Bee Culture

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South Dakota hives in 2003 getting ready to move to almonds. Early snow and just a bit of procrastination makes for a difficult move. (Brett Adee photo)

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JANUARY 2005 VOLUME 133 NUMBER 1

FEATURES

DEPARTMENTS & COLUMNS

KEEP IN TOUCH

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MAILBOX

Killing Hive Beetles

I wish to report an interesting experience. When I robbed one of my hives this past Summer, I found in it 20 to 30 adult hive beetles. Uncertain about what I could do, I decided to take a long shot and placed about a half dozen Harris Roach tablets in the hive. When I opened the hive this Fall to requeen, there was no evidence of hive beetles. Boric acid is the only active ingredient in this tablet.

I thought that someone might wish to try a similar experiment to see if the treatment has any merit.

I would appreciate having feed back if anyone tries this.

Oliver Osborn
P.O. Box 537
Lake Jackson, TX 77566

Keeping Bears Away

Scanning the last *Bee Culture* I noticed a note that a beekeeper was having trouble with bears. He moved his hives and lost them again. He was giving up until a way was found to keep them away.

Here in Vermont bears are numerous. Many hives have been marked, including some of mine. I got the idea that making it very uncomfortable for them was the way out.

Using ¾" plywood approximately 12" x 14" or larger, about three inches apart, using sheet screws long enough to protrude an inch, I laid them around the hives. When working around the hives I turn them over. Several beekeepers are using bear board with excellent control.

I have had good results for the last two years. My hives are all by themselves near a Market Garden. They have not been molested in two years. Using smaller boards near the entrance keeps the skunks away also.

Don't be bashful, use enough boards so they can't miss them. Cover with some grass to camouflage.

Bob Tracy
Waitsfield, VT

Bee-side Myself

The kamikaze honey bee scored a direct hit on my windshield. She groggily arched her body, wiggled her sting, and tumbled through the turbulence of the car's wake. To my horror, she was sucked inside my van window and down into the leg of my shorts.

I managed to drive to a nearby parking lot while gritting my teeth and waiting for the impending sting. Sweat trickled down my back.

I looked beside me for help from my teenaged son. The science whiz who once loved catching bees in jars and then releasing them was plastered against his window, eyes wide in disbelief. His mouth gaped open.

I tensed as I felt the shiver of six tiny bee feet stumbling around between my legs.

"Jason, help your mama," I whispered. A muffled buzz vibrated against my thigh.

"Wha—what can I do?" he squeaked. I told him to come around the car and to open the door. He hesitated.

"Come on, Jas!" I begged. The insect began dancing the disco version of "Flight of the Bumblebee" against my skin.

Jason approached my car door. Holding a plastic bag he had taken from inside the car, he sidled up to me.

Suddenly the bee emerged, buzzing and confused, and ambled up my thigh toward my knee. Jason squealed, reversed, and began jumping up and down and in circles. He resembled a drone in a social frenzy.

"I'm sorry, Mom, but you're on your own!" he yelled over his shoulder as he ran across the lot.

The bee zigzagged out the window at last, and I collapsed in relief on the seat. It occurred to me then that chivalry may not be dead, but it's certainly afraid of bees.

Beth A. Mlady
Parma, OH

"Good Old Days"

As we age we tend to bore listeners or readers with regularity, indifferent to the general concerns that what we have to say is either irrelevant to the times, distasteful or not sustainable in light of the preponderance of knowledge of the current generation.

So, please excuse me for disregarding my instincts while I digress a bit.

At about the age of 16 I became interested in beekeeping. It was my "thing," as if I needed any more responsibilities besides helping care for an assortment of cows, hogs, poultry, a large garden and, improbably, four horses what with having a tractor to do the heavy pulling.

My first mentor was a neighbor-beekeeper who apparently saw in me a promising student of beekeeping and perhaps a source of free labor. He very kindly asked me along to my first bee meeting held, as I remember, in a small village midway between my home and Medina, Ohio. It was presided over by Huber and E.R. Root, sons of A.I. Root, founder of the company bearing his name. Mr. Self, my sponsor, also asked me to accompany me to another meeting in Columbus, Ohio but I do not remember the occasion, except that I had the opportunity to meet Dr. Dunham then apiculture professor at The Ohio State University.

Now that I have revealed something of my anecdotage you will probably expect me to elaborate upon some of the virtues of

Continued on Next Page

MAILBOX

the "good old days" when bees and beekeeping were not encumbered with problems of mites, hive beetles, honey imports, diminishing forage, excessive business regulations and other blessings that infringe upon or endanger apiculturists.

Well, they were "good old days," but not for the reasons that you may expect me to expound upon. They were so because I was then a kid, eager to learn about something that offered a seemingly wonderful insight into a sphere of nature in which I was directly involved, a beautiful green, luminous, mysteriously heterogeneous world that intrigued this 16-year-old. I know this sounds "corny" when compared to the world of our grandchildren surrounded by the smothering urban "advantages" of their generation. Are they the better for it for having instant gratifications, possessions beyond belief and opportunities without sacrifices that we missed but accepted as the lot of being young? I don't propose to even make a statement in regard to such philosophical questions. If aging teaches nothing else it is to reserve judgments about matters that do not concern our own circumstances. I will say that beekeeping knowledge today has certainly been elevated to a high level as compared to those days when bees and their keepers were on about the same level of understanding.

The ultimate test of our respective cognitive powers may be whether we and the ubiquitous insects can survive the epic years ahead.

Larry Goltz
Redding, CA

INNER COVER

So, you going to try some Kiwi bees this year? Maybe an Aussie package or two? Already sellers are lining up to meet the expected demand.

They'll be ready early, no doubt. You can probably get February queens if you live far enough south. Maybe even in January. That's definitely a plus.

Just a thought. Maybe have them inspected when they get in. Take a few samples in the freezer. Look for . . . well, things that don't belong there. Or at least things you don't want. And let us know how they did. Were they any good?

•

What comes to mind when you hear "affordable prices, vast variety, abundant fresh foods and convenience." Why, the 75-year-old supermarket concept, of course.

Started in Jamaica, NY in August, 1930, The King Kullen Store promoted itself as "The World's Greatest Price Wrecker." Following soon were Piggly Wiggly in Tennessee, Ralph's in California and Weingarten's in Texas. What made them all work, of course, was the commonly available automobile, lots of free parking, refrigerators in the home, the ubiquitous shopping cart, and thousands of products.

Wal-Mart may be bigger, faster and cheaper than these first launches, but they use the same identical retail marketing plan. Like beekeeping, there's not much terribly new in the world, is there?

•

Speaking of grocery stores, a recent report predicts that the market for organic foods is expected to generate $32 billion by 2009. It's growing at about 20%/year, compared to the 2-3%/year for conventional foods. Supermarkets account for nearly 40% of that growth. There were 1,700 new product introductions in 2004 that helped.

This is no longer the realm of the long-haired, sandal-wearing hippie of 40 years ago. Organic foods are sold nationwide in major supermarkets, including Wal-Mart. The new USDA Organic Standard has opened all these doors. Price, quality and distribution are comparable to standard products and consumers now easily recognize, seek and find what they're looking for.

Boy, I wish I could do organic honey, don't you?

•

$62.3, $59.9, $57.4, $56.2, and $56 – all in Billions. What are these? Agricultural export sales for 2004, 1996, 1997, 2003, and 2005(projected). Unfortunately, the U.S. is expected to export exactly what it imports in ag products this year. That's a first. Ag products have *always* been a surplus crop – we always sold more than we bought from other countries. Not anymore.

Why? Record crop production in the U.S. and the rest of the world, too. Increased supply = lower prices. Econ 101.

Some things sell well though. Tree nut exports (almonds head that pack), dairy products and red meat lead the way in sales to Japan, Mexico, Canada, the EU and China, our biggest customers.

We buy lots of added value products though, and are buying more every year. For instance, essential oils, snack foods, wine and beer, red meats, processed fruits and vegetables, fresh vegetables and those mysterious miscellaneous grocery products. We buy these from, mostly, the EU, Mexico, Canada, China, Indonesia, Brazil and Australia.

I was in Texas recently and bought a local pack of honey – by local I mean it had a label of a packer in Waxahachie, TX – that contained honey from the U.S., Mexico, Canada, Russia, Ukraine, Moldovia and India. All that in an attractive, easy-to-use eight-ounce plastic container.

My question, then, heard here before, is why are the exporters in these countries selling barrels for pennies a pound, when they could be putting it in attractive, easy-to-use plastic containers and sending them here, for much, much more. Value added seems to be the wave of the future for ag imports, doesn't it?

•

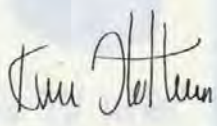
Of course much of next year's balanced trade (sales = imports) can be blamed on the decreasing value of the U.S. dollar abroad. The USDA didn't mention that in their Press Release though. As ineffective as the last Ag Secretary was, she was loyal, you can say that. Right up to the end.

But there's no denying the humongous deficit is creating financial shivers. The dollar may not even remain the world standard, but rather, the Euro may take the lead.

If you know somebody in Washington with some influence with these people I certainly would appreciate you speaking to them. This deficit thing is really, really, messing things up, isn't it?

•

Now's the time to make sure your smoker's been cleaned out, your hive tool sharpened, catalogs ordered, packages and queens (from wherever this year) lined up and plans made to attend all those Spring meetings. It's another New Year, and this one *will* be better.



A Few Questions For This Year?

JANUARY – REGIONAL HONEY PRICE REPORT

Our survey this month asked a variety of questions – where bees are kept, number of colonies this season, production, sale and pollination plans.

5% of our reporters keep their bees in an urban or city environment, while 8% have them in a small town (less than 20,000) locale. 11% consider their setting to be suburban. The majority, 76% have their bees in the country, which makes perfect sense, since only 14% of our reporters have fewer than 10 colonies. 29% have between 10 and 50, and 57% have more than 50. Average number, across all reporters and all regions is 245, with a range of 3 to 2,200.

Average yield, all reporters in all regions this season was 76#/colony, up a bit from the preliminary estimate published in the November issue of 70#/colony. This due to larger operations finishing extracting.

A third of our reporters move bees for pollination, but only 20% use a contract. That's actually up 25% from a couple of years ago. A handshake and a promise work for the rest.

Region 1. Sales this season steady so far. Average number of colonies 33, range 7 - 100. Yield average 61#/colony. Apples and blueberries in May.

Region 2. Sales so far steady to down. Average number of colonies 420, range 25 - 900. Yield 72#/colony. Cherries, pears and apples.

Region 3. Sales mixed so far. Average number of colonies 17, range 6 - 25. Yield 57#/colony. Peaches, raspberries, lima beans.

Region 4. Sales steady to up a bit this season. Average number of colonies 128, range 10 - 500. Yield 51#/colony. Apples, berries, pumpkins, clover, cotton and cantaloupe.

Region 5. Sales steady to up just a bit so far. Average number of colonies 125, range 15 - 300. Yield 115#/colony average. Oranges.

Region 6. Sales up this season so far. Average number of colonies 670, range 75 - 2,000. Yield 70#/colony. Mayhaws, blackberries, strawberries.

Region 7. Sales mostly steady to up a tad. Average number of colonies 310, range 20 - 2,000. Yield average 116#/colony. Apples, pumpkins, melons, cukes.

Region 8. About average sales mostly. Average number colonies 136, range 75 - 265. Yield 48#/colony. Peaches, strawberries, pumpkins, apples.

Region 9. Sales steady to up a bit so far. Average number of colonies 480, range 30 - 2,200. Yield average 79#/colony. Apples, squash, melons, almonds.

Region 10. Sales steady to up a bit so far this season. Average number of colonies 250, range 3 - 1,400. Average yield 91#/colony. Almonds, seeds.

Region 11. Sales only steady this season. Average number of colonies 48, range 12 - 175. Yield/colony 66#. Almonds, apples, cukes, pumpkins.

Region 12. Sales steady to down so far. Average number of colonies 315, range 120 - 600. Yield 78#/colony. Cherries, pumpkins, meadowfoam, almonds, apples, plums, avocados, pears, seeds.

	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																
55 gal. Light	1.12	1.00	1.12	1.18	1.00	1.13	1.25	1.45	1.00	1.13	1.45	1.40	1.00-1.45	1.18	1.19	1.47
55 gal. Amber	1.10	1.10	1.05	1.00	0.82	0.99	1.22	1.30	0.65	1.10	1.29	1.10	0.65-1.30	1.06	1.01	1.31
60# Light (retail)	96.00	118.40	120.99	95.13	105.00	120.00	101.44	100.00	128.00	125.00	165.00	115.00	95.13-165.00	115.83	113.83	101.83
60# Amber (retail)	95.00	101.65	117.14	94.25	95.00	102.50	94.50	95.00	115.00	117.14	165.00	95.50	94.25-165.00	107.31	100.09	95.55
Wholesale - Case Lots																
1/2# 24's	38.90	37.50	38.23	35.50	38.23	37.50	38.19	38.23	38.23	35.88	35.00	38.23	35.00-38.90	37.47	42.51	35.53
1# 24's	56.16	56.58	57.60	51.28	46.80	56.00	59.19	60.80	45.00	71.84	75.00	58.80	45.00-75.00	57.92	61.35	58.41
2# 12's	50.28	54.92	55.20	49.76	44.40	48.00	48.93	55.75	46.90	55.92	35.50	55.80	35.50-55.92	50.11	52.32	51.49
12 oz. Plas. 24's	48.28	50.88	54.00	49.03	46.00	48.00	47.19	48.00	40.60	47.82	69.50	45.60	40.60-69.50	49.57	50.49	48.59
5# 6's	58.21	61.04	64.10	51.23	64.10	60.00	57.85	60.10	54.60	56.43	65.00	64.10	51.23-65.00	59.73	59.84	53.86
Quarts 12's	76.00	90.75	82.20	74.19	70.00	83.33	81.19	76.20	78.83	82.36	87.20	72.00	70.00-90.75	79.52	80.76	76.76
Pints 12's	48.00	49.95	54.60	49.25	48.00	50.33	49.10	43.32	43.17	50.00	40.00	48.00	40.00-54.60	47.81	47.88	45.33
Retail Honey Prices																
1/2#	2.33	2.28	2.60	2.77	2.29	2.75	2.25	2.40	2.00	2.51	3.00	2.60	2.00-3.00	2.48	2.52	2.43
12 oz. Plastic	3.07	2.85	3.23	3.10	3.45	3.25	2.95	3.37	3.10	3.12	3.37	2.80	2.80-3.45	3.14	3.16	3.15
1 lb. Glass	3.35	3.25	3.73	4.01	3.53	3.75	3.47	4.17	3.91	4.10	3.97	3.75	3.25-4.17	3.75	3.79	3.75
2 lb. Glass	6.13	5.93	6.50	6.00	6.10	6.50	5.98	6.84	6.02	6.65	6.04	6.50	5.93-6.84	6.26	6.40	6.13
Pint	5.60	6.88	5.95	5.18	5.37	5.38	5.92	5.55	5.11	6.83	5.64	6.00	5.11-6.88	5.78	5.57	6.46
Quart	8.35	8.55	9.50	7.70	7.42	9.50	8.69	8.62	8.67	10.25	8.94	9.00	7.42-10.25	8.77	8.88	8.71
5 lb. Glass	12.90	13.10	15.50	12.75	13.00	13.50	12.81	14.50	13.95	14.42	12.76	13.73	12.75-15.50	13.58	13.18	12.58
1# Cream	4.38	4.64	4.92	4.33	4.92	3.95	4.39	4.98	4.92	4.81	4.88	4.00	3.95-4.98	4.59	4.75	4.32
1# Comb	5.00	4.54	4.75	5.23	5.34	4.50	5.32	4.25	3.99	5.93	5.50	5.00	3.99-5.93	4.94	4.99	4.13
Ross Round	5.10	3.85	3.60	5.16	5.10	4.50	5.45	4.50	5.00	5.63	6.00	5.10	3.60-6.00	4.92	4.70	4.54
Wax (Light)	2.13	2.08	2.00	2.17	1.20	2.13	2.25	2.50	1.89	1.10	1.43	2.00	1.10-2.50	1.32	1.67	1.60
Wax (Dark)	1.55	1.60	1.75	1.75	1.10	1.95	1.78	2.25	1.72	1.01	1.85	1.50	0.70-2.25	1.21	1.35	1.65
Poll. Fee/Col.	50.00	41.00	40.00	36.67	48.00	42.50	45.00	40.00	55.00	75.00	45.00	57.50	36.67-75.00	47.97	40.32	38.84

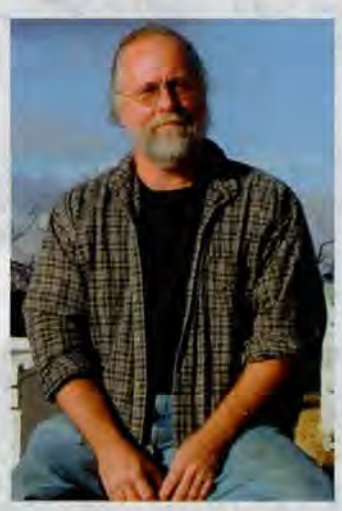
RESEARCH REVIEWED

Explaining • Defining • Using

Steve Sheppard

"Who'll stop the rain? Umbrella behavior in honey bees."

With all deference to Creedence Clearwater Revival's version of the song that poses the above question, honey bees clearly have known the answer all along. The western honey bee, *Apis mellifera*, belongs to a subgroup within the genus *Apis* well-known for the habit of "cavity-nesting." For an example of what that term means, take a look outside at your apiary and notice the cavity-containing boxes that you call beehives. In the absence of beekeepers, honey bees typically use cavities found in trees, in cliff faces or somewhere else. While cavities provide a measure of protection from predators and inclement weather conditions, there are times in the colony life cycle when there is no shelter from the storm, *i.e.* during swarming. Honey bee swarms face an uncertain world from the time they leave the old nest site until they "choose" a new cavity to remodel as a home. What happens to a hanging swarm when it is assailed by a downpour of rain? What mechanisms do honey bees have to deal with an onslaught such as they never encounter in the cozy cavity in which they normally reside? In a very interesting report, two researchers at Cornell University performed a series of experiments to address these and other questions (Cully and Seeley, 2004).



The researchers set up a series of artificial swarms (each with about 7,500 worker bees with a caged queen) and used video recording equipment to capture the behavior of bees in the swarms. They conducted a series of tests to examine several factors related to the protective curtain (mantle) of bees that form on the outside of swarms when faced with falling water. They investigated the behavioral details of what individuals bees actually do to form the mantle, the age distribution of bees both within the swarm and in the mantle and the effectiveness of the mantle in actually "shedding" rain from the swarm.

For the mantle formation study, the researchers evaluated the behavior of five swarms, first under dry conditions (five minutes), then while being sprayed with water (five minutes) and then for another 20 minutes as the swarm transitioned to dry conditions. One of the swarms was also evaluated in the rain, to check that mantle formation was the same with natural rain and sprayed water. The video images were viewed and a number of variables were measured, including body orientation, head tucking, wing spread and distance between bees. Statistical tests showed significant differences in the behavior of bees during the time they were in the protective curtain mode compared to normal dry conditions. The basic protective curtain behavior was as follows: The individual bee orients her body to be head up (relative to gravity), tucks her head under the abdomen of the bee that is immediately above her and closes her wings tightly to cover her abdomen. The researchers liken the effect of this behavior is for the mantle to produce "a collective structure that closely resembles a tiled roof." They also found that the bees in the mantle crowded together to reduce the space between individual bees and did not shift positions or rotate in and out of service, but stayed at their task during the "rain" episode.

To examine the age of bees that formed the protective mantle, the researchers looked at the distribution of marked age-cohorts of bees within the swarm and those that participated in the formation of the mantle. They found that it was the older bees that were involved in mantle formation, while younger bees stayed warm and dry inside the cluster. The authors suggested that, because younger bees have reduced metabolic rates, it is likely they position themselves inside the cluster to remain at a more optimum temperature. They also pointed out that because younger bees have a longer life span and will provide higher overall contributions to the colony in the future; reserving the younger bees in the core "helps the swarm maximize the total labor output of its constituent workers." The authors cited an example of a related behavior in army ants, where larger and more physiologically resistant workers constitute the outer layer when they form a protective cluster.

To determine the effectiveness of the behavior in actually shedding water (i.e. making the water run off the swarm rather than entering and wetting the bees), the researchers used a clever approach that took advantage of the fact that a small amount of lead time is needed for the mantle to form. They mounted several swarms on a horizontal bar to form symmetrical clusters with two sides. They then sprayed one side with a small amount of water

Continued on Next Page

to induce mantle formation and then poured equal amounts of water on the two sides of the swarm in sequence and collected the run off on paper towels. By weighing the paper towels before and after use, they were able to determine the amount of water that was shed by each side of the cluster. The results were highly significantly different. In the sides of the clusters where the mantle had formed, the bees shed most of the small amount of water that was poured on them (about 90%), while the sides that were "caught unawares" by the water dousing shed slightly more than half (about 56%).

Overall, this study investigated a very basic collective behavior of honey bee swarms that is probably little known by many beekeepers and researchers alike. The authors concluded that their most important finding was that bees of the mantle do not need to make large adjustments in their behavior to form a protective mantle. Thus, individual bees do not recruit bees to the mantle or move from the inside to the outside of the swarm. Instead upon sensing water droplets, they make the slight individual adjustment of their own bodies to orient themselves vertically, tuck their head, pull their wings tightly together and press themselves close together with their neighbors. The collective action of these individual behaviors forms the effective tile roof structure quickly and effectively.

The instinctive action to huddle close together to maximize the shedding of water and maintain thermal integrity reminds me of a time when I was among a group of high school friends caught out in the marshes of SC. We were collecting oysters on an oyster bar (not the drinking kind, but the mud flat kind) at low tide when a torrential rain squall came up suddenly and persisted through the rest of the day. Unfortunately, as we could not leave for a couple of hours because of tidal conditions, we huddled together in what seemed like freezing rain and pondered the unfairness of the universe (or more accurately our stupidity for not bringing rain gear). At the end of the ordeal, it was obvious from our drenched condition that we humans do not have the same facility to deal with water as honey bees. On the other hand we do know how to make umbrellas. BC

Dr. W. Steve Sheppard, Thurber Chair, Department of Entomology, Washington State University, Pullman, WA 99164-6382, shepp@mail.su.edu; http://apis.wsu.edu

Cully, S. M. and T. D. Seeley. 2004. *Self-assemblage formation in a social insect: the protective curtain of a honey bee swarm.* Insectes Sociaux 52:317-324.

Mark Winston

Waxing Poetic

"The candles came with a display, and brochures, that took beeswax unnecessarily into the dimension of unproven claims and wacky functions."

What do dust, golden halos, negative ions, and 108 Buddhism beads from the Qing Dynasty in China have in common? Remarkably, beeswax.

Beeswax surfaced into my ever-wandering attention zone last August, as my wife and I vacationed in our home province of British Columbia. We went to Tofino, a town immersed in stunning scenery at the edge of an often-wild Pacific Ocean. It was beach time, one of those a-book-a-day vacations, occasionally surfacing from sun and sand to head into town for dinner.

Tofino houses an eclectic mix of artists, hippies, surfers, and tourists, with the occasional out-of-work logger or fisherman to add some local color. Mostly, though, the year-rounders are long-haired, blond young adults who service the tourists by day, and party hearty by night.

Except, sometimes they party during the day, too, which is where beeswax unexpectedly entered my Summer holiday. The local artist centre was having an event, selling some pretty poor local art outside on their lawn while leftovers from the hippie days smoked stuff, played disjointed music on instruments without names, and danced to some rhythm bouncing around their heads beneath dreadlocks that didn't seem to have known much in the way of shampoo for quite some time.

Inside, though, they actually had some nice local arts and crafts, including an assortment of beeswax candles. You'd think that handcrafted beeswax candles would sell themselves, with their extraordinary smell, sleek look, and practical use, but apparently the products on their own weren't enough. They came with a display, and brochures, that took beeswax unnecessarily into the dimension of unproven claims and wacky functions.

Take the ions, one of my favorites. According to one brochure, beeswax candles "*clean the air when burned. The negative ions produced circulate in the room and attract pollutants . . . capturing and neutralizing dust, odors, molds, bacteria, viruses, and other toxins.*"

Another candle's publicity material expounded on the theory behind Mother Nature's balancing act. This highly scientific piece tells us that toxic emissions are positive ions, but the negative ions produced by beeswax candles are the good guys. They bind with the poisonous positive ions to create complete molecules with a heavier-than-air weight mass that falls to the ground, immobilized.

Got that? If not, you only need to believe in the outcome: a cleaner, sweeter, healthier home.

You could, of course buy one of those Negative Ion Emitter machines that cost thousands of dollars to clean your air, but hey, they produce an overabundance of ozone, and make dirt cling to your walls and furnishings. The bee's way is way better.

Or, my evil twin reminded me, you could consider vacuuming once a week instead of burning beeswax, if you prefer a non-cosmic solution to dirt and dust.

I also discovered that if beeswax is the white knight of home purity, paraffin is the black-hatted villain. You may not know this, but "*many top executives and technical engineers of the petroleum industry do not even let their families touch paraffin, or burn it in their homes.*"

Why? Well, paraffin is "*chemical ooze coming from the tail pipes of the oil refineries . . . creating dioxins, textured with acrolyn, a known carcinogen . . . Burning paraffin candles is essentially the same as breathing the exhaust fumes from a diesel engine.*"

Don't get me wrong. I enjoy the bee yard smell of a pure beeswax candle as much as the next beekeeper, and use beeswax candles because I appreciate the craftsmanship that went into keeping the bees and making the candles. But, I don't need to invoke kooky ion theories or petroleum industry conspiracies to appreciate a beeswax candle.

Still, perhaps I was missing the rich spiritual experience promised by the beeswax-worshipping candle makers whose products were on display. Admittedly I had not yet seen the golden halo that the beeswax gurus had promised would emerge when I burned my candles.

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"How could I break through my earth-bound senses to explore the deeper side of beeswax, I asked myself? But of course! eBay!"

Their literature also strongly hinted that I should be feeling a multi-level vibration from the candles that would calm my inner senses, and that I should be able to see the vibration within the halo surrounding the flame. Clearly I was blocked, resistant to the underlying rhythm of the universe that beeswax could unlock for me.

How could I break through my earth-bound senses to explore the deeper side of beeswax, I asked myself? But of course! eBay, source of all that we seek. Sure enough, a few clicks of the mouse and I was at . . . Buddhism beads.

Not any beads, but a Chinese/Tibetan beeswax necklace, antique no less, symbol of purity and peace, with 108 individual beeswax beads strung together into a stunning piece of jewelry.

I decided to ignore the politics of China and Tibet, which have been anything but pure and peaceful, and scrolled on to find 431 items made of beeswax, many of them similar Buddhist relics. There were the Buddha Prayer Beeswax Amulet Bracelets, and a few necklaces for sale made with yak bones and beeswax, a combination that truly had never crossed my mind.

Intrigued, I scrolled on. I knew about beeswax candles, of course, and furniture polish, but I was beginning to see that I had only scratched the surface of ways to buy beeswax in cyberspace.

Beeswax sculptures soon popped up, again emerging from Tibetan culture. There was the 1940s Old Tibet Beeswax Carved Horse Statue, and the 1940s Beeswax Statue Carved Mice & Rope sculpture. Mice and ropes had never entered my mind together, but then I guess I'm neither Tibetan, nor an artist. But I could see that the 1940s were a stellar period for beeswax sculptures that looked like animals.

But a beeswax snuff bottle? That came up somewhere between the lady and gentleman beeswax cameo set and the Mice and Rope sculpture. The snuff bottle was from China, not surprising because the Chinese believe that snuff possesses medicinal qualities to dispel colds, cure migraine, sinus and tooth pain, relieve throat trouble, cause sweats and counter asthma and constipation.

Chinese snuff bottles are made from a wide variety of materials, including coral, ivory, jade, jadeite, mother of pearl, lapis lazuli, quartz, malachite, agate, turquoise, gold, silver and . . . beeswax. I guess beeswax-scented snuff would smooth out that snort of pure snuff tobacco, but I wasn't tempted enough to put my bid into eBay for that one.

I was tempted by the beeswax and banana hand cream ("*rich, luxurious, and DOESN'T WASH AWAY like almost every other lotion does. You're not constantly reapplying lotion all day, and the banana scent is wonderful*").

I wouldn't mind smelling like beeswax, but couldn't relate to smelling like a banana all day. The banana smell is the same odor as honey bee alarm pheromone, and I couldn't quite bring myself to head out the beeyard in that condition.

By now, I was starting to saturate. When the beeswax collage fridge magnets popped up, I realized I'd had enough. Except, I figured if beeswax was interesting on eBay, honey might be even more fascinating, so I typed in honey and hit the Search button.

7295 items downloaded onto my computer, beginning with the Honey Nut Cheerios collectible Bobble head doll made by Funko, a must-have for Cereal Collectors.

I hadn't realized that there even were cereal collectors. I thought beekeepers were odd, and beeswax worshippers even odder, but cereal collectors? Whoever you are, I figure you're somewhere between the beeswax gurus and the honey nuts, since only 4912 collectible cereal items popped up in my eBay search.

My beach vacation had taken me from the seaside through vibrating beeswax candle auras into bobble head dolls and cereal collectors. It's sure a weird and wonderful world we live on, but next holiday . . . I'm staying on the beach. BC

Mark Winston is a Professor at Simon Fraser University, Burnaby, B.C., Canada.

Malcolm T. Sanford

Mexican Beekeeping Seminar, Part II

"Argentina's Problems. Dr. Ernesto Guzman Novoa moves to Guelph"

Last month, discussing the events of the 18th Mexican Beekeeping Seminar (Seminario Americano de Apicultura), I wrote about the relationship between Mexican honey production and the world market place. One of the major worldwide issues is the use of chemicals to treat a variety of pests and diseases and their potential to contaminate the global honey crop. A paradox in Mexico is that there exist Africanized honey bees, which appear to be tolerant to and require less treatment for many situations, especially infestation by *Varroa destructor*. Despite this fact, many beekeepers in that country either prefer to use strains of European bees, which require treatment, or don't know the level of tolerance to mites by the bees they keep (their level of Africanization), and so use treatments as a preventative "just in case."

Resistance to Chemical Treatments in Mexico

With this as a background, Dr. Stephen Martin, Department of Animal and Plant Sciences, University of Sheffield in the United Kingdom presented two papers. The first asked whether *Varroa* resistance to pesticides was in fact a problem in Mexico, and the second described some pests and conditions that might affect Mexican beekeeping in the near future.

Many species of organisms are found associated with honey bees, according to Dr. Martin, including insects, fungi, bacteria, viruses and mites. Upwards of 70 species of the latter may be found in bees in certain areas, but are often not problematic (benign). However, the global movement of honey bees has created conditions where benign organisms suddenly become virulent and cause problems. The prime example of this is *Varroa destructor*, not a significant problem on its natural host *Apis cerana* in Asia, but extremely damaging to *Apis mellifera* in many other regions where this mite has been introduced, usually through purposeful importation.

In areas where *Varroa* has become extremely invasive, Dr. Martin says the practice of treating with pyrethroids (Apistan® and Bayvarol®) has now created resistance in the mite populations to fluvalinate in both the United States and Europe. In addition, in a few short years, resistance has also developed to alternative materials like Perizin® in Europe and CheckMite+® in the U.S., both formulated using coumaphos. Finally, resistance to another class of pesticides, which includes the material amitraz, is also on the rise.

Dr. Martin says resistance by *Varroa* to most treatments is probably inevitable given the movement of bee stocks around the world. Especially dangerous for Mexico is importation of resistance through honey bees from the U.S., where it is already epidemic. It is crucial, therefore, for Mexican beekeepers to detect resistance as early as possible to avoid colony loss and reduce further spread of the phenomenon. Finally, Dr. Martin concludes that many Mexican beekeepers have the option to use Africanized honey bees should mites become resistant to treatments in European honey bees. Where this is not possible, they could also explore other non-chemical control methods such as drone trapping and screened bottom boards.

Other Threats to Mexican Beekeeping

In his second paper, he describes the four largest threats to the future of Mexican beekeeping, *Varroa destructor*, *Tropilaelaps clareae*, the small hive beetle (*Aethina tumida*), and finally the "capensis" problem. The first organism has already been discussed above. Many Mexican beekeepers are indeed fortunate that they can choose to manage Africanized honey bees, which have some innate tolerance to *Varroa*.

They might not be so fortunate, according to Dr. Martin, if the other mite, *T. clareae*, should be introduced. This mite is found originally on *Apis dorsata* (the giant Asian honey bee). This tropically-adapted mite is considered less of a potential problem in temperate areas such as the U.S and Europe, but in the Mexican tropics, it could wreck havoc. It is a huge problem in tropical areas of Asia when associated with *Apis mellifera*, and the Africanized bee may well not be as tolerant to this mite as it is to *Varroa* in the American tropics. The mite has a similar life cyle and appearance to *Varroa*, Dr. Martin con-

Dr. Marcelo Del Hoyo, right, at the banquet.

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cludes, who strongly urges any beekeeper finding a mite that appears different than *Varroa* to report it immediately to the veterinary authorities.

The small hive beetle (SHB) has yet to appear in Mexico, Dr. Martin says, but if it does, the environment would seem excellent for population buildup. In addition, it is known that Africanized honey bees can round up the beetles and keep them incarcerated for periods, but this does not remove the threat that any imbalance in a colony could provoke a beetle takeover. Again, as with *T. clareae*, Dr. Martin suggests any beekeeper finding a suspicious beetle, turn it in to the authorities.

Finally, Dr. Martin mentions the "capensis" problem. The introduction of an *Apis mellifera capensis* worker bee, which could easily become a pseudo queen, is ever present wherever bees are kept. The takeover by *capensis* pseudo queens in South Africa has resulted in severe dislocations of the bee industry in certain areas. The Africanized honey bee is as susceptible to the problem as are other subspecies, Dr. Martin said, meaning that Mexican beekeepers would not be able to shift to that race in case there are problems as they now can with *Varroa*.

Two papers discussed honey bee tolerance or resistance to *Varroa*. One by this author has already been published in *Bee Culture* (October 2004). Another by Dr. Gard Otis, University of Guelph, Ontario, Canada examined resistance in honey bees in France and Canada. Both populations had light *Varroa* mite loads, but the Canadian bees did not survive as well. This may have been due to the fact that the bees were challenged not only by Varroa, but also by tracheal mites. Dr. Otis concludes that the phenomenon of "resistance" found in French bees is localized, "French bees are not resistant in Canada, but Canadian bees are resistant in France."

The Canadian – Mexican Link Strengthens

There appears to be stronger links being forged between Canada and Mexico if one can read between the lines based on presentations at the Congress. Beyond the paper described in the above paragraph, Dr. Otis also presented information on his nutritional studies in Canada using both natural pollen and substitutes. He indicated that the same results were possible in the Mexican tropics (both humid and arid) using nutritional supplements as in eastern Canada. Dr. Ernesto Guzmán Novoa from Mexico, known for his genetic work (described in this article) is also expected to join the Guelph faculty soon.

Finally, Tim Wendell, a Manitoba beekeeper, described his management procedures in some detail. The information about wintering in an extreme temperate zone could not have contrasted more with the conditions most Mexican beekeepers face. Mr. Wendell also provided information on Canadian experience with mite- and disease-resistant stock. The story is quite involved, especially since the border with United States has remained closed for two decades. Russian bees imported into the U.S. were introduced into Canada through a project at the University of Guelph. This stock was translocated to Saskatchewan and the F1 hybrids were mated in isolated areas with selected drones.

The result of all this, according to Mr. Wendell, is not yet known since the project is very new and the conditions in Canada are much different than in Louisiana where this stock has been shown to be tolerant. Canadians are also looking at other stock in the United States, now that the border will be open again on a limited basis to queens. These stocks include that by Dr. Marla Spivak, University of Minnesota for increased hygienic behavior, and Sue Cobey's New World Carniolans® at The Ohio State University, as described here in the January 2003 issue.

Africanized Bees in Mexico

Dr. Ernesto Guzmán Novoa, who as I said before will be joining the University of Guelph research and extension team was the author of two papers at the Tabasco Congress. The first in conjunction with several colleagues involved a large study full of statistical measures to see if it was possible in Africanized bees to both increase production and at the same time decrease defensive (stinging) behavior through genetic selection. The results were mixed, but the authors were encouraged that diminished honey production did not seem to directly correlate with an increase in defensive behavior. This means that it would be possible to genetically select for each characteristic independently of the other. This kind of program has in fact been instituted in Mexico, as noted elsewhere in this column.

Finally, Dr. Guzmán presented a paper entitled "Africanized Versus European Honey Bees, Which Are Better?" Africanized honey bees entered Mexico in 1986 from Guatemala, which radically changed Mexican beekeeping. They have replaced European honey bees in almost 90 percent of the beekeeping regions in the country. Their expansion was favored by (1) increased reproductive activity, (2) more swarming, (3) a superior abundance of drones, (4) European colonies being taken over through queen replacement, and (5) genetic dominance in several other areas.

A major controversy continues to be the impact of Africanized honey bees on honey production in Mexico, according to Dr. Guzmán. In spite of reports from Brazil that honey crops have increased, there is little evidence of this in Mexico. However, the figures may not be reflective of all the variables involved. Nevertheless, a major reason for decreased production is the Africanized honey bee's propensity to put more resources into brood and swarms, rather than honey. Other effects are increased defensive behavior, resistance or tolerance to diseases and production of both pollen and propolis. From a biological perspective, therefore, Dr. Guzmán concludes, Africanized honey bees have been a great success.

The management of these insects, however, is another story. In most of Mexico, Dr. Guzmán says, beekeepers have had to relocate their apiaries (at least 50 percent in populated areas, 25 percent in less populated) and reduce the number of colonies in each yard to combat an increase in robbing, especially when colonies are fed. They have also negatively impacted queen rearing operations. Mating nuclei are much more at risk of being taken

over by Africanized swarms and/or robbed of their food. Finally, these bees have caused dislocations in commercial pollination. They are much more difficult to transport, resulting in more colony deaths and takeovers due to the stress involved in large-scale movement than happens with European honey bees.

The bottom line, according to Dr. Guzmán, is that biologically the Africanized honey bee has been very successful, but from a management point of view it has been a disaster for Mexican beekeeping. Although the objectionable behaviors of Africanized honey bees are technically "manageable," the costs are simply too much given current honey prices. If honey prices could be maintained at current higher-than-usual prices and other products such as propolis and pollen be marketed, Dr. Guzmán concludes, there would be some chance of overcoming the obstacles noted above.

Dr. Guzmán says that because Africanized honey bees have biological advantages, the idea that these bees can be eradicated cannot be considered. However, the biological advantages can and should be taken into consideration by beekeepers. For example, studies have shown that colonies that are 25 percent Africanized or less are as manageable as European bees. Mexican beekeepers, therefore, should begin to identify desirable characteristics in their bees and retain them through breeding. Unfortunately, there are less than 50 queen producers in the country, producing only 30,000 queens. Some 1.8 million are needed, and the vast majority of providers have no genetic improvement program (i.e. they are not "breeders," but only "producers"). The Mexican government, however, has instituted a program whereby most producers can increase honey production by 25 percent and reduce defensive behavior by 50 percent without recourse to instrumental insemination (see description of previous presentation by Dr. Guzmán). In addition, there was considerable evidence at the Congress that more and more beekeepers are considering queen rearing, either for their own operations or for sale.

Argentina's Disease and Pest Control Challenges

The largest non-Mexican group of participants from elsewhere in Latin America at the Tabasco affair was that from Argentina. Dr. Marcelo del Hoyo, Veterinary Sciences Faculty, University of Tandil, discussed the situation surrounding the world's number two honey producer and exporter, until last year when Argentine honey was excluded from the world market place due to contamination with nitrofurans, used to control American foulbrood (*Paenibacillus larvae*).

For many years, there has been a tradition in Argentina and elsewhere, according to Dr. Del Hoyo, for beekeepers to concoct their own treatments for diseases and mites. These "home remedies" have many problems, including:

1. No control over dose given to colonies
2. Use of prohibited materials (nitrofuran, chloramphenicol)
3. No control over period of treatment
4. Appearance of resistance
5. Limited effectiveness
6. Bee deaths
7. Contamination of combs and honey
8. Recalled honey
9. Lower prices for honey

Because of this, Argentina has, rather like China, taken steps to increase enforcement of chemical control through regulatory authorities and develop a system of traceability in honey. Dr. Del Hoyo says that producers have began to replace comb in huge quantities such that all traces of contamination (especially nitrofurans) are expected to disappear within a couple of years. Concurrently producers are now looking on organic honey possibilities, and analyzing soft chemical use to alternate with or perhaps replace traditional treatments.

As an example, Dr. Del Hoyo describes recommendations for *Varroa* control now instituted by the Comisión Nacional de Sanidad Apícola (CONASA) on a regional basis. These include rotating acaricides, using more organic or soft chemicals, monitoring mite levels before and after applying treatments (treating only when necessary), and coordinating treatment by regions or zones, typical characteristics of Integrated Pest Management (IPM) programs.

Recommended treatment plans generally consist of two or three mandatory treatments the first year followed by a evaluation of control achieved, which then leads to planning for treating the second year. The schedule set out is quite detailed, according to Dr. Del Hoyo. For example, in areas of severe Winters, two treatments are recommended: (1) late Spring when most of the brood is present and (2) early Autumn when the harvest is over and the brood nest begins to shrink in size. Three treatments are needed in areas where Winter is less rigorous: (1) early Spring as the nest expands before phoretic mites become protected in cells, (2) Summer at the end of the harvest as phoretic mites leave the cells, and (3) Autumn when the brood nest is minimal when most mites are found outside the brood cells). A suggested list of materials in Dr. Del Hoyo's paper include the following for Spring (oxalic acid, formic acid, rotenone, tymol), Summer (formic acid, amitraz, coumaphos, pyrethroides), and Autumn (tymol, oxalic acid, amitraz, rotenone, coumaphos, pyrethroides).

Dr. Del Hoyo has recently taken a sabbatical from his faculty position to help market materials developed by Apilab Laboratorios Apícola www.apilab.com. He reported on several of these at the Congress. They include Amivar®, Cumavar®, Oxavar®, and Naturalvar®, formulated on amitraz, coumaphos, oxalic acid, and tymol respectively. All are effective and the first two and last show no bee or brood mortality. The oxalic acid product killed some bees, but not enough to be significant, Dr. Del Hoyo contends. These materials used within the IPM procedures described above appear to have a larger future. They are now available in Uruguay and Chile. BC

Dr. Sanford is a former Extension Specialist in apiculture at the University of FL.

Knuckling It Through a Winter with *Varroa*

Dewayne Lumpkin

USDA Researchers, local entomologists, and pollination brokers: "Almond growers, cut back on the number of hives this year!"

"Tens of thousands of hives crashing," was the subject line in a thread of postings that dominated Bee-L's message boards through much of October and early November. *Varroa* mites – considered under control by many beekeepers – were suddenly killing off bees at a pace eerily reminiscent of the devastation wrought shortly after their late 1980s arrival in the United States. Decimated colonies were reported in California, Nebraska, Idaho, South Dakota, North Carolina, Missouri and Montana. Increased mite counts have been noted in most other states.

Lyle Johnston, President of the American Honey Producers Association is predicting a 40 percent reduction in the U.S. bee population this Winter from mites and related viruses. He says, "I saw it coming last Spring. I could see the approved treatments [Apistan and Coumophos] weren't working. Beekeepers have been getting pretty uneasy about the loss in their effectiveness and I knew it would come to this."

Beyond his concern for fellow beekeepers, Johnson knows what California almond growers are going to be up against in mid-February. He says, "Even last year, when bee losses weren't anywhere near what they'll be this year, some growers waited until the last minute to line up colonies. Beekeepers might not know until January 15th that they won't have bees to send to California for almond pollination." By then it could be too late to line up replacements.

By all accounts, Johnston's projections are probably not far off the mark. U.S. Department of Agriculture researchers, entomologists and pollination brokers trust his instincts and are recommending that almond growers cut back on the number of hives placed per acre during February's pollination.

Representatives of the almond industry are facing the situation with a mix of optimism and denial. Dave Baker, Director of Member Relations for Blue Diamond Growers, says, "I think the projected shortages are probably a gross exaggeration. There are the same number of producing acres this year as last year. We covered all of the acreage last year, although some coverage was a little weaker than the 2 - 2½ colonies per acre the growers would like."

He acknowledges the upcoming pollination season will probably be tight, but characterizes the projected shortages as "manageable." Baker explains, "Increases in pollination fees will draw beekeepers that don't normally come. There will probably be some last-minute scrambling, but unless we get a tremendous surprise, we should be able to cover any shortfall. Only time will tell if we experience extreme losses as beekeepers cull their hives."

Time has already told Burt Belliston all he needs to know about this Winter's *Varroa* mite devastation. Belliston keeps hives in Idaho, North Dakota and Montana. His beekeeping operation represents the worst-case scenario. He says, "I think we usually run about 6,000 hives and we might have 2,000 hives left at this point. One of our employees runs about 600 and will probably end up with about 150. It's really something. It happened quite fast and I wouldn't have believed it if I hadn't seen it."

Described as an "excellent beekeeper" his biggest mistake might be playing by the rules. Belliston has used the approved treatments to battle *Varroa* mites. He says, "Since the mites first came in, I used Apistan for four years, then I switched to Checkmite+ and used that for four years."

"This past Spring, we went back to Apistan and found the mites were totally resistant to it," Belliston reports. "By the time we realized we had a problem we had honey supers on and you can't treat. As soon as we got our honey out we started treating again, but it was too late."

A lot of beekeepers' fingers are pointing at the USDA for not developing and/or approving new mite treatments. Belliston says, "At first there was only one treatment for four years. Four years is too long to use any pest control. Ideally, you alternate between three different chemicals using each one for a maximum of three years, but that wasn't possible."

"We got the bees out of North Dakota a while ago

and we're probably going to see a 90 percent loss from those hives. Hives that have made a lot of honey have fewer problems. It's the bees that didn't do much honey production where we've seen the greater losses. Bees from Montana that produced a decent honey crop had a 31 percent loss, while those with poor crops had a 50 percent or more loss."

Losses aside, Belliston will honor his pollination contracts with any remaining hives. "We're expecting the one-third of our hives we have left to make it through the Winter and go to California to pollinate." He's also contacted almond growers so they can find replacement hives. He says, "That's going to be extremely difficult to do. It looks like bees are going to be really short."

"We've been running 6,000 hives and have no intention to go back to that amount if we decide to stay in the bee business," Belliston says. "Pollination in California is a huge part of our income. Last year it was more than half of our income. It would cost $200,000 to $250,000 to replace the lost hives and we're not willing to reinvest that amount."

When asked about other methods he might have tried, he responds, "I've read about mite resistant bees, but we don't have any of the Russian bees in our outfit. They have some resistance, but also have some characteristics that aren't desirable. We need bees that Winter well, are good honey producers and resist mites. The Russians don't make honey or Winter as well for us."

Many U.S. beekeepers have reported positive results from using Formic acid, although it's application is still unapproved. Some states allow emergency registration and the use of Formic acid to treat mites. Belliston says, "Formic acid is dangerous to work with. They're supposed to be developing a delivery system that's safe. I keep hearing there will be an overall registration for Formic acid in a gel pack that should be available in December, but that won't help until Spring."

John Jacob, a southern Oregon beekeeper, has been refining an "integrated pest management (IPM)" approach to *Varroa* mites (see sidebar on IPM by Jacob). He puts his own spin on techniques developed by other beekeepers and entomologists and believes IPM is the key to dealing with *Varroa* mites for the long haul.

Several years ago, Jacob recognized the growing *Varroa* mite threat and enrolled in breeding programs with the USDA mite-resistant queens from Russia. His first Russian breeder queen cost $500, but his breeding program has been successful and he's now supplying other beekeepers with these queens.

Lyle Johnston says exploring alternatives like mite-resistant stock is important. "We need to look at the option of developing resistant stock to offset the mites. We can't keep using controls the mites become resistant to. We've been a little complacent. Everyone's going to be woken up by this Winter's losses."

Pollination broker Joe Traynor isn't panicking...yet. He says, "Right now supply and demand for almond bees appears on an even keel. We won't know for sure until January, when Winter losses are known. Many beekeepers are controlling mites, especially *Varroa* mites, with non-registered chemicals and feel their

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I P M

Coming of Age

John Jacob

The subject of Integrated Pest Management (IPM) has become a popular concept and catch phrase in many modern agricultural discussions and decision-making processes. Beekeeping is no different. More beekeepers are asking – what is IPM, what can IPM do for me, does it really work, or where can I get a gallon of it?

For example, many beekeepers have tried individual IPM *Varroa* mite control measures such as screened bottoms or essential oils, and still have found heavy losses. This tendency to look for a single silver bullet, or a "chemistry first" cure is at the root of many poor hive management decisions and the problem of *Varroa* mite resistance to acaricides. Reliance on one simple measure will never work in the long run. A more integrated approach to *Varroa* management would incorporate several IPM tools simultaneously; including, but not limited to screened bottoms, resistant queens, essential oils, regular sampling of mite drop, and when mite populations near the Economic Injury Level (EIL), the limited application of any of a variety of acaricides. When used together IPM tools produce a synergy that results in a situation where the whole is greater that the sum of the individual parts.

IPM concepts are rooted in economics and long-term sustainability. The notion of pest management, instead of total eradication of a pest population offsets costs by reducing the number of agricultural inputs used and the length of time between treatments. In other words, only treat hives when you have to, not just because it is that time of year, or because it is convenient to the beekeeper. An IPM program can be tailored to fit any size operation and location. A one-size fits all approach will not work due to differing apicultural goals, economies of scale, and regional conditions. When designing your custom IPM program there are several categories of control measures to use, including *cultural* (screened bottoms, location, physical mite removal, comb renewal, etc.) *biological* (resistant Queen genetics, mycosis of *Varroa*), and *chemical* (approved acaricides, oils, organic acids, semiochemical traps). Each of these categories offers an array of options, which allows beekeepers to customize a synergistic multi-pronged attack on any hive pest or pathogen. Timing is always critical for the successful implementation of IPM. As such sampling for pest population levels is on-going.

The whole is greater than the sum of the parts with IPM programs. The use of a wide variety of tactics unified in concert will have a beneficial synergistic affect that cannot be achieved otherwise; effectiveness is in the integration. And don't forget – a couple gallons of IPM should be enough to treat a good many hives.

To learn more about John Jacob's IPM plan visit
www.oldsolenterprises.com

Obviously, prices will increase, and this will bring in new blood.

colonies will come through Winter in good shape."

He projects modest price increases for pollinating this year's almond crop. Some increases were put into effect with contracts signed prior to projected bee losses. According to Traynor, "Last year's bee prices were in the $50 range with some going as high as $65.This year, the largest almond grower in California – Paramount Farms at about 40,000 acres – gave their beekeepers a 20 percent increase for 2005."

He says, "We are locked into agreements made in July. In hindsight, I wish we'd made a bigger increase. Most almond bees are already contracted. I would guess the average price is around $55 to $60. Some beekeepers are holding out and won't commit until January...if bees are in short supply, and growers are desperate they could well pay $80 to $100 but I don't think very many colonies will be rented at this price."

Traynor is worried about some questionable actions stemming from bee shortages. Some single-story colonies offered for sale from Florida prompt his concern about small hive beetles landing in almond orchards.

Traynor's reasoned voice echoes those who worry almond growers won't respond to shortages by rationing the available supply of bees. He says, "I'm convinced that the answer to the almond 'bee shortage' is for all growers to use only one and a half colonies per acre (instead of the current two or more) and to use only 8-frame or better strength colonies."

Eric Mussen Extension Specialist at UC Davis, says, "I don't think anybody down here has an exact number of the percentage of bees that will be lost to *Varroa*. But we know darn-well already that some numbers of bees are going down and that some of the colonies look pretty small in population and they don't tend to build up at this time of the year – so it does look a little bit rough for almond pollination next Spring. I don't know how it's going to shake out."

"Let's say that there were only half as many bees as were needed. Would growers be willing to rent half as many so that everybody had half as many bees? Or are the people with the contacts going to rent all the bees and half the growers go without bees?"

"We usually recommend that growers rent two colonies per acre," Mussen adds. "If the weather is beautiful you don't need anywhere near two colonies per acre to get the job done, but, if the weather doesn't cooperate, that's when you need the two colonies per acre. It's kind of an insurance policy."

Mussen reports, "Obviously the prices are going to increase and if the prices increase that sometimes lures individuals who weren't going to come here to come here and replace the one's that are missing."

Frank Eischen, Research Entomologist with the USDA in Weslaco, Texas says, "There is no doubt that the *Varroa* control problem is very serious this Fall." He pinpoints the problem and a possible silver lining: "In many areas the mites are resistant to fluvalinate and Coumophos. Counter balancing this is a heightened awareness of the problem by beekeepers."

Eischen adds, "Many [beekeepers] are checking mite levels carefully. Those that have high numbers are seeking help. Fall treatments have an advantage of reduced brood nests thereby exposing the mites carried by the adult bees."

Burt Belliston says, "Last year there was a shortage of bees in California for the almond growers, yet new orchards are being planted. They keep planting trees when there aren't enough bees to go around."

He adds, "A lot of the growers don't realize the seriousness of the situation, and I think it is going to get worse. I've seen how fast it can happen. Four weeks ago we hardly had a dead hive. We had 6,000 hives at the time. Within two weeks hives can absolutely collapse. We need to keep almond industry in order to have a healthy bee industry."

Lyle Johnston explains, "Some of the almond growers may cut back on their orders for hives. Some will go without bees. Without bees you're talking 400 to 500 pounds per acre of almond yield. With bees the yield is closer to 3,000 pounds per acre with an average of two-and-a-half hives per acre, which meant 1.2 million colonies last year. The price of hives is going to get demanding. Last year hives were $54 each and they're predicted to hit $80 and more this year."

Many beekeepers have expressed frustration with the USDA's lack of approved solutions, yet a few admitted that some of the industry's wounds have been self-inflicted.

Unfortunately, even beekeepers that maintain a careful rotation of treatments and follow recommended usage guidelines aren't immune to Apistan and Coumophos resistant mites, that can be picked up readily anywhere.

The symbiotic relationship between beekeepers and almond growers may become stronger through an increased acknowledgement of the role pollination plays in a successful almond crop. Almond growers hoping the projections are a case of "crying wolf" one too many times may be in for a surprise in February.

This won't be the first time U.S. beekeepers have dealt with a major "bottlenecking" of the bee population, but this season's expected losses heighten the sense of urgency for change. Higher pollination prices may help tide the industry over while mite resistant bees repopulate decimated hives and the USDA approves additional treatments for *Varroa* mites.

White-knuckle monitoring of mite levels this Winter is taking its toll on beekeepers. Certainly, Burt Belliston isn't alone in his losses, although he's been more forthcoming than many beekeepers experiencing similar damage from *Varroa* mites. Lyle Johnston empathizes with Belliston's plight and knows the industry can't afford to lose beekeepers with his acumen and experience. When bee population losses lead to a decrease in the number of U.S. beekeepers, the industry suffers along with almond growers and others relying on agricultural crops that require pollination. BC

Dewayne Lumpkin is a freelance journalist who lives in Grants Pass, Oregon.

HONEY BOARD ROUND TABLE

Economic Adulteration • Misleading Labels • Contamination

Kim Flottum

Industry Leaders Wrestling With Industry Problems

Early in December the National Honey Board sponsored an industry Round Table, bringing together representatives of The National Honey Packers and Dealers, The American Honey Producers, The Western States Packers and Dealers, The American Beekeeping Federation, The California State Beekeepers Association, Sioux Honey Association and The Eastern Apicultural Society. These groups were able to attend because they met the geographical and membership criteria the NHB had previously determined.

Before the meeting a long list of issues were circulated and members selected those that were most pertinent to their respective groups. The three hot-button issues were Economic Adulteration, False or Misleading Labeling, and Contamination.

At the meeting a facilitator kept things focused and on time, mostly, and several invited speakers were brought in to update the crowd on the topics chosen, and possible options for addressing each issue.

Each of the options mentioned by the speaker was listed as they came up, and, when the speaker was finished, those in the crowd added options of their own that were specific to their group's perspective. These, too, were listed. When discussion was complete and all options listed, the group ranked the top three. Sometimes, most times, in fact, only one or two were chosen as the best and only way to solve the problem or decide an issue.

Interestingly, for the first topic – Economic adulteration – the majority of time was spent searching for the true definition of what honey is. We don't have one, you know, which is a bit odd. You know what honey is, right? But what you know as honey may, and probably is a tad different than how a U.S. packer, an Argentinian exporter, or the government of France would describe it. For global commerce to work, all of the people involved must have, and recognize the exact, same standards.

The revised Codex international standard for honey has been adopted by most countries and is a reliable, simple and enforceable standard. However, the Honey Board has also put together a standard definition. Though similar, it's not exactly the same. Is that important? Apparently not. Here's why.

There are several avenues to get FDA to adopt a standard where none exists. The easiest is to adopt an already existing standard – such as the Codex (and the similar NHB document) – which may take as little as several years. For FDA to do the leg work, we're told, would take a lifetime. They're in the business of food safety, not creating regs.

With a standard of what honey is, only then can it be decided what honey isn't. Which is where the economic adulteration part of this came in. And with that comes testing – for a multitude of adulterants – to the tenth of a part per billion. If you look for it, it will be there.

Which brings up the second-most ranked option – re-establishing a USDA sanctioned honey chemist position. We had one for years – Dr. Jonathan White – but when he retired the position went vacant. With the new contaminants, exotic sugar-like adulterants and global standards to meet, Round Table participants felt it necessary to reinstate this position. Funding? Good luck was USDA's answer. Figure $250-300,000 to start up, plus $200,000/year just to keep it going. Maybe the new Secretary of Ag is smarter than we figure, or the deficit suddenly goes "Poof." But industry pressure may help. A plan was made. Leaders chosen. A timeline drawn. Keep a good thought in this mind-boggling budget year.

Next on the list was false and misleading labeling. We've addressed this here already, on our Honey Market page. This is the stuff that calls itself "Honey Lite," or "Artificial Honey," or "Honey Sauce." We've all seen it, somewhere. And then there's those products that use almost no honey at all and SCREAM honey on the label. Is that fair?

And the worst – HoneyBaked Ham, for instance – those products that use honey in the name, and have *NO* honey at all!

Beside wanting to clunk these phonies with a hive tool, what can be done? Well, how much money do you have? Know a lot of good attorneys? All these other guys do, you know. But, maybe there's a trick or two yet. *Compelling* FDA to enforce existing rules might work. It's the compelling part that's tough. You have to do their work for them and prove these labels are misleading. Lab work. Evidence. Lawyers. Money.

What was chosen as the most likely task to succeed was to name a committee to draft a label requirement stating how much (as a %) honey was actually in the product, and make those cheaters put it right on the front of the jar – but only on liquid sweeteners. It would read, for instance, contains 40% Pure Honey. Making the really big offenders toe the line was left off this agenda, though. How much honey, do you think, is actually in a box of Honey Nut Cheerios? A don't ask, don't tell policy was deemed safest. Some is better than none. And it's still a lot.

What do you think about a Honey Spokesperson?

OK, what about some well-known TV guy doing a series on *Read*

Continued on Next Page

The Label and know what honey is, where it comes from, and what's in it?

OK. What about a "Real Seal" program? A seal on a jar of honey means it's 100% Pure Honey! No question. Absolutely. Endorsed by, somebody famous, or rich, or well dressed.

These actually sound like good things to do. I don't know who's who on TV, but somebody must. That couldn't hurt. A few commercials, late night and morning talk shows, and as many cooking channel shows as possible. That's good. How much, though? And for how long?

Continuity is needed for product endorsements, so a long term commitment, and cost is expected if this is chosen as a way to get honey known. 'Real Honey' seal is a workable thing, though. Lots of states already have this so it should be easy to get a standard, then a seal, then a regulatory agency, then a policing agency. They're mostly there already, at the state level.

Finally, the last topic was contamination, one that generated lots of discussion.

The exponential growth of *Varroa* populations resistant to the registered chemicals, plus the growing occurrences of American foulbrood resistant to Terramycin have led beekeepers to use alternative control tactics for both problems.

A whole chemistry lab of compounds have been thrown at *Varroa* resistant to nearly everything, some with some success, many with no success. This situation isn't isolated to U.S. beekeepers by any stretch, and those chemicals are finding their way into honey – domestic and imported. The reality of this hits home when you figure that current testing procedures are finding stray compounds at 1/10 of one part per billion.

Long term goals to solve this, of course, include developing stock resistant to these pests and diseases. But more immediate goals include getting organic acids (formic, oxalic) registered for use, along with the even more benign essential oil compounds available.

More importantly, however, is the need for standardized tests for these, or any contaminants. There are numerous labs doing testing, some using standard tests, but others using state-of-the-art methods that are propriety protected, thus not able to be substantiated by anyone else.

Currently, most U.S. packers are doing some tests, sending samples out for other tests, and not testing for other things. It's a mish mash of quantifiable data out there. To spur this along, the biggest customers are beginning to require proof of quality before they buy. They aren't interested in purchasing someone else's problem, it seems.

At the same time, producers are in the "Do I risk my bees, or risk contaminating my honey" rock and a hard place for everything – *Varroa*, AFB, even wax moth protection is a problem now, with PDB coming under scrutiny.

Adopting the Codex standards, or at least basing much of what is used in the U.S. on these international guidelines seems the sensible thing to do. Reinventing the wheel isn't in our best interests.

However, convincing the powers that be will be both time consuming and probably expensive. Commerce (not the department) will undoubtedly move ahead with developing techniques, standards, tolerances and guidelines, with or without the blessings of government. But if history is any judge, those guidelines developed by both business and government will be somewhat different when they're done. Who will have the best regs? And when?

The Round Table results developed will assist U.S. beekeepers and packers in producing a better product that is acceptable in the international market. If they all get done, that is. The unanswered questions left on that round table are many. Who will supply the money for registering chemicals, funding research, enforcing existing regulations, writing new regulations, hiring new scientists, and developing even more specific standards for honey?

Further, who will travel to Washington, attend the meetings and work at the state level for some of these tasks. Almost all of the people setting at that table are volunteers, with day jobs that take time, and without expansive funds to cover the costs of doing the jobs that need done.

Like King Arthur's Knights, the participants at this round table will search the world for their version of the Holy Grail. But if you will allow me one more myth – let's hope they are not all tilting windmills. BC

It was learned that FDA has signed off on Tylosin to be used to treat outbreaks of American Foulbrood. Mann Lake Ltd. will begin manufacturing the product almost immediately, it was announced. Some details remained on determining tolerance at press time. Tylosin will be used as a dust trteatment only, premixed with powdered sugar in colony-dose bags. Tylosin is extremely water soluable and is persistant in honey, thus will not be used in syrup.

One unrelated event came out during the Round Table discussions. One U.S. packer has been negotiating with the Chinese Ministry of Commerce (a quasi-government agency, he said) in hopes of transitioning current honey trade from an anti-dumping status to a bi-lateral agreement.

The group was assured, and insisted on the fact that if they were to endorse this action there would be *NO* additional expense imposed on any attending group. Assured by the rep for the Western Honey packers and Dealers there would be none (you heard that here first), the Round Table endorsed the action, to be written on Round Table letterhead.

A bi-lateral agreement regulates who in China sells honey, restricting the competition, and sets the selling price based on the world price.

The last time this was tried it was rumored that some honey from China found its way out of the country and was sold by other countries at very low prices, thus lowering the world price, thus lowering the price China had to sell it at. It rapidly became a race to the bottom. Perhaps this time it will be better regulated. But, if the near-total lack of enforcement of the current anti-dumping regs is any indication of how well it will be, the price of honey is in trouble.

Handling Queens

Tips For The Faint Of Heart

Larry Connor

Finding queens takes time, disturbs the bees (and often the beekeeper), and usually isn't necessary.

Hobby beekeepers are too often the unintentional victims of their lack of knowledge about queens and their bees suffer as a consequence. New hobbyists are faced with an almost overwhelming flood of information about equipment, when to start, when to feed, when to super, and so forth, so matters concerning queens usually boil down to this: is there a queen in the colony or not? It seems profitable to review the biology of a queen bee as it pertains to a hobby operation, especially a person new to beekeeping, and the critical beekeeping components they need to master if success is to find them in the apiary.

Winter is a perfect time for hobby beekeepers to hit the books, take classes and attend meetings in an attempt to learn as much about bees and beekeeping as they possibly can. It makes little sense to spend a considerable amount of money on bees and equipment only to fail to master key factors of the craft. What is essential for a new or hobby beekeeper?

Is The Queen Okay Or Not Okay?

"How can you say that the queen is okay?" the new beekeeper asked me. "You said you didn't see her!"

Finding a queen in a colony takes time, often disturbs the bees beyond what is needed, and can be frustrating for the beekeeper (hobbyist or otherwise). The truth is that for most beekeepers, it is not necessary or even advised that they find the queen each time they inspect the hive. Instead, they must know the signs the queen and bees leave so the beekeeper can clearly read them and conclude that the queen is doing her job. This is done by inspecting the brood nest and searching for eggs and newly hatched larvae.

Since eggs take three days from laying to hatching, the presence of both eggs and newly hatched larvae in a brood frame tells the beekeeper that the queen was alive and laying within the past four days. If you see the eggs and larvae, it is rarely necessary to search for the queen. These eggs should be centered at the bottom of the cells, and only one egg per cell. Off centered eggs and multiple eggs in a cell indicate other problems.

On older combs, which are generally darker, finding a queen is not a challenge for an experienced beekeeper, but on new combs, especially new light wax and white plastic foundation, seeing the eggs and larvae can be very difficult. Because eggs and newly hatched larvae occupy a very small percentage of the surface of the bottom of a cell, and because eggs are positioned vertically and are thus even more difficult to detect. For this reason, it may serve many new beekeepers to carry a magnifying lens and small flashlight into the apiary and search for eggs and larvae. If you have a mentor to learn from, this should be one of your first

Bee Eye For The New Guy

If you are new to beekeeping here's a tip. Take the frame you want to examine for eggs and look at the *bees* on the frame carefully to make sure one isn't the queen. If she's not there, give the frame a quick downward shake over the top of the open colony to dislodge the attendant bees. Maybe two so they're mostly all gone. Then, move to the top of a nearby hive, make sure it's in the light, and examine at your leisure. Use a magnifying glass and flashlight if you need, take your time, look carefully, and don't worry about bees on your hands or otherwise in the way.

Beekeeper Rollin Hannan, Jr. inspects a frame searching for eggs and larvae. Notice that he is holding the frame flat, so that the maximum part of the bottom of the cells is visible to him. It was a bright day, but the eggs were still difficult to spot on the light foundation.

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This deep frame is built on white foundation. In the marginal light conditions, it is almost impossible to make out the eggs at the bottom of the cells. There is a progress of developmental sizes from lower left where eggs are present, to the upper left, where the brood is being sealed by worker bees.

lessons in the apiary – take out a brood frame and find eggs and larvae in normal arrangement (one egg or larvae per cell) and if you do not find them in the cells, learn what options you may follow.

Once experienced at egg and new larvae finding, the beekeeper will position the frame so the sun shines over his or her shoulder and lights the bottom of the cells, and all will be revealed.

Natural Queen Replacement

If you do not find eggs and larvae in a colony, what should you do? It may be an indication of queen replacement, when the queen is being replaced either through supersedure or swarming.

Queenless colonies are often nervous, less settled and noisier than colonies with a queen. For new beekeepers, lacking a basis of comparison, this is not a good diagnostic tool. Ask your beekeeping mentor to show you a queenless colony and discuss the difference with a colony with a laying queen.

The nectar flow is on. It is mid-Summer and the bees have filled up the brood nest. This frame has cells of emerging bees, but the empty cells are being filled with ripening honey. When the nectar flow slows, the bees will open the brood nest for the queen to lay, producing bees for the Winter.

Inside a colony, there is a natural progression of reduced brood rearing as a queen is superseded or as the colony reduces the queen's weight and size prior to swarming. (Egg-loaded queens cannot fly!). As strong colonies (even same-season package colonies which had a queen accepted) adjust for queen replacement, there is a noticeable reduction in egg laying, and as workers emerge, the empty cells are used for pollen and nectar storage, not polished for egg laying. So, if you see a large amount of stored food in the brood nest, and few eggs and young larvae, this (almost always) indicates a queen replacement is underway.

[Note that some good strong colonies place pollen in the brood nest, not just on the edge of the brood nest. I have reason to suspect that this is a desirable genetically controlled behavior for it puts pollen into the immediate area of brood rearing, where it is needed.]

Any time after a replacement virgin queen mates and starts to swell in size with egg development, the bees stop food storage in the brood nest and start to prepare those cells for brood use. The bees move or eat the pollen and stored honey and systematically polish the bottom of each cell so the queen will be stimulated to lay into the cell. Queens will not lay eggs into uncleaned cells (an exception takes place when a vigorously laying queen is moved to a small hive, and the queen actually lays eggs on stored pollen!).

During a strong nectar flow a queen may be crowded right out of the brood nest as bees store superabundant nectar in the brood cells. You can prevent this by providing plenty of drawn comb for the bees, above the brood nest to cure honey. Summer flows provide colonies with a rest from active brood rearing, and the later brood rearing contributes bees for the Winter cluster. These bees will build the colony's Fall reserves and keep the colony vigorous during Winter months.

New beekeepers should set up an observation hive or a nucleus colony and record the changes in the comb as queen replacement occurs. I suspect that commercial beekeepers might benefit from more frequent and detailed observations on a few select colonies.

Queen Finding Observations

1. Laying queens are large, swollen with eggs, and slower moving, while virgin and just-mated queens are smaller and often move very fast.
2. Yellow and golden queens are generally easier to find than dark strain queens.
3. Queens often move away from the light so they will run from frame to frame as you work a colony. Keep looking on the next frame for these queens.
4. Other queens remain quiet and continue laying eggs as you inspect the colony.
5. During Spring buildup, continue looking for an additional queen even if you find one. Many colonies have two queens (mother and daughter) at buildup time. This may involve as many as 20% of all over wintered colonies.

Queenless Colony?

Do not panic. Breathe. The queen is dead, long live the queen, but the beekeeper must not become a drama queen.

You have the option of letting the bees produce a queen from young larvae in the colony, or a frame of eggs and larvae moved from another colony and placed in the center of the broodnest. If you do this, the colony looses several weeks of key buildup time and part or all of the honey crop, but watching the process is instructional.

Ideally you will have a local beekeeper who keeps extra queens on hand and will be able to sell you a queen to introduce into the hive using a conservative introduction method. Otherwise, call and get a queen from a reliable supplier sent to you via UPS immediately.

Whenever you purchase such a queen, ask a few questions! Where is the queen from? How long has the queen been in this cage (or holding colony)? Is the *supplier* using queens from the same batch of queens this one is from? This last question is telling if a supplier is using a group of queens in his or her operation and sells you one of these queens, then there is a good chance they are the best queens the supplier is willing to purchase or able to produce. Pass on any queen recommended as "just removed from a strong colony" as she is probably one set for replacement, is old and will soon will go down hill in vigor. However, she may hold the colony together until you get your act together, however, and obtain a young queen from a reliable source.

If a hobby beekeeper is lucky enough to have a local beekeeper who raises queens, schedule a purchase of cells from the beekeeper. Hannan uses different colored cell bases when he grafts from different genetic stocks, so it is easy to tell which cells are from which line. Note the heavy webbing of wax on the cell on the middle left. This is extra wax resulting from the nectar flow and is not good for queen production or queen release. Remove such wax from the tip of the cell so the queen is able to emerge normally.

Keeping Queens Alive Outside A Hive

As a rule, don't do it. Don't try to keep a queen alive outside a colony any longer than necessary. It is better to introduce a queen into a small nucleus colony than let it die on top the refrigerator while you figure out where you are going to put her. While the refrigerator may keep the queen out of way of the dog, it is not a really smart place to keep her. Cool, dark places are best, give the queen a drink of water on the storage cage screen. But get that queen installed as soon as you can!

Some don'ts for new beekeepers (and others):

Just because someone once dropped a queen into a magic substance and the queen was accepted does not mean that this will work for you.

Conditions change in beekeeping. Fight any urge to install a queen with a direct release method. Install the queen using a conservative introduction technique or method. Introduce her into a small nucleus or increase colony.

Don't hurry a queen out of a shipping cage.

Even for queens shipped with the bees in a package, delay her release. Packages loose a third of their queens the first Summer starting with introduction.

Do not buy the argument that package bees do not swarm the first year.

They sometimes do. Weather conditions contribute to this, as does your forgetting to put a super on top of the bees, or to open up the flight entrance.

Don't believe everything you read abut bees and queens. Build a consensus of success stories for your bee work for your area and your conditions.

Plan Ahead

Ah – the midwinter beekeeper's dream – that during the next Spring and Summer all things fall into place exactly as planned. You have entered the dates onto your calendar when you will receive package bees and make splits, and in January have ordered the extra queens you want in April, May and June so they will be ready for you when you need them. Too often it is a dream.

Reality does not always fit our calendars. What I suggest is that you order queens from one or more queen producers (I suggest diversity in both genetics and geographic origin of queens), knowing you will be able to delay shipment of the queens, or even cancel the order, if necessary.

Hobby beekeepers are advised to seek a group shipment of packages and queens from a larger beekeeper in the area, where packages and queens are delivered by private truck rather than through a commercial shipper. Select someone who has done this for several years, and has been successful at it. Also, a few package bee producers in the south deliver packages to drop-off points in the northern part of the U.S., so you may want to inquire about getting your bees this way. They assume the liability for the live delivery until they reach the drop-off point. When you need to be ready to jump into action and put the bees and the queens into the proper hives on a timely, hopefully on a same-day basis. BC

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Honey House Equipment – Honey Pumps & Filters

James E. Tew

So Much Of Beekeeping Is Not Really Keeping Bees

Why discuss pumps and filters?

In my discussion here of pumps and filters, I am only reviewing what I use in my lab. The sheer number of models of filters and strainers presently on the market is daunting enough, but when combined with the obsolete units still in use, a comprehensive discussion becomes overwhelming. Reviewing the particular pumps and filters I use is not an endorsement for those particular devices. For a multitude of reasons we have acquired the equipment we have. It's what we use and what I know.

Honey Pumps

Comparatively speaking, installing a honey pump and installing a package of bees are miles apart. Whereas all bee books tell you how to install a package, very few books tell you how to install a honey pump. We nearly blew the supply line on the honey pump before realizing the filter had clogged. To our credit, we caught the problem before making a real mess. I like to think that we know what we are doing and still we nearly screwed up. Some comments seem in order.

Through the years we have accumulated several of these small pump units and could not live without them. They also pump sugar syrup or corn syrup when needed. If you don't have a honey pump and you have more than 20 colonies, consider splurging. At the very least a honey pump sitting around will make your beekeeping friends envious.

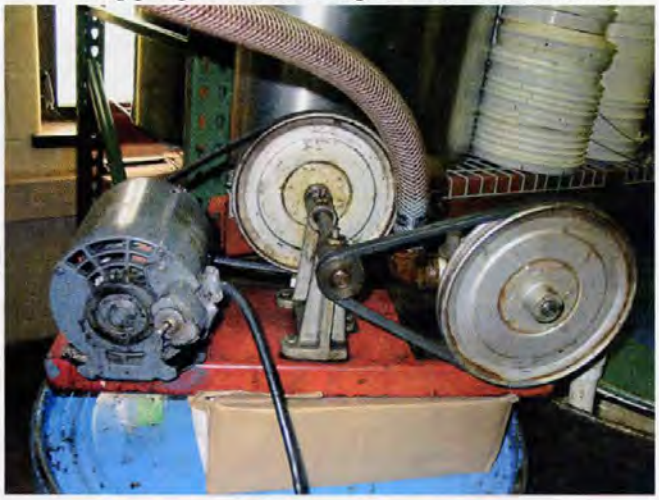
There isn't a large selection of pumps available in the bee catalogs though. You can buy a large pump costing several thousand dollars or a smaller pump costing hundreds of dollars. You can guess which ones I have.

Some specs on the small pump

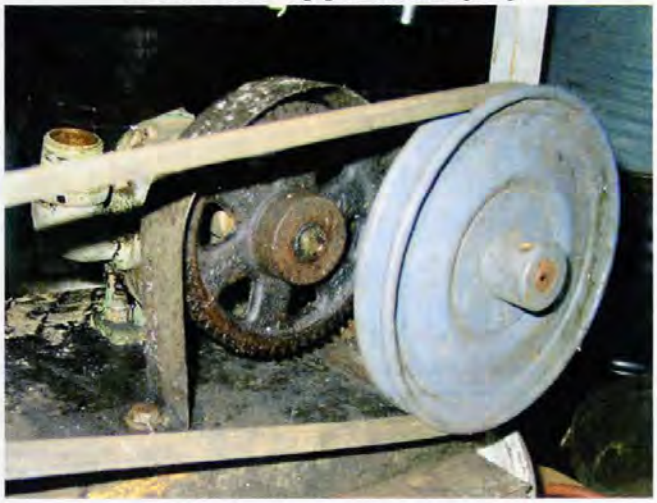
Normally, a ½ H.P. electric motor (1725 R.P.M.) is required to pump honey that has been warmed to about 85 - 100°F. If cool honey is to be pumped, a ¾ H.P. motor would serve you better. The pumps we have are either brass or bronze, but I can't tell which. This pump moves about 2½ gallons of honey per minute and works best if the piping is 1½" on both sides of the pump.

The pump should run slowly in order not to incorporate too much air into the honey. Of course, the bubbles will rise to the top of the bottling tank if the honey is slightly heated and allowed to settle. Never-

A honey pump with a reversing 1/2 H.P. electric motor.



A Walter T. Kelley gear-reduced pump.



theless you still have the "bubble scum" to deal with as the bottling tank empties.

The pump pictured features a speed reduction shaft (called a "jack shaft") that I prefer to a direct drive. Direct belt connections would require a larger pulley on the pump making the connection to a honey sump tank more difficult. Rick Thilbault, at Maxant Industries, explained that the jack shaft greatly reduces the speed of the pump thereby reducing air induction and reduces the risk of collapsing the plastic lines.

Some of the older Walter T. Kelley pumps were gear-drive reduced. These made a bit more noise, but man, were they solid pumps. You still see these old models for sale at auctions.

Our pump modifications

Since we move the pump to different locations we haven't plumbed the pump in permanently.

We use reinforced neoprene tubing for our supply lines. When pumping honey from a drum or a five-gallon pail, we heat the honey to approximately 100°F which makes filtering at the bottling tank easier. A reversing switch on the pump motor is worth its weight in gold, but must be added to the motor in most cases. This is what can happen: The hot honey increasingly heats the plastic tubing so that it is very warm to the touch. As the honey is pumped the filter begins to plug up. I primarily use the in-line filter sold by Dadant. This unit is designed to run at about 0-40# of pressure. As the filter begins to plug, increasingly building back pressure, the now-hot and flexible tubing – usually just above the pump outlet – will balloon out to frightening dimensions before exploding with the requisite honey mess everywhere. This is where the reversing switch enters in. If you can get to the switch before all honey breaks loose you can reverse the pressure and save the day. Other style filters have overflows that allow the honey to exit the clogged filter avoiding the build-up.

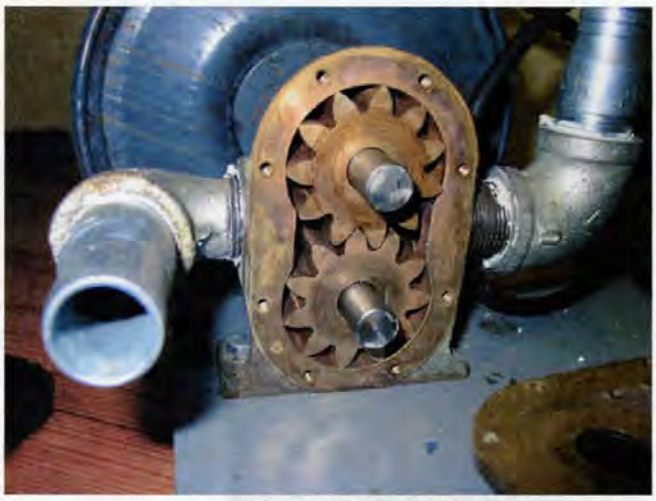
Pump maintenance

These pumps are heavy duty and hardy, but a few things can go wrong. The speed-reduction shaft requires occasional lubrication or it begins to squeak. If the pump is not adequately cleaned after use honey may granulate in the pump, freezing the workings and causing it not to pump. This requires opening and cleaning with hot water, but the pump inter-workings are reasonably simple.

We hang the honey line from suspended ceiling hooks that were purchased from a suspended ceiling supply company. In this way all aspects of the pump, line and filter can be moved in order to pump into different bottling tanks. In larger honey processing facilities these pumps are frequently permanently installed in sumps near the uncapper and extractor and are usually turned on with a float switch.

The Honey Filter

While several useful filters are available from bee supply companies, I primarily use the filter available from Dadant & Sons. It is a simple, in-line, stainless steel filter. A perforated stainless steel basket supports a micron-rated filter bag. The filter is 5" in diameter and 14" long with 1½" inlets and outlets. The filter can withstand flow rates up to five gpm. On the very top of the filter is a pressure gauge. Honey pressure as measured by that gauge should be kept below 40 psi. The filter bag requires occasional to frequent cleaning. Oh, use the reverse switch on the pump to relieve the filter pressure before opening the filter. You'll be glad you did.



The mechanism inside the honey pump.

The honey filter pictured is hanging along side a gravity filter that we occasionally use. So far as I can tell, the gravity filter is no longer manufactured. It was little more than a stainless steel container with a mesh basket that supported a filter bag. Though it worked well enough, the in-line filter is faster, has a finer filter and strains the honey better.

Strainers

When only a small amount of honey needs processing we use simple strainers. At this point, I am not quite sure what the difference is between straining and filtering. To me, straining is a more elementary procedure whereas filtering can require a lot more technology. In all cases – filtering or straining – warming the honey significantly helps the process. When

An overview of my pump and filter.

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The inline filter. Pressure should not exceed 40 psi. To clean, release pressure, remove cap, filter and wash inside or replace.

using the gravity flow model that I discussed above, the system should be "primed" with already-filtered honey before beginning to process the crop. Frequently, there are upper outlets so filtered honey can be taken near the top of the filter. In this way, the filtrate being removed from the honey stays in suspension rather than caking along the filter bag wall. The longer stuff stays in suspension, the longer the filter bag will filter.

In the figure showing the strainer above the bottling tank, a strainer bag should be installed in the filter cylinder. In my opinion, this technique should only be used for very small crops or for secondary filtering as the honey comes from another filter. When used for primary filtering, this filter will clog quickly.

A gravity strainer above a bottling tank, supported by a tripod system.

I end where I start

I end this discussion where I started[1]. Working with the mechanics of honey processing equipment is far removed from subjects like or the principles of honey production. While most of us love bees, few of us love hard work. All these motors, pumps and filters make our lives easier and free up more time for us to do what we enjoy – play with our bees. BC

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[1] For a comprehensive discussion of honey house equipment see: Tew, James E. 1992. *The Hive and The Honey Bee*, Dadant & Sons, Inc. Hamilton IL. Chapter 15. Honey and Wax – A consideration of Production, Processing and Packaging Techniques. Pages 657-704

WHERE ARE WE GOING?

And what's with this handbasket?

Jim Fischer

The law that allows bees in, keeps Inspectors out!

Remember the poem *The Rime of the Ancient Mariner* from school? Reading it again may prove instructive in light of recent changes to U.S. bee regulations. If poetry is not your thing, the band *Iron Maiden* did a musical version in the 1980s, a better summary of the story than most textbook attempts.

If you're wondering what classical literature or an aging heavy-metal rock group have to do with beekeeping, recall that the poem is a saga about unintended consequences. Killing an albatross initially appears to save a ship lost in snow and fog, but ultimately results in disaster for the ship and crew.

In the situation at hand, the unintended consequences are more an onerous burden than a disaster. But, like the mariner in the poem, we will be forced to wear an albatross around our necks.

Clauses and Effects

U.S. membership in the World Trade Organization (WTO) obligates the U.S. to accept imported "goods," subject to only a very limited set of negotiated controls. In return, U.S. export goods get similar treatment. This sounds reasonable until one realizes that live bees are considered "goods," entitled to no special consideration.

If you're thinking, "Booooring." or "Where's the consequences?" then you haven't thought it through slowly enough. Let's hear what Dr. Wayne Wehling of the USDA Animal and Plant Health Inspection Service (APHIS) says about the impact of the new WTO-compliant bee import rules:

The new Federal Bee regulations preempt state laws on restricting imports of bees.

Did that catch your attention?

While all state apiary laws are not instantly preempted, we will be forced to choose over time to either eliminate most of our current beekeeping regulations, or standardize on strict nationwide rules. In the interim, we must decide which of us will be treated unfairly.

The immediate impact is that while state apiarists are required to regulate domestic queen and package shipments, they will have no such control over imports from other countries. Moreover, the new standards "are no less rigorous than any international standards," which means standards are much more lax than existing state rules.

This isn't a dilemma; it's a TRI-lemma, with three ways to lose:

1) U.S. bee producers must comply with existing state requirements, but must now compete with foreign producers who can ignore state apiarists and ship bees earlier in the season than anyone except Hawaiian bee producers.

2) State apiarists must now blindly trust inspections done on the other side of the planet, or scrape up funding to inspect these shipments after they arrive in their states. Recall, these bees will be "certified" by inspectors who were unable to detect *Varroa* (in New Zealand) and Small Hive Beetle (in Australia).

3) Anyone who purchases imported bees is stuck if the bees turn out to be diseased or infested.

Given budget crunches in almost every state, "user fees" may be required for on-site inspections, and who pays for the cost of controlling any outbreaks caused by the imports? This brings new meaning to the old phrase "buyer beware."

Why Not "Just Say No?"

Well, because we must admit that a few among us may want to "give the bees a try," even if Canadians were so dissatisfied with bees from New Zealand and Australia that they lobbied their government to resume admitting bees from the U.S. We cannot dismiss the imports as "insignificant," even if the number of shipments is tiny.

Recall that African bees spread from a single researcher's apiary in Brazil.

Connect the dots.

Over The Long Haul

The basic problem is that WTO rules do not recognize individual state-level efforts as valid. We must have a "national surveillance program" to be able to make any statements about which diseases and pests are present in the U.S., and which are not, let alone declare any area free of a pest or disease.

If you read *Honey Bee Pests, Predators, and Diseases*, an A.I. Root book that gets depressingly thicker with each new edition, you can make a very short list of what problems are found in the U.S., and a very long list of the problems found elsewhere on the planet.

While most known pests and diseases are not found in the U.S., we have no current proof sufficient to satisfy the WTO that this is the case. To make matters worse, the President and Senate approve treaties, while Congress approves spending, so we can't even tell Congress "you broke it, so you fix it."

We have to go hat in hand and beg for money to protect vague concepts like "biosecurity" and "the future of beekeeping." APHIS representatives say that they warned both national beekeeping organizations in clear terms about this at their annual meetings in 2000 and 2001, but perhaps everyone was too preoccupied with the future of the Honey Board to pay attention to minor details like the future of U.S. beekeeping itself.

Why Not Simply Trust Exporters?

Apiary regulations in the U.S. are designed to be independent of trust. This is a good thing, as you

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"How much would you have done to keep *Varroa* out of the U.S. if you had the chance? How much must you now do because of *Varroa*?"

don't have to trust me to be a good beekeeper, or to be honest. You don't even have to know me. If I want to ship or bring bees to your state, I have to be inspected by impartial inspectors who have no interest in my agenda, and their decisions are final.

Meanwhile, NZ Trade Negotiations Minister Jim Sutton was quoted by the Australian Broadcasting Corporation on November 8th as saying:

"...the [U.S.] Agriculture Department... has decided New Zealand bees pose no threat,"

But what was really said was that WTO membership forces the U.S. to allow the shipments *regardless* of the threats posed. But the bees may be shipped if, and only if, the bees and apiaries from which they come pass specific inspections and tests *within 10 days* of shipment to meet WTO "SPS guidelines," and thus reduce the threat.

Adapt Or Die

If we can agree that some level of regulation is for the good of beekeepers everywhere, there is something that can be done. We need a "national veterinary authority" to satisfy WTO requirements, as our current state-level scheme is "incomplete," an accurate assessment given the budget cutbacks that have decimated many state inspection programs. To accomplish this, we need to:

1) Convince Congress to fund federal tracking of the incidence of bee diseases and pests so we can at least firmly state which pests and diseases are not here.

2) Modify current state-imposed quarantines to make them national quarantines, so we can at least refuse imports harboring pests that some areas may already have, but no one anywhere wants more of – like Small Hive Beetle and African bees.

Truce Or Consequences

Item "(3)" in the list is the most difficult. Learn how to form consensus and compromise. This means first admitting that no single organization represents more than their own voting members, and that only a unified coalition of groups can claim to represent "U.S. beekeepers."

While we need ongoing APHIS involvement, we need to keep them on a short leash. Recall the "Citrus Canker" program in Florida to see how "disease control" can become draconian. There, even healthy citrus trees on private property were destroyed without either notice or right of appeal just because they might be diseased.

The risk inherent in inaction should become more clear when you realize that Argentina is trying to pull the same trick as New Zealand and Australia, demanding "market access" for their bees. They are leveraging the U.S. preoccupation with bigger trade issues to force the U.S. to allow imports without even identifying any actual beekeepers who want to buy their bees. Since the U.S. doesn't have a national quarantine we cannot refuse shipments of African bees from Argentina.

Profit Only?

Profit seems the only motivation to air freight live bees from the other side of the planet. The U.S. is not without leverage, however. Right now, U.S. bee researchers feel that it is their obligation to provide genetics, breeder queens, and technical assistance at no cost to researchers in all other countries. Perhaps we shouldn't give away valuable technology to countries who put profit before Common sense. There can be significant leverage inherent in "agricultural technology." Cargill and ADM learned it long ago, which is why they have corporate jets, and we don't.

Am I overreacting? How much would you have done to keep *Varroa* out of the U.S. if you had the chance? How much must you now do because of *Varroa*? What are you willing to do to keep the next problem out of the western hemisphere? Sometimes, one is forced to compel cooperation and understanding by being just as uncooperative as the other fellow just to catch his attention.

We Hafta Think About NAFTA

"NAFTA" is a trade agreement between Canada, the U.S., and Mexico. Its rules are even more lax than WTO rules. It is only a matter of time until someone overwinters bees in Mexico, pollinates almonds in California and moves to the fertile valleys of British Columbia for honey. Currently, Canada isn't going to allow "bees on comb" from the U.S. any more than the U.S. will allow them from Mexico, but NAFTA is all about "enhancing trade," no matter the collateral damage.

Thinking Outside The 16-1/4 x 19-7/8 x 9-5/8 Inch Box

We'll probably not ever be able to justify the cost of national surveys, but we may find a cheaper solution in Europe's approach. The EU inspects the actual imports themselves, removing and analyzing queen cage attendants. This has to be cheaper than trying to find these problems after-the-fact in hives in the field. It certainly seems more cost-effective, as it is unlikely that such bee shipments will become very common. We gather samples from each package that enters, too, and run them through some lab tests. This would not restrict trade and may not even allow us to "refuse imports," but it *would* allow specific problem shipments to be detected and destroyed, and apiaries receiving the problems to be identified and decontaminated.

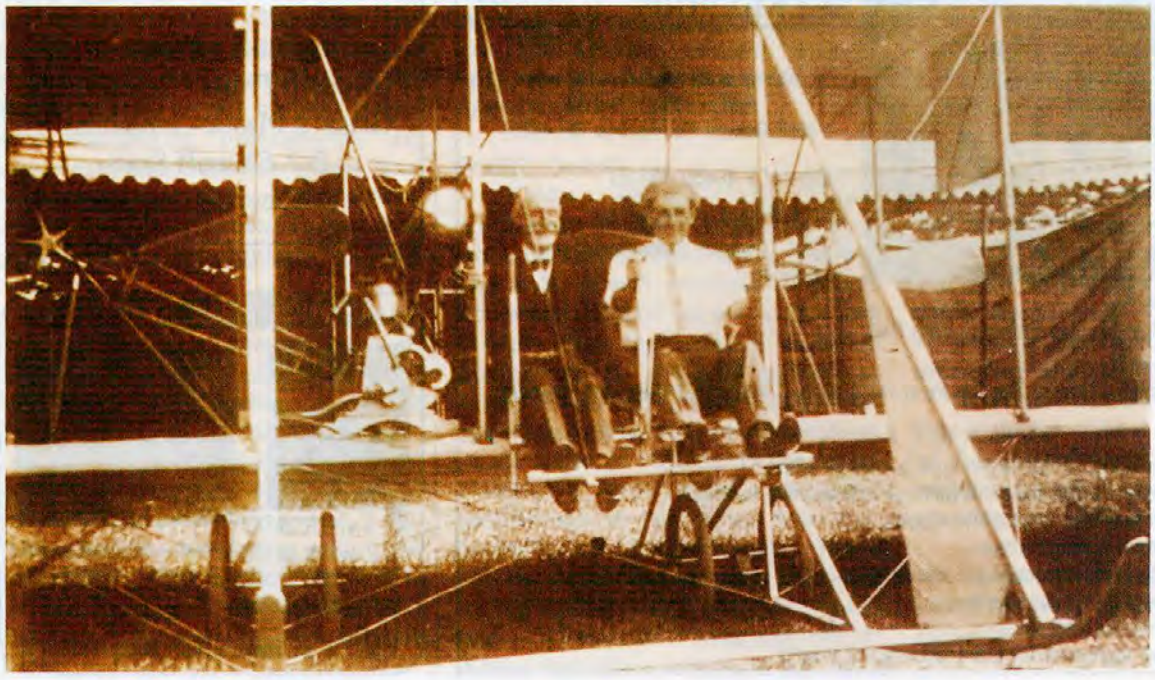
But we can't continue to ignore this in hopes that it will all go away or somehow fix itself. We never get what we deserve, we only get what we negotiate. BC

James Fischer keeps bees in Virginia, and reads trade agreements to cure his insomnia.

Dear Friends,

I have a wonderful story to tell you – a story that, in some respects, out rivals the Arabian Nights fables – a story, too, with a moral that I think many of the younger ones need, and perhaps some of the older ones too if they will heed it. God in his great mercy has permitted me to be, at least somewhat, instrumental in ushering in and introducing to the great wide world an invention that may outrank the electric cars, the automobiles, and all other methods of travel, and one which may fairly take a place beside the telephone and wireless telegraphy. Am I claiming a good deal? Well, I will tell my story, and you shall be the judge. In order to make the story a helpful one, I may stop and turn aside a good many times to point a moral.

In our issue for September 1, I told you of two young men, two farmer's boys, who love machinery, down in the central part of Ohio. I am now going to tell you something of two other boys, a *minister's* boys, who love machinery, and who are interested in the modern developments of science and art. Their names are Orville and Wilbur Wright, of Dayton, Ohio. I made mention of them and their work on page 241 of our issue for March 1 last. You may remember it. These two, perhaps by accident, or maybe as a matter of taste, began studying the flights of birds and insects. From this they turned their attention to what has been done in the way of enabling men to fly. They not only studied nature, but they procured the best books, and I think I may say all the papers, the world contains on this subject. When I first became acquainted with them, and expressed a wish to read up all there was on the subject, they showed me a library that astonished me; and I soon found they were thoroughly versed, not only in regard to our present knowledge, but everything that had been done in the past. These boys (they are men now), instead of spending their summer vacation with crowds, and with such crowds as are often questionable, as so many do, went away by themselves to a desert place by the seacoast. You and I have in years past found enjoyment and health in sliding down hill on the snow; but these boys went off to that sandy waste on the Atlantic coast to slide down hill too; but instead of sliding on snow and ice they slid *on air*. With a gliding machine made of sticks and cloth they learned to glide and soar from the top of a hill to the bottom; and by making not only hundreds but *more than a thousand* experiments, they became so proficient in guiding these gliding machines that they could sail like a bird, and control its movements up and down as well as sidewise. Now, this was not altogether for fun or boys' play.* [When I suggested that, even though sliding down hill on the air was very nice, it must have been quite a task to carry the machine back to the top of the hill every time, the reply was something like this: "Oh! No, Mr. Root - - no task at all. Just remember that we always sail *against* the wind; and by a little shifting of the position, the wind does the greater part of the work in carrying it back." It just blows it back (whenever the wind is strong enough) up hill to the starting point.] They had a purpose in view. I want to stop right here to draw one of my morals. If I allude to myself somewhat, please do not think I do it because I wish to boast. Some of you have read or heard me tell of the time when my attention was first called to bees. Almost the first thing I did was to go to the book stores and see what *books* were to be found on the subject. I studied these books day and night, and read them over and over again. Then I procured the books and bee journals from the old world; and when the language was something I could not manage I hired an interpreter to translate for me until I knew pretty nearly what the book contained. In less than one year I was in touch with the progressive beekeepers of the world; and the *American Bee Journal*, that had been dropped for lack of support, was started up again. I mention this to show you that my success in bee culture, from the very first, was not luck or chance. It was the result of untiring energy and work. Now let me draw a contrast. During the years that are past, quite a number of men have come to me with their patented hives. A good many of these men had never seen a bee journal. Some of them who had paid out their hard earnings to the Patent Office had almost never seen a book on bee culture, and they were not sure, from actual experience, of the existence of the queen bee. We have inventors at the present time who are giving their lives and money to the four winds in the same poor foolish way. If you wish to make a success of any thing, or in any line among the many lines that lie before us in this great world of ours, find out what the great and good men have done in this special line before you.



A.I. Root in one of Wright's early planes, at the Medina County Fairgrounds.

Well, these two men spent several summers in that wild place, secure from intrusion, with their gliding machine. When they became experts they brought in, as they had planned to do, a gasoline engine to furnish power, and made a little success with their apparatus before winter set. As soon as the weather would permit, their experiments were resumed the past season. You may have seen something in regard to it in the papers; but as their purpose has been from the beginning to the end to avoid publicity, the great outside world has had but very little opportunity of knowing what is going on. The conditions were so different after applying power that it seemed at first, to a real extent, as if they would have to learn the trade of guiding their little ship all over again. At first they went only a few hundred feet; and as the opportunity for practice in guiding and controlling it was only a few seconds at a time, their progress was necessarily very slow. Let me digress again just a little.

I do not know exactly how many years ago it was, perhaps something like thirty, that I saw in the *Scientific American* that they had in France what was called at that time a velocipede. As soon as I saw the description I sent an order for one, and I think I had about the first machine in the semblance of a bicycle that was ever in Ohio – perhaps one of the first brought into the United States. The machine cost over $100; and as it was a heavy affair, the express on it cost quite an item more. When it came to hand, after days and weeks of anxious waiting, neither myself nor anybody else could ride it at all. The whole town jeered at me, and the story of the "fool and his money" was hurled in my teeth so many times I almost dread to hear it even yet. Men of good fair understanding pointed their fingers at me, and said that anybody of good common sense ought to know that *that* thing would not stand up with a man on it, for that would be an utter impossibility. I worked at it, the crowd in my way, for several hours in the morning. Finally, I rented the largest hall in the town, went in with one trusty boy who had faith, for a companion, and *locked the door.* After quite a little practice on the smooth floor of the hall, I succeeded in riding from one end to the other; but I could not turn the corners. When, after still more practice, I did turn one corner without falling, how my spirits arose! A little later I went in a wobbly way clear around the room. Then my companion did the same thing, and, oh how we did rejoice and gather faith! A little later on, with a flushed but happy face, I went out into the street and rode around the public square. You can guess the rest of it. Well, these boys wanted just the same kind of privacy to try their flying machine that I needed for my velocipede but as it measures about forty feet from the tip of one wing to the tip of the other, instead of a large hall they wanted a large level field in some out-of-the-way place. I found them in a pasture lot of 87 acres, a little over half a mile long and nearly as broad. The few people who occasionally got a glimpse of the experiments, evidently considered it only another Darius Green, but I recognized at once they were really *scientific explorers* who were serving the world in much the same way that Columbus did when he discovered America, and just the same way that Edison, Marconi, and a host of others have done all along through the ages.

In running an automobile or a bicycle you have to manage the steering only to the right and left; but an air-ship has to be steered up and down also. When I first saw the apparatus it persisted in going up and down like the waves of the sea. Sometimes it would dig its nose in the dirt, almost in spite of the engineer. After repeated experiments it was finally cured of its foolish tricks, and was made to go like a steady old horse. This work, mind you, was all new. Nobody living could give them any advice. It was like exploring a new and unknown domain. Shall I tell you how they cured it of bobbling up and down? Simply by loading its nose or front steering apparatus with cast iron. In my ignorance I thought the engine was not large enough; but when *fifty pounds* of iron was fastened to its "nose" (as I will persist in calling it), it came down to a tolerably straight line and carried the burden with ease. There was a reason for this that I can not explain here. Other experiments had to be made in turning from right to left; and, to make the matter short, it was my privilege, on the 20th day of September, 1904, to see the first successful trip on an air-ship, without a balloon to sustain it, that the world has ever made, that is, to turn the corners and come back to the starting point. During all of these experiments they have kept so near to soft marshy ground that a fall would be no serious accident, either to the machine or its occupant. In fact, so carefully have they managed, that, during these years of experimenting, nothing has happened to do any serious damage to the machine nor to give the boys more than what might be called a severe scratch. I think great praise is due them along this very line. They have been prudent and cautious. I told you there was not another machine equal to such a task as I have mentioned, *on the face of the earth*; and, furthermore, just now as I dictate there is probably not another man besides these two who has learned the trick of controlling it. In making this last trip of rounding the circle, the machine was kept near the ground, except in making the turns. If you will watch a large bird when it swings around in a circle you will see its wings are tipped up at an incline. This machine must follow the same rule; and to clear the tip of the inside wing it was found necessary to rise to a height of perhaps 20 or 25 feet. When the engine is shut off, the apparatus glides to the ground very quietly, and alights on something much like a pair of light sled runners, sliding over the grassy surface perhaps a rod or more. Whenever it is necessary to slow up the speed before alighting, you turn the nose up hill. It will then climb right up on the air until the momentum is exhausted, when, by skillful management, it can be dropped as lightly as a feather.

Since the above was written they have twice succeeded in making four complete circles without alighting, each circle passing the starting point. These circles are nearly a mile in circumference each; and the last flight made, December 1, could have been prolonged indefinitely had it not been that the rudder was in such position it cramped the hand of the operator so he was obliged to alight. The longest flight took only five minutes and four seconds by the watch. Over one hundred flights have been made during the past summer. Some of them reached perhaps 50 or 60 feet above ground. On both these long trips *seventy pounds* instead of fifty of cast iron was carried on the "nose".

Everybody is ready to say, "Well, what use is it? What good will it do?" These are questions no man can answer as yet. However, I will give you a suggestion or two. The man who made this last trip said there was no difficulty whatever in going above the trees or anywhere he chose; but perhaps wisdom would dictate he should have still more experience a little nearer the ground. The machine easily made thirty or forty miles an hour, and this in going only a little more than half a mile straight ahead. No doubt it would get up a greater speed if allowed to do so – perhaps, with the wind, a mile a minute after the first mile. The manager could doubtless go outside of the field and bring it back safely, to be put in the little house where it is kept nights. But no matter how much time it takes, I am sure all the world will commend the policy so far pursued – go slowly and carefully, and avoid any risk that might cause the loss of a human life. This great progressive world can not afford to take the risk of losing the life of either of these two men." [If these two men should be taken away by accident or otherwise, there is probably no one living who could manage the machine. With these men to teach them "the trade" however, there are plenty who could doubtless learn it in a few weeks.]

I have suggested before, friends, that the time may be near at hand when we shall not need to fuss with good roads nor railway tracks, bridges, etc., at such an enormous expense. With these machines we can bid adieu to all these things. God's free air, that extends all over the earth, and perhaps miles above us, is our training field. Rubber tires, and the price of rubber, are no longer "in it." The thou-

sand and one parts of the automobile that go to make its construction, and to give it strength, can all be dispensed with. You can set your basket of eggs almost any where on the upper or lower deck, they will not even rattle unless it be when they come to alight. There are hundreds of queer things coming to light in regard to this new method of travel; and I confess it is not clear to me, even yet, how that little aluminum engine, with four paddles, does the work. I asked the question, "Boys, would that engine and these two propellers raise the machine from the ground if placed horizontally above it?"

"Certainly not, Mr. Root. They would not lift a quarter of its weight."

"Then how is it possible that it *sustains* it in the air as it is?"

The answer involves a strange point in the wonderful discovery of air navigation. When some large bird or butterfly is soaring with motionless wings, a very little power from behind will keep it moving. Well, if this motion is kept up, a very little incline of the wings will keep it from falling. A little *more* incline, and a little more push from behind, and the bird or the butterfly, or the machine created by human hands, will gradually rise in the air. I was surprised at the speed, and I was astonished at the wonderful lifting power of this comparatively small apparatus. When I saw it pick up the fifty pounds of iron so readily I asked if I might ride in place of the iron. I received, by way of assurance, the answer that the machine would no doubt carry me easily. You see then I would have the "front seat;" and even if it is customary (or used to be in olden times) to accord the front seat to the ladies, I think the greater part of them would say, "Oh! Sit still, Mr. Root. Do not think of getting up to give *us* your seat."

At first, there was considerable trouble about getting the machine up in the air and the engine well up to speed. They did this by running along a single-rail track perhaps 200 feet long. It was also, in the early experiments, found advisable to run against the wind, because they could then have a greater time to practice in the air and not get so far away from the building where it was stored. Since they can come around to the starting point, however, they can start with the wind even behind them; and with a strong wind *behind* it is an easy matter to make even more than a mile a minute. The operator takes his place lying flat on his face. This position offers less resistance to the wind. The engine is started and got up to speed. The machine is held until ready to start by a sort of trap to be sprung when all is ready; then with a tremendous flapping and snapping of the four-cylinder engine, the huge machine springs aloft. When it first turned that circle, and came near the starting point, I was right in front it; and I said then, and I believe still, it was one of the grandest sights, if not the grandest sight, of my life. Imagine a locomotive without any wheels, we will say, but with white wings instead, we will *further* say – a locomotive made of aluminum. Well, now, imagine this white locomotive, with wings that spread 20 feet each way, coming right toward you with a tremendous flap of its propellers, and you will have something like what I saw. The younger brother bade me move to one side for fear it might come down suddenly; but I tell you, friends, the sensation that one feels in such a crisis is something hard to describe. The attendant at one time, when the rope came off that started it, said he was shaking from head to foot as if he had a fit of ague. His shaking was uncalled for, however, for the intrepid manager succeeded in righting up his craft, and she made one of her very best flights. I may add, however, that the apparatus is secured by patents, both in this and in foreign countries; and as nobody else has as yet succeeded in doing anything like what they have done I hope no millionaire or syndicate will try to rob them of the invention or laurels they have so fairly and honestly earned.

When Columbus discovered America he did not know what the outcome would be, and no one at that time knew; and I doubt if the wildest enthusiast caught a glimpse of what really did come from his discovery. In a like manner these two brothers have probably not even a faint glimpse of what their discovery is going to bring to the children of men. No one living can give a guess of what is coming along this line, much better than any one living could conjecture the final outcome of Columbus' experiment when he pushed off through the trackless waters. Possibly we may be able to fly *over* the North Pole, even if we should *not* succeed in tacking the "stars and stripes" to its uppermost end.

January 15, 1905

The Wright Brothers' Flying Machine

I shall have to apologize a little, friends, for giving a picture of the gliding machine instead of a flying machine; and I shall have to apologize a little more because the rudder in the rear that guides it from right to left is not shown in the cut; neither are the diagonal wire braces shown. You will recollect the machine is made of white canvas. The wires are also white; and with the clear sky for a background it was very difficult to get a clearly defined picture. To make it a little plainer the outlines have been marked with ink, as you will observe.

The back side of the plane shows the outline as it really appears. The cotton is stretched over a light framework of light sticks, giving it somewhat the appearance of a bird's wing; for both wings, upper and lower, are concave to some extent. The front rudder, that changes the course of the machine up or down, is a small independent wing that can be raised or lowered out of its level by the operator. The back rudder that does not show in the picture consists of two vertical wings that can be revolved on a pivot so as to turn the machine either to the right or left. The operator, Mr. Wilbur Wright, if I am correct, is shown very plainly. (Glider not pictures here.)

It has often been remarked that one of the most beautiful sights in the world is a ship under full sail, especially a new sailing vessel with clean white canvas. There is something especially exhilarating about the way in which the canvas catches the wind and sends the ship scudding through the waves. But to me the sight of a machine like the one pictured, with its white canvas wings and rudders subject to human control, is one of the grandest and most inspiring sights I have ever seen on earth; and when you see one of these graceful crafts sailing over your head, and possibly over your home, as I expect you will in the near future, see if you don't agree with me that the flying machine is one of God's most gracious and precious gifts.

The flying machine pictured here is the same thing as the glider, but with the aluminum engine which stands right close to the operator and the pair of propellers, one each side of the back rudder. When in flight the propellers are invisible. Their action is very much like the motion of a bee's wing – perhaps not quite as rapid. But the picture gives you a very fair idea of the new vehicle that requires no macadam road, no iron rails, and no expensive bridges. Its highway is God's free air; and as it has only the vaulted heavens above to fence off our domain, there surely should not be any dispute about the "right of way;" neither should there be any difficulty in the way of collisions or getting in each other's way. The automobile is largely restricted in making speed by other vehicles, especially where the driver does not wish to annoy or inconvenience any of his fellow-men. If anybody gets in our way with the air-ship we not only have ample space to go around him to the right or to the left, but we can "duck under" or scoot over his head if it seems advisable. There does not seem to be much danger in the way of loss of life unless something happens to the front rudder; and that is one feature that should be made safe beyond the possibility of an accident. While up in the air there is but very little to injure or to put any great strain on any part of the machinery. If you run into a tree or a house, of course, there would be a smash-up. No drinking man should ever be allowed to undertake to run a flying-machine.

This article was published in Gleanings in Bee Culture *January, 1905 by A.I. Root.*

Keep 'em COMFORTABLE

Serge LaBesque

Beehive design has come a long way since the hollow log, but it is nevertheless still begging for improvements. The intent of this article is to share a few considerations about our beehives, their shortcomings, and how we may be able to remedy them.

But before we examine our equipment, we must first of all realize that it has three main types of users: beekeepers, bees, and their pests. To prosper, to remain as healthy and productive as we want them to be, our bees need decent living quarters. Unfortunately, they are sometimes lodged in inadequate dwellings, in which case it should not come as a surprise to their keepers if they become diseased or if they abscond. Pests, on the contrary, may find in our hives exactly what they need to thrive. Shouldn't it be the opposite? Shouldn't the hive be a comfortable shelter for the bees, a nesting place that inhibits the development of bee parasites, and eliminates sources of diseases as much as possible?

Whereas beekeepers have to manipulate supers only occasionally, bees live in them continuously. Yet, for centuries, beekeeping equipment has evolved under constraints that were imposed by humans, and the needs of the bees have seldom been taken into consideration. Besides the "bee space", it seems that most of today's hive components are designed mainly to achieve low fabrication and use costs. The insects definitely did not dictate any of these requirements. If you try to fabricate your own supers, you will find it difficult to buy the wood for much less than what you would have to pay for a precut, mass-produced kit. The same goes for tops, inner covers, bottom boards and other hive essentials. From this example, it is easy to understand why, in order to meet their business goals, or to merely survive, manufacturers of beekeeping equipment have resorted to design over-simplifications that, in the end, are not always the best for the honey bees their products are intended to contain. Granted, when left to themselves, bees do not always choose or construct the best nests either.

For a moment, go back and try to remember your first hive inspection of the season: The bees had been kept inside by long periods of inclement weather until, finally, there was a mild and sunny day. You grabbed your veil, smoker and hive tool, and you rushed to the apiary. Bees were flying. You pried a migratory top off a hive, exposing the top bars of the brood chamber, and . . . your heart sank at the sight: The hive top was waterlogged, water was dripping down onto the frames from its greenish, mildewed underside, and the upper edges of the super were wet, just like the frame rests that retained water. When you tried to pry the first frame out, the cold propolis resisted, and the pressure of the hive tool squeezed even more water out of the frames' top bars. Everything seemed to be soaked in there! Everything seemed so cold! Finally, the hard propolis gave way and the frame came out. It was a frame of honey. The bees had not touched it. Some sort of grayish-green bloom was covering the wax. Oh well, spring was approaching and the bees would clean it . . . After examining the minuscule brood nest, you closed the hive with its wet top, feeling a little uneasy about it, but satisfied to know that the colony was alive. Alive yes, but not in great shape! Obviously rainwater had penetrated the hive. The ex-

posed joints along the edges of the migratory top were the apparent culprits. Migratory tops are simple to fabricate, require little material, and end up being almost as inexpensive as a hive top can be. Because they are not wider than the hives they cover, beekeepers can place their hives right next to each other on their trucks, which is a feature of importance to most commercial beekeepers. But a large quantity of the rain that falls on these tops penetrates inside the hives by capillary action through the narrow gaps that separate them from the supers they are intended to protect. This is particularly true if the propolis seals are incomplete, or have been broken and the bees were unable to restore them. The same phenomenon also occurs between adjoining supers. Capillary action is powerful. It will drive amazingly large amounts of water in any direction, even against gravity. A trapping tray placed under a screened bottom can demonstrate the astonishing quantities of water that may circulate inside a hive. To correct this problem, you may replace the migratory top by a telescoping top and an inner cover.

It is Summer now: The sun is high in the sky, and it is a real pleasure to watch the bees coming and going. On the landing board and in the entrance, bees are fanning as hard as seems possible. Masses of bees! You lean on the hive to look more closely at the bees, and . . . you burn your hand on the metal of the telescoping cover. There is only a thin layer of plywood and the inner cover to separate the super from this hot sheet metal! Now it strikes you: The bees are not bringing nectar! They are gathering water or staying outside to keep the inside of the hive relatively cool. And they are *consuming* honey to do all this work! How could they be *making* honey in these conditions?

To correct this new problem, you decide to paint the hive top white, and maybe, if you get around to doing it, you will be making an insulated hive top.

Like many beekeepers, I enjoy tinkering with my colonies and my beekeeping equipment. Since I started beekeeping, I have gradually modified my equipment in a series of attempts at keeping my bees healthy and comfortable. Without departing from the widely accepted standard dimensions, my hives now include several features that differentiate them from most. In the following, I invite you to take a look at some of my favorite hive details.

The top of a hive is just as important to the bees as the roofs of our houses are to us. It is their first line of defense against both rain and intense sun. The upper part of my hives comprises three pieces that work together. The uppermost, the cover, is made out of fiberglass. Just like boat hulls that are made out of this material, the cover is impervious to water, durable, tough, and integrally molded with a white gelcoat to reflect the summer heat. Its perimeter, which generously overhangs the supers, functions as an effective drip edge. Underneath this "roof" is a rectangular plate of plywood. This is the true lid of the hive. Without it, the cover would become bonded with propolis and would be difficult to lift. A screened ventilation notch is cut in its rear edge. In an emergency, it may even be used as a temporary hive bottom. The fiberglass cover is simply removed whenever the hive is to be transported. Next is a hive top feeder containing floats that are made out of an insulating material such as rigid foam or, preferably, cork boards. The floats prevent the bees from drowning whenever they are being fed syrup, and they insulate the upper part of the hive. This arrangement is similar to that which is found in our own houses, where the insulation is placed directly above our ceilings, and not above the attics. This feeder is kept on the hive year round. If the colony needs to be fed, the feeder is already in place. It also receives the occasional pieces of bridge comb I may find during hive inspections, as well as the wax cappings left over after extracting honey so that the bees can clean them up. During the winter, some of the moist, warm air rises in the cavity of the feeder. The water vapor that does not escape through the ventilation notch condenses under the lid, and drips down into the feeder instead of showering the bee cluster. Combined with the use of follower boards, which I described in the February 2004 issue of *Bee Culture*, this feature contributes largely to keeping my colonies dry during the Winter.

With the cover and lid set aside, one of the compartments of this top feeder has just received some syrup. The insulating floats not only prevent bees from drowning, but they also prohibit water vapor from condensing directly above the clustered bees. Inset shows the screened inner cover and the telescoping fiberglass outer cover.

Close-up on a drip edge that separates two hive components. This detail prevents rainwater from penetrating inside the hive by capillary action.

Let's now take a look at the sides of the hive. The wood of the supers is essentially left bare. I used to paint my hives. No longer. Now, only their corners receive a narrow stripe of paint. This is to seal the end grain of the wood and to protect the joinery. A few Winters ago, the paint of several of my older supers started displaying a multitude of blisters that were filled with

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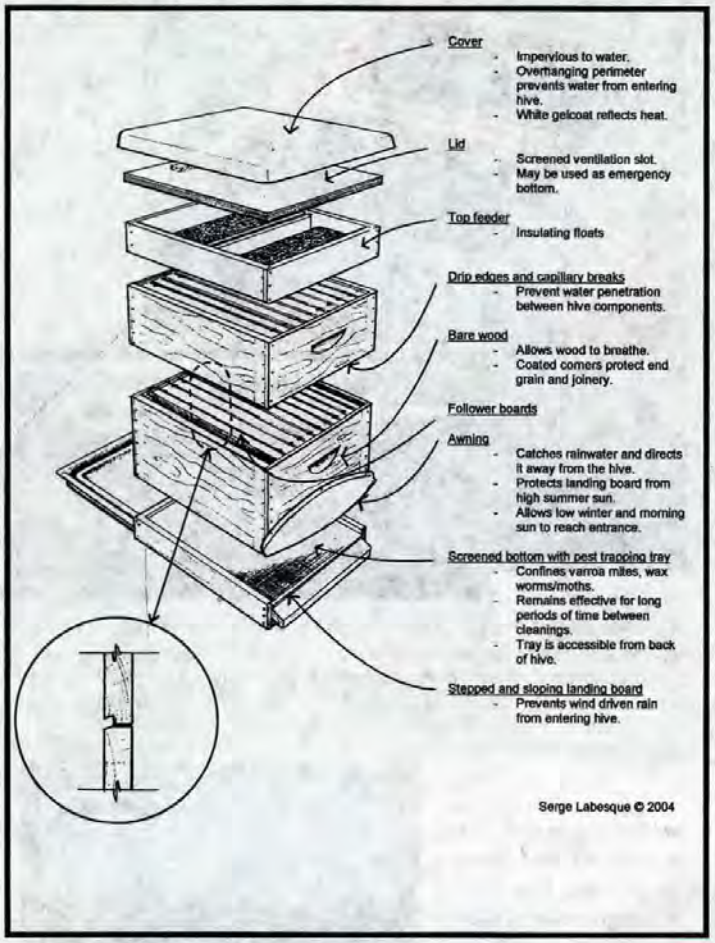

water. This meant that the colonies inside these supers were in an environment of very high relative humidity, which, again, is not good for the bees. So, I made a batch of supers that, contrary to what most books recommend, I left unpainted. They were stocked with bees, and I noticed that the colonies were doing very well in them, even during our hot dry summers. Actually, the honey seemed to accumulate and ripen faster in these bare wood boxes. Since I only paint the corners of the supers, the rest of the wood ages naturally, but it does not seem to deteriorate noticeably faster than it would under a coat of paint (at least in our climate). I don't have to spend much time painting, which I dislike anyway, and a quart of paint is sufficient where, previously, gallons would have been necessary. Furthermore, when I decide that it is time to retire a super, I simply saw the corners off, and burn the rest of it in our woodstove, without fear of getting intoxicated by the fumes burning paint produces.

Water may also penetrate into the hive through the gaps that separate hive components. To prevent this from happening, I experimented with different capillary break and drip edge configurations. The detail I currently use consists of cutting a ¼" wide, 25° chamfer along the upper edges of the hive components, and a ¼" drip edge along their lower edges. These cuts are easily done on a table saw after the supers are assembled. In effect, this is not all that different from shiplap sidings that are used in many of our houses.

Let's now take a look at the entrance of the hive. In the middle of a sunny Summer day, place a thermometer on the landing board. Watch the temperature climb, 100°F, 120°F and up. In such conditions, when the bees are fanning to cool their brood nests, they can only draw very hot air inside the hive. I use small awnings made out of white fiberglass to keep the landing boards from heating up under the high Summer sun. They are shaped and placed in such a way as to allow the rays of the low Winter and early morning sun to reach the entrances of the hives, while providing cool shade when the sun climbs higher in the sky. These awnings also serve to protect the entrances of the hives from rain by shedding the water to the sides of the hives.

The bottoms? Screened bottoms, of course, with pest trapping trays that are removable from the rear. So beneficial are these beekeeping tools that I would not even think of going back to using solid bottom boards. Such screened bottoms not only help keep *Varroa* mites, wax worms and other unwelcome critters under control, but their trapping trays are also remarkable indicators of the colonies' health status and activity (see November 2002 issue of *Bee Culture*).

The landing boards have a small step, and slope forward to prevent wind driven rain from entering. In fact, the bees do not really need landing boards, but we beekeepers have gotten used to watching our bees on these "front porches".

Water inside the hive, excessive heat, elevated moisture and a high level of CO_2 are conditions that are harmful to bees. Colonies that are kept in damp environments suffer a high incidence of diseases such as nosema and chalkbrood, if not Winter mortality, and they may develop slowly in the Spring. Proper ventilation of the hive is an element that is crucial to the wellbeing of your colonies in all seasons. The hive details we have just discussed help address these problems. And, at this point in time, I really like how my hives are performing. Best of all, I am convinced that the bees they house are healthier, and that the colonies are stronger and more productive than they would have been in my older equipment.

Of course, the best hive construction details are no substitute for good colony management, quality queens and generous honeyflows. But they are an important complement to them.

To sum it up, here is a list of features I recommend you incorporate into your hives:

1. Use screened bottoms with effective trapping trays.
2. Use follower boards in the brood chambers, particularly during the Winters.
3. If you must paint your hives, make sure that you use a paint that lets the wood breathe.
4. Use a hive top feeder.
5. Place an insulating material inside the feeder.
6. Provide a screened ventilation hole above the hive top feeder.
7. Cover the hive with a white telescoping top.

You may want to give some consideration to these ideas. When you arrive at solutions that work for you as well as for your colonies, please share your ideas with all of us. Just one recommendation: Make sure that your hives can use moveable frames, preferably of standard dimensions. The Langstroth hive, even though not a perfect design, has received wide acceptance, and it is a pretty good starting point. BC

Serge Labesque makes life easier for his bees near his home in Glen Allen, California.

100 Years Of Keeping Bees

James E. Tew

Where are we the same and where are we different?

Where are we the same and where are we different?

Well, another new year is here. Time moves so fast that it feels I experience several new years per year. I'm the guy who used to wonder why anyone would need the day feature on his watch – never mind the year. Now I shamelessly look for both on a daily basis. No doubt I will require the usual four months to make the internal change from 2004 to 2005. And then there's those New Year's Resolutions.

2005 Resolutions?

This year I sense that I will list things similar to all other past years – lose weight, get in shape, take better care of my bees, organize my office . . . blah, blah, blah.

Looking back – not forward

Rather than planning for next year, I want to look *back* for a few moments. In November last year the Pennsylvania State Beekeepers' Association (PSBA) honored me with an invitation to participate in their 100th birthday anniversary. It was an impressive event. They had resolutions from all major elected officials and had officially designated April 12, 2004 as "State Beekeepers' Day." They had a good crowd at a nice facility with great food. I was humbled by my neighboring state's commitment to beekeeping. Beekeeping energy abounded and everyone was in good spirits.

At their banquet, I was asked to speak about something somewhat relevant to being 100 years old. I perused my bee book library and came up with *Advanced Bee Culture*[1] by W.Z. Hutchinson, published in 1905, a single year of being exactly the same age as the PSBA. This is a fairly common book published by A.I. Root. As I reviewed the Table of Contents, I was struck by how much some things have not changed.

Of approximately 35 topics, only three – just three – topics are not particularly common today. But the remaining 32 are timeless. "Making a Start in Beekeeping, Making Increase, Making Quality Extracted Honey, Developing a Market for Comb Honey, Migratory Beekeeping, and Rendering Beeswax are examples of issues that are at least 100 years old that we still discuss at bee meetings till this very day.

And the three topics that have changed?

"The Choice of Hive Design, Contraction of the Brood Nest, and House Apiaries," were the three topics that have fallen in disfavor today – somewhat.

The Choice of Hive Design

In 1905, when Hutchinson discussed the choice of hive design, he was referring to specific hive styles. While already popular in 1905, the Langstroth Hive design was not yet ruling supreme.

But wait. Are not beekeepers today being teased with various hive styles – some plastic and some wood? We have, it's true, settled on the Langstroth concept, but the raw materials to fulfill that concept have, and continue to evolve. For instance, various formulations of beaded foam and rigid plastic keep testing the market waters that heretofore were the sole domain of wood.

As far back as 1879, A.J. King was developing a hive he called the *American Bee Hive,* a name patriotic by any standard today. It was just one of the various hive styles lingering around during 1905. Clearly the American Bee Hive (ABH) was not as successful as the Langstroth design since very, very few of us have an ABH today. But I have access to the remnants of one and from those weathered remains and King's book[2]; I rebuilt an *American Bee Hive* as near to specifications as I possibly could.

On the surface of things, having good plans and parts of an original hive from which to take measurements, one would think it would be fairly easy to duplicate the piece, but I had immediate challenges. Lumber has changed since 1905. The original hive was constructed from 1-1/8" thick lumber and was made from solid boards (probably Tulip Poplar). The first

[1] Hutchinson, W.Z. 1905. *Advanced Bee Culture.* The A.I. Root Company, Medina, OH 205pp

[2] King, A. J. 1879. *Beekeepers' Text Book.* Orange Judd Company, NY. 230 pp.

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thing I had to build was lumber. But enough of my whining about construction challenges.

The beehive pictured would never have been coated in clear varnish, but after my work developing construction lumber, I could not bear to simply paint it. While everything else was built to A.J. King specifications, my varnish finish was not to standards (Ironically, the original coating would probably have been white lead paint.)

This hive opened from the left side as well as the top. The hive had a built-in entrance reducer/closing device. It was also provided with a glass back protected by a hinged door. The bottom board was slanted back to front to keep out moisture but interestingly was also intended for wax moth larvae to "roll from the hive." Ventilation needs were addressed by having various complicated controllable ventilation holes on the front, top and side of the hive. The outer cover was very heavy and telescoped down over the hive proper, eliminating the need for the now-famous *hive-top-rock.*

The hive contained two small supers having no frames but sporting glass walls. I don't know why. It was an interestingly complicated hive. And, it was one of the decisions of the day that beekeepers one hundred yeas ago had to make – what kind of beehive to use?

Contraction of the Brood Nest

Hutchinson was a bit vague about how to go about this procedure, but the idea was to reduce brood populations at a time when bees were not needed. Specifically, during summer months when nothing was in bloom, why allow the bees to run high populations of foragers – all needing to be nurtured and fed – when there was nothing to collect. Essentially, space in the brood nest was restricted. When producing comb honey, we still frequently employ this procedure, but I don't know of any beekeepers who are trying to reduce populations during nectar dearths. In Hutchinson's defense, he was not a proponent of automatically reducing all brood population sizes but only those that were being used to produce comb honey and those that would be building up at a time when no stores were available for harvesting.

House apiaries

In our beekeeping past we frequently kept bees in buildings constructed for that purpose. I guess it was part of our European beekeeping ancestry. There has never been a "standard" house apiary. I have visited the Shaker museum at Shaker Heights, Ohio and have stood amidst the stone foundation of the village bee house. In Seville, Ohio, A.I. Root photographed a bee house that was hexagonally walled and ornately decorated. But many of these buildings, as you might expect, were very lightly constructed. Many times, hives were only put in them for the warm weather season and later moved to wintering cellars.

So far as I can tell I am a lone voice asking if this idea should be reviewed again. As our industry becomes more urbanized it seems logical that circumspect neighbors will only become moreso. Two of my four backyard hives are in plain view and at best I have an uneasy truce with my adjoining neighbors who are plainly viewing them. A small apiary house would allow me the privacy of working the four colonies and would allow the occasional inspection on rainy or cool days. But the cost of such a building can't be ignored when compared to the cost of planting windbreaks or simply putting my hives someplace more remote. At any rate, house apiaries are an old idea that, for the most part, we do not employ now.

My reproduction of "The American Bee-Hive."

Old Pests – New Pests

One hundred years ago our beekeeping predecessors were well acquainted with American and European foulbrood, wax moths and ants. Their control recommendations were quaint though, as, no doubt, will our use of Terramycin be one hundred years from now. There was no mention of mites, pesticides or Africanized honey bees in my one-hundred year old book. Why would there be? These pests were completely unknown. In fact, *Varroa* was just being introduced into the European honey bee population on the other side of the world, and Africanized honey bees hadn't been thought of yet.

One hundred-year old advice and observations

As interesting as anything I have discussed thus far were the serendipitous comments that Hutchinson occasionally made in

his centurial book. In the opening paragraphs of his book, he said, *"General farming is very poorly adapted for combining with beekeeping, yet the attempt is probably made oftener than with any other pursuit."* The reasons are obvious to this day. A farmer can't be two places at once – producing a crop or working with bees. Both efforts occur at the same time.

Another of Hutchinson's recommendations – increase your colony numbers 10-fold or enough to match the value of the farm crop. Now that's a sobering recommendation for one-hundred years ago and for today.

He said, *"It should be understood, however, that beekeeping is not an occupation in which one can easily become wealthy.....Fortunately, however, the perfection of a man's happiness bears but little relation to the size of his fortune; and many a man with the hum of the bees over his head finds happiness deeper and sweeter than ever comes to the merchant prince with his cares and his thousands."*

And as though Hutchinson was speaking to a beekeeping group next Thursday night, he said, *The successful man is the one who succeeds in* ***spite*** *of difficulties. As some unpleasant, discouraging feature comes up, the first thought is: "'If only things were different, I would be all right;" then comes up the thought: "The successful man succeeds in* ***spite*** *of these difficulties. He overcomes them. Don't give up; instead, set your wits to work, summon up your courage and go at your troubles like a thousand of brick."*

One hundred years later

A century later, modern beekeepers are remarkably the same. We have more pests, but we have better equipment. We still complain about queen stock and we still chase swarms. We're beekeepers. We carry on the tradition simply because we want to. Most of us don't make a lot of money at our beekeeping, but we really, really enjoy it. Thanks to the Pennsylvania State beekeepers for inspiring me to look at our past. BC

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Do You Get Black Locust?

Walt Wright

Is it the bees, or the trees that decide?

Several times I've pointed out that in my area black locust nectar is not stored in the supers. Black locust blooms here in the storage lull just prior to the beginning of the white wax flow. But the relationship between the bees' development schedule and the trees development schedule is not the same for all areas. Black locust is a case in point.

But first, I need to fix something from the April '04 article on nectar collection. In it I omitted the difference typically seen in second year colonies (those from a split last year). The difference is that second year colonies will often add nectar at the top when established colonies are in the storage lull just prior to the main flow. Some experienced beekeepers are aware that last year's splits are this year's best producers, but they don't know why. It is sometimes attributed to the presence of a young queen but I don't believe that. The characteristic of adding a couple supers of nectar by the second year colony while the established colony adds none at the top gives a split a head start on production.

I don't know why they do that as there doesn't seem to be an obvious advantage to the overall survival format. It may simply be a carry-over from the increased motivation of first year establishment, but that seems far fetched as all new bees are in the second season. If this turns out to be a dependable characteristic, it might change the management strategy of beekeepers interested in maximizing honey production.

With that out of the way, let me proceed into the storage lull versus accumulation of black locust nectar/honey, recalling that most of the following is not necessarily applicable to second year colonies, but mostly established colonies.

Richard Bonney was a very savvy bee man and one of my favorite contributors to this magazine. Several years ago he speculated on these pages that black locust was always "rained out" at his location in northern Massachusetts. Since the literature is devoid of any description of what is happening in a beehive in the Spring, he had no way of knowing that it had nothing to do with wet weather, but I concluded that his bee and tree development schedules were similar to mine in Tennessee.

In correspondence with a Michigan expert about his 50 year old scale hive data, there was substantial disagreement on the reason for the 25-day notch in weight gain. The chart shows where the scale hive weight was recorded at five-day intervals. Weight gain is shown in the positive direction and weight loss is shown in the negative direction. Connecting the data points adds some confusion because where the chart crosses the zero line is not necessarily a data point on the zero line. It would have been much easier to read if it had shown cumulative weight gain and loss. Although poorly done the graph does show the early flow in May, the storage lull in early June and the peaks of the main flow in June and July. Note that a few rainy days will distort this data significantly. The weight gain went to zero, and even went negative through the period centered about June 10. He claimed that there were no sources or flowers during that period.

I made an appointment with him for June 1 and traveled to Michigan on May 31. The intent of my visit was to show him in his own hives what was happening at that time in the season. On the last 30 miles to his residence, black locust was everywhere along the interstate highway. It appeared to be just past peak bloom. He had told me in advance that his area produced supers of black locust in years that the bees get suitable flying weather during bloom.

The visit was timed to the beginning of the early June storage lull indicated on his scale hive data. There are enough hive indications of reproductive swarm cut off that there was a good chance that he could be convinced that I was not a redneck crackpot, and I desperately needed an expert to take a serious look at my observations. The visit failed to stimulate his interest. But that is not relevant to black locust timing. The point is that if that season was representative of typical bee/tree development schedules for his area, he would indeed get black locust in supers. Black locust bloomed there before the storage lull. Had reproductive cut off not started the storage lull, the dip in weight gain would have been later, if it occurred at all. Other sources could fill the gap.

It should be noted that the foragers are not on vacation during that lull. At the landing board the hive often appears quite busy, and they are actively working black locust. You can tell a forager working black locust because she has a powdered look from entering the flower envelope. Both pollen and nectar foragers have this characteristic dusting of the black locust beige pollen.

Here's what happens. When black locust blooms during the storage lull the incoming forage is used to feed the colony. Incoming nectar is managed for both population and brood volume because both are peaking during this period. Further,

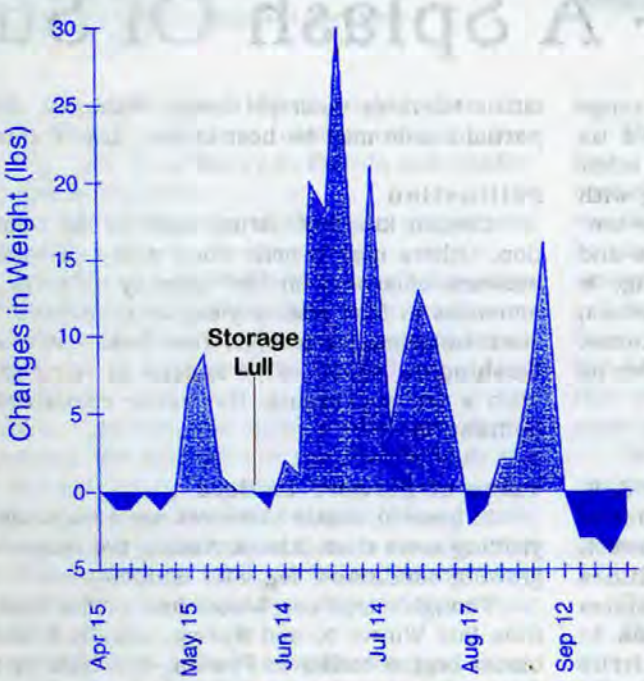
understand that generating wax makers during the period creates the need for nectar used as the raw material for wax, but does not fully explain the failure to add nectar at the top. In two weeks or less the colony will be doing both. Failure to store nectar at the top appears to be deliberate. Go figure.

Two areas in Maryland provide an interesting study in the variance in bee and tree development schedules. Considerable time is spent in suburban D.C. for personal family reasons. There is some time for contacting local beekeepers, an outlet for my passion for going among the ornery little boogers. John, of Ellicot City, was located about 20 miles north of Washington and closer to Baltimore. His name had shown up in bee magazines as a contributor/letter writer. When visited, he told me that his major honey crop was black locust. I was skeptical so another visit in another season was timed to coincide with the period of late general green up. On that visit, with most trees nearing full leaf out, he pointed to some bare trees on the horizon and said they were black locust. Conclusion: For his area, black locust would bloom *after* the storage lull when the white wax flow started.

Those of you who pay attention to field forage will already know that black locust is slow to leaf out in the Spring. The blooms appear on essentially bare branches and leaf-out gets under way as the bloom begins to fade. One of the reasons black locust is so showy is that the bloom does not have to compete with leaf foliage. In my area of Tennessee, even the bloom trails leaf-out of other hardwood trees such as oak.

Meanwhile, 30 miles south of Washington, in southern Maryland, beekeepers wondered why the bees "just quit" on black locust. The bees stopped adding black locust in the supers while it was still in bloom. The beekeepers seemed to like my explanation of the internal operations of the colony that produce the lull in overhead nectar accumulation between reproductive swarm cut off and the start of the "main flow". In their area, black locust bloomed just before, and into the storage lull, as it does in Michigan.

For the two Maryland locations about 50 miles apart, the bee development and the tree development schedules are quite different. The southern Maryland location is surrounded by the tidal waters of Chesapeake Bay. The Atlantic Ocean is warmed by the gulf stream moving up the coast. Without understanding all the details, we conclude that it would be safe to guess that the tree development schedule is influenced by the warming waters of the Chesapeake more than the bee development schedule.



Michigan Scale Hive Data, Circa 1954

I am convinced that the development schedule of bees is influenced by the early season forage availability. The local mix of sources affects the build up rate. For two seasons in a row, build up and the development milestone indications were a week late at my location. The first season the sources were out there, but the bees had almost no flying weather. The second season late Winter freezes retarded almost all their normal build up sources. The indestructible maples (we have several) actually failed to bloom at all. Slow build up was obvious both years. In the late freeze season, we still didn't get black locust in the supers. Both the bee and tree development schedules were retarded by over a week.

There are two lessons in the above discussion on black locust. Whether you get black locust gain in supers, or not, is dependent on the relationship of bee and tree development schedules in your area. And those development schedules show seasonal variations. The bees' development schedule has the added influence of local forage mix available during build up.

The second lesson concerns a subject not discussed. The reference literature often points to "day length" as a possible reason for predictability of colony actions or activities. Day length and sun angle are responsible for the gradual change from Winter to Summer, and to that extent it affects seasonal changes in the colony. But the bees react to changes much closer at hand. Climatic conditions in any given season have much more impact on colony development than the position of the sun.

Consider for a moment the effects of elevation on development schedules. Both bee and tree development is retarded at higher altitudes. Although the day is longer at the mountaintop than in the valley by virtue of improved sun angle, development is slowed by colder air. Last frost dates vary by three weeks from my area to Gatlinburg in the foothills of the Smokies. Variation to the summit is much more. You can drive down the mountain from the top and watch Spring unfold from bare trees to full leaf-out at the resort areas. Short distances with significant change in elevation affect bee development schedules accordingly. Let's put the "day length" theory to rest, along with some of the other guesswork of yesteryear. BC

Walt Wright experiments with his bees at his home in Elkton, TN.

Honey Plants

Connie Krochmal

Citrus – A Splash Of Sunshine

America is blessed with a range of climate zones. These give us colder areas where apples and other temperate fruits thrive along with warm, subtropical regions for tender species, such as avocados and citrus. Of all the citrus, orange is the best honey plant. Nonetheless, the others are good nectar sources. Most citrus provides some pollen as well.

Where Grown

Cultivated in USDA zones 8, 9, and 10, citrus is a major source of honey in the Southeast, Southwest, West, and Hawaii. This includes Florida, and the Gulf Coast states to Texas, Arizona, and California. In addition to commercial citrus groves, dooryard plantings are common throughout the area.

General Description

More often than not, citrus plants are trees. However, a few kinds are shrubs. They range in height from nine to 50 feet. Typically, these feature glossy, aromatic foliage with winged leafstalks. Especially when young, citrus plants can be spiny. Generally the waxy, white flowers are fragrant. Up to 2½ inches across, blossoms open singly or in clusters from the axils of the leaves.

Growing Conditions

Various types of citrus differ slightly in their cold hardiness. As a general rule, the trees withstand colder temperatures than the flowers or fruits.

Demanding a well drained soil, citrus tolerates most pH levels. Normally, it's grown in full sun, though partial shade may be best in hot, desert areas.

Pollination

Certain kinds of citrus, such as the pummelo, require cross pollination. Others may benefit when pollen is transferred within the flower, or between blossoms on the same or different plants. Pollination leads to increases in fruit size or yield for grapefruit, lemon, some mandarin varieties, tangelos, tangerines, Temple and Valencia oranges, tangerines, and Washington Navels. This is true to some extent for the other oranges. With a few exceptions, the minor citrus crops show little benefit from pollination.

Value of Flowers to Bees

In general, citrus blossoms are a major nectar source with some kinds yielding more than others. Among the factors affecting the nectar flow are growing conditions, fog, and temperature.

Though citrus can bloom four or five times a year, the main period is from late Winter to mid-Spring, usually from February through May. The bloom begins earlier in Florida, and later in the West. On the average, a blossom yields 1.5 bee-loads of nectar. When the bees are working the flowers, the hives smell like citrus blossoms.

Most citrus honey is labeled as orange blossom even though it is likely a blend of different citrus.

Besides oranges, there are several other major citrus crops. In addition, the lesser known ones discussed here are grown commercially as well.

Major Citrus Crops

Grapefruit (*Citrus paradisi*)

Grapefruit is cultivated mostly in Florida along the Atlantic Coast, and to a lesser extent in Texas, California, and Arizona. This area produces most of the world's grapefruit. Reaching 30 to 50 feet in height, these are large vigorous trees. The plants can withstand temperatures of 23-24°F.

Considered a valuable honey plant, grapefruit is almost equal to that of orange, often yielding surpluses.

Lemon (*Citrus limon*)

Produced primarily in the cool coastal regions of California, smaller quantities of lemons are also grown in Arizona, and Texas. The plants are hardy to 26-27°F. Susceptible to disease in humid areas, they aren't a good choice for Florida.

This is the most vigorous of the citrus plants. From nine to 20 feet in

height, the stout, spreading trees are ever-bearing. Sometimes thorny, they bloom at all times of the year. The blossoms are white on the inside and pink on the outside.

In California, the plants are a source of surplus honey, yielding about 45-50 pounds per colony. This isn't quite equal to that of the orange – possibly due to climatic factors in the coastal areas that seem to affect nectar flows. The aromatic honey ranges from clear or water white to light amber or yellow. The flavor varies from delicate to tangy with some degree of tartness reminiscent of the fruit.

Lime (*Citrus aurantifolia*)

These are produced in Florida and California. One of the smallest citrus plants, they reach 12 feet in height. The much branched trees have a shrubby look. Tolerating temperatures to 33°F, it is among the least hardy citrus. There are two kinds of limes with the smaller-fruited Key or Mexican lime being most common. The Tahiti lime displays somewhat more frost resistance than the Key lime.

Lime yields nectar freely, and blooms throughout the year.

Orange (*Citrus sinensis*)

This is also known as the sweet orange to distinguish it from the sour orange, a related species. Usually spineless, orange trees are less than 25 feet tall. Orange is a major source of honey in Florida and California. They're also grown in Texas and Arizona.

Oranges can withstand more cold than lemons, limes, or grapefruits, tolerating temperatures of 23-24°F.

There are several types of sweet oranges. While the Navels are eaten fresh, most oranges are intended for juice. Valencias – the most commonly grown juice variety – are well-suited to all citrus-growing areas. Navels are cultivated mostly in the West. Grown in limited quantities, blood oranges have deep red pulp.

Orange trees bloom for about a month. The various types can flower at slightly different times. Among the earliest are the Navels with the Valencias blooming last. On the average, orange blossoms begin to open around February 20th in Florida. Assuming the weather isn't cold and rainy, this can occur as early as February 6th. In California, flowers usually start appearing around the last of March or early April, extending to mid-May. The later the bloom starts, the shorter the nectar flow. Most of the nectar is collected between 11 am and 4 pm.

In California, the average surplus is 60-120 pounds of honey per colony, though it isn't as good in coastal areas. Florida beekeepers get about 75 pounds. The yield is best when there are hot days, cool nights, and sufficient irrigation. Four out of five years brings a good honey crop in California.

This is considered one of the finest honeys in the U.S. It varies considerably in color and flavor, and can darken with age. In color, it can be almost water white, transparent, amber, bright light brown, or light yellow. It has a light, pleasant, fruity flavor that matches the fragrance of the blossoms. Very heavy-bodied, this often granulates within a few months.

Because the nectar flow is early and extremely heavy, beekeepers need to have strong colonies to take advantage of the blooms.

Tangelos

These are generally crosses between tangerines or mandarins with either pummelos or grapefruits. The name is a combination of *tang* from tangerine and *elo* from pummelo. Grown mostly in Florida, the vigorous plants are about the size of orange trees. They thrive in hot areas, and tolerate temperatures slightly below freezing. Tangelos require cross-pollination for best production. Most tangelos resemble tangerines. These have easy to peel skins and very few seeds. The flavor can vary from mildly sweet to sweetly tart. Minneola is one of the most popular varieties. Its fruits are slightly elongated with knobby stem ends and dark reddish-orange skins.

Tangerines (*Citrus reticulata*)

About nine to 13 feet in height, these small trees may be upright or weeping. These can have spines. Withstanding temperatures as low

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as 19°F, they're more frost resistant than other citrus. For that reason, tangerines are grown along the Gulf Coast and other slightly cooler areas. They're also cultivated in Florida, Texas, Arizona, and California. These bloom from late March through May in California.

As a group, tangerines include both tangerines and mandarins. When looking at the two kinds of fruits, it's easy to tell them apart. Mandarins ripen early, and are yellow or light orange, while tangerines are deep orange to reddish-orange. Tangerines are a traditional Christmas citrus. Once known as 'kid glove oranges,' these segment easily, and are easy to peel.

Tangerine trees are very good honey plants. The honey is water white to pale yellow. They can yield 60 pounds per colony.

Less Commonly Grown Citrus

These specialty fruits are grown commercially to a limited extent. All are good nectar/pollen sources.

Calamondin (*Fortunella crassifolia x Citrus reticulata*) is a kumquat/mandarin hybrid. Relatively cold tolerant, it withstands temperatures to 19°F. This is grown in Florida, the West, and Southwest. It is also a popular dooryard and hedge plant in home landscapes. The small, round fruits have a loose, reddish-orange skin.

Citrange (*Citrus sinensis x Poncirus trifoliata*) is a sweet orange/trifoliate orange hybrid. It is incredibly hardy to 10°F. The thin-skinned, acid fruits are 2½ inches in diameter. They're used to make lemonade-type drinks.

Citron (*Citrus medica*) is grown in Florida and California. Only six to nine feet in height, this is a straggly shrub or tree. Very sensitive to frost, it requires a warm climate. Citron is the only deciduous citrus. The blossoms are whitish inside and purplish outside. Composed mostly of rind, the large, lemon-like fruits are candied. The nectar flow is excellent, and gives a good honey yield.

Kumquat (*Fortunella crassifolia*) is often seen in landscapes. Strictly speaking, this isn't a citrus, though it is a related species. Hardy to 16-17°F, kumquat is an attractive shrub or tree reaching about 12 feet or so. It's densely covered with small, glossy leaves. Used in hybridizing other citrus, these plants produce small, longish, citrus-like fruits about the size of a thumb. Sweet and juicy, they have tender, edible peels.

Lavender Gem or pink tangelo (*Citrus paradisi x Citrus reticulata*) is a grapefruit/Samson tangelo cross. With a sweet, delicate flavor, the fruit resembles a pint-sized grapefruit. It is grown in California.

Limequat (*Fortunella crassifolia x Citrus aurantifolia*) is a kumquat/lime hybrid. Grown in Florida, these are hardy to 18°F. The very large fruits resemble limes.

Meyer lemon (*Citrus limon 'Meyer'*) is considered a variety of lemon. Brought to America by a USDA plant collector, it originated in China. This attractive, compact tree is often grown in home landscapes. It is hardy to about 20°F. Though the Meyer lemon can bloom any time of year, the heaviest flowering takes place in Winter.

Oro Blanco or Melo Gold (*Citrus grandis x Citrus paradisi*) is a pummelo/white grapefruit cross. Grown in California, the fruits are sweeter than grapefruits. They have golden flesh.

Pummelo, pomelo, or shaddock (*Citrus grandis*) is a relative of the grapefruit. A large spreading tree, it is usually 15 to 18 feet tall and almost as wide. Yielding fruits year-round that remotely resemble grapefruits, this species has the largest fruits of all the citrus – the size of a basketball. This is grown in California, and Florida. Hardiness can vary from one variety to another. These plants provide a good nectar flow.

Tangor (*Citrus reticulata x Citrus sinensis*) is a mandarin orange/sweet orange hybrid. They look and taste like oranges. Easy to peel, they're very seedy. Tangors are less frost tolerant than tangerines. Several varieties are grown in Florida, Arizona, and California. The Temple orange is the best known tangor.

Trifoliate orange (*Poncirus trifoliata*) is related to citrus. Hardy to 0°F, it is suited to cold areas where it is often cultivated as a hedge plant. The trifoliate orange is also used as rootstock for other citrus, and for breeding other kinds. The small, bitter, acidic fruits can be used for marmalade and flavoring. The honey yield from this plant is fair. The bees eagerly work the flowers.

Ugli Fruit or uniq fruit (*Citrus paradisi x Citrus reticulata*) is a naturally occurring hybrid of grapefruit and tangerine. It is grown in Florida. Basically, the fruits resemble oversized grapefruits with very loose skins.

Migratory beekeepers often move their colonies south to take advantage of the citrus blooms. This results in a great honey crop along with higher profits for citrus growers. BC

Connie Krochmal is an award winning garden writer and a beekeeper.

RUSSIAN BEES
Another Story

Bob Harrison

With resistance running rampant, and other treatments not yet registered, resistant bees are the ONLY answer to Varroa.

I recently attended the Fall meeting of the Kansas Honey Producers (KHPA). I gave a presentation on my experiences with the Russian bee, The Purvis Brothers Gold & Blue line survivor bees and why moving in another direction other than chemical control of *Varroa* is so important.

Dr. Larry Conner was also speaking and I was more than willing to participatesince he is a walking encyclopedia of queen breeding and production information, and I wanted to hear him.

Gary Reynolds, a commercial beekeeper and former USDA researcher at the Baton Rouge Bee Lab was there also, and gave his presentation outlining the Russian program and the grant he had received to study the Russian bee.

Gary did a good job of covering the basics, which most people now are familiar with and said he had purchased drone source hybrid colonies and a Russian Breeder queen from the Russian bee lab program.

I have observed the Russian project since its beginnings and recall Dr. Shimanuki talking about importating Russian bees because the time would come when the chemicals used to treat *Varroa* would start to fail.

I believe now is that time. *Varroa* are resistant to Apistan (Fluvalinate) and Checkmite (coumaphos) in many areas of the U.S.

Some beekeepers have tried ApiLife Var (thymol) but the temperature range for this product is tricky. Winter has set in now in the northern plains so all beekeepers can do in those areas is hope for the best and wait for Spring. Several beekeepers that normally do not go south for the Winter have headed south to rebuild in the early Spring from *Varroa* losses.

However, as proof of the mite tolerance of the Russian bee I can show that beekeepers which have embraced the Russian bee are not in the same boat as those which did not. For instance: •My Russian bees remain untreated and carry an amazingly low *Varroa* count. •They are gentle, excellent honey producers •over 90% of the time requeen when they swarm. (Not requeening after swarming has been a big problem with production queens from different queen breeders over the last decade.) •Most Russian queens will quite often stop laying during even a short pollen or honey dearth during any time of the year. •Many Russian hives keep queen cells in the hive during the active season and tear them down when ready to cap and start another, a very strange trait I have never observed in other strains of bees. •The Russians first wintered on small clusters but I have worked out a management solution which allows the Russian hives to Winter with a larger cluster. •The best Russian lines I have

The Purvis Brothers insemination set-up.

found are dark and a few are jet black in color, but they do not look like my Carniolan queens. •The Russian/ Russian queens are dark with blond hairs and the longest wings of any bees I have ever worked with. •They do seem to use quite a bit of propolis and are very hard to introduce in a hive of any race other than another Russian line or bees that carry Russian genes, but once established in your hives the problem goes away. (I believe a difference in pheromones exist and is the cause of the problem.)

This year I received 100 Russian/Russian queens which were yellow/orange in color. I thought a mistake had been made but when I talked to the queen breeder and Charlie Harper (the producer of Russian Breeders) they both said a light colored Russian line had been released from Baton Rouge in 2004. The yellow/orange Russian queens were even harder to introduce than the first black Russian/Russian queens (100 at the start of my Russian/Russian project) I had received earlier. I also had trouble with queenlessness with the yellow/orange Russian/ Russian queens at a later date after I had verified queen acceptance at least twice after introduction. I do not understand the reason for the problem but other beekeepers I have talked to report the same situation.

All these queens were started in very small nucs, with sealed, emerging brood, to make introduction easier. Not all the brood was from Russian hives, however. Some brood was taken from my Italian colonies. I still have quite a few Italian colonies but plan on switching the outfit over to Russian/Russian, plus a small percent of Purvis Brother Apiaries (PBA) Gold line survivor bees and bringing in quite a few of the Purvis Brothers Apiaries (PBA) Blue line Russian/Russian survivor bees.

I have got three instrumentally inseminated Russian/Russian breeder queens, which have been distilled from all the releases by the Baton Rouge Bee lab so far. We will use PBA Blue line Russian production queens to provide the drones in Missouri. I consider myself very lucky to be able to purchase Russian/Russian production queens from Dann Purvis as I know of no other source in the U.S. for next year of pure Russian production queens. Most so called Russian queens are not pure Russian but hybrids. Some hybrids do show *Varroa* tolerance but some show very little.

> "You can get the Russians to reduce swarming with careful management."

My opinion is that if you seek the best *Varroa* tolerance and complete tolerance to the tracheal mite you need to use the Russian / Russian and not a hybrid (Russian queen daughters open mated to the queen producer's commercial line).

This year I visited PBA and looked at the PBA Russian breeders and was impressed. I brought back several PBA blue line Russian instrumentally inseminated queens (including one I inseminated myself with Dann's help).

Dann Purvis believes he has collected most, if not all of the genetics released under the USDA-ARS Primorsky Russian program since the first release. I have not found another source with all the genetics. Dann and I would have liked to collect all of the lines which were culled and run our own testing with added *Varroa* pressure. We hope the Baton Rouge bee lab will release a few of the last discarded lines to us for further testing with added *Varroa* pressure.

All that I can say about the yellow/orange Russian hives I started this year is they are gentle for now. They were started on a single frame of newly hatched nurse bees to make introduction easier. They slowly built up all Summer and then I moved half on to late season sunflowers and the other half into the Missouri Blackwater River bottoms for Fall heartsease. Both groups look good and are strong for Winter but spent the Summer drawing the top box of foundation instead of producing a honey crop.

They will not receive treatments of any kind. If they die from *Varroa* then so be it. I don't want the genetics of bees that cannot survive. I would welcome a line of light colored Russian queens as I have trouble finding the black Russian queens in populous hives (but not in early spring). I could swear they hide at times but maybe only my imagination and failing eyesight.

Dann Purvis and I both agree on the *Varroa* tolerance of the Russian/Russian bee but Dann believes his PBA gold line bee is just as good a survivor bee, produces more honey and is easy to

Testing for hygienic behavior using liquid nitrogen to kill brood.

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"Purvis queens cleared up the PMS in my hives."

introduce. Dann has crossed his Blue (Russian) with his Gold lines in open mating and has experienced the same survival strengths with the additional benefits of hybrid vigor. We did bring two of the PBA gold line queens back to Missouri. They were both easy to introduce. We grafted larva from the breeder we liked best although both had amazing brood patterns with almost no open cells. We open mated the daughters to a super hygienic line we have. Five were installed in hives with Parasitic Mite Syndrome (PMS) and the PMS cleared up much to our amazement. We have placed an order for PBA gold line production queens to make splits with next Spring before we get mature drones in Missouri.

To sum things up I believe we need to start converting over to *Varroa* tolerant queens and doing a comb rotation to remove brood nest comb on which chemical strips have been used. Jeff Pettis (USDA-ARS bee lab at Beltsville) has been suggesting beekeepers begin a yearly rotation of comb on which chemicals have been used out of the hive. I started several years ago doing comb rotation and most of my comb has been changed. I mark the year I put comb in a beehive by writing the year installed on the top of the frame with a magic marker and have been doing so for around 20 years.

PBA spray paints the end bars with the corresponding queen marking color of the same year the frames are placed in the hive. I still have got quite a few Italians but hope to dispatch those queens in the coming Spring and replace with *Varroa* tolerant queens. The Italians were at such high *Varroa* loads I had to treat early this year. I used ApiLife Var and tested before, during and after treatment. I believe I got a control in the 90% range for both years I used it on Italian regular production hives, but temperatures were in the ideal range throughout both treatment periods. I would like to have raised some Russian daughters and open mated in the area of close to 150 Russian/Russian hives and installed those queens in those failing Italian hives. Instead I treated with ApiLife Var due to an injury I had last April. I was lucky to get accomplished what I did, and thank Glenn Davis, Dick Scott, Bryan Norris, Aaron Quinn and Justin Danner for their help in keeping my operation going.

I am convinced, after many sticky board tests, that the Russian line is *Varroa* tolerant. I am only three years into the project so I can not say I may never have to use a soft treatment for *Varroa* control, but I am optimistic no treatment will be needed.

Each year I have tested the Russian line for tracheal mites and would only find a tracheal mite in maybe one of 30-50 samples. I sent samples last year to a professional lab and they found a single mite.

I will do the same this Fall with the yellow/orange 2004 Russian/Russian line along with my own testing but I expect similar results to the black Russian line. However, my production Italians have always got tracheal mites unless given a dose of menthol once a year.

I hate to give up that Italian line. I have used them for years. They have had consistently higher honey production than any line I have ever used by at least a super to at times over a hundred pounds with all things being equal.

I am still learning about these Russian bees but I believe that if managed correctly I can get similar honey production to my Italian line. It will take a few years of experimentation and careful breeder queen selection, though.

I have been pleased with the honey production from the first 100 black Russian queens I received. In my opinion the secret to increasing their honey production besides breeder queen selection from among the top honey producers might be:

- Fall management the year before by setting them on a strong Fall flow of nectar and pollen. This provides plenty of young bees to Winter on and makes for a bigger Winter cluster, important if you Winter in a cold climate. I used this approach this year and am happy with the results. The Russians tend to Winter with a smaller cluster than I like seeing.
- The Russian queens tend to slow down Spring egg production in periods of cold rainy weather. In my opinion in early Spring the small cluster size coming out of Winter is at least part of the low honey production problem. I see the above as a possible solution.
- I do complete teardowns and rebuilds of each production hive after Winter is over. From years of experience with my Italians I know the amount of brood I can leave so the hive will be at peak population when the honey flow starts about eight weeks later. I am still learning with the Russians. I have heard horror stories about the Russians swarming, but did not follow my gut feeling to leave a larger amount of brood last Spring to avoid it. Now, I believe I can do a stronger Spring rebuild with the Russians without swarming becoming a problem. Of course if you figure wrong (like I did with my Italians one year) you end up with your production swarms in the trees. An eight-week buildup period with perfect weather and perhaps the Russians would be in the trees if close attention were not paid to swarm control.

I have been involved with beekeeping for years, but I have enjoyed learning about this different bee. I recommend you start with a small percentage of your colonies with *Varroa* tolerant queens and then slowly convert all your colonies. I hope to have my whole operation *Varroa* tolerant by next Summer. BC

Bob Harrison is a commercial beekeeper in Missouri. For information on Purvis queens contact them at dannzann@alltel.net.

Photographing Honey Bees

PATIENCE REQUIRED!

Luke Marshall

Photographing bees on their turf is not an easy task.

As I look up over the top of my camera I'm suddenly filled with a sense of peace as a honey bee lands on the flower in front of me. I've been lying, waiting in the same position for nearly an hour in the hopes that bee, flower and timing will all come together to form the perfect scene for me to catch on film.

Photographing bees in their natural environment is not an easy task to perform. To the average person a honey bee's actions are sporadic and unpredictable at best and for a photographer this can be a nightmare.

As always though, in photography, the more you know about a subject the easier it becomes to photograph.

I arrived in Saskatoon, Saskatchewan in late April, the start of what would be five months of beekeeping with the hopes of learning about these tiny workers and photographing them at the same time.

In Saskatchewan, each of the three major sources of nectar to the bees in this area (dandelions, carrigana and canola) require one thing above all else to produce a good image, patience.

The first good-sized blooms of flowers are dandelions and so it was bees on dandelions that would be my first subject. As with anything, these yellow flowers present their own challenges when it comes to photographing, but it's their height from the ground that seems the biggest. When photographing live subjects I've found that they look most appealing and dramatic when shot from underneath and these dandelions weren't going to make it easy on me. After setting up tripod after tripod as low to the ground as possible and shooting with no success, I finally conceded and got down on my stomach and handheld the camera as best I could. I spent many hours on the ground but was rewarded with the odd bee coming to land right in front of me and was able to get some great shots.

Eventually the dandelion's time came to an end and the bees moved on to their next early source of nectar, carrigana (often called Siberian Pea Tree). Carrigana is a small tree, which produces beautiful yellow flowers. These trees were a perfect height from the ground to photograph comfortably. But they grew, for the most part, in tight bunches making chasing bees around the flowers very difficult. The bees always seemed to be on the other side of the tree just out of reach, and any movement would shake the flowers and knock the bees loose. After spending much time in frustration over this, I noticed that if I waited long enough the bees would eventually make it over to a flower nearby. All I had to do was be patient, chasing bees around the bush was getting me nowhere.

Once the carrigana flow ended there was a bit of a dry spell and then the big show came to town. Canola started to shoot up everywhere and just like the bees I was in heaven, or so I thought. The flowers were everywhere, huge fields of them covered in bees just

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waiting to be photographed. It turns out however that just as height was an issue with the dandelions so it was with the canola.

Canola stands quite high and in turn makes it quite susceptible to the slightest gust of wind. When photographing subjects up close, any movement can prevent you from getting a clear picture and in my case there was no getting around it. There was no solution for me in this case and so I would end up waiting for a time when the winds seemed to be calm; on the prairies this seemed to be rarely or never. I would be able to shoot approximately once every four outings, which was frustrating at the best of times, but with some perseverance I finally amassed a collection of shots that I was happy with.

In conclusion, I have to say that overcoming these three obstacles and the many others that I encountered over the summer has given me a great appreciation for the honey bee. It's for this reason that I plan on spending much more time shooting this subject and trying to give beekeeping and bees much more exposure to the general public, exposure which I think is important and beneficial to the industry.

One of the biggest lessons I've learned so far is to be patient, trying to bend a bee's will to your own doesn't work but if you relax and give it time you'll be rewarded. BC

Luke Marshall can be contacted for further information at: Image Exploration, 102B-1919 University Dr. NW, Calgary, AB, CANADA T2N 4K4, 403-220-4438, Fax 403-220-0423; luke_marshall@yellowknifehost.com

Nouvelle Cuisine With Honey

And now dessert . . .

Michael **Young**

The finale dessert.

The perfect finish and accompaniment for every meal is a good dessert. I love a good healthy dessert! And believe me, it is difficult to choose which one to make, having munched through so many bread & butter puddings. I now have a belly like a poisoned pup.

It is not a great name, bread & butter pudding. It makes you want to go to sleep. Unlike the dish itself, add crème fraiche (cream that has been thickened by a slight natural fermentation) and honey and it would deliver anyone out of a dream. However, my secret desire gave in and I was finally seduced by the exotic honey & passion fruit brulee, with the honey & raspberry fig coulis. A perfect harmony, the passion fruit imparts a little acidity and bitterness with objection, only to be defeated and betrothed with the sweet flavor of honey. Far too nice to eat, you could almost save it for a rainy day.

So! Exotic passion fruit brulee it is, with a raspberry and fig coulis

Like a beggar needs a suit! I have dressed the brulee up in a suit in the guise of a honey pot, just to add that beekeeper's touch. In a nice honey pot. So start collecting the pots and when party time draws near set your deserts in them, fresh fruit salad, trifle, sorbet or syllabub. Just remember, for sheer value, just add honey.

Recipe Makes 8 servings.

6 egg yolks
2 whole eggs
200g/½ lb. honey
310 ml/10½ oz. creme fraiche
7 passion fruit (4 for garnish)

Preheat the oven to 120°C (250°F). In a bowl, beat egg yolks/eggs, honey and vanilla together until pale and thick. Stir in creme fraiche. Remove the seeds from three passion fruits and gently mix into the thick mixture custard.

Place the dishes in a deep tray and carefully pour the custard mix into each dish. Pour hot water inside the tray (bain-marie)(double-boiler) until the water level is two-thirds up to the top of the dish.

Bake in the oven at least 50 minutes, remembering that if your custard dish is deeper than normal a few more minutes in the oven is necessary for the temperature to penetrate inside the core. When cooked, cool slightly, and chill in the refrigerator.

If using honey pots increase the recipe by 50%.

Honey Raspberry & Fig coulis

300g/10½ oz. fresh figs/tinned figs or
500g/18 oz. dried figs or
200g/7 oz. fresh raspberries or 350g/12 oz. raspberries packed in light syrup

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147g/5 oz. honey
4 tablespoons brandy or raspberry liqueur (optional)

Method

I have included a recipe for dried figs, as I always seem to find dried figs lying in the cupboard that are left over from Christmas. However, using fresh fruit produces a far superior coulis. Nevertheless, there is no need to soak overnight. Just peel and blitz. Depending on the water content, add extra syrup from tinned fruit would suffice, until the correct pouring consistency is reached. Do this while it is being blitzed.

If you are using dried figs just chop them roughly. Place into a bowl, add the raspberries, and juice with 250ml/½ cup water. Mix together well. Cover and leave to soak in a cool place overnight. Finally Blitz and puree fruit mixture until smooth.

Place mixture into a saucepan. Stir in honey and brandy or liqueur (optional). Bring slowly to a boil, then simmer for 1 minute.

Just before serving, place a spoonful of honey on the top of the brulee. Burn with a flame torch or place under a hot grill. This will produce a nice caramelized color. Passion fruit or fresh figs can be used to garnish the desert. I have decorated with a tuile garnish and used syrup figs with a mint leaf.

The coulis can be served in a small pouring jug and added to the brulee at the table. This is a marvellous sweet, one that my taste buds have never forgiven me. The inside color has a spanking opaque luster that is a divine manifestation. Once eaten, it will never be forgotten.

Note: Once the fruit has been pureed, strain it through a nylon strainer to remove seeds, if preferred.

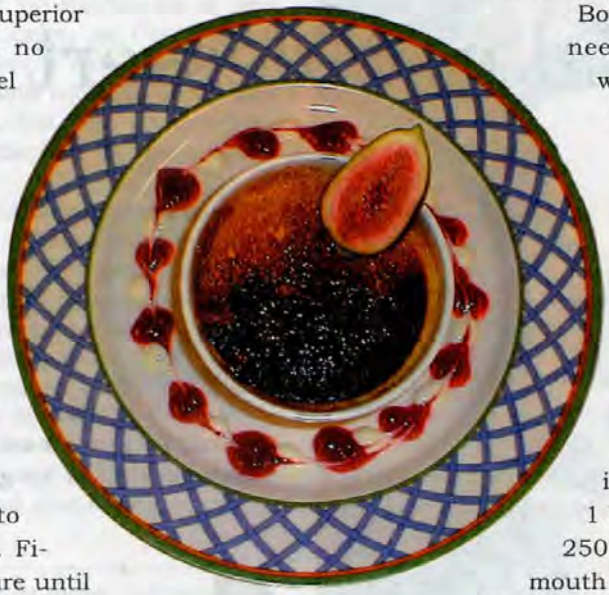
Blitz, adding to the food processor.

We're including another of Michael's recipes that fits the season.

Wassail To All Beekeepers

The golden hues of Autumn have left us and there's a nip in the air, Winter is here and this is a really comforting drink for a cold Winter's night and excellent for ringing in the New Year. The warmth of the drink and of its spices is a wonderful antidote to the stresses and strains of everyday life. It is also as good as saying welcome to my home to invited friends.

The Beekeeper's Mulled Wine



Bowls for serving hot punches need to be heatproof. Do not worry too much if the only one you have is a saucepan. Just wrap a nice colorful cloth round it. Or why not just leave it on a slow cooker to keep it warm. This recipe makes 16 portions or eight beekeeper portions. Here's what you need:

1 bottle white wine or Mead if possible
1 bottle red wine
250 ml/8 fl. oz. sweet red vermouth
250 ml/8 fl. oz. cranberry juice
6 strips orange rind
8 whole cloves
1 stick cinnamon (3 inches)
8 pods cardamom, crushed
1 tablespoon dark raisins
250g/9 oz. honey
Lemon slices
Orange slices
Apple slices

Pour white and red wines or mead into a large stainless steel or enamel saucepan. Add vermouth, cranberry juice, orange rind, cloves, cinnamon, and cardamom pods. Heat wine mixture gently until very hot but do not boil. Remove saucepan from heat, cover with a lid and cool. Strain wine into a bowl.

Just before serving, return wine to a clean saucepan. Add raisins. Heat gently add the honey until the wine is hot enough to drink. Add fruit slices and serve in heatproof mugs. When tasted shout "Wassail" to all beekeepers.

I am aware of the onslaught of cooking programmes that one has to be pestered with on the box. Until I get orders from the great editor above, Bon Appetite, yours a Beekeeping Chef. BC

Michael Young teaches Culinary Arts and is a beekeeper, wine maker, artist and honey judge. He lives in Belfast, Northern Ireland and will be in Ohio for EAS 2005.

YOU SAY APIOTHERAPY, I SAY APITHERAPY

Ann Harman

Apitherapy? Or Apiotherapy? The Dorland's *Illustrated Medical Dictionary* uses the "o" but Apimondia does not. The North American Apiotherapy society used the "o" but the American Apitherapy Society does not. What does all that mean? Use any spelling you want – the meaning is the same: the use of honey bee products for treatments.

The use of natural products for treatment is as old as man's presence on earth. Discoveries of the benefits of the various hive products were probably accidental. But as civilization progressed many uses were found. As times changed, interest in natural products waned but recently has increased significantly. Fortunately this interest has sparked some true scientific research and the results could be considered to support some of the ancient uses.

Apitherapy commonly brings to mind the use of bee venom, but treatment also includes using honey, pollen, beeswax, royal jelly, propolis, and in some cases bee larvae. Throughout any discussion of bee products it is important to remember that certain of these substances are actually products of plants. Plant products have different concerns from those of bee products.

Honey, pollen and propolis are the three plant products found in the hive. Beeswax, royal jelly, venom and larvae are produced by the honey bee. Briefly, plants are responsible for the colors, aroma, and most of the substances found in honey, pollen and propolis. Bees convert the sucrose in honey to glucose and fructose and evaporate water. The plant is responsible for the other factors. In order for the bees to transport pollen they add a bit of nectar to stick the fine grains together. But the plants are responsible for the proteins, vitamins and other compounds. Propolis is collected from buds of deciduous trees and carried back to the hive. Since propolis is extremely sticky it will collect bits of wax and pollen. But the plant is responsible for producing the resin.

The products of the bee herself were certainly known to early man. Honey and beeswax were easily obtained along with bee venom delivered by unhappy bees. The combs contained not only honey but also larvae – rich in protein – and royal jelly. The combination of honey, larvae and royal jelly constituted a nourishing food. However, we do not know the medicinal uses, if any, of early man – no written records.

When detailed references were made in the past for healing a condition with hive products, frequently it is difficult for us, today, to figure out exactly what disease or health problem is being treated. Our descriptive words of today tend to have more of a medical description.

We do know that the Egyptians used honey for healing, usually in combination with other ingredients. Recipes were recorded in their medical papyri. An Egyptian wound dressing was made from one-third honey and two-thirds fat or grease. At the same time as the famous Egyptian civilization the peoples of Babylon and Assyria were also using bee products, mainly honey and wax, for healing.

At about the same time as the Egyptians, China was using honey as a medicine. Later, around 220 B. C. a Chinese book on medicines mentioned that honey was used to cure indigestion. Honey was also used as a base for the addition of other ingredients. Several hundred years later another Chinese medical book listed honey, beeswax and bees as being superior medicines. Later, honey mixed with opium was in use. Honey was also considered a "drug for longevity."

The great civilizations of Greece and Rome used hive products for treatment. The Greeks applied propolis to bruises and sores. A famous book known as *De Materia Medica* was the work of a Greek physician in the first century A. D. The recipes for medicines used honey, wax, propolis and honey wines. It is interesting to note that this book was the chief authority on medicines for seventeen hundred years. With that span of time the medicinal uses of hive products could have spread to all corners of the world.

The Romans used various types of honey wines as medicine. We would know the wines today as mead with various additions, such as herbs and spices and possibly fruit juices. Propolis found uses in making poltices. Bee venom was listed as a medicine in writings of both the ancient Greeks and Romans. Writings of Pliny indicated that pulverized dead bees were a remedy for many ills. However, in some of the mid-eastern countries bees were not considered fit for human consumption so both brood and adult bees were not used either as food or as medicines.

Honey also served medicinal purposes in ancient India. A paste of honey and butter was used for surgical wounds. Evidently honey, as a part of magical charms, figured

Continued on Next Page

in the treatment of snake bites, scorpion stings and insect bites and stings.

In Spain, in the 12th century, pollen was used as a sedative tonic, as well as being an aphrodisiac. Also pollen was considered beneficial for stomach, bowels and heart, and for food-related swellings (whatever they might have been).

We know that the Arabs used propolis to treat wounds, particularly from arrows and thorns. It was said that it cleans and softens the skin. The Incas used propolis for treatment of inflammation with fever. Propolis was also mentioned in medical books from the Caucasus region.

Even St. Patrick, of Ireland, enters into the story of apitherapy. The story goes that he changed water into honey that then was made into relics. These relics were used to "heal every disease."

In Finland several epic poems or sagas tell of the curing powers of honey. In one of the tales it seems that a handsome young man wished the hand of a lovely maiden. However, this young man had offended one of the elders who captured him and cut him into eight pieces and threw the pieces into the river. This young man's pieces were pulled out of the river, magically, by his mother and, with some more magic, pieced back together. However, although he was now all in one piece he could not speak or move. The mother sent the bees up into the heavens to find and bring back honey so she could make an ointment to cure him. The bees returned with the appropriate honey; she concocted the ointment, spread it on him and – of course – he was cured.

Along this same line, in Finland, charms were to be recited when making salves from honey so that they will cure many evils. Songs were also recited for requesting the appropriate honey for healing salves. The sources of the appropriate honeys were the trees, the sky with its constellations, and even from a rainbow and a cloud with a beautiful maiden. These honeys were made into salves to serve as ointment for wounds and sores.

Bee venom was used to treat Charlemagne. However at that time the bee sting was the only way the venom could be used. In the 1800s various attempts to collect bee venom were tried. A most labor-intensive method was successful. J. Langer, at the University of Prague, pressed the abdomen of a bee forcing the sting to protrude with a drop of venom. This was collected with a capillary tube or was absorbed onto cloth where it dried and could be removed. However, to collect one milligram of venom it was necessary to use 25,000 bees!

Another method for collecting venom was to pull the sting apparatus from the bee and extract the venom from the venom sac. More venom could be obtained this way, but it still involved handling individual bees. In order to make the collection more efficient girls were stationed in front of a number of hives where they could catch individual bees and force them to sting into cloth. Finally an electric shock device was invented. Here the bees were put into a box containing a grid of wires and lined with an absorbent paper covered with a thin rubber membrane. When the box was closed, an electric shock was given and the bees stung through the rubber membrane to be absorbed by the paper. However, this method killed the bees, but it was much more efficient than previous methods.

Logo

American Apitherapy Society

The venom collected was extracted from the cloth or paper with a solvent and used as an injectable solution. Bee venom, however collected, was used for treating arthritic conditions. The solution or the crystallized venom could also be used for making salves and ointments.

Pollen traps were invented to scrape pollen from the bees' legs upon entering the hive. Previously pollen was collected from the cells in the comb. Even today some cultures use both pollen from the traps and also from the comb. To preserve pollen it is necessary to dry it very soon after collection, mix it with honey, or freeze it directly after collection.

Certainly royal jelly was consumed in countries where brood to be eaten was removed from the hive. In the Ivory Coast royal jelly was reserved for the richest elderly and wealthiest of the Ivorian elders. Production of royal jelly in quantity began during the middle of the 1900s with the development of vacuum-collecting pumps to remove it from queen cells on the third day of larval life.

Propolis traps have simplified the collection of clean propolis. Previously it was scraped from frames and other parts of the hive. Unfortunately scraping frequently mixed in wax, bee parts and hive debris.

During this long history of medicinal uses of hive products, results from their use have been anecdotal. Research during the past hundred years has been primarily on the composition of these products and their use by and for the bees themselves. However quite a number of books have been written in many countries describing the benefits of apitherapy.

In the next article hive products for treatments will enter the modern world. We will leave the era of charms and potions and discover the progress of apitherapy today. BC

Ann Harman contributes each month on many diverse topics, from her home in Flint Hill, VA.

? DO YOU KNOW ?

Species of Mites

Clarence **Collison**
Mississippi State University

A honey beehive and nest provides an acceptable habitat for a wide diversity of mites. More than 86 species of mites have been recorded in association with the different species of honey bees found in the world. The mite species include incidental associates, facultative associates and obligate associates of honey bees. Some of these mites are scavengers in the hive debris and may invade the stored provisions, some are predatory that feed on the scavengers, and others are hitchhikers, using honey bees as a mode of transportation to reach places where they feed and live. The most devastating group are those that are parasitic on adult honey bees and their brood.

The world wide dispersal of mites parasitic on honey bees has been one of the most serious problems encountered by modern beekeeping. The devastation of most feral honey bee colonies and the impact on managed colonies in the affected regions, has totally changed colony management.

Please take a few minutes and answer the following questions to determine how familiar you are with this important topic.

Level 1 Beekeeping

1. ___ The geographical region in the world with the largest number of honey bee species and species of honey bee parasitic mites is:
   A. Africa
   B. Europe
   C. Australia
   D. South America
   E. Asia
2. ___ The switching of *Varroa* mites from *Apis cerana* to *Apis mellifera* occurred in the 1940s and was published in 1950s and happened in:
   A. Europe
   B. The USSR
   C. South America
   D. Africa
   E. Asia
3. ___ The Frow treatment was used to control:
   A. European foulbrood
   B. Honey bee tracheal mite
   C. American foulbrood
   D. *Varroa* mite
   E. Sacbrood
4. ___ Drones that are infested with *Varroa* mites during the brood stage have reduced emergence weight and the seminal vesicles, mucous glands and testes are reduced in size resulting in less spermatozoa. (True or False)
5. ___ *Varroa* mites feed on adult bees by puncturing the exoskeleton. (True or False)
6. ___ Foraging worker honey bees carry more adult *Varroa* mites than flying adult drones. (True or False)
7. ___ Length of adult worker honey bee life is greatly reduced for any worker bee that had to support a female *Varroa* mite and her offspring during her development. (True or False)
8. ___ One foundress female *Varroa* mite and her offspring will have a similar impact on developing worker and drone larvae/pupae. (True or False)

Please match the following mite stages with the appropriate diagram. (5 points)

A.Female *Varroa* Mite B.Male Tracheal Mite
C.Female Tracheal Mite D.Protonymph *Varroa* Mite
E.Deutonymph *Varroa* Mite F.Larval Tracheal Mite

9. ___ 10. ___ 11. ___

12. ___ 13. ___

Advanced Beekeeping

14. ___ *Varroa* mites have a haplo-diploid or arrhenotokous sex-determination system. (True or False)
15. ___ *Varroa* mites have low proteolytic enzyme activity to allow nearly direct uptake and utilization of bee hemolymph proteins. (True or False)
16. ___ *Varroa* mites prefer nurse bees over foragers and adult drones over adult workers. (True or False)

17. ___ Original host of *Tropilaelaps clareae* is:
A. *Apis mellifera*
B. *Apis cerana*
C. *Apis dorsata*
D. *Apis florea*
E. *Apis andreniformis*

18. ___ *Tropilaelaps clareae* feeds on honey bee adults and brood. (True or False)

19. ___ *Euvarroa sinhai* is a parasitic brood mite associated with *Apis laboriosa*. (True or False)

20. ___ Folbex-VA is an acaricide used against *Varroa* and tracheal mites in Europe. The miticidal fumes are generated with smoking papers. (True or False)

21. ___ *Tropilaelaps clareae* occurs on five different species of honey bees: *Apis dorsata*, *Apis laboriosa*, *Apis cerana*, *Apis florea*, and *Apis mellifera*. (True or False)

22. ___ All three species of *Acarapis* mites (*A. woodi*, *A. dorsalis*, *A. externus*) feed on honey bee hemolymph. (True or False)

23. ___ Of the three species of *Acarapis* mites, only *A. woodi* is found in the United States. (True or False)

24. During the period 1984-1990, it is estimated that ___ percent of the honey bee colonies in the United States died as a result of the honey bee tracheal mites.
A. 50
B. 10
C. 70
D. 30
E. 20

25. ___ *Acarapis externus* and *Acarapis dorsalis* are serious external parasites of adult honey bees. (True or False)

26. ___ If female *Varroa* mites are not mated soon after moulting, they are unable to produce any viable offspring and are therefore non-reproductive or infertile. (True or False)

Answers On Next Page

?Do You Know? Answers

1. E) Asia
2. B) The USSR
3. B) Honey bee tracheal mite
4. **True** *Varroa* mites feeding on drone brood results in reduced emergence weight, and the seminal vesicles, mucous glands and testes are reduced in size which results in a reduction in the number of spermatozoa.
5. **False** The exoskeleton of the honey bee does not permit female *Varroa* mites to puncture it and suck blood. The mite must squeeze between the overlapping segments in order to reach and finally cut through the thin membrane. Then the mite is able to suck blood.
6. **False** Drone honey bees carry more *Varroa* mites than foragers over three weeks of age. Some research indicates that 23% of the *Varroa* mites outside brood cells may be on flying drones. Older foragers carry only a few mites.
7. **True** The length of adult life is greatly reduced for any worker bee which has to support a female *Varroa* mite and her progeny during its development. A bee's life is halved, on average, when it has been the victim of one mite and her offspring.
8. **False** Since the drone larva/pupa is larger and has greater reserves of fat and protein then worker brood, they can support more *Varroa* mites. One female mite entering a drone cell will therefore not have the same impact on the adult drone as on a worker, even though more young mites reach maturity in the drone cell.
9. C) Female Tracheal Mite
10. A) Female *Varroa* Mite
11. F) Larval Tracheal Mite
12. B) Male Tracheal Mite
13. D) Protonymph *Varroa* Mite
14. **True** *Varroa* mites have a haplo-diploid or arrhenotokous sex-determination system. Males are produced from unfertilized eggs and females develop from fertilized eggs (as in bees).
15. **True** *Varroa* mites are highly specialized to survive and reproduce on its bee host. Physiological adaptations include low proteolytic enzyme activity to allow nearly direct uptake and utilization of bee hemolymph. proteins.
16. **True** *Varroa* mites discriminate amongst the various types of bee brood and adult honey bees. Mites prefer nurse bees over foragers and adult drones over adult worker bees.
17. C) *Apis dorsata*
18. **False** *Tropilaelaps clareae* are phoretic on adult bees, but without access to bee brood, they can survive only a short period of time. It appears that the mite cannot feed on adult bees.
19. **False** *Euvarroa sinhai* is a parasitic brood mite associated with the Asian dwarf honey bee, *Apis florea*.
20. **True** Folbex VA is effective against both tracheal and *Varroa* mites and it is used in Europe to control these mites. The miticidal fumes are generated by igniting a paper strip that has been treated with potassium nitrate (saltpeter) and bromopropylate. The smoldering strip is hung in the top of a hive with the hive entrance plugged for 30 minutes.
21. **True** Unlike most honey bee parasitic mite species that have only one or two bee hosts, *Tropilaelaps clareae* has been found on five different bee species: *Apis dorsata*, *Apis florea*, *Apis mellifera*, *Apis laboriosa*, and *Apis cerana*.
22. **True** The two external *Acarapis* mite species, like *Acarapis woodi*, the honey bee tracheal mite, are blood feeders.
23. **False** In the United States, *Acarapis dorsalis* was first detected in New York in 1930. Further surveys have shown that both species of external *Acarapis* mites are found on honey bees almost everywhere in the United States. The honey bee tracheal mite, *Acarapis woodi*, was found in the United States in July 1984 for the first time.
24. A) 50
25. **False** The two external *Acarapis* mite species have been reported to cause no visible symptoms of injury to bee hosts. It is believed that there is no relationship between the prevalence of external *Acarapis* mites and colony performance. No measurable loss in bee population or production has been observed. But because they feed on their host's blood, it is possible that they have negative effects on infested bees.
26. **True** Soon after mating is completed, the sperm transport system in the female *Varroa* mite degenerates thereby preventing any future mating. If females are not mated soon after moulting, e.g. due to the premature death of the male, they are unable to produce any viable offspring and are therefore non-reproductive, or infertile.

There were a possible 13 points in each test level this month. Check the table below to determine how well you did. If you scored less than 6 points, do not be discouraged. Keep reading and studying- you will do better in the future.

Number Of Points Correct
13-11 Excellent
10-8 Good
7-6 Fair

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

GLEANINGS

JANUARY, 2005 • ALL THE NEWS THAT FITS

BUSH TAPS NE GOV JOHANNS AS NEW AG SEC

Farm-friendly Nebraska governor Mike Johanns has been named the new secretary of the U.S. Department of Agriculture by President Bush, pending confirmation. The Republican governor will succeed Ann M. Veneman, who recently announced her resignation.

Born in Iowa and raised on a dairy farm, the 54-year-old Johanns became a lawyer and served in county and city government before becoming mayor of Lincoln, Neb., in 1991. He won the governor's office in 1998 and in 2002 became the first Republican to win re-election in more than four decades.

Johanns graduated with a bachelor's degree from St. Mary's College in Winona, Minn., in 1971. He earned a law degree from Creighton University in 1974 and was a clerk for Nebraska Supreme Court Judge Hale McCown. He practiced law in the mid-1970s and became a partner in the Lincoln law firm of Nelson, Johanns, Morris, Holdeman & Titus in 1977.

FRED HALE MEMORIAL

Fred was the oldest living man in the world at 113 years until he passed away in his sleep at the Nottingham in Syracuse, New York, on November 19, 2004. He was12 days short of making his 114th birthday.

He was born in New Sharon, Maine, December 1, 1890. Fred saw time span from 10 years of the 19th century, through the 20th and a few years of the 21st. In 1921 Fred and his wife moved to South Portland where he raised his family and lived there until he was 107 years old. Fred's wife died in 1979. Fred retired in 1957 from the Railway Express Postal Service, he liked to live one day at a time. He was a great beekeeper keeping them all the years he lived in South Portland. He was one of the founders of the MSBA, Inc. and an honorary life member. He was especially fond of making comb honey in the old four by five inch sections, producing many of these for the MSBA booth at the Maine Agricultural Trade Show in Augusta and he liked to attend the MSBA annual meetings with the help of his good friend Ann Pacquin. Fred always said he ate honey and pollen everyday to which he credited his longevity.

Fred was also the longest living Maine Mason. He was a member of Franklin Lodge in New Sharon. He was honored as the oldest man in the U.S. by the Grand Lodge of Maine in 2003, and was asked if he was a "Belly Mason?" He responded "yes," he certainly enjoyed those many Masonic lodge suppers. Asked how he lived so long his reply would often be, "Oh I don't know – punishment I guess," but he also gave credit to eating honey and pollen. In the winter of 2004 he was presented with the Maine Masonic Cane as the oldest man in the US and the first recipient of the cane. Fred had 83 years of Masonic service.

Fred Hale was a great icon to Maine beekeepers and all beekeepers who knew him and we all wish him to have a good rest and peace.

"He was a Great Beekeeper."

Matt Scott

BEEKEEPER OF THE YEAR

Joe Rowland (last year's recipient) presents Empire State Beekeeper of the Year to Aaron Morris at the Fall meeting of the Empire State Honey Producers Association in Owego, New York.

CALIFORNIA BEEKEEPERS

The CA State Beekeepers Association held their annual convention November 9 in San Diego. Among the highlights of the meeting were the awards presented. The Honorary Beekeeper Lifetime Membership was presented to Bob Beekman (left). Bob was a school teacher after returning from the Army until he bought his father's business, Bee-Haven Apiaries in the Modesto area. He has served as President of CSBA. The Beekeeper of the Year was presented to Valerie Severson from Strachan Apiaries. For the last 25 years she has specialized in the development of New World Carniolan queens and is a master at artificial insemination. And the Young Beekeeper of the Year was presented to Matt Beekman (right). Matt owns and operates his own business in the Central Valley and is currently working on formic acid methods that work.

SWEETENER NEWS

Cargill Introduces Likewise™ Honey Product Cargill's new Likewise™ Honey Product debuted at the 2004 IFT Annual Meeting and Food Expo® in Las Vegas, July 13-16. Cargill's unique honey product matches the sweetness, taste, color and mouthfeel of USDA Grade A Honey. This affordable alternative offers a 1:1 replacement and can easily be substituted in existing products. It can also be used in new or reformulated products to get the same great taste of honey while ensuring formulation competitiveness.

"We are excited about the opportunity of working with our customers to help them explore the many possibilities of using Cargill's Likewise™ Honey Product," said Anne Mollerus, innovation manager, Cargill Sweeteners North America. "This is a great tasting, affordable honey product that will benefit food processing and foodservice customers."

All Is *Not* Equal The company that makes the artificial sweetener Equal filed a false advertising lawsuit claiming its hot-selling competitor, Splenda, isn't really made from sugar, as its packaging claims.

In a complaint filed in federal court in Philadelphia, Merisant Co. said Splenda's marketing slogan, "made from sugar, so it tastes like sugar," should read something more like, "made from dextrose, maltodextrin and 4-chloro-4-deoxy-alpha, D-Galactopyranosyl-1,6-dichloro-1,6-dideoxy-beta, D-fructofuranoside."

The third substance in that list is the chemical name for sucralose, the sweet part of Splenda. The other two ingredients are bulking agents, found in many foodstuffs, that help control Splenda's taste. Sucralose alone is about 600 times as sweet as sugar.

Merisant said McNeil Nutritionals, the unit of Johnson & Johnson that markets Splenda, had misled consumers into thinking the artificial sweetener was "natural," or made with raw sugar, when it is actually a synthesized chemical.

"In reality ... there is no sugar in Splenda and Splenda's sweet taste does not come from sugar," the lawsuit said. "Splenda is not natural in any sense of the word. Instead, the truth about Splenda is that it is sweetened with a synthetic compound that is the result of a complex chemical process."

McNeil Nutritionals spokeswoman Monica Neufang said the lawsuit has no merit.

"Splenda," she insisted, "is made from sugar, so it tastes like sugar."

According to the Fort Washington, Pa.-based company, sucralose begins its life as pure cane sugar, which is then chemically altered during the manufacturing process to create a new compound that doesn't contain any calories.

Since its introduction in the United States in 2000, Splenda sales have soared. It has since passed Equal in the U.S. retail market for sugar substitutes. *from an AP release*

DISTINGUISHED SERVICE AWARD

Bill Mondjack (right) President of Lehigh Valley Beekeepers Association, Pennsylvania, presents the "Distinguished Service Award" to Mr. Richard C. Olson. Richard has been an active member of the LVBA since 1981, he's been the treasurer since 1988 and this is his sixth year as the newsletter editor.

FOREIGN NEWS

AUSTRALIA A Queensland winery received a A$28,550 federal government grant to expand its production of honey-based ports, creams and mixer drinks.

The Mount Nathan Winery successfully sought the assistance to help cover the cost of construction of a honey processing shed and the purchase of 85 new beehives.

Owner Peter Gibson said the winery now has about 18 hives on the property as well as more hives in the area. He figures that with the new hives he will be able to double his production.

Honey is extracted and packaged on site to be sold to the public as well as fermented/fortified on site to produce a range of products.

The centerpiece of the company's logo is a honey bee with an exaggerated stinger reflecting the name of one of its product range called 'Bee Stinga.'

In the last year the winery, in Queensland's Gold Coast hinterland, has expanded as a tourist attraction and now features a Perspex hive that allows visitors to see the bees going about their work.

NEW ZEALAND New Zealand agricultural software company Xenacom Ltd. has opened a branch office in the United States.

Xenacom, whose products include Xen-APIARY – a hive management and tracking system – now has an office in the Iowa State University's Research Park.

This houses technology community that links technology creation, business formation and development assistance with established technology firms and the marketplace.

Xenacom chief executive Heather McEwen said expansion into Iowa was the culmination of hard work.

"The result is a steady growth in the number of international customers choosing our software and development services," she said.

AUSTRALIA The Department of Primary Industries went on full alert after a nest of mite-carrying exotic bees was found on a shipping container in Brisbane.

Department taskforce manager Ian Douglas said the nest of Asian honey bees (*Apis cerana*) had been captured and destroyed and a 3.75-mile quarantine zone declared around the site.

The bees in the nest are being tested for both species of *Varroa* mite – *jacobsoni* and *destructor*.

"From our research, we are confident the mites on these bees are of the *Varroa jacobsoni* variety which is believed to only survive on this particular species of Asian Honey Bee and will therefore have no impact on our bee industry. However, the quarantine area has been put in place until this can be confirmed," Douglas said.

"If the mites are found to be of the *Varroa destructor* variety, which can infest domestic honey bee hives, we will further step up the intensity of our surveillance in the area."

The quarantine area has been set up as a precautionary measure to restrict movement of any bees in or out of the area for the next 28 days.

"Beekeepers with hives in the quarantine area need to be aware of restrictions on movement of bees that are now in place," Douglas said.

Dock workers at the Brisbane port found the nest while unloading a container ship and immediately contacted the Australian Quarantine Inspection Service officers.

"Because of quick reporting and coordinated response to this incursion, we are confident that we can eradicate the bees," Douglas said.

The Asian honey bee is of concern to the Queensland bee industry because it may carry and introduce exotic bee parasites, in particular *Varroa* mites.

"While the hive was successfully destroyed, there is a very low risk that foraging bees have transferred *Varroa* mites to local domestic or feral honey bees," Douglas said.

"The department is undertaking an intensive surveillance and eradication program which involves setting up a system of traps within the quarantine zone to prevent movement of any potentially infested bees."

Department officers will also monitor local feral bees and destroy feral beehives within the quarantine area." – *Alan Harman*

Display Advertisers

I always tell people that beekeeping is like farming, but you don't need to own the land. You can always put your bees on somebody else's place. You pay honey for rent. For some reason, landowners think this is a wonderful deal.

Around here we customarily pay six five-pound lugs, although my Steamboat Springs landowners get a 60-pound bucket, because Jack spoiled them, and I can't very well cut back now.

Either way it's a good deal for me. When I was in Brazil, my beekeeper host told me that down there the beekeeper pays ten percent of his crop to the landowner.

It never fails to amaze me how many people like having honey bees on their land. One fellow called a couple of years ago and said he wanted bees. He really wanted to get his 20 acres reclassified as agricultural – for tax purposes – because in Colorado, farmers pay less. He thought the bees might help. Anyhow, I met him early one morning for a tour of the property. It was way up a lovely little valley that drains into the Colorado River.

So we got out of the car, and this was a pretty scenic spot. The first shafts of sunlight illuminated the ragged peaks on the Grand Hogback beyond the river. The air was suffused with that magical early-morning light, and suddenly this guy threw out his arms, and sang "America the Beautiful." I'm not kidding. And he was pretty good. If you saw this in a movie, you'd say, "This is so Hollywood. This would never happen in real life." But it did happen. It was totally spontaneous and unpretentious. I said, "Mike, you're making me cry."

Mike is a plumbing contractor. He sings at events where they need a patriotic singer. He doesn't do Carnegie Hall, but if Rifle High School needed somebody to sing the Star-Spangled Banner at Homecoming, Mike would be happy to oblige.

A week later, he called and said, "We never talked about money."

I said, "What do you mean?"

He said, "I mean, 'How much money are you going to pay me to keep your bees on my property?'"

I said, "You get six five-pound lugs of honey. That's what my landowners get."

There was pause on the line. Then he said, "Oh. OK. That sounds all right. I guess."

Everybody thinks this sounds all right.

I don't know how Mike came out with the taxman. I do know that another of my landowners, Kay – who runs a bed and breakfast at her high-mountain hideaway – tried unsuccessfully to lobby for agricultural status on the basis of having bees – and a few cows – on the property.

Kay claims that she loves my bees, but she loves them more at a distance. One day she called to say that honey bees were visiting a couple of her horse troughs. She said she was worried that the little darlings might drown. If I tipped over the tubs, she'd move them. I got the impression she was trying to do me a favor.

When I checked the troughs, there were sticks floating in them, and sure enough, the sticks were covered with bees. It looked benign enough. Sure, there were a few floating dead bees, but these tubs were not bee death traps. So I left everything as it was.

A week later, Kay talked to my wife Linda. Why hadn't I emptied those troughs as I had agreed?

Sometimes it takes me awhile, but suddenly I got it. It wasn't drowning bees that bothered Kay. It was live ones. She was afraid to empty those tubs as long as they had bees in them. This was something that you or I wouldn't have thought twice about. But Kay was stuck. She wanted to move her horse troughs, and she couldn't do it without my help.

I had to make a special trip – and turn on the charm – to make this one right.

I sometimes keep bees up by Aspen. It's a particularly good spot early in the year. You never saw dandelions so thick.

Lada doesn't actually own the place. But years ago when Mrs. Paepke gave 300 acres to Pitkin County, she did so with a proviso – that Lada gets to live there for the rest of his life. Most of the land is oak-brush hillside, but the valley floor has some alfalfa and sweet clover. Lada is 80-something, and he still gets around. He cusses those S.O.B.s upstream on the ditch who steal his irrigation water. He leases out some land for cow pasture. He rents out a couple of battered 1950s-vintage trailers and a converted farm shed to Aspen "locals." The ambience is a little primitive. The place looks more like Appalachia than the playground of the rich and famous.

The property sits right next to the Aspen airport. It amuses me working the bees when the Lear jets come screaming in overhead. I wonder what the movie stars think.

Lada doesn't hear so well. When I initially called him to inquire about putting bees on the property, I talked for a while, and he didn't say much. Then suddenly he said, "Bees? Did you say 'bees?'"

When I said, "Yeah, bees," he said, "Bring 'em up."

I give Lada 12 quarts, and he hands them out at the senior center in town. He thinks this is a wonderful deal.

Ed Colby

Honey Rent

BOTTOM BOARD