colonies in the yard? Though skunks are common problems, I have not found the perfect control for them. (If I had, I would be telling you of it now.) Some of the standard bee texts recommend that colonies be raised off the ground in order to make the animal "stretch" to reach the entrance. Get the colony too high and you, the beekeeper, will be stretching to put on supers. Forcing the skunk to distend will allow the defending bees to sting the skunk's tender underbelly; something I assume the skunk would really find uncomfortable. But I wonder? If skunks will scratch on the hive entrance and eat bees as they charge out - all the while incurring stings around the face and within the throat (Autopsies have shown skunks to have stingers imbedded through much of their digestive system.) Then why would a few stings on his ventral side drive him up the bee wall? I remember another recommendation that was in the same vein. The suggestion was to make a cylinder of common chicken wire the length of the hive entrance and having a diameter of about 4-5 inches. This small roll of chicken wire was placed at the hive entrance. Bees could freely come and go through the wire, but the skunk would again be forced to expose his tender underside.

Various kinds of entrance guards have been described that probably offer good control. A prominent feature of each of these guards is a series of spines that make it impossible for the skunk to scratch and paw the hive entrance. Tennessee beekeeper, Mr. John Kelley, recently showed me a design that is made of aluminum carpet tacking. After cutting off the lip on the tacking, the spines are turned in both directions and attached to a piece of wood. Figure 2 shows both wooded and aluminum tacking. It's cheap and easy to make. I'll let you know if it works. Thanks to Mr. Kelley.

I don't want skunks bothering my hives. I have personally used the activities of skunks as examples of reasons that a hive can be unpredictably hostile. They were up all

Figure 1: Bare spots in front of the hive indicating skunk predation.

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BEEYARD ... Cont. From Pg. 36

night defending themselves and are suffering from a bad attitude the next morning, but the hard fact is that I have no hard proof that bees hold a grudge that long. Certainly, if I were a bee and I was kept up most of the night by an animal that was trying to eat me, I would have an attitude the next day, but I am not a bee. Though books commonly say that prolonged skunk attacks can kill a colony, I have never personally had it happen. How much energy should I allocate for skunk eradication? Let me get back to you on that in future articles. I will, at least, put on some of these entrance grids. I feel a need to be in control. I don't know.....as was discussed in previous articles, maybe killing the skunk is not the best answer. I suspect there is more than one.

Man, Has It been Hot and Dry! I didn't really expect to get a honey crop this year. All of my colonies were from packages or splits. But I always knew there was a chance that a great year would provide a crop. It ain't gona' happen. The colonies all built up nicely, but the heat and drought that Ohio, and many other states suffered, laid the 1999 honey flow to rest. What a way to end the millennium - a busted flow.

In Summer months, many of you have been concerned about the mass of bees hanging on the front of your colony. Indeed, on hot days, it can be most of the bees within the colony. You've added supers, staggered supers, even tried ventilated inner covers of various sorts, in order to get the bees back inside. So long as there are not extenuating circumstances, bees hanging out front in the hot months of the year are perfectly normal. I can't universally speak for all nectar and pollen producing plants, but if it is so hot that bees can't process nectar, I suspect most plants will be practicing heat-tolerant procedures also and are probably not producing nectar and pollen either.

When I was a little guy growing up in the deep south, the front porch was a popular place to perch during hot times of the day - even into the evening - until mosquitoes finally drove us into the hot house. (Air conditioning has destroyed all that.) I have equated bees hanging out front as nothing more than bees sitting on the front porch. Now having written that, it is important that bees have access to a dependable supply of water, but they can usually find it unless you keep bees in the Southwestern U.S. However, be forewarned that bees matted out front are not in a good frame of mind and will readily attack if provoked. All things considered, I would not drop everything in order to make equipment changes to entice bees back into the colony (Caveat: If neighborhood kids or neighbors are a challenge, getting the bees back into the colony may be important from a societal stance rather than a bee stance.)

The Year of the Earwig In 1324 pages of text and photos, the *Hive and the Honey Bee* gave no space to earwigs. Root's 718 page *Honey Bee Pests, Predators and Diseases*, Third Edition, gives them a page, however. How bad can earwigs be? In Alabama, earwigs are commonly found in honey bees in significant numbers. No doubt they are found in other states. In years past, I have noted that earwigs were not a common hive resident in Ohio, but that all changed this year. For the first time, I have earwigs in my office, in my home, and in my bee hives. I don't know that they do anything within the hive. I faintly remember one paper, in Russian I think, indicating that earwigs could be alternate hosts for the bacteria causing European Foulbrood. Other than that one point, I have never heard complaints about them. Of course, they are a pain when extracting and must be caught in the filter when processing honey. Straining bees from honey is bad enough, but earwigs in the honey filter are unsightly. I don't know of anything you can do about them; in fact, I'm not sure anything should be done about them.

The Birth of a Trend? As beekeepers, the parasitic mites, both Varroa and Tracheal, abused us. We are still traumatized by the experiences they put us through. We followed the mite control protocol as we initially dealt with the small hive beetle. Was that the right thing to do? We added more chemical control recommendations to our pesticide menu and prepared to do chemical battle on a new front with this beetle. At the recent Eastern Apiculture Society meeting in Maryville, Tennessee, I distinctly saw a growing number of beekeepers and scientists say, "Hold the phone! American foulbrood, Varroa mites, Nosema, tracheal mites, and now the small hive beetle. Where does this chemical control attack end?" Time and again during various talks and conversations, a phrase common in other aspects of agriculture was used within beekeeping - Integrated Pest Management (IPM). Maybe, we

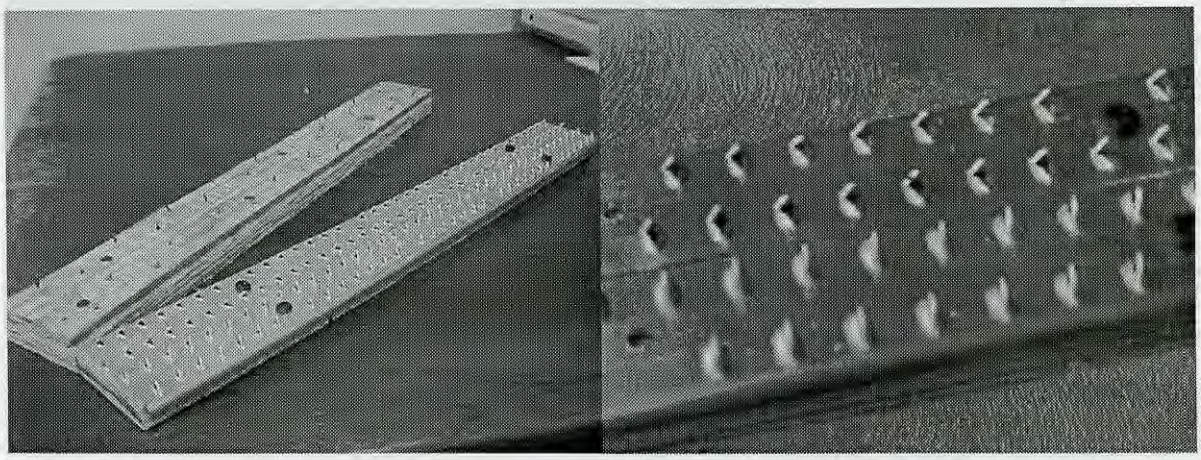


Figure 2: Wood and aluminum carpet tacking used to reduce skunk predation with a highlight of the aluminum spines.

Figure 3: Skunk excrement (Close examination shows honey bee body parts).

Figure 4: An earwig hiding in the corner of the outer cover.

are truly beginning to accept the fact that, within the foreseeable future, we are not going to eradicate either of the mites and can probably do very little to eradicate the small hive beetle. While I still cling to the general recommendation to treat for mites at least once per year and probably twice per year in the Southern parts of the US, I suspect that we will be forced to become increasingly tolerant of the occasional mite without the urge to run back to the truck for a chemical bullet. Most states now tolerate a small amount of American foulbrood until treatment can be implemented so why should mites be different. Treating when necessary, developing other controls - both chemical and natural, and allowing a few specimens to show up during routine colony examinations are all IPM components. Yet, this is frequently hard to accept. I want my hives squeaky disease-free. Nope, I don't particularly like it, but the control costs, both monetarily and managerially, seems to be ever increasing. We will be required to live with some population of pests in our colonies in spite of our best control efforts. Skunks and all.

I read a piece in a friendly science publication (Discovery, August, 1999) about Purple Loosestrife (Lythrum salicaria). In some places Loosestrife is called Purple Passion or Salvation Jane. Considered by many to be a noxious weed, the competitive exotic plant has been in the US for years. For no apparent reason, the plant now seems to be increasingly abundant and is accused of crowding out indigenous plants, which it probably does. Several different control wars are being fought. In contrast, one lone scientist is recommending that we stand steady. He speculates that Loosestrife will not be the only plant on the horizon if left unchecked. He predicts that a natural control system will develop that will hold the exotic in check in the future (But how long is that?) Reading that piece, I was reminded of the common honey bee. It was introduced into the Americas and spread completely across the continent. Concerns were voiced that the honey bee suppressed native pollinators and it probably has. But honey bees were not so lucky as Purple Loosestrife, Kudzu, Johnson Grass, and dandelions. We seemingly brought bacteria (foulbroods), protozoa (Nosema) and viruses in the early loads of bees to this country. Honey bees were never truly disease-free in the US. Even so, we have had nearly 200 (somewhat) pest-free years. Are the recent scourges within beekeeping nothing more than a balancing of an exotic introduction within its new home range? Is it nature's way of making a balanced spot within the ecosystem of "native" organisms? Again, I don't know, but if native species of bees were being suppressed by honey bees, predaceous mites and other recent honey bee pests could be seen as a mitigating force in the competitive world of pollinators.

Talk to Me about Soybeans. Bees from the virtual yard are predominantly in a dearth now - never mind the drought. In Ohio, we would have been in a dearth even if we had no drought. Yet, there are thousands of acres of soybeans within Ohio that are in bloom now. Superficially, soybeans look like a great nectar and pollen crop right when we need it the worst. Yet, many parts of the country get nothing from the crop. Why? Alternatively, many parts of this country get copious amounts of nectar from soybean that results in a high quality honey crop. Why? I don't know. During my 25-year career, I have discussed this conundrum with various USDA scientists, university specialists, and beekeepers, to no avail. I am currently providing honey bees for a hybrid soybean geneticist who is trying to develop hybrid soybeans. On several million soybean blooms, I have only been able to find a few pollinating insects - mostly honey bees and they seem to be nectar collectors. What gives? While sitting in a soybean test plot today, I marveled at the paucity of all pollinating insects. Have soybean breeders unintentionally selected for varieties that offer no pollination reward? Do you get a honey crop from soybeans in your area. If so, where are you and how often do you *get it?*

Autumn. Autumn will soon be here. The year has passed quickly. Next time, I must begin the process of preparing for winter. Can you believe it? Maybe I can finally get that paint done before next year. Until then. BC

Literature cited

Gutin, Joann C. (1999) Purple Passion. Discover. 20(8)76-81

Dr. James E. Tew, State Specialist, Beekeeping, The Ohio State University, Wooster, OH 44691, 330.263.3684 Tew.1@osu.edu, http://www2.oardc.ohio-state.edu/agnic/bee/; http://www2.oardc.ohio-state.edu/beelab/

BEE PLANTS

For The FAR North

B.A. Stringer

In those nebulous regions described as "far north," bees and their keepers and the plants they depend on, all face the common reality of a shorter, cooler growing season. Plants that manage to thrive in the far north may also be suited for high altitudes in more southern areas, where the growing season is correspondingly abbreviated. However, tolerance to cold temperatures, as indicated in plant hardiness maps, is not the only factor limiting plant growth in the north. These maps take only temperature into account, and omit other defining features such as the length of the frost-free period, the amount of rainfall through Summer, the timing and amount of snowfall, and the effects of winds (wind chill). Canada has produced a plant hardiness zone rating for many ornamental plants, which takes into account these additional environmental factors.

Let's look at some of the best nectar producers that are adapted to a short, cool Summer. I have chosen examples that are suited to areas with around 100 frost-free days a year. They will grow in shorter Summer areas if provided with protection from the elements, and also in longer season sites. However, because of the tremendous range of terrain and climatic conditions within this region, not all of these selections are suited to all areas in the far north. I recommend that you seek advice from local gardeners and nurseries and university extension services for best options in bee plants for your home ground.

Ornamental bee plants best adapted to the cold are frequently those closely related to the native flora in the northern latitudes. You can have a beautiful garden by utilizing many of these native species that also produce nectar and pollen for your bees.

The time that bloom begins and ends varies with locale, but in general the sequence remains the same. I have arranged this plant sampler approximately in sequence by beginning bloom time. Of particular note are the very early bloomers and the very late-flowering plants, as well as those valuable for their extended period of bloom. However, just because the flowers are out, it doesn't necessarily mean that the weather will be such that the bees will be able to forage.

Willows produce blooms from very early to mid-Spring, come in a variety of colors, shapes and sizes and are perfect for bees.

For early nectar and pollen in almost all areas of North America, willows are invaluable. There are species of willow (*Salix*) that thrive even in areas where frost can be expected in nine months of the year. Both nectar and excellent quality pollen are produced by the male catkins, while the inconspicuous female flowers, borne on separate plants, secrete nectar only. Shrubs or trees, depending on species and where they grow, willows are an important early boost to a wintered colony for brood rearing and buildup. The flowers of the familiar pussy willows, *Salix discolor*, are worked by bees whenever weather permits in early Spring, which may be mid- to late April in many northern areas. Pussy willow grows best in moist soil where it may reach up to 30 feet high. Pruning should be done straight after flowering, to encourage the next year's flower buds, which form on the new Summer growth. This large shrub has been recommended in New Jersey for roadside planting to increase bee forage. Northern willow, *Salix bebbiana*, is an extremely hardy, widely adapted willow that thrives in thickets from moist lowlands to dry uplands. It blooms a little later than other willows, overlapping with dandelions and fruit trees.

Small packages contain good things for bees when they are the flowers of grape hyacinth (*Muscari botryoides*) and Siberian squill (*Scilla siberica*). These are two very hardy bulbs that are good for naturalizing as they spread easily, and are well worked by bees for both nectar and pollen. Both bloom through April and

Maples bloom from very early to early Spring, and offer huge rewards due to their size and number of blossoms.

May and produce clusters of blue flowers that are very attractive to bees. Squill pollen is a distinctive dark blue, easy to recognize on bees returning to the hive.

As a group, maples are an important source of bee forage over much of the northern tier of the United States and into Canada. The species vary with locale, but nectar is produced by nearly all, and pollen most. The red maple, *Acer rubrum,* is a large, hardy tree which bears striking red flowers in early April. A grove of red maples in flower has been likened to a scarlet haze. The flowers are a source of nectar and some pollen, and this tree has also been recommended for roadside bee forage improvement in New Jersey. In Autumn, the leaves turn bright red. Red maple grows quickly, thriving on poorly drained sites, and is an important source of bee forage especially in eastern Canada.

The amur maple, *Acer ginnala,* is a shrubby tree that grows to 20 feet in height that fits into landscapes with ease and is reliably hardy into the far north. It produces both nectar and some pollen in late May to early June, which is a little later than most other maples. The amur maple is a desirable ornamental for its fragrant white flowers and bright scarlet Fall foilage, as well as its usefulness to bees.

Many species of manzanita (Arctostaphylos species) are important to bees in the northern regions. Bearberry, also known as kinnikinnik, (Arctostaphylos uva-ursi) is native to the coldest parts of Canada and is found from the Arctic regions south through Oregon and Montana. This prostrate shrub makes an excellent ground cover and thrives on the poorest soils where little else grows. Where abundant, its pink flowers are the source of light amber honey that has a faintly bitter taste. Some pollen may also be collected. The bloom through May and June is followed by red berries that are relished by game birds, especially grouse.

In mid-May, you'll see the ornamental crab apples dressed in their best. The Siberian crab apple, Malus baccata, is probably the hardiest of these, its profuse, sweet-smelling blossoms producing both nectar and pollen which stimulate brood rearing. This small tree grows to about 15 feet, covered with rose-colored blooms in early to late May, depending on locality. It is an excellent ornamental that grows best *in well-drained soil.*

The alder buckthorn, *Rhammus frangula,* is an ornamental shrub with a very long flowering period. Small clusters of white flowers are produced from peak bloom in May through to September, supplying both nectar and pollen for bees. As the fruit ripens, it turns from red to black and is frequently eaten by songbirds. The alder buckthorn is common in eastern Canada, thriving in poorly drained areas, but may become invasive in sites that suit it particularly well.

In mid- to late May, the greenish-yellow flowers of the Ohio buckeye, *Aesculus glabra,* are important to bees for pollen and are also a source of some nectar. This tree grows to 40 feet and is valuable for its reliable, productive bloom each year. Like its tender cousin the horse chestnut, Ohio buckeye bears flowers in dense clusters that open over a period of time, prolonging the bloom. In addition to its beauty in bloom, the tree also puts on a show of orange foliage in Fall. For best bloom and Fall color, plant in a well-drained site.

Oriental poppies, *Papaver orientale,* are highly attractive to bees for their excellent quality pollen in late May to June. You can often see

Crab apples bloom at differing times, come in a multitude of colors, shapes, sizes and styles and are wonderful in the landscape.

several bees in a single flower busily combing the anthers and packing purplish-black pollen in their corbiculae. Flower colors range through reds, oranges, pinks and white, all with a black blotch at the base of the petal. These long-lived poppies transplant poorly, so plant them where they will not need moving.

Tartarian honeysuckle, *Lonicera tartarica,* is a source of nectar and pollen in late May to early June. This 10-foot deciduous shrub produces masses of pink flowers for about two weeks and is considered a good nectar supply for bees. The plant needs good drainage with some Summer water. Red berries in Fall attract birds.

Combining kitchen utility with beauty in the border and attraction to bees, garden hyssop, (*Hyssopus officinalis*) is a long-blooming perennial herb with many virtues. From June to September, the dark blue, fragrant flower spikes are extremely attractive to bees, which crawl in the flared entrance of the blooms to collect nectar and some pollen. Grown in masses, the plants are very inviting to bees and will attract them whenever weather allows flight. You can propagate garden hyssop by seeds or cuttings, and the plants will stand dry conditions once established.

The borage family has two members that grow well in cool Summers

Continued on Next Page

Blackberries produce a delicate and wonderful honey, and you get the fruit.

and, though a trifle rough for a very cultivated garden, are valuable in a wilder part of the landscape. Both are very attractive to bees. The common herb borage, *Borago officinalis*, blooms from late June until frost, producing a high-sugar nectar and some pollen all day, even in cold weather. Nectar in the pink and blue nodding flowers is protected from the rain. The leaves are coarse and rough, but the clusters of starry flowers are carried high on bristly, arched stems and are well worked by bees. A close cousin, the blue borage, blue weed or viper's bugloss (*Echium vulgare*) flowers from June to September, and is a source of nectar and pollen for honey bees. The rough, bristly stems and leaves grow about knee- high, providing a long bloom of true blue flowers emerging from pink buds. It may be an invasive weed in some areas, but garden varieties are more containable. For bloom through June and July, try the bright colors of bearlip penstemon (*Penstemon barbatus*), which produces nectar in pendulous, red flower clusters to four feet, and Jacob's ladder (*Polemonium caeruleum*), a source of nectar and pollen in rich blue flowers with yellow stamens. Jacob's ladder needs rich soil as it is a heavy feeder.

Popular in old-time gardens, the burning bush is a good bee plant for nectar and pollen in June. Also known as gas plant or fraxinella, *Dictamus albus* has aromatic leaves that emit a flammable oil which may be ignited as a garden "parlor trick." Grown in full sun, this perennial produces purple flowers in June and is well worked by bees.

Fleabane, *Erigeron speciosus*, is an excellent, free-blooming perennial for the garden border. Growing about knee-high, the plant bears clusters of asterlike flowers with slender violet or lavender petals from Summer through Fall. The flowers are very attractive to bees for nectar.

Blooming intermittently all through Summer, the rugosa rose, *Rosa rugosa*, is a deciduous, prickly shrub well suited for hedges. Bees work the fragrant flowers for pollen from early June onward. Later in the season, the scattered flowers give way to bright red rose hips which are eaten by game birds and songbirds. Choose single-flowered cultivars of this extremely tough shrub for gardens and bees.

Noted as one of the best nectar and pollen plants in Ontario, the basswood or American lime, *Tilia americana*, flowers in late June. The tree is also important to bees in other northern latitude countries such as the United Kingdom and the former USSR. The tree is large, up to 120 feet, and is the hardiest species of the genus. Because of the size of a mature tree, the potential bee forage in the massive number of flowers is immense. However, the flow

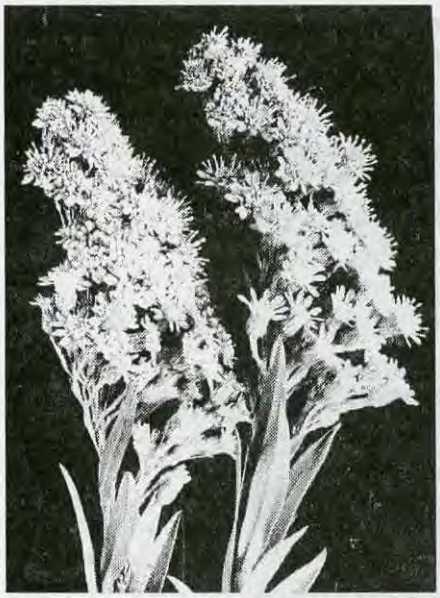
There are hundreds of varieties of asters, blooming from early Summer to hard frost.

Borage is a garden plant, bees, and bumble bees both love it.

is frequently irregular with two or three years out of five being good for honey production. Native stands in Ontario and Manitoba were heavily harvested around the early 1900s, seriously depleting bee forage in these areas. The density of bloom is directly related to the amount of light reaching the tree, with some trees over 100 years old bearing an estimated 62,000 flowers. Basswood is sometimes susceptible to aphid infestation and the resultant honeydew production, which is a nuisance in populated areas and an unwelcome contaminant of the honey crop. A major hardwood in some deciduous forests in southern Ontario, basswoods are also good shade trees if you have room for them. Their wood is light in color and clear of knots, and has been used in the manufacture of square sections for comb honey.

A good perennial nectar plant in a moist spot, scabiosa (*Scabiosa caucasica*) bears light blue flowers late in the year, from July through September. The flowers resemble small lace-edged pincushions and the everlasting seed heads form geometrically patterned globes. You may wish to combine these medium-height plants with fleabane, asters and false dragonhead in the garden for good effect.

Goldenrods are very important nectar and pollen plants for the late-Summer flow, probably because of their great abundance rather than high production of individual flowers. Hardy perennials, goldenrods



Goldenrods come in many forms, sizes and productivity levels. They tend to be late bloomers, but some are mid-Summer producers. They are being commonly grown as cut flowers in the garden.

are widespread over moist to dry areas in the wild throughout North America, and are also easily cultivated in a garden, where the flowers are profuse and attractive. The two most prevalent species in northern climes are Canada goldenrod, blooming from July through August, and western goldenrod, *S. occidentalis*, blooming August through September. Both prefer moist soil, and some reports state that Canada goldenrod plants in dry sites do not attract bees.

Species of eupatorium are hardy perennials that are showy enough to be included in a garden and will also benefit bees by supplying nectar, and possibly some pollen, late in the Summer. Throughout Canada, boneset (*E. perfoliatum*) grows wild to shoulder-height, with loose, white flower clusters on top of the stems from July to October. The predominant species in Ontario is *E. maculatum*, which flowers on sticky stems in August and September. Both of these species of eupatorium are commonly known in their area as joe-pye weed, and prefer growing with "wet feet" in low ground where water is not far from the roots. In a garden, plant them where you can water them easily, or where the soil is naturally damper than elsewhere.

A hardy annual plant that is a good late supplier of nectar and pollen, jewelweed (*Impatiens* species) blooms in August and early September. It grows rapidly to six feet with smooth, branching stems, and is best suited to a spot with plenty of water. It is commonly found wild in lowlands in Ontario. Himalayan balsam, *I. Glandulifera,* does well in eastern areas of Canada, in gardens and where it has escaped from cultivation. It has pink to purple flowers and reseeds freely. Bees working the flowers become dusted with white pollen on their backs. The jewelweeds are also called "touch-me-not" because of their seedpods which, when ripe, spring open at a touch, scattering the seeds.

Early frosts that kill goldenrod do not affect the many species of asters that are significant sources of nectar and some pollen throughout continental North America. Their chief value lies in the lateness of their bloom and their perennial growth. The New England aster (*Aster novae-angliae*) is common from Quebec to Alberta and through the northeastern United States, and is also a familiar garden specimen. It blooms from August to frost and produces best in a damp site. A close cousin, the New York aster, (*A. novi-belgii*), is in flower from September onward and is very attractive to bees, especially when days are cooler. It is native to coastal Newfoundland and south to the New England states, and its many cultivars are commonly found in gardens across the country.

For later color in August and September, add some false dragonhead, also called obedient plant (*Physostegia virginiana*), which supplies nectar and possibly some pollen. The pink, tubular flowers on a four-foot-tall spike form a dense, floriferous stand. For another "parlor trick" in the garden, twist the flowers on the stem, and watch as they obediently stay in position. This ornamental plant thrives in moist areas and has also escaped to become naturalized in some areas.

The sustaining food supply for bees is generally the local wild flora, with a boost from suitable cultivated plants. Bees do not make a honey crop from gardens alone. Extend your beekeeping knowledge by becoming acquainted with the bloom times of local crops that are bee-pollinated or used by bees for nectar and pollen. Depending on your area, these may include canola, (rape), buckwheat, sweet clovers and alfalfa. Watch also for the nectar and high-protein pollen flows from alsike, white and red clovers, and fruit tree (apple, cherry and plum) bloom. In addition, don't underestimate the value of weeds to bees. The common dandelion produces good-quality pollen as well as nectar, and other weeds vary in importance with their abundance. Of particular note are knapweeds and thistles, hairy vetch, blackberries, chicory, fireweed, mustards and wild radish.

Whether you live in the far north or high on a mountain, you can enjoy a short season garden that contributes support to your bees and pleasure to the beekeepers. BC

Bertie Stringer grows and writes about honey plants around her home in Blodgett, OR.

Charles Butler
The Feminine Monarchie

Karl & Betty Showler

To any beekeeper, the list of the Rev. L.L. Langstroth's library of books on beekeeping shows him to have been well-read on practical and scientific beekeeping before writing his own book. This list, the result of research into Langstroth's library, was published as an appendix attached to Florence Naile's *The Life of L.L. Langstroth,* Cornell, 1942, reprinted 1976.

There is one book on the list of which he held three editions, Charles Butler's *The Feminine Monarchie,* the editions of 1623, 1634 and 1704. This underlines Langstroth's view of Butler's work, which was an outstanding contribution to early post-medieval apiculture.

To some degree, Charles Butler is forgotten, so who was Charles Butler?

Charles was a man of many parts with a notable reputation as a philologist, musicologist and apiarist. On all three subjects, he wrote important 17th-century works covering language, music and bees. Certainly in his book on bees, he included all three topics, publishing what is possibly the only bee book that included a musical score.

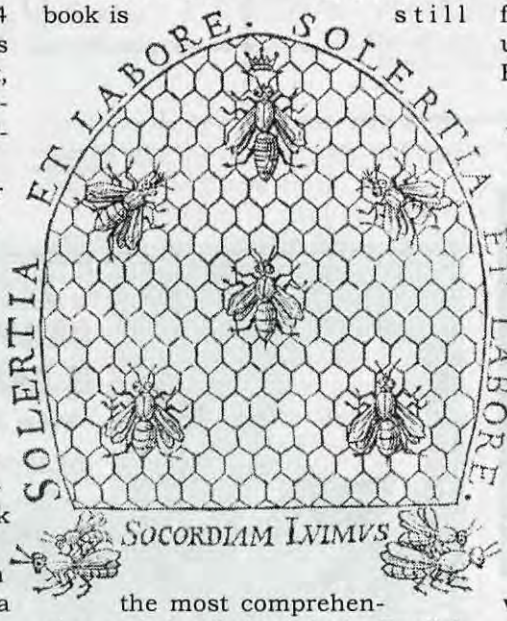
Charles Butler was born at High Wycombe in Buckinghamshire, a market town some 35 miles to the west of London on the road to Oxford, but now bypassed by the M40 expressway. Butler went, by the standards of his generation as a mature student, aged 19, to Magdalen Hall, Oxford. Here he also held a junior appointment in his college. He duly took a bachelor of arts degree in 1583 and then proceeded to a master's degree 4 years later.

His next appointment was the headmastership or "Chaplainship" of the Holy Ghost School, Basingstoke, a small town some 40 miles due south of Oxford. He was also able to serve as parish priest of Nateley Scures.

In 1600, he moved to a nearby village, Wooton St. Lawrence, where he was to remain until his death 48 years later.

One must assume by the depth of knowledge shown in *The Feminine Monarchie,* first published in 1609, that he had long been a most observant beekeeper.

Four hundred years later Charles Butler's book is still the most comprehensive and detailed study in English on the management of bees in skeps.



His musical interests led him to attempt to indicate the piping of queen bees by musical notation, and in the 1623 edition, he added a madrigal for four voices.

As an extension of his interest in language and spelling, he published a phonetic edition of *The Feminine Monarchie,* entitled *The feminin' monarchi'* or *The histori of bees* in 1634, so it is possible to catch when reading it aloud the sound of the 17th-century southern English educated voice. It is possible a rural New Englander might be nearer to that accent than myself.

He also wrote a Latin thesis on rhetoric, a subject beloved by 17th- and 18th-century academics to develop thought and language. Linked to this was a study on the relationship of partners in marriage, to themselves, to their families, and to the rules laid down in the Bible.

Old age did not prevent him from publishing an English grammar and a study of words 'like and unlike,' for Charles Butler was looking for a uniformity and consistency in the English language.

Running alongside all of this was his work on music, its presentation and the setting of words to music. In 1636, he published the *Principles of music, singing and setting.*

Bell-ringing beekeepers, and I know several, will be interested to know that Charles Butler, in 1625, caused his church's three medieval bells to be recast, including the one cast in 1604 just after his appointment 21 years before. Perhaps his musical ear could detect they were no longer ringing true.

Charles Butler and his wife, whose name I do not know, had five children, four of whom survived infancy. His daughter, Elizabeth, he called his "honey girl" because he put the profit from certain hives of bees aside, from her birth in 1612, until her marriage on Saint Valentine's Day in 1633 when the "honey girl's" fund amounted to £400. This was in those days a very substantial marriage portion.

Honey Girl Elizabeth married Rev. Richard White, and in due course they were the grandparents of Gilbert White, author of *The Natural History of Selbourne,* a village in Hampshire to the south of

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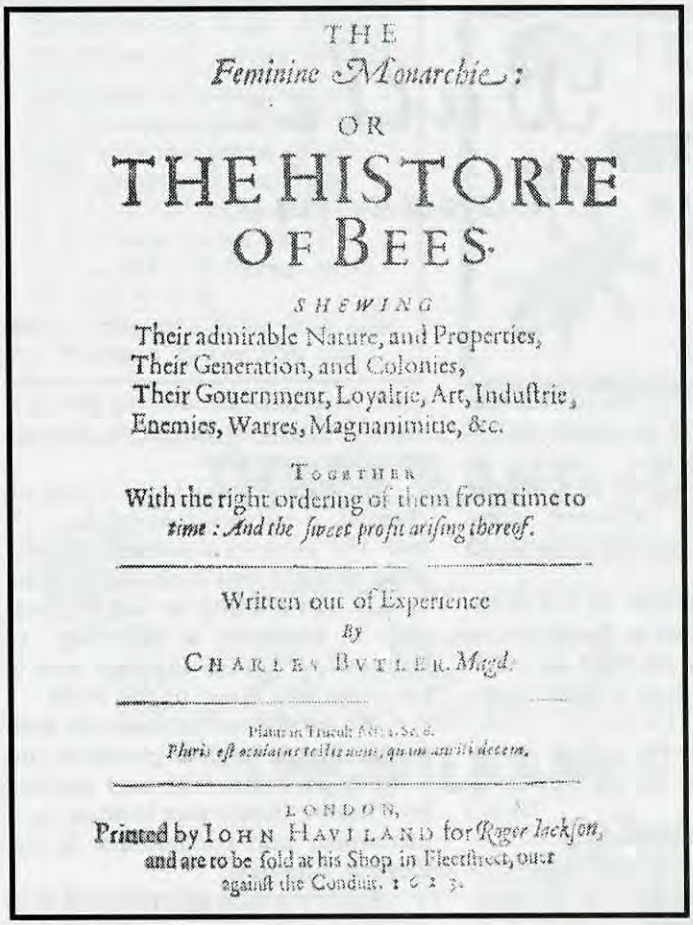

THE
Feminine Monarchie:
OR
THE HISTORIE
OF BEES.
SHEWING
Their admirable Nature, and Properties,
Their Generation, and Colonies,
Their Gouernment, Loyaltie, Art, Induſtrie,
Enemies, Warres, Magnanimitie, &c.
TOGETHER
With the right ordering of them from time to
time: And the ſweet profit ariſing thereof.

Written out of Experience
By
CHARLES BVTLER. *Magd.*

Plautus in Trucul. Act. 2. Sc. 6.
Phurìs eſt oculatior teſtis unus, quàm auriti decem.

LONDON,
Printed by IOHN HAVILAND for *Roger Iackſon*,
and are to be ſold at his Shop in Fleetſtreet, over
againſt the Conduit. 1623.

Basingstoke. *The Natural History* must be one of the most widely read and reprinted books; and from a beekeeper's point of view, interesting, as it contains possibly the first reference to a Drone Assembly.

Forty years after the phonetic edition of *The Feminine Monarchy* had left the printing press and long after Charles had died, R. Richardson produced in Oxford a Latin translation, *Monarchia foeminarum.* Oddly, this was in turn translated back into English by the unnamed author "W.S."

The "W.S." translation was published in London in 1704 by A. Baldwin and also by another publisher, G. Conyers. As I have not seen either edition, I do not know if they are identical, but both are recorded by the *Bibliography of British Bee books* as using the same type.

In 1969, a Dutch publishing house, *Theatrum Orbis*, in their 'English Experience' series produced a reprint of the first edition, and in 1985, Northern Bee Books, Mytholmroyd, UK, reprinted the 1623 edition with its four pages of music. The latter edition is still in print. BC

Karl & Betty Showler are specialists in selected new, old and antiquarian books on bees, beekeeping and allied subjects.

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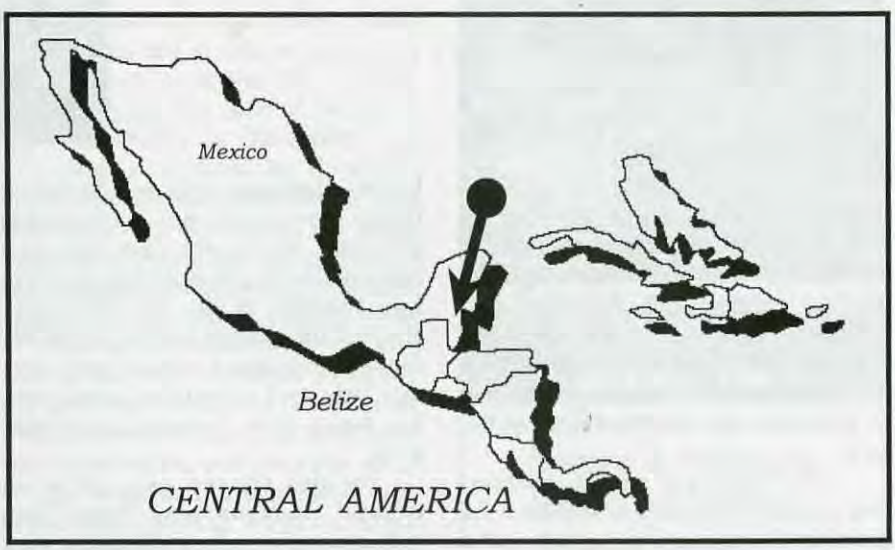
A Beekeeping Trip To BELIZE

Brian J. Sherriff

In the Spring of 1997 I joined a group of beekeepers at Gatwick Airport and set off for a flight to Miami, where we stayed the night before heading out the next day to the little country of Belize.

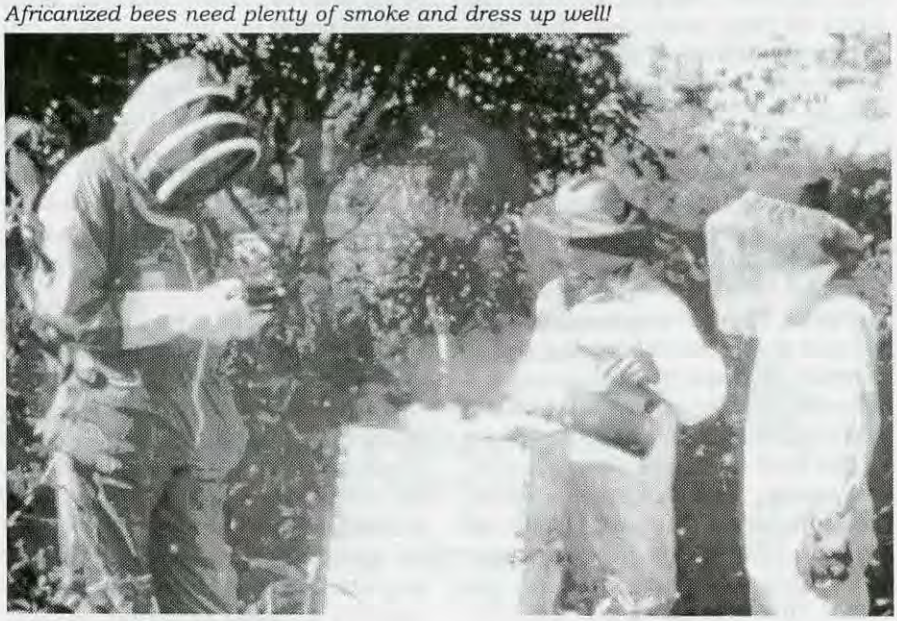
Our flight took us down over the Florida Keys over part of Cuba and over Cancun, Mexico. We followed the Mexican coast on the eastern part of the Yucatan Peninsula until we crossed the border into Belize, where we landed at Belize City Airport. Here we were met by the manager of the Crystal Paradise Resort in a rather battered old bus. We soon learned why it appeared old and battered when we started to travel on the roads! Except for one or two main roads, most of them were just dirt, completely unsurfaced and full of large potholes. We were told that the tires and shock absorbers would last about nine months!



We traveled along the western highway to Belize zoo, which housed animals native to Belize, all of which were in large pens with plenty of foliage and trees of the type of habitat that the animals were used to. We saw peccaries, deer, wild cats, howler monkeys, tapirs, alligators, storks and the rare jaguar, and they had one which was black.

We traveled on past Belmopan, which is the administrative capital of Belize, and to San Ignacio which is a bustling little market town, then on to Crystal paradise Resort. This was a collection of thatched huts all with running hot and cold water, good showers and comfortably appointed rooms, two rooms to a hut. These were typical of the type of accommodations to be found in the country districts of Belize. The dining room was also a thatched building, and we ate around one large table.

Africanized bees need plenty of smoke and dress up well!



We enjoyed local cooking provided by the proprietor's wife, and meals consisted of a meat, together with local vegetables like yams, mangos, sweet potatoes, followed by plenty of fruit, including oranges and bananas which were on the trees all around us. My thatched hut or cabana had a hammock slung outside under cover. I found this to be very comfortable, once I had mastered the art of getting into it and staying in it! I would read there in the evenings and during the heat of the day, if we were back from our many varied and interesting trips.

The old bus was driven by Jeronie. He was very friendly and jolly and the son of the proprietor. He took us up to the Pine Ridge Mountain and to the River Frio, where we swam. We also visited Rio Frio cavern which used to be used as a home by Mayan Indians. We also crossed the Mopan River on an antiquated and primitive ferry, which

Mayan honey house where the beekeeper has a woodwork machine and a bottling tank.

Mr. Mai prepares a sample of honey.

a man winched across the river on cables, to visit the Mayan temple of Xuanantich. We walked amongst the Mayan temples and pyramids and climbed to the top of the highest one which gave a marvelous view over the surrounding jungle. At the top it was cool after the humid heat below.

After visiting a garden containing jungle plants which are used for medicinal purposes at Ixchel and a canoe trip down the Mopan River, we were ready to see some bees. We stopped at a small Mayan village called San Antonio to buy some bananas and learned that there was a beekeeper nearby called Mr. Mai. They told us where he lived and where he kept his bees. Off we went in the bus through the jungle and past some cultivated fields until we saw an old cabana with a beekeeper's veil and hat hanging up, at which point we knew we had arrived, but there was no sign of the beekeeper. A small boy was our guide, and he took us down a jungle path on foot until we came around a corner where we spied Mr. Mai working with his bees. He was not expecting us and must have been very surprised to see eight Europeans coming to see him and his bees!

The national language in Belize is English, which was lucky for us!

The Mayans also have their own language which is mostly Yucatan Mayan, and in some parts, Spanish is spoken as well.

Mr. Mai welcomed us and invited us to see his apiary, so we donned our beekeeper's protective clothing and in trepidation we entered his beeyard with 15 colonies of Africanized honey bees. The bees, which were black, did not seem to be too aggressive and only bothered those who were not adequately dressed. Those with bee suits and beeproof hats and veils did not have any trouble at all. Mr. Mai also showed us around his farm and his crops of cabbages, which were nice and tight and a good size, along with his sweet corn, bananas and peanuts.

He also showed us a colony of tropical, stingless bees. These were in a crevice in a rock and were very small and looked like mosquitoes. They entered their nest, which could not be seen, by a small beeswax pipe about two inches long and about the diameter of a ballpoint pen. He told us they all went inside at night, and that they sealed the entrance with beeswax for safety, and opened it up again in the morning.

We saw several of these colonies of stingless bees – some in trees and rocks and also in houses. Several of the Indian beekeepers had log hives hanging beneath the eaves of their huts, and they harvested the honey, which we understood was used for medicinal purposes.

In one of the cabanas where we stayed at the Fallen Stone Butterfly Ranch in the Toledo district of Belize, we found a nest of small stingless bees under the floorboards of the veranda. When the floorboards were removed, the nest was revealed, and we saw that it was about the size of a melon and made of beeswax and propolis. The Mayan people collect about one kilo of honey from a colony of this type and have many uses for the honey, beeswax and propolis, which is very sticky and pliable. As we watched, the Indian squeezed the honey out of the comb, and whilst this was going on, the bees did not attack, but just flew around at the entrance, and I was told that they would soon make themselves a new nest.

We traveled in the Cayo district to Belmopan, the administrative capital of Belize and to another jungle resort made up of a group of round cabanas all very nicely appointed. So nice in fact, that on my next visit I would like to stay there for a few days. There were facilities for jungle walking, horse riding, canoeing, bird-watching and looking for bees.

This was Pook's Hill Resort. The proprietor, who was a South African, took us into the jungle and showed us the nests of five different sorts of stingless tropical bees. Two types were of the mosquito variety and were no bother to us, but the other three sorts of bee were about two-thirds the size of a honey bee, and these had much larger entrances to their nests, measuring an inch or more across. Some were in trees and we could not get very close, but one type, which had its nest in the ground, was very aggressive and could bite – we left them rather quickly!

It was fascinating to walk through the thick vegetation of the jungle to find these nests and sometimes we had to cross log bridges over streams.

In the Toledo district of Belize we visited more Mayan beekeepers, and their Africanized bees were not so nice. In one apiary a hive had fallen over and we were warned to dress up well. We started to move the fallen hive and at once we were attacked by the bees. Plenty of smoke had been used, but it did not do the trick. Those who were not adequately dressed departed quickly.

A camera case that was on another hive was covered with stinging bees and so we could not take photographs because bees covered the camera lens. We had to walk about half a mile through the jungle before the bees left us.

Surprisingly, it is the custom of Belize beekeepers to take one or more combs from the hive and carry them about 50 yards away to a hand extractor in the open, spin the extractor in the open, remove the honey, and return the combs to the hive. I don't know why, but they do not seem to experience robbing at all.

We visited a commercial apiary, owned by Mr. Sebastian Tun. He runs about 50 very orderly colonies of Africanized bees in a clearing in the jungle, under the shade of some trees. The hives were in neat rows and on stands, with the legs in metal tins containing oil. This was to stop the ants from getting into the hives. Mr. Tun also made beehives from mahogany for the local market. This wood is readily available in the area and therefore inexpensive.

Beekeeping was a very active industry in Belize until a few years ago. We were told that parts of the country were sprayed with herbicide to kill off marijuana, but it also killed the bees, which in turn had an adverse effect on the bee industry and their very healthy cooperative at Orange Walk. At the same time along came *Varroa* and the Africanized bee, and so the beekeeping came to an end.

However, beekeeping is starting up again in a small way and is growing as an industry that offers a good financial return to the Mayan Indians.

Belize is a wonderful country to visit, with jungle, savannah and sandy beaches that face the largest barrier reef in the Northern Hemisphere and second largest in the world. The people are very cosmopolitan, running from black to white, Indian, Mestizos and many others in between, all of whom were very friendly and courteous. The country is only about the size of Wales. It has mountains in the south and west and is bordered by Honduras to the south, Guatemala to the west and Mexico to the north. For those who like archaeology, the country is rich in Mayan temples and pyramids, and the Mayan people are still there.

One of the reasons for my visit was to test our bee suits when being used with African or 'killer' bees. I am pleased to say that they were very comfortable and we suffered no stings, even in the aggressive apiaries. Upon leaving, we gave the Indian beekeepers some of our equipment.

I hope to go again and learn more about Mayan beekeeping with their Africanized bees and tropical stingless bees. I would also enjoy meeting these charming people and visiting their wonderful country once more. BC

Brian Sherriff owns the Sherriff Bee Suit Company in the UK. He travels extensively and is known world-wide for his suits, and his keen sense of humor.

Does Beekeeping Skip A Generation?

Two Different Stories, Two Different People, Both Want the Same Thing- *To Be Just Like Their Grandfather.*

What The Photograph Says...

My great-grandfather, Ambrose Eastwood, kept bees in Lawrence, Massachusetts. His time among the hives ended many years before I was born. I suspect, though, that it is from him that I inherited my propensity for beekeeping. It is said that the expression of certain genes often skips generations, and that might be true for the apiculture gene, at least in my family: Neither my father nor my grandmother (Ambrose's grandson and daughter) showed any inclination toward keeping bees.

When my grandmother died, I was entrusted with the old family photographs, and in looking through them, I was surprised when I came upon a picture of my great-grandfather with his bees. I can recall my grandmother telling me stories of the bees that her father kept in the backyard, but at the time my beekeeping penchant was still latent, and I did not really pay much attention to what was said.

In the photo, my grandfather is shown posing with an empty comb in front of some hives, dressed formally in a suit, pipe clenched between his teeth, the chain of the obligatory pocket watch of his time clearly visible. Certainly that was not his typical beekeeping garb, but he chose to be pictured with his hives in his Sunday best. The season seems to be early Spring, judging by the trees and the small cluster of bees at the entrance of each hive.

Ambrose lived a long and, I presume, contented life in the last century. I wonder how he got started keeping bees. Did he keep bees more for pleasure or for profit? The former is my guess, given that he went to the trouble of having the photograph taken. Did he like to sit by the hives on a sunny day in April, as I do, and watch the foragers returning with the first pollen of Spring? What was beekeeping like in the 1800s? He certainly did not have to contend with the mite problems we have today, and clover grew everywhere. What was life in general like in my great-grandfather's day and age? Would he be happier living today? Would I have been happier living back then?

All I have of my great-grandfather are that faded photograph and the delight that I get from keeping bees. Ever since I found that picture, I have wondered what he was really like. I would like to have known him.

Michael Onyon lives in Haverhill, Massachusetts, and has been keeping bees for the past 10 years.

I Wonder Why...

As a seven-year-old beekeeper and elementary student, I feel it is important for grown-ups to understand that some bee talks are just plain boring. I like people who come into school to show things and tell about them.

I have some ideas of what my friends and I consider important questions about bees. I thought for awhile that queens were born with red dots on their back but I watched my grandpa put dots on queens. It was neat.

" I was shocked when my grandpa told me that there was no daddy bee in the hive."

I was shocked when my grandpa told me that there was no daddy bee in the hive. Where did he go? What happened to him? I still don't know what happened to him. I have learned about the birds and the bees but I still don't know what happens to the drone. Grandpa said he dies, but why?

I have a lot of questions I am more interested in! I don't understand why bees sting. I have been stung and it hurts a lot. Most of my friends have been stung by yellow jackets, bumble bees, or wasps. They blame honey bees. I wish that people who come to school to talk about bees would talk about other stinging insects as well as show us some insects besides honey bees. An observation hive is nice too.

And there is the question, "How do bees make honey?" I know they go to flowers and get pollen and nectar and put it into their chest thing (honey sac) and take it back to their hive and make honey. It sounds pretty gross but honey is real good. It would be neat to have honey to taste in class. All my friends say, yum, yum, yum when we shared honey in my last year classroom.

Some people are allergic to bees. Are they allergic to honey? What about pollen? What happens to a person when they are stung? I know it hurts and is sore for several days but some people go to the hospital and I was told that some people die. Some of my friends are really scared of bees. I like drones and queens because they don't sting but my friends don't know that!

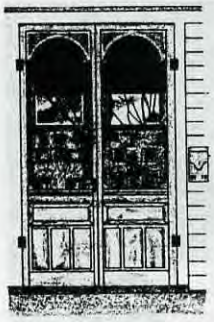
I saw that a dog was killed by bee stings from Killer Bees. He was tied up and his owners had to watch him die. It is sad. I know that all bees are not bad because some bees have to protect themselves by stinging. Beekeepers can wear special clothes to protect themselves. I am not afraid of bees when I dress up.

Some of my friends don't like bees at all. I don't know why. One even said we should kill them all. I don't know if it is true, but my grandpa said that we wouldn't have food to eat if bees didn't visit flowers to get pollen. What foods would we have if there were no bees?

Several other things really bother me. What happens if the queen dies? They probably get another queen, but how? Is all honey the same? And do honey bees go to all flowers? And my mom and dad say no pets and no bees at our house. Where can you keep bees?

I love bees. Some of my friends share my feelings but there are some who just hate bees. If you are a beekeeper and you come to my school to talk about bees, I would like you to share your honey with us, bring some live bees (this may scare some of my friends), and make sure my friends understand that other insects sting as well as bees. Be sure you tell us what bees do and how valuable they are in the food chain. BC

Andrea Stahlman attends second grade- New Albany Elementary School, New Albany, Ohio. She was introduced to bees at a very early age by her grandfather.



Ann Harman

Home Harmony

Canadian Cuisine

This September we are celebrating not only National Honey Month in the United States but also the international beekeeping congress, Apimondia, in Vancouver, British Columbia, Canada. Beekeepers from all over the world will be listening and watching. While in Canada, they will be tasting Canadian cuisine. Unfortunately, some beekeepers are not able to attend. For you, here are some Canadian honey recipes so you can get a little of the flavor of Apimondia at home.

Canada is a major factor in the world market of honey. Canadian honey is produced right across the country, from the Atlantic to the Pacific. Each province has its own bee association. In addition, many provinces have local associations. Many have recipe books and leaflets (filled with wonderful recipes) which you can obtain by contacting the association (see *Bee Culture*, April, 1999, for association addresses).

So let's get started on our visit to Canada. Remember that Canada uses the international units of measure, kilograms, liters, milliliters. Where possible the recipes will give both international and American units so everyone can use the recipes.

HONEY BANANA CHEESECAKE

Our first stop is going to be this incredible cheesecake. Many cheesecakes contain fruits such as cherries or strawberries. This one is definitely different and truly delicious. Don't make this just for a special occasion - give your family a treat.

2 cups	500 ml	vanilla wafer crumbs
1/3 cup	75 ml	melted butter or margarine
2 tablespoons	25 ml	honey
1-1/2 pounds	675 ml	cream cheese
3/4 cup	175 ml	honey
2 tablespoons	25 ml	all-purpose flour
2 teaspoons	10 ml	vanilla
3	3	eggs
2 cups	500 ml	sour cream
1 cup	250 ml	mashed, ripe banana

Combine crumbs, melted butter and the 2 tablespoons (25 ml) honey. Press crumbs in bottom and halfway up sides of 9-inch (3 L) springform pan. In large bowl, beat cream cheese. Add honey in fine stream while beating. Add flour, vanilla and eggs all at once. Mix until smooth. Do not overbeat (or mixture will rise and then fall during baking). Stir in sour cream and mashed banana. Turn into prepared crust. Bake at 375°F (190°C) 60 to 65 minutes or until done. Cool on wire rack 10 minutes. Loosen sides of cheesecake from pan. Cool. Cover and chill thoroughly. Serve with fresh sliced bananas. 12 servings.

Manitoba Honey Recipes
Manitoba Agriculture

Our cooking trip to Canada will wander around among the provinces. I recommend looking at a map to see where we go.

HONEY MUSTARD BASIL SPREAD

A versatile spread that takes sandwiches to another class. It's also terrific on your favourite cooked pasta – warm or cold.

1 cup	250 ml	fresh basil leaves
1/4 cup	50 ml	honey
1/4 cup	50 ml	mayonnaise
2 tablespoons	30 ml	Dijon mustard
1	1	clove garlic, minced or pressed

salt and pepper to taste

Combine all ingredients in food processor or blender. Process until smooth. Cover and chill up to 2 days. Makes about 3/4 cup (175 ml).

Discover Ontario Honey
Ontario Beekeepers Association

SARA'S GARDEN SALAD

You will find the dressing for this next recipe is very useful for many types of garden salads. It has the right combination of sweet and tangy. And, of course, a salad dressing made with honey is smooth and pleasant, never gritty like one made with sugar.

1/3 cup	75 ml	oil
2 tablespoons	30 ml	honey
2 tablespoons	30 ml	frozen orange juice, undiluted
1	1	clove garlic
1 teaspoon	5 ml	salt
3/4 teaspoon	4 ml	dry mustard
1/2 teaspoon	2 ml	celery seed
1/2 teaspoon	2 ml	paprika
1/4 teaspoon	1 ml	pepper
1	1	head lettuce
1	1	tomato
1 cup	250 ml	cauliflower florets
1	1	avocado, diced
1/2 cup	125 ml	blanched almonds, toasted, diced

Process oil, honey, orange juice, garlic, salt, mustard, celery seed, paprika and pepper in blender until well mixed. Break up head of lettuce in bowl and cover the top with tomato wedges, cauliflower florets and diced avocado. Pour dressing over the top and sprinkle with toasted almonds. Serves 6 to 8.

A Honey Of A Cookbook
Alberta Beekeepers Association

Most of Canada's beekeepers are hobbyists who make their honey primarily from alfalfa, buckwheat, canola, clover and sunflower. In some areas, honey from the blackberry, blueberry and cranberry is obtained. Fireweed, maple, raspberry and goldenrod are also regional honey sources.

GRILLED STEAKS WITH FLUFFY HORSERADISH SAUCE

If your outdoor grill is still ready for making supper, try this sauce on your next steaks.

Place 2.5 to 4 cm (1 to 1-1/2 inches) thick, tender steaks on preheated grill. Broil 12 to 15 minutes for medium-rare, turning once. Serve with fluffy horseradish sauce. To make the sauce, blend the following ingredients:

1/2 cup	125 ml	dairy sour cream
2 tablespoons	30 ml	prepared horseradish, drained
1 tablespoon	15 ml	lemon juice
1 tablespoon	15 ml	honey
2 teaspoons	10 ml	freeze-dried chives

After blending the ingredients, cover and refrigerate 3 to 4 hours. Makes 2/3 cup (160 ml) sauce.

Manitoba Honey . . . Naturally Pure
Manitoba Beekeepers' Association, Red River Apiarists' Association, Brandon Area Beekeepers' Association

A coffee cake is certainly a perfect accompaniment to a cup of good coffee. Since a brunch would not be complete without a coffee cake, make this recipe for your next relaxing Sunday brunch.

APPLE HONEY COFFEE CAKE

Served warm, the flavour and aroma of this cake are irresistible!

Apple Honey Topping

1/3 cup	75 ml	honey
1/3 cup	75 ml	melted butter
1/2 cup	125 ml	whole pecans
1 teaspoon	5 ml	cinnamon
1	1	large apple, pared, cored, thinly sliced

Combine honey, butter, pecans and cinnamon in a 9 x 9-inch (2.5 L) greased baking pan. Arrange apple slices evenly over honey mixture. Set pan aside.

Coffee Cake

1 package	1package	dry yeast
3/4 cup	200 ml	warm water
1/4 cup	50 ml	honey
1 teaspoon	5 ml	salt
1	1	egg, lightly beaten
1/4 cup	50 ml	shortening
2-1/4 cups	550 ml	all-purpose flour

Dissolve yeast in warm water in large mixing bowl; let stand 10 minutes. Stir in honey, salt, egg and shortening. Add 1 cup (250 ml) of the flour and beat vigorously. Gradually stir in enough remaining flour to make a soft, sticky batter. Drop batter by spoonfuls onto topping in pan. Cover and let rise in a warm place until doubled, about 1 hour. Bake at 375°F (190°C) for 30 to 35 minutes or until golden brown. Immediately invert pan onto serving plate. Serve warm.

From Canada's Honey Producers

HONEY YOGURT SALAD DRESSING

Sometimes you need a quick, simple salad dressing. This recipe is just that. Honey blends well with the tangy flavour of yogurt.

1 cup	250 ml	plain yogurt
1/4 cup	50 ml	honey
2 tablespoons	25 ml	poppy seeds
pinch	pinch	ginger

Whisk ingredients together and drizzle over salae.

Canadian Honey Council

PEAR & APPLE HONEY TURNOVERS

Do you have some vanilla ice cream handy? Perhaps even honey vanilla? If so, make some of these turnovers to serve with that ice cream.

1-1/2 cups	375 ml	apple, pared, cored and chopped
1-1/2 cups	375 ml	pear, pared, cored and chopped
1/3 cup	75 ml	honey
1 tablespoon	15 ml	lemon juice
1 tablespoon	15 ml	cornstarch
1/4 teaspoon	1 ml	cinnamon

pastry for a 2-crust pie

Combine fruit, honey, lemon juice, cornstarch and cinnamon in a saucepan. Over medium heat, cook and stir until bubbling and thickened. Cool. Roll out pastry 1/8-inch (0.2 cm) thick and cut into 12 4-inch (10 cm) squares. Place about 1 tablespoon (15 ml) of filling on half of each square. Moisten the edges of the dough and fold to make a triangle. Seal edges by pressing together with tines of a fork. Prick the top of each turnover to allow steam to escape. Place turnovers on ungreased baking sheets and bake at 425°F (220°C) for 15 minutes or until lightly browned. Makes 12 turnovers.

Manitoba Honey Recipes

PINEAPPLE CHICKEN CHOW MEIN

Since Apimondia is meeting in British Columbia, a recipe from the B.C. beekeepers is appropriate.

1/4 cup	50 ml	cooking oil
1 cup	250 ml	thinly sliced onion
3 cups	750 ml	finely chopped celery
1 can (10 oz)	1 can (284 ml)	bean sprouts, drained
1 can (14 oz)	1 can (398 ml)	pineapple tidbits, drained
2	2	chicken bouillon cubes
1/2 cup	125 ml	boiling water
1/4 teaspoon	1 ml	pepper
2 tablespoons	25 ml	honey
2 tablespoons	25 ml	cornstarch
1/4 cup	50 ml	soy sauce
2 cups	500 ml	chopped, hot, cooked chicken

chow mein noodles

Heat oil in a large, heavy saucepan over medium heat. Add onion, celery, drained bean sprouts, drained pineapple, bouillon cubes dissolved in boiling water, pepper and honey. Cover; bring to a boil. Reduce heat. Cook 3 to 4 minutes. Blend cornstarch and soy sauce. Stir into vegetables. Add chicken. Cook, stirring constantly, until thickened, about 3 minutes. Serve immediately over chow mein noodles. Makes 4 to 5 servings.

B.C. Honey Producers Association Gourmet Honey Recipe Book

Thank you, Canada, for these absolutely delicious recipes. Now we can enjoy a visit all through the year.

?Do You Know? Answers

1. **True** The honey bee life cycle, regardless of caste, is composed of four life stages: egg, larva, pupa and adult.
2. **False** The pupal stage in all three honey bee castes is the longest developmental stage. The egg stage lasts three days and the queen, worker and drone larval stages lasts 5.5, 6.0 and 6.5 days, respectively. The queen pupal stage is 7.5 days, worker pupal stage is 12 days and drone pupal stage is 14.5 days.
3. **True** Both fertilized and unfertilized honey bee eggs are white in color and cylindrical in shape having the appearance of a tiny white sausage. Even though they may vary in length and width, these size differences are not related to whether they are fertilized or not fertilized.
4. **True** Within the worker caste, the egg stage lasts three days, larval stage 6 days and pupal stage 12 days. Therefore, within the brood nest that is developing under ideal conditions, you would expect to have twice as many larvae as eggs and four times as many pupae (capped cells) as eggs.
5. **True** The honey bee larva is a whitish wormlike grub that is essentially an eating machine designed for rapid growth with a huge digestive system. It has no eyes, legs, or antennae, possessing a simple mouth which needs only to lap up the copious amounts of food placed in the cell by the nurse bees.
6. **False** Queens produced in preparation for swarming or supersedure of the old queen are normally higher in quality than queens produced in emergency queen cells. Supersedure cells are normally larger than emergency cells, which is related to the origin and care of the cells. Supersedure queen cells typically begin from queen cups containing an egg, whereas, an emergency cell is normally started by modifying a worker cell containing a young larva. Starting as an egg in a cup usually means a larger cell since the larva receives a larger quantity of royal jelly over a longer period of time.
7. **True** Brood rearing in colonies in the extreme southern parts of the United States do not have a break in the brood rearing cycle. In tropical and semi-tropical areas, brood rearing is controlled more by the availability of food which is controlled by the availability of water, than by temperature and daylength.
8. **False** During the first two to three days of larval life, regardless of caste, each larva is mass fed large quantities of royal jelly. As this mass feeding period comes to a close, the quality of the brood food changes, impacting caste determination and rate of development.
9. **True** Nurse bees begin to visit cells as soon as eggs are laid and continue at frequent intervals throughout the duration of the egg and larval stages.
10. First the queen sticks her head in a cell and inspects it to see if it has been cleaned, ready to receive an egg. Secondly, the queen measures the width of the cell with her fore-legs to determine if it is a worker- or drone-sized cell.
11. A) days 8-9
    B) day 3
    C) day 4
    D) day 10
    E) day 20
    F) day 11
    G) days 9-10
12. Molting is the process during which the larva casts off its exoskeleton and grows a new larger one to accommodate its increase in size brought about by feeding in the periods between molts. When molting occurs, the skin splits over the head and slips off the posterior end of the larva. This process normally takes less than 30 minutes.
13. Absconding differs from swarming in that: a) the entire colony moves to a new location in response to unsatisfactory conditions in the nest: and b) it is not associated with the rearing of a new queen.
14. In order to defend their colony, guard bees must be able to distinguish workers from their own and other colonies. Odor is the primary stimulus used by guard bees to recognize intruders. All adult bees in a colony share the same odor which is different from that of any other colony. In addition, the behavior of the bee they are examining, is also used by guard bees to determine if they are friend or foe. Some intruders fight back or attempt to escape while others exhibit a submissive behavior during examination.
15. Initially the cooling process involves cluster expansion and fanning. Groups of fanning bees are found throughout the brood nest and at the nest entrance; expelling currents of warn air from the hive. When cluster expansion and ventilation cannot cool the nest adequately, water collection and evaporation are used.

There were 25 points in the test this month. 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

Clarence Collison is a Professor of Entomology and Head of the Department of Entomology and Plant Pathology at MS State University, Mississippi State, MS.

Richard Taylor

Bee Talk

"I can think of no other branch of agriculture in which one achieves *greatness* just by being good at it."

Apiculture is the only branch of husbandry I know of that has its own mystique. The beekeeper is surrounded by a kind of romantic aura. I think there are several things about me that might be interesting to the curious – my strange family, for example, with children born 40 years apart – but what others seem to find most interesting is that I am a *beekeeper*. Sometimes strangers, stopping at my honey stand, look at me with a kind of awe, as if from another world.

I have no idea why this is. It may be partly due to the very long literary tradition involving beekeeping. Many of the books, especially the older ones, portray beekeeping in a highly romantic light. There are, of course, exotic branches of husbandry, such as ostrich farming, that one might expect to excite this kind of fascination, but they don't. Or you might think that producing maple syrup would create a similar sodality among its devotees, but that hasn't happened either. I once found myself at a meeting of beekeepers in a large hall where the maple syrup people were meeting, at the other end, at the same time, and the atmosphere of the two meetings was utterly different. The beekeepers were animated by a spirit of friendliness and talkativeness. They wanted to talk about bees, speculate on nectar sources, and all sorts of things, while the syrup people just talked about the price of syrup.

I saw a wonderful expression of this uniqueness at my first international meeting of beekeepers, in 1968. There were all the beekeepers, big and small, famous and unknown, all mingling together with the quality bestowed by their common passion. Many had cameras, and were taking pictures of each other, especially of the famous faces from abroad. I particularly remember the then secretary of the EAS who gazed across the filled auditorium with wonder and remarked, "Every great in the world is here!" I can think of no other branch of agriculture in which one achieves *greatness* just by being good at it. Certainly one would not gaze out upon an assemblage of cattle ranchers or poultrymen and make such a remark.

If you are a beekeeper, driving across the countryside, and you see an apiary, you instantly feel a kind of bond with its owner, totally unknown to you. I have even been known to stop and go knock at the door, to swap stories with the stranger who shared with me the special world of beekeeping. Indeed, a beekeeper is somehow automatically a friend to every other beekeeper in the world. A few years ago a beekeeper from Sweden came to these parts, bent upon meeting and talking with every beekeeper he could find. Even though he was hitherto unknown to any of us, he was welcomed by all, and by the apicultural experts at Cornell. All any of us needed to know about him was that he was a beekeeper. Just like us.

This special aspect of beekeeping had its downside for me many years ago. I had been writing this column in what was then called *Gleanings In Bee Culture* and it eventually began to attract some readers. And this started to bring beekeepers *to* my door in increasing numbers, almost always unexpectedly, and almost always when I was very busy. Typically a stranger would appear and say something like: "Me and the Mrs. found that we were in Trumansburg, so I says to her, 'let's look up doc Taylor.'" Of course, like any beekeeper, I like to meet and talk with other beekeepers, but this soon became a problem, especially for a very busy person with schedules to keep. I solved this problem by choosing a new mailing address at a nearby town, where I asked the postmaster not to give out my real address. This also solved the problem of phone calls. Beekeepers were constantly calling from all over the country with their questions, almost always as I was sitting down to dinner. Usually they would say "I'll just take a minute of your time," but there they were, 15 minutes later, still talking about bees.

Of course one thing that contributes to this special aura that surrounds our craft is that it is inherently interesting, especially to anyone who loves nature and is sensitive to its mysteries. This is why so much has been written about bees – more, in fact, than about any other animal with the exception of ourselves. There is not a great deal to be said, from the standpoint of botany, about a maple tree, beyond what has already been said long ago, and the same can be said of all the other plants and animals that we keep for their products. But new and wonderful things are being discovered about bees all the time. And our keeping of them not only provides us with something edible, as in the case of vegetables, poultry and whatnot. We are given what is perhaps the most delectable food on earth and, in the form of comb honey, something lovely to see as well.

All these things combine to make a meeting of beekeepers a special event. You get to mingle with other beekeepers, all of them

Continued on Next Page

BEE TALK ... Cont. From Pg. 53

friends, including those you have not met before, and you get to hear talks, some of them profoundly interesting, relating to new discoveries in the world of the honey bee. And the beauty of it is that there always are new discoveries. BC

Richard Taylor is a philosopher and lifelong beekeeper who lives in the Finger Lakes region of New York.

Questions?

Can't Bear To Pitch

What is the best thing to do with back copies of *Bee Culture*? I hate to throw them away.

Like *National Geographic*, bee journals tend to pile up. I once heard of a ceiling collapsing under the weight of the *Geographics* in the attic. Beekeepers sometimes imagine that a long, unbroken run of bee journals will be gratefully received by some library, but this is seldom if ever true. The best thing you can do with back issues of *Bee Culture* is to leave them, one at a time, in the office of your dentist or physician.

Keeping AHB Out

Africanized bees have been found in my area, and I am told that I can keep them from getting into my hives by using pollen traps, which will prevent any Africanized queen from getting in. Will that really work?

Anthony Richards
Inverness, FL

I doubt it. Sooner or later, in the normal course of things, you are going to have virgin queens in your hives that will need to fly out to mate, perhaps with Africanized drones, and such a newly mated queen would, I think, have no difficulty getting through a pollen trap.

Prevent Destruction?

How are southern producers of package bees and queens going to prevent Africanized stock from destroying the bee breeding programs?

J.B. Barrett
Gaston, IN

In my opinion this is going to become an insuperable problem, especially in the Gulf states, and queen rearing will have to be done elsewhere. Queen rearing in northern states is already expanding, but this, of course, means that the queens will be later in coming. Package bee business, I believe, will suffer most.

Hungry Bees

I read that a colony of bees consumes honey fastest in Winter, as fuel to stay warm, but later read the honey consumption is fastest in the Spring, during brood rearing. Which is correct?

J.B. Barrett
Gaston, IN

Honey is consumed fastest in the Spring, during the build up period of heavy brood rearing.

What Killed Them?

I lost my two colonies in the Fall or early Winter. There was plenty of honey, the syrup feeders were full, and the TM patties were untouched. I don't know why they died. I decided to salvage the honey, but discovered that it is not clear. It is whitish and dense. The bottom of the container has a solid white sediment.

Dominick J. Fufalino
Norwood Park, IL

I cannot be sure from your description, but this sounds like a mite kill. You do not mention treating with Apistan. As for the honey, it is probably okay; try it and see how it tastes. In any case, it can be fed back to bees without danger.

Contaminated Honey

My bees come into Spring with lots of capped honey in the hives. I used to extract most of this, but now, since the honey has been in the presence of Apistan, I consider it contaminated and do not know what to do with it. Just giving it back to the bees seems to me to get nowhere. Any suggestions?

Mike Hebb
S. Strafford, VT

I would give it back to the bees. I do not think this would be wasteful, because the more honey they have the faster they build up to store more honey.

Torch To Scorch

I acquired a large number of used supers and am cleaning the old wax from the frames. I can use a torch to scorch the inside of the supers, but how do I deal with the frames? I know there was wax moth damage.

William Talbott
Carrollton, OH

Neither wax moths nor mites contaminate equipment so you do not have to worry about that. Unless you have some reason to believe that the equipment may have been infected with American foulbrood, then chances are it was not, and you can use the equipment without any sterilizing. If you think there is a danger of AFB, then the frames can be dipped in boiling water.

Questions are welcomed. Address: Dr. Richard Taylor, Box 352, Interlaken, New York 14847 enclosing a stamped envelope for response.

Answers!

Richard Taylor

INNER ... Cont. From Pg. 6

lions of hives, thousands of beekeepers and only a few with badges. (Remember though, there are *some* with badges out there, and they can, and will enforce the laws that exist.) The ultimate responsibility lies, however, with the user. That's YOU, by the way. Yes, CheckMite+ is an organophosphate that can, and will injure mites, bees and beekeepers. But so can fluvalinate. Or aluminum phosphide. Or paradichlorobenzine. Or a smoker run amok in a truck bed.

Please, until other chemicals are available do not condemn what we have. It isn't the best there is, but it's the only other, and for some the *only* means there is to keep bees. Be careful. Be cautious. Be legal. If you are, you and your bees will all be here next year.

•

Even if Apimondia isn't on your agenda this month, and EAS didn't make it in July, or the Federation gathering in Texas or the Honey Producers California meeting isn't in your plans... they all have one thing in common and one thing to attend to – Good Planning.

You've been to a meeting, somewhere, sometime, where planning, was, well, only a C, or at best a C+. Frustration, disappointment, maybe even anger was the result. Long term, those feelings can lead to loss of members or attendees and worse – money. This happens in every group, association and club sometimes and in some lots of times, for awhile anyway.

Planning a meeting is a complex business. It gets easier with practice, but it never gets easy. And even the smallest monthly county association meeting needs a plan, and, interestingly, a routine.

Who plans your meetings? Somebody needs to be in charge, which means that there needs to be something to be in charge of. Often the job of 'Program Director' is a lonely spot. Sometimes there's some direction from the President or members, like, let's do something on *Varroa* sometime, o.k.?

Finding speakers, or coaxing members to talk on a variety of subjects, for a year's worth of meetings can be a challenge. But even with that there are the other things. Opening the building, chairs, tables, projector, books, videos, drink stuff, cups... the list goes on.

And it needs done, every month. Many groups divide some of the chores so one person doesn't do it all, all the time. Coming early and staying late gets old and if your group abuses that one, or even those few for long they more often than not quit. So you not only have to find someone else, but you've lost a ready (but please, not all of the time and not forever) volunteer.

Larger meetings, of course, require even more planning, and the big stuff – speakers, dates, buildings – usually are handled fairly routinely. It's the details, though, that make or break an attendee's good time.

Registration procedures, lights, projector problems, speakers running too long, breaks running too long . . . all are details, but any one can ruin, or cause distractions at any size meeting.

The next time you attend any meeting, for any group, observe what went well, if you can, (smooth meetings are hard to define, just because things work so well). Then try to find some things that didn't. Then, for your next meeting lend a hand, offer some suggestions, do the work, and try and emulate what you know is good, and avoid the rest.

So when you're pulling honey this month, remember that it's National Honey Month, keep your capping knife sharp, your filters clean, and plan ahead.

Gleanings

SEPTEMBER, 1999 • ALL THE NEWS THAT FITS

EAS CHANGES CHAIRS

Kim Flottum, Medina, Ohio was elected Chairman of the Board for the Eastern Apicultural Society at the annual Summer conference in July, held in Maryville, TN. Flottum held the CT Director's position several years ago, was President when EAS met in Wooster, Ohio, in 1995 and has served in several appointed positions since then.

Interested in continuing the direction the Society has been going under Emeritus Chair, Dr. Dewey Caron, DE, Flottum is also interested in making sure EAS keeps up with the changing face of U.S. beekeeping by stressing the educational efforts of the group, and increasing opportunities for EAS Master Beekeepers, and for the group's intensive 2-1/2 day annual short course.

John Root, President of the A.I. Root Co. and Publisher of *Bee Culture* Magazine of which Flottum is the Editor, was the first Chairman of the Board for EAS. He also served as President in 1978 and Sites Chairman for many years.

The Eastern Apicultural Society is composed of 21 member states and 5 Canadian provinces, all located east of the Mississippi River. The Society holds regular Director's meetings, has an annual week-long conference, and sponsors a Master Beekeeper program. They also annually honor an outstanding Apicultural scientist with the prestigious Hambleton Award, give a graduate student award, fund research projects and sponsor several other awards. They have an annual Honey Show at the conference and publish four newsletters a year. They will next meet in Salisbury MD, July 31-August 4, 2000.

Be Careful In NZ

BEE PRODUCT LABELS

The New Zealand government is to establish an expert working group to review the warning regime for dietary supplements and foods containing bee products.

Associate Health Minister Tuariki Delamere said the review follows the introduction in April of an amendment to the New Zealand Food Standard law of 1996 which introduced mandatory warnings for products containing royal jelly, bee pollen or propolis.

Previously, warnings were placed voluntarily on most products.

The working group will be made up of food and public health scientists, including a scientist from the bee industry, although final membership of the group has yet to be decided.

The group will advise on whether the precautionary approach to warnings is appropriate; the quality of evidence that led to the mandatory requirement was adequate; and the quality and extent of the risk assessment and consultation was adequate and appropriate.

–Alan Harman

And You Can Get Them Next Spring

THE RUSSIANS ARE HERE!

Hardy Russian honey bees that resist attack by devastating *Varroa* mites will be showing up in American beehives within a year, thanks to scientists in LA with the Agricultural Research Service, USDA's chief research wing. Russian bees' genetic resistance will provide beekeepers with a tool – in addition to chemical pesticides – to control the mites.

Varroa mites – eight-legged parasites – are among the worst enemies of honey bees worldwide. In the U.S., the mites have attacked bees in almost every state. Though only about 1/16-inch in size, they can destroy a hive of tens of thousands of bees in as little as 6 months. The mites have also eliminated most of North America's wild honey bees.

Under a Cooperative Research and Development Agreement signed this week by ARS and Bernard's Apiaries, Inc., Breaux Bridge, LA, bee breeder Steven Bernard is authorized to raise hundreds of Russian honey bee queens this Fall and Winter. The bees will be available for sale to U.S. beekeepers early next year. The beekeepers will use the queens to produce more queens for populating hives with mite-resistant offspring. These offspring will be fathered by drones, from the American hives.

Compared to domestic honey bees, the Russian bees are more than twice as resistant to attack by *Varroa* mites, according to tests by geneticist Thomas Rinderer and colleagues at ARS' Honey Bee Breeding, Genetics and Physiology Research Unit in Baton Rouge, LA.

The domestic honey bee and the Russian honey bee are the same species, *Apis mellifera*. But the Russian bees have had to develop resistance to survive in their homeland, the mite-infested Primorsky region of far eastern Russia. Rinderer studied the bees there, then imported them under a federal permit. He said it is likely that wild – as well as domesticated – honey bees in the U.S. will eventually have Russian honey bee parentage.

These bees now being tested at the ARS Honey Bee Breeding, Genetics, and Physiology Research Unit in Baton Rouge, LA and reared at Bernard's Apiaries, Inc., in Breaux Bridge, LA, are generally gentle and produce honey at about the same level as commonly used commercial stocks according to Rinderer.

Through a newly signed Cooperative Research and Development Agreement, Bernard's is now taking orders for breeder queens. The breeder queens will be produced this Fall and Winter for shipment to customers early in the year 2000. Breeders queens can be ordered from Bernard's Apiaries, Inc., 1025 Bernard St., Henderson Station, Breaux Bridge, LA 70517-7875, phone and FAX 318.228.7535, email: sbernhoney@aol.com. Orders must be received by September 30, to ensure delivery. Orders received after September 30 will be accepted on a first-come basis, based on queen availability. The order of acceptance will be based on FAX or email time and date or postmark date.

"Our experience with hybrids of Russian and domestic stocks during the past year has been favorable," Rinderer noted. "However, depending upon the drones that a beekeeper uses to mate with the Russian queens," he said, the characteristics of the hybrid offspring may be highly varied. That's why we're asking everyone who buys a Russian queen to let us know about the performance of their bees. We can use that information in our ongoing program to improve the performance of the Russian stock."

ABF Supports
HONEY BOARD CHANGES

The National Honey Board is changing its management arrangement. The Board is reviewing proposals from independent firms to take over the NHB office and carry out the Board programs. Currently, the office staff are all NHB employees.

Bob Smith and Sherry Jennings have announced that they are leaving the NHB at year's end to form a management company which will seek clients such as the Honey Board. They predict cost savings to such boards as compared to operating with captive employees, by spreading overhead costs over a bigger base.

Such a marked change, quite naturally, raises many questions. The Honey Board members are meeting regularly via conference calls to consider all these questions and to set the best course for the future of the Honey Board. We are confident that they will make the proper decision.

The current and former members of the Honey Board and the current and former members of the NHB staff have recorded tremendous accomplishments to the benefit of the honey industry. We are confident that the current and future Board members and the current and future NHB staffers will continue to have a positive impact on the honey industry.

Bob Smith and Sherry Jennings each have been on the NHB staff more than nine years. They have played major roles in the Honey Board's successes. It is only fitting – and good business sense – that their new firm would be given due consideration as the possible management firm. Regardless of who gets the contract, we would expect little, if any, change in day-to-day contact with the NHB office. Such management arrangements are common; most members/clients deal with "managed" offices without any knowledge of such arrangements.

The 13 members of the National Honey Board were selected by you – the U.S. honey and beekeeping industry – through the Nominations Committee process. The industry installed them in this position of tremendous responsibility. Through your votes in the various referenda, you have given overwhelming endorsements to the Honey Board program. You have demonstrated your confidence in their ability.

Next year, you will have another opportunity to endorse the Honey Board in a referendum and to approve an expansion of the NHB programs to fighting honey adulteration and funding beekeeping research. The ABF has worked hard to effect these positive changes and our members have consistently backed this effort by resolutions at our annual meetings.

We encourage you to stay abreast of the happenings at the Honey Board – after all, they are spending your money. We also encourage you to seek ways to use Honey Board materials and programs to augment your own marketing activities.

Clint Walker, III
ABF Vice President
Jesup, GA

Yield Increases
CANOLA POLLINATION PAYS

Australian research has found that using a beekeeper's pollination services can increase a farmer's canola yield by up to 16 percent. Agriculture Western Australia research officer Rob Manning came up with the figures after two years of on-farm field research. "During the 1996 trial, this worked out at an estimated $140 a hectare, but this is determined by the canola price on the world market," he said.

Early results from another trial in 1997 also indicated a significant increase return for canola growers. Manning found the closer the hives were placed to the crop, the better the yield result - and if the stocking rate was raised to three hives a hectare it could be possible to increase the yields further. Farmers would not see the difference by simply walking through the canola crop, he said, but measurements of plant height, branch number and density together with pod numbers and seed weights showed the improvements. "Plus, if the seed is more viable, it's got more vigor," Manning said. "So when the seed is used the following year, the farmer gets a better plant and improved germination rates, providing a better quality plant again to pollinate."

By contrast, other research has shown that if the same seed is used over and over again from self pollinated crops the seed yield vigor drops and oil quality is compromised.

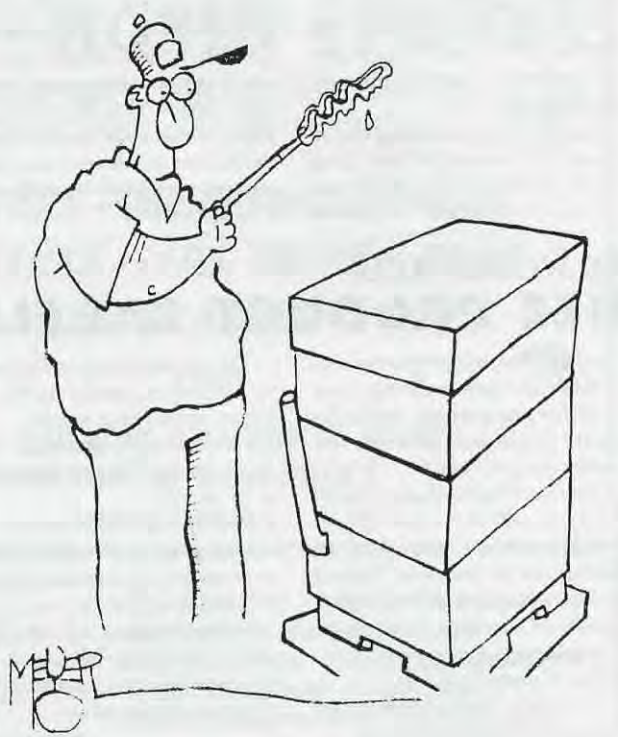
The research results have been an eye-opener to Australian farmers who saw honey collected from their crops but questioned whether the beekeeping activity increased their yields.

Manning began his research in 1996 when he first placed hives in canola fields. He found the 16-percent increase came when the hive stocking rates were set at one per hectare. Manning, who used the karoo Canola variety said the increase in yield would probably vary between different varieties of canola. "Each variety had its own particular nectar and pollen quality which may or may not attract bees to the same degree," he said. But no matter the canola variety, Manning said commercial pollination would make a difference.

"Farmers are getting value for their money when they pay for hives to be placed in their crops," he said. "The trial has proven it represents money in their back pocket."

In both experiments, conducted at different locations north of Perth, Manning compared his results with those of neighboring crops that did not use honeybees.

by Alan Harman



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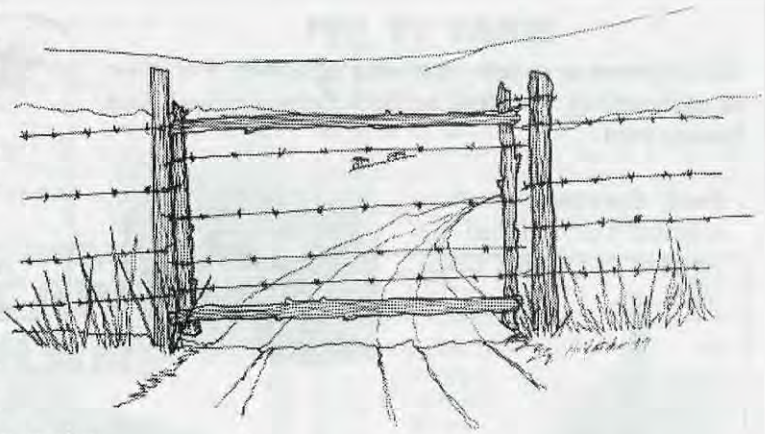
Good Fences . . .

Ed Hughes



My farmer friend, Kurt, left me a message saying that he was going away for a few weeks and that if I intended to work my bees while he was gone, I should bring a fence puller with me because he had the gates clinched up pretty tight. I have opened many a tight pasture gate in my life, and I've developed some special techniques for opening the extra-tight ones. So I wasn't worried.

We waited for a warm day before checking the bees. When we got to the first gate, my wife, Bobbalee, asked me which way I was going to swing it – toward the truck or away from the truck. It was too hot for taking extra steps, so I thought carefully, calculating the minimum number of steps I would have to take for swinging it this way or that.

"I'll be swinging it away from the truck," I said confidently.

Approaching the gate, I plucked the top wire just to see how tight old Kurt had gotten it. Surprisingly, it gave off a very low-pitched, almost menacing, hum.

Always looking to impress Bobbalee, I tried my one-handed technique first. The gate didn't even jiggle. I followed with a two-hander, a lunging bull approach and a karate kick. Nothing.

Sensing that the level of violence was escalating, Bobbalee intervened.

"How are you ever going to shut it if you do get it open?"

It was a good point.

We had had some trouble this Spring with the wind blowing over some of our empties that we stored out at Kurt's. Fearful that some of the empty supers on top of the hives might also blow off, I'd brought some heavy rocks with me.

In most places in the world, people have rocks just lying around, often within a few steps of their hives. On the edge of the Sand Hills in Nebraska, rocks are rare. I actually had a neighbor come over one evening offering me a fist-sized rock as a kind of friendly gesture. He had found it under an old shed he was tearing down.

"I can't thank you enough, Eldon, for this nice rock."

"Well, you said you needed 'em."

"I sure do, and any others you should happen to find."

To minimize the number of things we would have to carry the remaining half-mile to the hives, Bobbalee suggested we don our suits on the spot before we began our march across the plains. I put on everything I could wear, stuffed my pockets with smoker fuel, and hoisted the bag of rocks over my shoulder.

As we trudged along under the hot sun, I kept one eye cocked for rattlesnakes and another toward the Smithson ranch a mile away. I could see the front porch, and if they came out, they would certainly see us. I imagined what they might say to each other and their neighbors if they saw us.

"Martha, come quick – there are Ed and Bobbalee Hughes laying siege to their hives again."

"They must have some fearsome bees to have to put their suits on when they are so far away. Do you reckon that's a half-mile or a mile?"

"Probably more like a mile, and then the way he's going they'll have to clamber up the face."

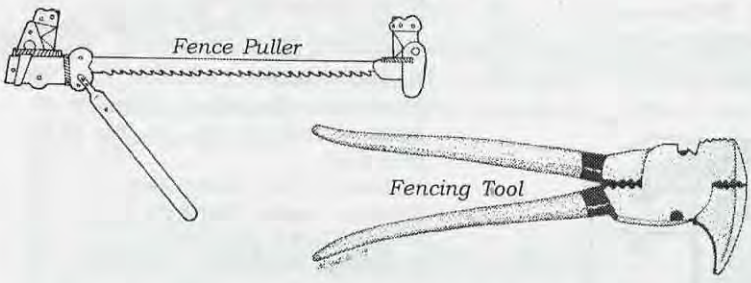
"They're kind of an odd couple aren't they?"

"Maybe we should go give them a lift."

"No, no. Look, he got up again. He'll make it."

And I did, but next time I'm bringing the fence puller.

Necessary Beekeeping Tools



BOTTOM BOARD