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JAN 2010

Bee Culture

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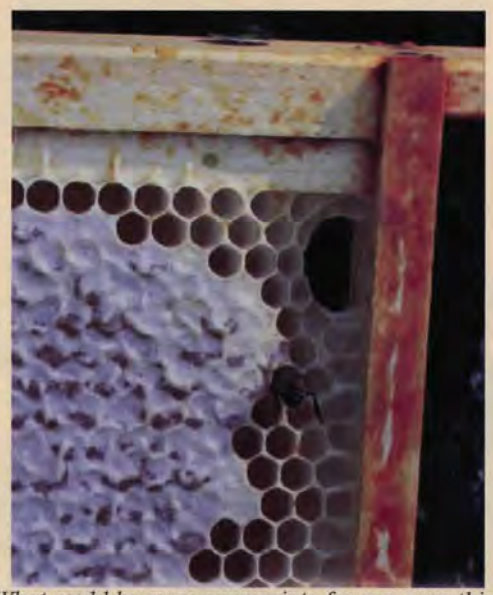

What could be more appropriate for our cover this month than a Langstroth frame, the business end of an Italian honey bee Langstroth originally helped import, and a fine sample of honey, the topic of discussion in our 2010 Calendar, enclosed. Enjoy! (photo by Deb Davidovits)

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Bee Culture

THE MAGAZINE OF AMERICAN BEEKEEPING

JANUARY 2010 VOLUME 138 NUMBER 1

FEATURES

DEPARTMENTS & COLUMNS

Loves Beekeeping!

Arriving home after a long day at work, my plan was to end the day with a few mindless chores. This plan was quickly diverted when I noticed an unusually large number of bees flying about the house. Normally this high level of activity would occur when the girls found a honey source near the house, like when I leave out some combs or honey buckets by mistake. But I knew I hadn't done anything like this. How could there be a significant flow at the end of September? At that moment I flashed back to three days prior when my daughter and neighborhood girl friend were chasing each other in and out of the house and the basement then through the door to the outside. Round and round they went.

Could it be, I thought to myself, that they left the basement door open? The very basement door I used to bring in my 20 full supers of honey to store until extracting day? As I rounded the back of the house, the cloud of bees confirmed my worst fear: the basement door was open and the full supers were covered with hungry bees. The now closed basement door was blanketed with learned bees looking to come back for another fill and the cellar windows were black with fat bees trying to get back to their hives with their ill gotten booty.

I went into the cellar just as it was getting dark. I turned on the cellar light and was immediately reminded that the remaining 100,000 or so bees were orientating on the only light they had, and thus were dive bombing the basement lights. So I had a basement full of bees, supers that needed the bees removed and relocated, and all to be done in a hot bee suit – in the dark! Oh joy.

Since the sun was setting, I took a chance that some of the girls would be looking to go home and so I opened one of the basement windows. Fortunately, this worked as more bees were going out than coming in. This gave me a chance to start moving supers. I was also lucky that the supers were covered with plastic bags and this acted as a deterrent, slowing the bees from getting too deep into the combs. I was able to pull off the plastic, brush the bees off the tops and sides of the supers and run into the other section of the basement that I closed off with a tarp and cover them back up before they were rediscovered. By super #4 I was sweating profusely, but the process was going smoothly. That is until I tripped in the dark over one of the now sticky plastic bags and dropped number #5. This final disaster behind me, I moved the rest of the supers and left the basement, task complete.

I stood there in the yard sweaty, tired, and discouraged. And then, I laughed. I laughed at my girls, the culprits who didn't realize what leaving the door open yet again would mean. I laughed that I missed a classic photo op, and mostly I laughed at realizing this was one of those many moments only we beekeepers have, and I now have another memory I will never forget. I love beekeeping!

Matt Haas
Hiddeford, ME

Top Bar Hives

I enjoyed the long lang article very much. Sure would like to be able to build one but as a carpenter, I am lost. Could never get the wood around here. I suspect the author could drum up a good business selling these as kits. I see them especially good at building up brood to replace brood in weak colonies. I suspect a pollen trap could be placed on top and under the super, or just a top trap but I am unsuccessful using them. Makes me want to try a top bar hive. We need to do anything we can to keep these bees around.

Dick Largen
Bethalto, IL

Storing Supers

In response to the article in the October 09 *Bee Culture* about Winter storage of equipment, may I describe another method.

I am a hobbyist beekeeper and for several years I have stored my supers and frames wet without any wax moth problems.

After extraction I put the wet frames back in the supers. Each super is sealed in a black bin bag (refuse sack). Outdoors, on a hive stand and closed UK hive floor a stack of these supers is made. The stack is topped with a UK style flat roof.

In the Spring/Summer the supers are unwrapped and checked – a very sticky job! The supers can then be added to hives as needed. I like to think that the bees move up quicker into a wet super.

Colin Taylor
Bury, Manchester, UK

More Swarms!

With the publicity honey bees are getting I've had many speaking requests from garden clubs this year and everyone has the same question, "What can I do to help the honey bees?" The fact is that many of these folks are interested in honey bees and beekeeping but have little desire for honey production or sales. Mostly they are organic gardeners who want a small hive or two for pollination and to satisfy a yearning for a more intimate knowledge of this little angel of agriculture.

We read that in any mating of honey bees nature permits a bit of genetic diversity to develop because of the many drones queens mate with. Since we hear that few feral colonies of honey bees are left, and genetic diversity is the foundation of the ability of honey bees to develop resistance to parasites and diseases, maybe we are missing an opportunity to re-establish feral colonies of honey bees.

Imagine 15 or 20 new gardener beekeepers managing their hives with the help of a mentor for the ex-

Continued on Page 9

plicit purpose of pollination and to generate one or two swarms a year. Plus swarms generated by beekeepers who keep most of their hives for honey production but agree to manage a few for swarm production, especially from offspring of their survivor or production queens. The number of drones from these 'best of' colonies could also provide a way to increase the quality of all area hives, feral or managed.

While seeming simplistic, with refinement it may grow to be part of a viable solution to the problems honey bees face today. Perhaps we may see the development of a smaller nuc-type hive that is an inexpensive option to a full size hive. Or a greater market for nuc production among hobby beekeepers with no desire to expand their own apiaries but still want to use splits as a management option. In any event, it would invite more folks to "do their part to help the honey bees."

Michael Salnicky
Cresco, PA

Imidacloprid

Another "Thank you!" is due *Bee Culture*. I'm just now reading your August edition, "Thought on EPA," by Ted Box for The Western Farmer Stockman regarding imidacloprid. Thee may be hope for not only our honey bees, but our disappearing birds. Most of the dedicated insect eaters, tanagers, flycatchers, and kingbirds, orioles, warblers, swallows and wrens are now rare or entirely gone. Also, the common omnivorous birds, robins, bluebirds, meadowlarks, even blue jays and crows are noticeably fewer in number.

We live in a heavily wooded area with steep hills, numerous creeks and spring-fed waterways near a lake. The terrain is steep hills of fractured rock layers under varying depths of sand, loam and/or gravel that supports huge trees, assorted bush and brushy vegetation and wild blooming plants. We're at least 10 miles from anywhere it might be profitable to plant row crops. Area farms raise grazing animals and hay or market gardens.

It's been a honey bee heaven for six or seven hives since 2001 when we restarted beekeeping, until 2008 when we lost three. This Spring started with three hives, quite enough for beekeepers beyond the age to climb ladders. But, in March we had wildfire in the area that destroyed the early wild bloom and in April persistent raid soaked the fruit and tree blossom. We fed syrup and pollen patty, but we lost two in late April and early May. So, ever the optimists, we ordered three more. While two thrived, one dwindled and at two weeks had a capped queen cell. Two weeks later, no sign of a queen and seriously dwindled. We combined it with the weaker of the new hives, successfully, as it soon became the busiest, at least on the days when it didn't rain. We'll likely have a precipitation record for the year. Meanwhile, the survivor hive was playing catch-up and only produced an excess of 30 pounds. So, we feed syrup and candy and hope. So far, so good.

Now, I'm catching up on reading what I should have paid attention to when it was fresh and new. Imidacloprid is also to be used to control termites, a major problem in the area, and for pets, everybody has at least one. The same terrain that supports so many good things takes any drop of liquid with all incorporated contaminates and lets it meander to the water table or simply glide downhill to a stream. That drop and all its near companion drops can end up anywhere dozens of miles away.

If bees carry it home, become directionally challenged, do hive bees that store if forget how to cure it or cap it? Do nurse bees forget the larva need fed? Do queens remember how or where to find a drone? Do drones remember there's something they're willing to die for?

Do birds who eat insects? Do predators who eat birds? Do grazing animals who eat hay or feed? Do people who eat? Is anybody doing the research to find out?

Rachel Kinkennon
Edwards, MO

INNER COVER

Over the Thanksgiving Holiday I spent time with friends and family and had a thoroughly enjoyable break away from the office. I traveled to the west coast and while there visited the largest Renaissance Fair I've ever seen and took some time to talk to the owner of a beekeeper's supply company in downtown San Francisco. Some of that will be in the webinar you see advertised elsewhere in this issue.

One evening, after a large and delicious meal of leftovers we sat around, all of the family folks here, and talked about pets. Dogs, cats, birds . . . mostly dogs.

I haven't had much contact with dogs for the last twenty years or so...I had several after high school and during college, but since then I'm gone more than not and taking care of a pooch is problematic when you're not home. Or expensive. Or a real test of who your friends are. Don't get me wrong, I like dogs and I like visiting friends that have them, but it just wouldn't be fair to a dog to have one in my home.

The friends and family I spent time with aren't fanatics by any stretch, but they do care about their animals. But in the 25 years I've been dogless the care and feeding of these animals has changed it seems. Now, if you've been keeping pets all this time and have kept up with the latest in animal husbandry then you already know where I'm going. Animals that live with people generally get medical and dietary care comparable to what you and I get. Well, not quite maybe . . . but it is certainly far more complicated, sophisticated, advanced, and expensive than when I had a pooch. Of course the science of caring for dogs has advanced a lot too. A whole lot. As a result, pet owners have the opportunity to take better care of their pets . . . cancer treatments, a million special diets available at the pet store, targeted medications, surgery for all manner of ailments, and insurance to cover all this is available too. But better care comes with a price. The price is actual dollars and in time invested in the care.

I was fascinated as I listened to the stories of aging animals and the ailments they had and the care they were given, of young animals and the treatments required for genetic disorders they inherited from inbreeding selection and regular shortcomings of a particular breed, and the money people spent, time they took and work they did to help their dogs recover from a multitude of unfortunate or even necessary incidents – from injuries received at dog parks in the city to microchip embedding procedures, to vitamin supplements and other medications given on a daily, sometimes several times daily basis for allergies, pests, predators and diseases. Truly, I've been out of the canine loop.

Interestingly, you won't be surprised, the care and feeding of our bees has followed a similar curve. When I started learning of honey bees and what few problems they had back before the mites and the new fangled pesticides and exotic diseases and traveling work schedules and weather patterns and mononculture diet dominance and the plethora of viruses all present today . . . why, yes, beekeeping was different. But life was different then . . . everything was different then...or, at least it seems that way, doesn't it?

After listening to all the stories and tales of what pet owners go through today, compared to what I had to do way back when I had responsibility for a dog . . . well, I wonder . . . do I want to start up again? Or, like all those family folks...you do what you have to do if you want a pooch. Or a box of bees.

•

We begin our yearlong series looking at the life and work of L. L. Langstroth this month with an informative and fact-filled piece by Marc Hoffman. Marc, if you missed his introduction earlier, is certainly what I would consider a Langstroth Scholar . . . having studied and researched the great man's life, his background and history, and his philosophy. He's an accomplished actor, and as a playwright has written and performed a one-man play on LLL's life during and after his discoveries entitled "Beeman." We are fortunate to be one of the first to publish many of Marc's discoveries and we are pleased to share them with you. One exciting discovery presented in this article is a photo of LLL's wife. We discovered it while looking for something quite different when putting together the last edition of our ABC. It was originally published in *Gleanings* back in 1875, and we are very pleased to be able to share this discovery with you now.

As stated in Marc's article he will have more of LLL's story and background later this year so please watch for these additional articles.

Amazing Pets. Lorenzo Lorraine Langstroth, Happy Anniversary!

Next month we have some work by Roger Hoopingarner, another LLL scholar and retired Michigan State Extension Specialist in Apiculture, who not long ago took the third edition of LLL's *Hive And The Honey Bee* and annotated it in detail, looking at the discoveries LLL made, some assumptions he got right, and some not. He, too, will have several contributions so please watch for those during the coming year.

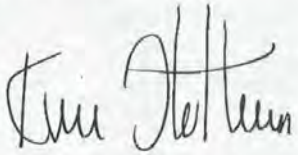
Later this year Tammy Horn, author of *Bees In America, A History of the Honey Bee in America,* and *Piping Up* (not yet released), a history of the role of women in American beekeeping will make some observations on what women were doing during the time LLL was around, and some notes on Mrs. LLL, an under-appreciated personality in the development of American beekeeping.

Later this year we also have Gene Kritsky, from the University Of Cincinnati, author of *The Quest for the Perfect Hive* to be released very soon (and reviewed here), and Jim Tew, *Bee Culture* columnist and curator of the beekeeping equipment museum in Wooster, Ohio, and a student in the construction of early hives and other beekeeping equipment, presenting information on the history and evolution of hives up to and including LLL's box.

Wrapping all this up next December, the actual month of LLL's birth, the Entomological Society Of America is sponsoring a symposium looking at the contributions of LLL to modern entomology, and to beekeeping in general. We hope to be a part of that celebration, too.

What a year we have planned! A year of discovery and rediscovery, a year of new information and a review of what we thought we knew, but maybe didn't. A two hundredth anniversary only comes around once in our lifetime . . . don't miss a moment of this year's journey.

Happy New Year!!



New For 2010

Nicotine Bees. 53 minute DVD, available on Amazon, and from Pierre Terre productions. Directed by Kevin Hansen. Check for price.

This production does a decent job of explaining honey bee biology in short, visual soundbytes, mostly done by Jim Bobb, commercial beekeeper, and Chairman Of The Board for the Eastern Apricultural Society. This is for the purpose of what should be happening in a colony. The rest of the cast describe what is going on in their colonies that shouldn't be happening.

There are some familiar faces here. David Hackenberg gives a lot of the history of Colony Collapse Disorder and the pursuit of the cause, Stan Sandler, a commercial beekeeper from PEI explains some of the problems in his area, and Warren Seaver, a commercial beekeeper from Delaware describes his experience with CCD. There are other U.S. beekeepers in the mix also. Plus, there's Walter Haefeker, the VP of the European Professional Beekeepers, from Germany, who describes experiences there with CCD. They all have essentially the same story... things seem fine, bees leave, bees don't come back...the colonies die. Confusing animations are used for this though...unnecessary I think... but the voice overs are to the point.

And then they all reach a similar conclusion...it's the new pesticides being used in all their respective areas – the neonicitinoids, in all their forms and formulations. They outline the disaster that will occur when the bee population falls too low, and that if you are concerned, contact your politicians, the EPA, and to plant pesticide-free bee gardens and provide safe habitats.

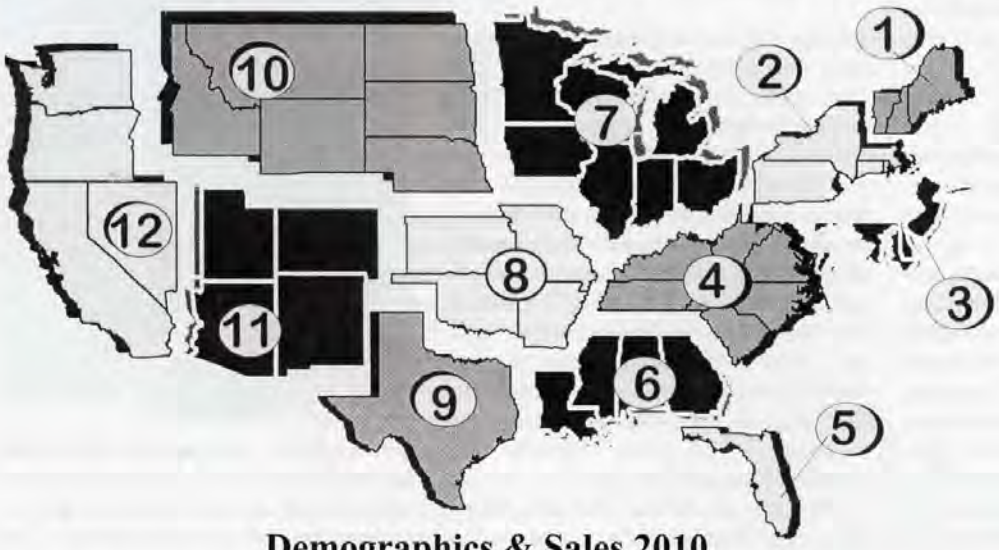
This isn't a new story, but it's a good story...though there are some that think that although these pesticides are one of the key ingredients in CCD, they are not the only key...it matters little...they still play a dangerous and unknown role in the ongoing struggle with CCD. Good for bee clubs, and to show to garden clubs and farm groups.

And the music is excellent.

Kim Flottum

Why didn't someone think of this before? This two jar, one-lid with screen between honey bee tester is just the thing for testing bees with powdered sugar. Dump your 300 bees in one jar from the hive you want to test (take a frame out of the middle of your brood nest, make sure the queen isn't on there, and shake/thump the bees into a dish pan. Tap the pan so all the bees go in one corner, then simply pour them into the jar and put on the double cap). Pour sugar into the jar, attach the second jar, shake rattle and roll with the empty jar on top. When done, reverse. Sugar and mites fall into one jar through the screen, bees stay put. Remove the cap, release the bees, pour out the sugar and mites and count. Perfect. $20.00 plus post. John Williamson, P.O. Box 2033, Fort Macleod, Alberta, Canada, T0L 0Z0. ajwilli@telus.net.

JANUARY – REGIONAL HONEY PRICE REPORT



Demographics & Sales 2010

The demographics of our reporters, and of beekeepers generally is shifting just a tad, reflecting the general population movement from the country to the city…kind of anyway.

Overall, the reporters we touch base with every month have changed just a bit even since last year, when just over 30% had some of their bees in an urban environment…this includes a large city – over 100,000 – medium sized cities – between 25 and 100,000, and smaller cities or suburbs or developments. This year that group of reporters has increased to nearly half…47%. Of our city dwellers, a third have bees in a sizeable city – over 25,000, while the remaining 2/3rds have bees in smaller towns and the burbs. But this breaks down into an interesting mix. 15% are in cities over 25,000, 20% are in suburbs or develop-ments, and 12% are in small towns. Developments are definitely becoming more attractive to beekeepers. Still, any shift to having more bees in any size city is a good thing. Because our reporters usually have enough colonies to produce enough honey to sell, the trend is still more in the country, and over 50% do that exactly…have some, or all of their bees in the country. That's not a surprise…you go where the honey is.

Interestingly however, more than 60% or all of our *readers* have bees in cities, small towns or the suburbs, so the trend of our reporters is catching up…as is the trend of all beekeepers…the simple fact is that there are more people living in the city than the country, so if beekeeping is to grow…

Varietal and artisan honey are growing in popularity, and one sure way to produce specific varieties or artisan blends is to harvest when the honey is ready, not when the beekeeper is…To that end 54% of our reporters harvest at least twice per season, and 21% harvest three or more times a season.

Sales in this honey-short season are interesting so far. 33% report increased sales, 42% report no change in sales so far, while 24% report reduced sales…perhaps due to increased prices? Maybe…47% report they are increasing prices this year, 51% say prices will remain the same, and only 2% report that they are decreasing prices this year. Time will tell if it's price, or availability that has the most sway this season.

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.50	1.65	1.56	1.58	1.58	1.55	1.75	1.56	1.40	1.55	1.39	1.55	1.39-1.75	1.55	1.56	1.50
55 Gal. Drum, Ambr	1.59	1.55	1.63	1.40	1.45	1.35	1.19	1.95	1.30	1.29	1.33	1.33	1.19-1.95	1.45	1.41	1.33
60# Light (retail)	133.54	124.50	130.00	125.50	133.54	133.33	125.50	135.00	125.00	133.54	135.00	149.00	124.50-149.00	131.96	130.59	122.36
60# Amber (retail)	128.47	115.00	130.00	124.00	128.47	124.50	96.00	140.00	100.00	128.47	110.00	147.50	96.00-147.50	122.70	125.45	119.27
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	67.57	61.98	54.60	51.25	67.57	55.75	60.00	67.57	67.57	55.36	64.80	83.55	51.25-83.55	63.13	61.60	53.12
1# 24/case	91.11	78.28	74.40	69.70	91.11	76.20	69.60	74.56	49.44	97.50	78.00	90.00	49.44-97.50	78.32	79.44	77.23
2# 12/case	72.15	64.08	66.90	62.33	72.15	65.53	57.00	65.10	57.30	75.00	62.10	82.75	57.00-82.75	66.87	70.89	65.59
12.oz. Plas. 24/cs	70.54	71.98	54.00	73.10	70.54	61.60	60.40	60.64	47.98	57.60	50.10	69.53	47.98-73.10	62.33	62.98	60.57
5# 6/case	76.27	75.98	77.40	69.84	76.27	90.00	69.60	79.10	65.50	80.40	82.60	88.75	65.50-90.00	77.64	79.29	77.84
Quarts 12/case	109.32	129.95	112.20	102.77	109.32	85.80	87.00	95.00	109.32	93.97	92.40	117.50	85.80-129.95	103.71	106.86	103.71
Pints 12/case	55.28	73.48	66.00	69.80	55.28	50.20	51.00	57.08	50.20	69.00	45.50	67.50	45.50-73.48	59.19	67.66	63.09
RETAIL SHELF PRICES																
1/2#	4.00	3.48	2.75	3.14	3.99	3.25	2.95	1.79	4.06	2.72	3.68	4.56	1.79-4.56	3.36	3.25	2.91
12 oz. Plastic	4.10	4.06	2.98	3.82	3.99	3.72	3.51	3.55	3.19	3.36	3.97	4.58	2.98-4.58	3.74	3.99	3.72
1# Glass/Plastic	5.00	4.69	4.73	4.77	4.99	5.32	4.31	4.33	4.29	4.57	4.78	6.17	4.29-6.17	4.83	4.80	4.66
2# Glass/Plastic	8.00	7.50	8.81	7.24	8.99	7.75	6.50	8.65	6.99	7.97	7.63	9.75	6.50-9.75	7.98	7.96	7.37
Pint	9.50	8.25	6.50	6.53	6.99	5.96	8.83	6.20	5.25	7.75	7.25	9.31	5.25-9.50	7.36	7.75	7.28
Quart	12.83	12.65	11.00	10.65	11.99	9.41	8.33	11.38	12.83	13.69	10.32	14.70	8.33-14.70	11.65	11.99	11.52
5# Glass/Plastic	21.08	15.24	19.98	16.42	21.08	15.00	14.90	19.50	13.39	15.38	20.66	23.00	13.39-23.00	17.97	18.63	16.92
1# Cream	5.50	5.61	6.50	5.44	5.89	5.36	6.63	5.99	5.89	5.31	4.12	6.75	4.12-6.75	5.75	6.26	5.45
1# Cut Comb	7.17	5.09	6.50	5.33	7.17	6.13	6.62	5.99	7.17	7.50	6.00	9.85	5.09-9.85	6.71	6.79	6.17
Ross Round	6.95	6.74	6.50	5.88	6.95	6.50	6.66	6.50	6.95	6.95	8.00	9.62	5.88-9.62	7.02	6.52	6.29
Wholesale Wax (Lt)	4.00	3.83	3.50	3.82	4.38	4.29	4.47	4.00	4.38	4.00	3.25	4.42	3.25-4.47	4.03	3.91	3.37
Wholesale Wax (Dk)	3.17	3.32	2.50	2.59	3.17	4.00	3.20	3.00	3.17	3.17	2.90	3.15	2.50-4.00	3.11	3.37	2.44
Pollination Fee/Col.	89.63	90.00	61.50	43.20	89.63	67.50	57.00	60.00	89.63	89.63	20.00	112.00	20.00-112.00	72.48	81.98	80.62

a closer look

NOSEMA DISEASE

Clarence Collison
Audrey Sheridan

Nosema apis & Nosema ceranae both are trouble for bees, and beekeepers.

Nosema disease (nosemosis) is one of the most prevalent adult honey bee diseases and is caused by two described species of microsporidia, *Nosema apis* and *Nosema ceranae* (Chen et al. 2008). Transmission of *Nosema* in honey bee colonies occurs mainly via the fecal-oral route in which pathogens are spread by transferring feces of diseased hosts to uninfected hosts via ingestion. Adult bees ingest *Nosema* spores when they are eating contaminated food and when they are cleaning up fecal material from infected bees. The spores germinate within the ventriculus (midgut) and release polar tubes that transfer their sporoplasm into midgut epithelial cells where they generate more spores. Millions of new spores can be found inside of a bee's midgut a few weeks after initial infection (Bailey and Ball 1991) and the spores excreted with feces become new sources of infection in the colonies. Although infected bees do not exhibit obvious external disease symptoms, infection of *Nosema* causes digestive disorders, shortens the life span of honey bees, decreases population size of honey bee colonies, and reduces honey production and crop pollination.

Until recently, nosemosis was attributed exclusively to *N. apis*. However, *N. ceranae* is an emerging pathogen that has increased its distribution in the past decade by jumping from Asian honey bees, *Apis cerana*, to European bees (Klee et al. 2007). *N. ceranae* has now been detected on four continents (Asia, Europe, North America and South America) (Huang et al. 2007) and seems to be displacing *N. apis* in European honey bees (Klee et al. 2007, Williams et al. 2008). Chen et al. (2008) upon examining honey bee samples collected between 1995 and 2007 from 12 states showed that *N. ceranae* was present in bees collected a decade ago and is a widespread infection in the United States. Klee et al. (2007) found that host colonies and individuals may be co-infected by both microsporidia species. The intracellular development of *N. ceranae* in the ventricular cells appears to be similar to that of *N. apis* (Fries et al. 1996, Higes et al. 2007 and Chen et al. 2009) and are often resistant to the immune responses of their host (Higes et al. 2006).

N. ceranae is highly pathogenic when experimentally inoculated into European honey bees and is associated with reduced honey production and increased winter mortality (Higes et al. 2006, 2007). Higes et al. (2007) inoculated *Nosema*-free honey bees with 125,000 *N. ceranae* spores, isolated from heavily infected bees. The infection rate was 100% at the dosage administered. By day three post-infection (p.i.), a few ventricular cells (4.4%) were observed to be parasitized, whereas, by six days p.i. more than half of the cells (66.4%) showed different stages of parasitism, increasing to 81.5% on day seven p.i. In the infected groups, mortality was not observed until day six p.i. (66.7%). Total mortality on day seven was 94.1% and by day eight p.i., not one infected bee was alive. Only one control bee died on day seven p.i.; all the remaining control bees were alive by day 14 p.i. and were confirmed uninfected. On day three p.i., mature spores could be seen inside host cell tissue, implying that the microsporidian development cycle had been completed. The high mortality rate demonstrated that *N. ceranae* is highly pathogenic to *Apis mellifera*.

"Nosema disease is known to cause numerous metabolic changes in the host."

The observations that *N. ceranae* causes a higher mortality than *N. apis* in caged bees despite the same pathogen load (Paxton et al. 2007) and that colonies infected with *N. ceranae* die if left untreated (Higes et al. 2008) suggest that the new species possibly has a higher virulence.

Williams et al. (2008) found that the genetic sequence of *N. ceranae* found in North America differs from those reported from China where it was originally described (Fries et al. 1996) and Spain (Higes et al. 2006). However, the North American haplotype is shared with those reported from Austria. The presence of only a single *N. ceranae* haplotype in North America suggests that parasites here originated from a single source, likely Europe.

Parasites typically compete with their hosts for nutrition and exert an energetic stress on them. There are two different mechanisms by which the energetic stress is imposed, the parasite either directly draws energy from the host for its own metabolic needs or the host needs to expend en-

ergy for mounting an immunological response, which is an energetically expensive process (Schmid-Hempel 2005). The energetic stress placed on the host as a result of an infection can compromise the effectiveness of the immune response itself and allow other pathogens to invade the host, setting off a cascading effect. Using proboscis extension response and feeding experiments, Mayack and Naug (2009) were able to show that bees infected with *N. ceranae* have a higher hunger level that leads to reduced survival and concluded that energetic stress is the probable cause of the shortened life span observed in infected bees (Hassanein 1953).

Another physiological impact on individual bees, associated with the disease, is the reduction in the capacity to feed larvae royal jelly secreted by the hypopharyngeal glands (Hassanein 1951). When newly emerged adult honey bees are dosed with spores, the hypopharyngeal glands of these bees fail to develop in size and eventually atrophy, whereas those of healthy bees increase in volume over the first two weeks or so of adult life (Wang and Moeller 1969). Ultrastructural signs of this degeneration may be seen in the glands of workers five days after dosing with 5,000 *N. apis* spores each and by 10 days they are very noticeable (Wang and Moeller 1971). This degeneration undoubtedly interferes with the secretion of brood food, so that infected bees are less able to feed larvae.

Nosema disease is known to cause numerous metabolic changes

"In order to complete the proper development of both the hypopharyngeal glands and the fat body, newly emerged bees must digest large amounts of protein over the first few days of adult life."

in the host. Bees infected with *N. apis* have a reduced metabolic efficiency due to the degeneration of the ventricular epithelium and lower secretion of digestive enzymes (Liu 1984, Malone and Gatehouse 1998). In addition, *N. apis* infection reduces pollen collection (Anderson and Giacon 1992) and induces queen supersedure (Farrar 1947, Furgala 1962). In a study comparing the pollen-gathering rates of workers treated with sugar-water containing either *Nosema* spores or sacbrood virus to sugar-water-treated (control) colonies placed in kiwi orchards, a significantly lower amount of pollen was gathered in the pathogen-treated hives compared to the control hives. There was no significant difference in the pollen yields of sacbrood and *Nosema* infected colonies, and the reduction in pollen collection of *N. apis*-treated and sacbrood virus-treated colonies was attributed to a decrease in colony sizes resulting from pathogen mortality (Anderson and Giacon 1992). Farrar (1947) found that the presence of *Nosema* had a depressing effect on brood rearing somewhat proportional to the percentage of infection among worker bees. Furthermore, queens with active *Nosema* infections eventually ceased oviposition and became sluggish, and the last batch of eggs laid often dried up in their cells.

In order to complete the proper development of both the hypopharyngeal glands and the fat body, newly emerged bees must digest large amounts of protein over the first few days of adult life (Winston 1987). Crailsheim and Stolberg (1989) have shown that newly emerged bees (kept in cages or hives) undergo a rapid rise in the activity of gut proteolytic enzymes immediately after emergence and that this activity peaks within one week of adult life and then drops to a relatively steady state for the rest of their lives.

Activity levels of four bee midgut proteolytic enzymes were measured in adult honey bees three, eight and 24 days after dosing with spores of *Nosema apis*. Trypsin and chymotrypsin activity levels were significantly lower in *N. apis*-dosed bees than in the controls at each time point (Malone and Gatehouse 1998). Elastase levels were significantly lower than controls in dosed bees examined at eight and 24 days, but not at three days. Leucine aminopeptidase levels were lower in dosed bees at days three and eight, but not at day 24. In both the dosed and the control bees, levels of each of the four enzymes were

significantly higher at days three and eight than at day 24. Reduced digestive proteolytic activity in young bees infected with *N. apis* may explain why hypopharyngeal gland development is disrupted in these insects. BC

References

Anderson, D.L. and H. Giacon 1992. *Reduced pollen collection by honey bee (Hymenoptera: Apidae) colonies infected with* Nosema apis *and sacbrood virus.* J. Econ. Entomol. 85: 47-51.

Bailey, L. and B.V. Ball 1991. *Honey Bee Pathology.* Academic Press, London, UK, 124 pp.

Chen, Y., J.D. Evans, I.B. Smith and J.S. Pettis 2008. Nosema ceranae *is a long-present and wide-spread microsporidian infection of the European honey bee (*Apis mellifera*) in the United States.* J. Invertebr. Pathol. 97: 186-188.

Chen, Y.P., J.D. Evans, C. Murphy, R. Gutell, M. Zuker, D. Gundensen-Rindal and J.S. Pettis 2009. *Morphological, molecular, and phylogenetic characterization of* Nosema ceranae, *a microsporidian parasite isolated from the European honey bee,* Apis mellifera. J. Eukar. Microbiol. 56: 142-147.

Crailsheim, K. and E. Stolberg 1989. *Influence of diet, age and colony condition upon intestinal proteolytic activity and size of the hypopharyngeal glands in the honeybee* (Apis mellifera *L.*). J. Insect Physiol. 35: 595-602.

Farrar, C.L. 1947. *Nosema losses in package bees as related to queen supersedure and honey yields.* J. Econ. Entomol. 40: 333-338.

Fries, I., F. Feng, A. Da Silva, S.B. Slemenda and N.J. Pieniazek 1996. Nosema ceranae *n. sp. (Microspora, Nosematidae), morphological and molecular characterization of a microsporidan parasite of the Asian honey bee (*Apis cerana*) (Hymenoptera, Apidae).* Eur. J. Protistol. 32: 356-365.

Furgala, B. 1962. *The effect of the intensity of* Nosema *inoculum on queen supersedure in the honey bee,* Apis mellifera *Linnaeus, J.* Insect Pathol. 4: 429-432.

Hassanein, M.H. 1951. *The influence of* Nosema apis *on the larval honeybee.* Ann. Appl. Biol. 38: 844-846.

Hassanein, M.H. 1953. *The influence of infection with* Nosema apis *on the activities and longevity of the worker honeybee.* Ann. Appl. Biol. 40: 418-423.

Higes, M., R. Martín and A. Meana 2006. Nosema ceranae, *a new microspordian parasite in honeybees in Europe.* J. Invertebr. Pathol. 92: 93-95.

Higes, M., P. García-Palencia, R. Martín-Hernández and A. Meana 2007. *Experimental infection of* Apis mellifera *honeybees with* Nosema ceranae (*Microsporidia*). J. Invertebr. Pathol. 94: 211-217.

Higes, M., R. Martin-Hernandez, C. Botias, E.G. Bailon, A. Gonzales-Porto, L. Barrios, M.J. del Nozal, P.G. Palencia and A. Meana 2008. *How natural infection by* Nosema ceranae *causes honeybee colony collapse.* Environ. Microbiol. 10: 2659-2669.

Huang, W.-F., J.-H. Jiang, Y.-W. Chen and C.-H. Wang 2007. *A* Nosema ceranae *isolate from the honeybee* Apis mellifera. Apidologie 38: 30-37.

Klee, J. (and 14 co-authors). 2007 in press. *Widespread dispersal of the microsporidian* Nosema ceranae, *an emergent pathogen of the western honey bee,* Apis mellifera. *J.* Invertebr. Pathol. doi:10.1016/j.jip.2007.02.014

Liu, T.P. 1984. *Ultrastructure of the midgut of the worker honey bee* Apis mellifera *heavily infected with* Nosema apis. J. Invertebr. Pathol. 44: 282-291.

Malone, L.A. and H.S. Gatehouse 1998. *Effects of* Nosema apis *infection on honey bee (*Apis mellifera*) digestive proteolytic enzyme activity.* J. Invertebr. Pathol. 71: 169-174.

Mayack, C. and D. Naug 2009. *Energetic stress in the honeybee* Apis mellifera *from* Nosema ceranae *infection.* J. Invertebr. Pathol. 100: 185-188.

Paxton, R.J., J. Klee, S. Korpela and I. Fries 2007. Nosema ceranae *has infected* Apis mellifera *in Europe since at least 1998 and may be more virulent than* Nosema apis. Apidologie 38: 558-565.

Schmid-Hempel, P. 2005. *Evolutionary ecology of insect immune defenses.* Ann. Rev. Entomol. 50: 529-551.

Wang, der I. and F.E. Moeller 1969. *Histological comparisons of the development of hypopharyngeal glands in healthy and nosema-infected worker honey bees.* J. Invertebr. Pathol. 14: 135-142.

Wang, der I. and F.E. Moeller 1971. *Ultrastructural changes in the hypopharyngeal glands of worker honey bees infected by* Nosema apis. J. Invertebr. Pathol. 17: 308-320.

Williams, G.R., A.B.A. Shafer, R.E.L. Rogers, D. Shutler and D.T. Stewart 2008. *First detection of* Nosema ceranae, *a microsporidian parasite of European honey bees (*Apis mellifera*), in Canada and central USA.* J. Invertebr. Pathol. 97: 189-192.

Winston, M.L. 1987. *The Biology of the Honey Bee.* Harvard University Press, Cambridge, MA, 281 pp.

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RESEARCH REVIEWED

The Latest In Honey Bee Research

Steve Sheppard

"Genetic characterization of U.S. honey bee populations."

The history of the introduction of honey bees to the United States is a fascinating and rather long story that involves the human-assisted movement of bees across an ocean with sailing ships and later with steam-powered ships. In a future article, I will recount a bit of this history and highlight the involvement of Rev. Langstroth in the early importation of Italian honey bees to the United States. As with many other agricultural crops and animals, the goal and outcome of early importations was to establish managed populations in the U.S. In addition to this intended consequence, honey bees also escaped as swarms and established a resident unmanaged (feral) population across much of the country. This feral population consisted of a mixture of the descendents from the various subspecies that were originally introduced.

In breeding programs, genetic variation provides the baseline on which selection (by the breeder) can act to produce stocks with desired characteristics. One consequence of establishing species in new places is that the new population tends to exhibit reduced genetic variability (compared to the source population) due to "founder effects." Among other things, founder effects reflect the failure of importation to "sample" the entire diversity of the original populations.

In addition to the initial founder event of the introduction, modern commercial queen production methods, whereby individual queen "mothers" are used to produce thousands of daughter queens, may also put downward pressure on genetic diversity.

Recently, Delaney and colleagues examined genetic diversity in commercial honey bee populations from the two major queen production regions of the U.S., sampled about a decade apart. The researchers sought to characterize possible genetic changes in these populations through time and to determine whether previously reported genetic differences persisted between the two regions (Delany et al., 2009).

In their introduction, Delaney and colleagues discussed a number of issues that could affect genetic variability in commercial stocks. These included the fact that in the early 1990s, less than 600 queen mothers were used to produce nearly one million commercial queens annually in the U.S. In addition, the establishment of *Varroa* mites in the late 1980s appears to have largely eliminated an extensive U.S. feral honey bee population derived from escaped swarms and their descendents. This is noteworthy because these same feral honey bees were known to be a reservoir for some of the genetic diversity of subspecies not maintained by beekeepers and, thus, represented a possible source of diversity available to commercial populations through drone contributions.

The researchers collected samples of workers (daughters) from "queen mother" colonies that were used by U.S. commercial queen producers in both the western region (2004 -15 producers) and southeastern region (2005 -20 producers). In addition, they had a similar set of samples taken about a decade earlier from many of the same producers (western - 1994 - 21 producers; southeastern - 1993 - 22 producers). They interviewed the producers to get an estimate of the number of queens that were produced annually and the number queens that were used as mothers in the grafting process. The bee samples were analyzed for variation in mitochondrial DNA and at 10 different microsatellite loci. Microsatellites are a relatively new genetic tool that permits comparison of genetic variation contributed by both males and females, whereas mitochondrial DNA only reflects contributions from the female lineage.

The survey results showed that queen producers used somewhat fewer queen mothers to produce daughter queens in 2004-2005 compared to the 1993-1994 period. Overall, the queen producers used 603 queen mothers to produce 890,700 queens in the 1993-1994 period or about 1,477 daughters from each mother queen. A decade later, they used 473 queens to produce 869,500 queens or about 1,838 daughters from each queen. These patterns of queen mother use were similar for both the western and the southeastern queen producers.

The genetic analyses provided an interesting picture of the commercial queen producing population across time. The 10 microsatellite loci analyzed for the 1994 western commercial breeding population (WCBP) contained a total of 128 different alleles (an allele is a particular genetic variant). In the 2004 WCBP population, only 92 of these alleles could be found, a loss of 36 alleles. However, 22 "new" alleles were found in the 2004 WCBP, reducing the overall allelic decline from 128 to

114. Similarly, the 1993 southeastern commercial breeding population (SCBP) contained a total of 102 alleles, of which only 77 were found in the 2005 population, a loss of 25 alleles. However, 22 "new" alleles were found in the 2005 SCBP, bringing the allelic total back up to 99. Statistical examination of the distribution of alleles in the WCBP and the SCBP revealed significant differences between the breeding populations of the two regions. Interestingly, of the 22 new alleles found in the 2004 WCBP, 14 were previously unknown from U.S. honey bee populations (either in the SCBP or in a similar study of the US feral honey bee population). The mitochondrial analysis largely supported the findings of previous studies demonstrating that commercial breeding populations primarily contained the descendents of Italian/Carniolan honey bee subspecies. Small amounts of both nuclear (microsatellite) and mitochondrial DNA markers also showed contributions from African honey bees in the commercial populations.

Delaney and colleagues noted that, while there was no significant loss of allelic diversity over the 10 year span between the sample collections, there was a significant change in the allelic compositions. Both the WCBP and the SCBP lost a number of alleles over the period, offset by the gain of new alleles. Possible sources for these new alleles included contributions into the commercial population by Africanized honey bees, Russian stocks or unknown importations and the sharing of breeding stocks between the two regions of the country. The loss of original alleles across the 10 year time span was less in the SCBP than in the WCBP, something the authors suggested may result from the greater proportion of alleles that the SCBP shared with the previously extant feral population (89% in the SCBP compared to 77% in the WCBP). Analysis of the 11 "overlapping" SCBP operations (those that were sampled in both periods) revealed that the SCBP actually experienced a gain of alleles between 1993 and 2005.

In the Discussion, the authors concluded that "due to ...the inflow of new alleles...the current queen production practice of producing 1,000,000 daughter queens from less than 500 queen mothers is having little effect on genetic diversity...". However, without the influx of new alleles from various sources such as Africanized honey bees, Australian packages, Russian stocks, etc. there would have been a decline in the genetic diversity, in at least the WCBP. They go on to state ... "the maintenance of adequate genetic diversity in U.S. commercial honey bee populations will probably depend on the future inflow of new alleles". The finding that the WCBP remains genetically distinct from the SCBP is information that should be usable by both queen producers and other beekeepers. That is, sharing genetic material between the two regions provides another means to help maintain diversity within specific beekeeping operations. BC

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References

Delaney, D.A., M.D. Meixner, N.M. Schiff and W.S. Sheppard. 2009. *Genetic characterization of commercial honey bee (Hymenoptera:Apidae) population in the United States by using mitochondrial and microsatellite markers.* Ann. Entomol. Soc. Am. 102: 666-673

APPRECIATING LORENZO LANGSTROTH

Marc Hoffman

Inventor, Scientist, Author, Minister

Lorenzo Lorrain Langstroth – inventor, scientist, author, and minister – was born on Christmas Day in 1810.[1] During 2010, his bicentennial year, several of us who have been fascinated by his legacy will write about his life and accomplishments.[2] We intend to explore his contributions – looking at not only their origins and value, but also the controversies that have surrounded them. His achievements were not always recognized or appreciated. In this, the first article, I will look at Langstroth's origins and early training in some detail. But before I get to that I will discuss some general matters and give a very brief overview of his long life.

Lorenzo Langstroth is best remembered for inventing the practical movable frame beehive in 1851, but he made many other contributions to the art and science of beekeeping and was also a prodigious author. He published his book, *Langstroth on the Hive and the Honey-bee, A Bee-Keeper's Manual*[4] in 1853 and contributed many articles and letters to the journals, which often published his contributions over the simple attribution "LLL" because he was so well known that it wasn't necessary to provide his full name. I will, from time to time, use that designation for him in this article.

Among his many other accomplishments, Langstroth patented improvements to the honey extractor,[5] was instrumental in bringing Italian bees to this continent,[6] and verified the function of the spermatheca.[7] We are benefiting from his work today, not only from the increased honey production and intensive pollination made possible by his hive, but from the scientific knowledge we have gained. Tom Seeley, Professor of Neurobiology and Behavior at Cornell University has pointed out that we know more about the honey bee's behavior than any other insect's, and this knowledge was made possible by our ability to observe and manipulate them using the Langstroth hive.

Langstroth's powers of observation were remarkable, and he first described many of the truths we know about honey bees. He wrote that he benefited, in his early years of keeping bees, by having no one to teach him. As a result he had to learn for himself through observation and experimentation.[8]

It is amazing that he accomplished so much considering his disability, which he called his "head troubles." Beginning in his college years, he was incapacitated for months at a time with headaches and depression, which would come on suddenly and often lift as quickly. He writes that his wife, Anne Tucker Langstroth, believed that he did not lose time by these bouts because he would make up for the lost time by being overactive when he came out of them, a phase she considered "intolerable." From this we can theorize that he was, in today's terms, bipolar, or manic-depressive. These problems continued into his old age. He died in 1895 when he was 85.

Although the general story of his life is well known, many new details have become available. It has been extremely exciting to look through his manuscripts, to double-check sources, and to put together information that has never been available – a real detective story. The new phenomena of online databases and search engines, the availability of obscure books scanned and made available by Google and other resources, and the genealogical resources gathered by the Mormon church have vastly improved the quality of research.

As an example of these discoveries, (and this is the very first time that this information is being published), Reverend Langstroth, knowingly or not, promoted false information about his son. James Tucker Langstroth, who died of tuberculosis in 1870 at the age of 33, was very important to LLL as a business partner and was well known and respected in the national beekeeping community. Lorenzo Langstroth, an abolitionist, encouraged James, who shared his views, to fight for the Union. The story that they maintained was that James contracted his fatal tuberculosis during his service in the Ohio regiments during the Civil War. Several obituaries repeat this as fact. However, a published history of the Tenth Massachusetts Regiment of volunteer infantry lists James T. Langstroth as enlisting in 1861 and being *discharged* two months later. His service record at the National Archives states that James was discharged for scrofula, that is, dermatoid tuberculosis. A doctor[9] associated with the National Museum of Civil War Medicine, in Frederick Maryland, advises me that it would normally take longer than two months after infection to become

symptomatic; he was infected *before* enlistment. James, after being discharged in Massachusetts, returned to Ohio to enlist there, never revealing that he was infected so that he would be accepted. My research associate Matt Redman and I would have never discovered this matter but for the publication of the history of the Tenth Regiment on Google Books.[10] The misrepresentation was undetectable for 150 years.

Our most complete window into the life of Lorenzo Langstroth is the book-length biography written by Florence Naile, *America's Master Of Bee Culture, The Life of L. L. Langstroth.* She did her research in the early 20th century when many of Langstroth's contemporaries were still alive. In addition to interviews and other sources, the book relies heavily on a series of articles Langstroth published late in his life, "Reminiscences," which appeared in 1892 and 1893 in *Gleanings in Bee Culture*, (the former name of *Bee Culture* magazine.)

Naile's biography is detailed and informative, but incomplete in important ways. The most regrettable gap is the lack of information about his wife, Anne. Langstroth often refers to her in his writings. When he was well she was a helpmate and companion, but she when he was not functioning she was essential to maintaining his life. An educated woman, she was able to support the family by taking teaching jobs when he was not able to work. She wrote an impressive plea to the Patent Office, successfully obtaining a reissue of his hive patent.[11] Her sickness and death, 22 years before his, was a blow to him, and we can get an idea of its importance by the fact that among the papers he retained until his death is a diary she wrote detailing her daily health problems.[12] Another gap is the lack of critical information about some of Langstroth's circumstances. Naile is an apologist for him, which is understandable, but as a result it is sometimes difficult to be certain what really happened. Langstroth could be generous, astute, and objective, but he also made some very damaging decisions, which he then justified in his journal articles. His enemies said horrible things about him that were clearly exaggerated. It's hard to sort out the truth.

Several photos of Langstroth have come down to us. In the most often published, his face is lined, he is wearing a clerical collar, wearing wire rim glasses, and has a half smile: "The kindly Reverend Langstroth." There is only one known photo of his wife.[13] In it, she looks hollow-cheeked and emaciated. It may be that she shows the effects of her long illnesses, or the picture could be from a period when they were so poor they were not eating properly. It is unfortunate that material that is more original is not available. Certainly they had family photos – they must have at least taken a studio portrait of their son, James Tucker Langstroth, before he went to war – but we are not aware of the location or existence of any.

As I have learned about Langstroth's extended family, I have been struck by how many accomplished individuals are relatives, including Mary Katherine Drexel, a Catholic Saint;[14] John Lorain, the first person to publish about the hybridization of corn and an early advocate of erosion resistant farming practices;[15] and more recently his great-great-grandson, Clyde Lorraine Cowan, Jr., whose work in physics – the discovery of the neutrino, an elementary particle-earned the Nobel Prize.[16] LLL is related to Thomas Loraine McKenney, appointed by President Madison to be Superintendent of Indians, who studied the Native Americans extensively and published *History of the Indian Tribes of North America* in 1844.[17]


Mrs. Langstroth, Anne Tucker

A Brief Summary of Langstroth's Life[18]

In the final section of this article I will discuss his origins and early years in detail, but it will be helpful to first have a concise summary and chronology of his entire life. Lorenzo Langstroth was born in Philadelphia on December 25, 1810. He showed an early interest in insects, which was discouraged by his family. He was given a college preparatory education and passed the examinations to enter Yale at the age of 16. While an undergraduate he found Christ and upon graduation entered Yale Divinity School, supporting himself by working as a teacher of undergraduate mathematics, and as a teacher in various girls' schools. He married Anne Tucker, whose mother owned one of the schools. He had a succession of jobs as church pastor and as headmaster of girl's schools, but in each case was not able to continue because of ill health. There are several versions of his discovering beekeeping, but one holds that he purchased his first bees in 1838.

In 1848, back in Philadelphia teaching at a girl's school, he continued to study and experiment with bees. In the Summer of 1851 he made his most renowned discovery, "bee space," which led to his invention of the practical movable frame beehive in October of that year. In 1852 he received a patent on that hive.[19] His ill health suddenly returned, which required him to move in with his sister and her husband in Greenfield, Massachusetts. When his health returned he wrote the book *Langstroth on the Hive and the Honeybee, A Beekeepers Manual*, which was published 1853.

In 1858 he moved to Oxford, Ohio, to a house purchased for him by his brother-in-law, Aurelius B. Hull. In 1860 he assisted the U.S. Division of Agriculture in successfully importing Italian bees for the first time. His son and business partner, James Langstroth, enrolled in the

Union army in 1861, at the age of 24. James survived the war but died of tuberculosis in 1872. In the following year LLL's wife died and during the final stages of her illness their daughter Anna, and her husband, Hugh C. Cowan, moved in with them. In 1887 Hugh Cowan's business required a move to Dayton, and LLL moved with them, although census records indicate that they had separate residences. LLL died on Sunday, October 6, 1895 while giving a sermon and is buried in Dayton.

Langstroth's family history

Langstroth's maternal great grandfather was a British sea captain, Thomas Lorrain. From the Boston News-Letter of May 31, 1759:

> Thursday about two o'clock in the afternoon, a French privateer sloop...chased a snow[20] off Port Morant, close to the Harbour's mouth. ...The sloop Viper, Thomas Lorrain, commander, ...belonging to this town being there, immediately weighed anchor and put to sea after her, and by eight in the evening took her and carried her into Port Maurant, to the great satisfaction of the Planters there, who in all probability would have suffered greatly, particularly at this time when they are transporting their produce to market... As the ...Viper had intelligence of another privateer sloop, that was seen of the East-end, the Viper sailed the next day...

LLL often described his family as having French Huguenot origins. Another descendent of Captain Lorrain confirms this, describing him as being a "full blooded Frenchman altho [sic] born in England."[21]

Among the children of Captain Thomas Lorrain and his wife Mary McKenney were John Lorrain, who was a pioneering advocate of conservation, and Elizabeth Lorrain, LLL's grandmother. John Lorrain's book, *Nature and Reason Harmonized in the Practice of Husbandry*, published posthumously in 1826, advocated tilling practices that prevented soil erosion, and other conservation practices that were decades ahead of his time.[22]

Interior of the Coleman-Hollister House (now the McCarthy Funeral Home) in Greenfield, MA as it looks today. Lorenzo Langstroth was principal of a girls' school located in this house, and later lived in the house, which had been purchased by his sister and brother-in-law.

Elizabeth Lorrain married James Brown Dunn, a prominent individual and a slaveholder who served in the State legislature for a term.[23] One of their children, Rebecca Dunn, is LLL's mother. Langstroth writes that he got his abolitionist views from his grandmother, Elizabeth Dunn who, as a widow and under the influence of the Methodists, freed her slaves. After James Dunn died, Elizabeth remarried, to Gideon Comegys from another prominent family. Elizabeth Lorraine Dunn Comegys is buried in the Christ Church IU in Worton, MD.[24] Two historic houses, the Lorain House and the Dunn House, stand today in Chestertown.[25]

LLL was born in Philadelphia, the second of eight brothers and sisters, to John George Langstroth and Rebecca Amelia Dunn Langstroth. John Langstroth's father, Thomas Langstroth, who moved to the Colonies from England as a young man, set up one of the first paper mills for fine paper in the Colonies. Their ancestral home, in Langstrothdale, England, had many paper mills.[26] John G. Langstroth continued his father's business, sometimes partnering with his brother. LLL relates that, as a boy he learned to handle horses because he made deliveries for his father, but he didn't learn to hammer a nail until he was an adult.

As a boy, LLL was interested in insects, but his parents strongly discouraged his activities. He relates being punished for putting holes in his pants by kneeling to watch insects on the ground, and for catching flies and putting them into paper cages for observation.

Lorenzo was given a college preparatory education, including the classical languages, and could read Latin directly into English. He was required to memorize long passages, including from the Roman poet Virgil, and retained much of it until quite advanced age. Virgil writes about bees in his Fourth Georgic (much of it quite fanciful and inaccurate), and LLL wrote later that that was the only knowledge of bees he had when he eventually began keeping them. He enjoyed mathematics. He passed the entrance examinations to Yale and matriculated at the age of 16, in 1827.

The 19th century saw an acceleration of scientific discovery, invention, and enterprise. Although LLL did not take any college courses that directly relate to his later attention to bees, he had a mentor in Denison Olmsted, professor of mathematics and natural philosophy, a man full of scientific curiosity, a penchant for invention, and a devotion to making accurate observations. He was also in charge of he college's meteorological data. LLL roomed at Olmsted's in his freshman year.

The early decades of the 19th century were known as the Second Great Awakening, a time of increased religious fervor. The First Great Awakening took place in the 1730s and 40s. The Second Great Awakening began in approximately 1800 and grew in strength through the 1830s and 40s. This period saw an increase in religious activity and revivalism, and is sometimes linked to the increasing sentiment for abolition, a factor leading to the Civil War.

LLL's acceptance of religion was one event in this wave. LLL writes that he wasn't particularly religious in his early college years, but that he didn't have a clear

direction, either. He describes his reluctance to meet with certain of his fellow students, who were proselytizing under the leadership of a certain professor. Nevertheless, after having a long talk with one of them he found Christ, and subsequently chose to become a minister. LLL writes that his father discontinued support of his education at this time because of business reverses. Deprived of parental support, LLL had to earn his way, which he did by teaching mathematics to Yale undergraduates, by teaching in private schools, and by working as a private tutor.

I have no specific evidence for this, but I suspect that his father's support may have been discontinued partly because he was unhappy with his son's choice of direction. There is something in the way LLL brushes over his father's decision that has attracted my attention to the matter. His father was a businessman who had spent a great deal on the education of his oldest son, so it is reasonable that he had expectations of the responsibilities LLL would be assuming. The extent of these responsibilities became clear later when, in 1836, two years before John Langstroth died[27] both LLL's mother and a younger sister moved in with him and he was required to support them. In all of his writing, I am unaware of LLL's mentioning paper manufacturing.

In 1836 he won a very promising job as pastor in the South Parish in Andover, Massachusetts. He married Anne Tucker that year. He was able to host a visit by one of the most popular preachers of the time, Lyman Beecher, at his church. In 1837 his son, James, was born. But the parish duties were too strenuous for his delicate health and LLL had to resign his church position two years later. He remained on salary, performing what duties he could, until the end of March, 1839, when the relationship was ended.

LLL described two versions, not mutually exclusive, of the circumstances of his taking up beekeeping. In one version, in 1838 he visited someone who had observation hives and, fascinated, bought a colony from him. A second version is that he took up beekeeping for relaxation and relief from his head troubles, and to be out of doors, which he found healthful. But a third version, from family lore as related by Thomas Ashmead Langstroth, relates that it was LLL's uncle, Piscator who interested Lorenzo in bees. Piscator Langstroth was only a few years older than LLL. He discovered a method, which he kept secret, of bleaching beeswax so that it was white, and therefore desirable for use as candles in the Catholic Church. Piscator grew very wealthy from his invention, which must have made an impression.[28]

After a brief term as principal of Abbot Academy in Andover, he moved to Greenfield, Massachusetts in 1840, where he became the head of the High School for Young Ladies in a large mansion next to the Second Congregational Church. After supplying the pulpit[29] at the church for three years he became, in 1843, its permanent pastor, a position he filled for five years.

Before continuing with LLL's story, I would like to describe my visit to the Coleman-Hollister House, which is the name now given to the building that housed the school for girls, and is the place where, in 1852, LLL wrote *The Hive and the Honeybee*.[30] It was designed and built in 1796 by Asher Benjamin, who influenced buildings throughout New England through his own projects and the seven architectural and building manuals he wrote. Since 1918 it has housed the McCarthy Funeral Home, which was generous enough to give me permission to enter and look around.[31] It is beautifully maintained and one can easily imagine life there in mid-nineteenth century. In LLL's time the railroad track not far from the building had not yet been built and one can imagine that somewhere in the surrounding fields LLL kept his apiary. The church, which is now a rebuilt edifice, not the one LLL led, is a few steps away.[32] This beautiful house, after being purchased by his sister and brother in law, Almon Brainard, a prominent attorney, would years later become a refuge which would shelter LLL for six years.

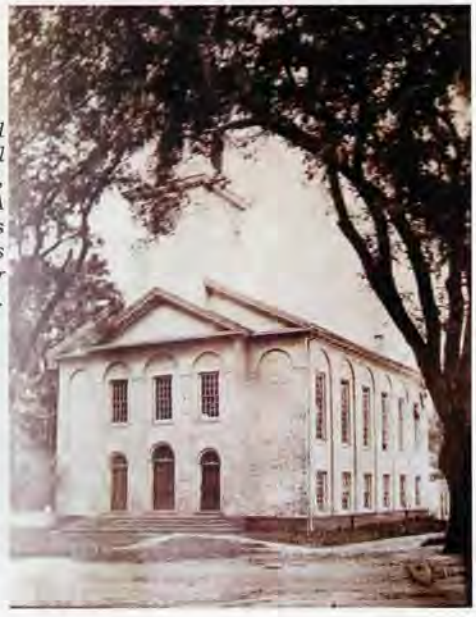
In 1848 he resigned his position with the Second Congregational Church because of ill health and returned to Philadelphia, where he opened a school for young women. The events to come – his discovery of bee space and his invention of the practical movable frame hive, will be described in another article.

A disturbing pattern – success followed by illness – headaches and depression, his "head troubles" – would recur throughout his life. At each iteration, optimism, and the good will his rectitude and good intentions earned him, would enable him to begin an enterprise, only to see him fail before the fruits could be harvested. He had a growing family, and other relatives depending on him. If only he could find something like the secret process his Uncle Piscador had, some discovery that would be his. BC

Marc Hoffman is a beekeeper and Langstroth historian. He lives in Silver Spring, Maryland.

References

[1] Many thanks to Matt Redman, my research associate, for his contributions to this article. Thanks also to the librarians of: the American Philosophical Society Library, Philadelphia, Pa.; Mann Library at Cornell University; the National Archives II, College Park, Md.; the National Agricultural Library, Beltsville, Md.; Marylandia Room, Hornbake Library, University of Maryland, College Park, Md.; Catholic University Library,



Second Congregational Church, Greenfield, MA where LLL was Pastor. This building no longer exists.

Washington, DC. Thanks to Peter Miller, Town Historian, Greenfield, Mass., and to members of the Langstroth family – Lovell and Libby Langstroth of Pacific Grove, Ca. and George Langstroth Cowan of Scranton, S.C.

[2] Sources of information about Langstroth's life: Langstroth wrote a series of articles titled "Reminiscences," which appeared in *Gleanings in Bee Culture* magazine in 1892 and 1893. Florence Naile published her book *America's Master of Bee Culture, The Life of L. L. Langstroth* in 1942, reprinted in 1976. An 18-page biography written by Ophia Smith, "Langstroth, The 'Bee Man' Of Oxford" appeared in Vol. 57 of the journal *Ohio History*. It can be read online by opening **www.ohiohistory.org** and searching for "Langstroth." I shall refer to Reminiscences, to Naile, and to Smith in these footnotes.

[4] Referred to in these notes as *Hive and the Honey-Bee*. It is available online at **http://chla.library.cornell.edu/c/chla/browse/1.html#block1**

[5] US Patent 61,216 issued January 15, 1867 to Langstroth and Samuel Wagner. It is a four-sided geared extractor meant to be attached to the top of a barrel or other container and designed to be used for pieces of comb as well as frames.

[6] Naile, pp 112-113

[7] *Hive and the Honeybee*, p 37. The spermatheca is an organ in the queen bee that stores the drones' sperm from her mating flights.

[8] Reminiscences, Feb 1893, p 80

[9] Dr. Barry Thompson, EAS Master Beekeeper

[10] *The Tenth Regiment Massachusetts Volunteer Infantry 1861-1865*, p 474. Available online through Google Books.

[11] Reproduced in full in Naile, p 123-128.

[12] Diary, American Philosophical Society Library collection.

[13] Medley of American Beekeepers, published as an addendum to *Gleanings* in March, 1875. Photos were identified and introduced in the March, April and May issues of *Gleanings*.

[14] http://www.katharinedrexel.org/family.html

[15] *Nature and Reason Harmonized in the Practice of Husbandry*, published posthumously in 1826.

[16] **http://nobelprize.org/nobel_prizes/physics/laureates/1995/press.html** One must be alive to receive a Nobel. Clyde Cowan died in 1974. The 1995 physics prize was awarded to his partner, Frederick Reines. The citation credits them both. See also, **http://www.arlingtoncemetery.net/clcowan.htm**.

[17] McKenney, T.L. and James C. Hall. *History of the Indian Tribes of North America with Biographical Sketches and Anecdotes of the Principal Chiefs Embellished with One Hundred and Twenty Portraits From the Indian Gallery in the Department of War, at Washington.* McKenney was also in charge of Indian Affairs for the Andrew Jackson administration – certainly not much to be proud of – but in his favor, he was soon fired for his relatively enlightened views.

[18] General details of LLL's life in this section are taken from Naile and Reminiscences.

[19] US Patent 9300. Patents may be viewed on the internet through the US Patent and Trademark website, or through Google Patents. There are problems with the drawings for patent 9300 currently displayed on the websites: they are redrawings made in 1912 to facilitate the printing of the patent, which is handwritten in the original. The drawings do not accurately represent the original drawings, which are in the National Archives in College Park, Maryland. In fact, it is impossible to construct a practical device following those drawings.

[20] **http://www.answers.com/topic/snow-ship** A snow (pronounced "snoo") or snaw, is a sailing vessel. A type of brig (snows are often-referred to as "snow-brigs"), snows were primarily used as merchant ships, but saw war service as well.

[21] Letter Rebecca (Lorrain) Wills to her nephew Edward, October 2, 1843.

[22] John Lorrain's marriage certificate is among the Marquis de Lafayette collection in Lilly Library in Bloomington, Indiana. Why? We've tried to find out and failed. This may be irrelevant to our knowledge of LLL, but it sure has piqued our curiosity.

[23] Archives, Marylandia Room, Hornbake Library, University of Maryland, College Park, Maryland

[24] The parishioners of the church do not know what IU means or stands for.

[25] **http://www.kentcountyhistory.org/house_detail.php?ID=4**

[26] Letter, 1968, Theodore Ashmead Langstroth, Special Collections, Mann Library, Cornell University.

[27] Obituary, Philadelphia Inquirer, April 18, 1838.

[28] Piscator's daughter Hannah married Francis Anthony Drexel. Their daughter, Katherine Drexel, was eventually canonized as the second American Catholic Saint.

[29] That is, filling in while there is no permanent pastor.

[30] For beautiful pictures of the interior, see **http://www.memorialhall.mass.edu/activities/architecture/coleman.html**

[31] This was arranged through the good offices of Peter Miller, Greenfield's town historian,

[32] A picture of the original church is on display as one enters the main doors of the church. In the front yard of the church is a small monument to LLL, erected in 1948, which reads, 'This tablet is erected as an acknowledgement of the debt beekeepers of the world owe to his skills and unselfish leadership, scholar, observer, author, friend of mankind. July 19, 1848."

Another interior view of the Coleman-Hollister home.

Larry Connor

Changing The Way We Train New Beekeepers

A look at bee biology and how it affects colony management

The Bee Nest & How It Affects Colony Design

My October to December travel blitz was momentarily interrupted by a phone call from neighbors near the Farm to help gather up a bee tree in a nearby town. The tree, at a horse farm, had already been cut down and the caller wanted to know IF I wanted it. I had just been at meetings in Michigan and Texas, with a bonus side trip to Palmer, Alaska to meet the new granddaughter. In a day I was set to drive to Connecticut for the fourth SNEBA meeting. I really did not want to take a day to help move and split open a bee tree and move the bees into frames on a questionably warmish day in mid November. So I passed.

Later I got a report that the comb extraction went well, and the queen was located and safely transported to a new regular home. The combs were fitted with light cord so they would stay in place in their new home in wood frames. It all seemed pretty logical and straightforward (See photos by Kathy King and Craig Fuller). I was given orders to stop by to see a strange new bee that was surrounded by lots of worker bees. On my drive out East I stopped and saw a worker bee denuded of body hairs and missing its sting. The beekeepers had found a robber bee and she had stung one of them. I guess that is how some beekeepers like to learn.

Did the sting come out?
Yes. It came out into his hand.
Then it was a worker bee.

I wish all mysteries were this easy to solve.

Natural vs. Beekeeper-Provided Nest Sites

Since I drove the 800+ miles from Kalamazoo to Hamden, I had some time to reflect on the nature of the bee nest, and how beekeepers have been forcing bees into structures over the millennia that the bees may or may not want to occupy. Most of the time the bees are pretty flexible and adapt to the human-provided space. Sometimes the bees rebel and depart the nest, especially if there is no brood or riches of food present.

Craig Fuller holding a frame with a comb fragment from the bee tree. Kathy King photo.

Removing a comb from the nest. Kathy King and Craig Fuller photo.

The maple tree this colony occupied provided a cylindrical nest space and long and narrow combs. While there is some parallel nature to these combs, they often have a twist or flex due to the bee's community comb building in a free form space. The bees work to fit the comb surfaces together, often amazingly so. But when the combs were carefully cut out from the bee tree they seem to be rotated ninety degrees to fit into the open frame. This is not an act of evil manipulation, but an attempt to fit the natural comb into an artificial space. This gives me pause for thought, since I constantly wonder if the bee space we provide is the best shape for bees.

We know that the different races of *Apis mellifera* L. have been selected for different nesting sites. As glaciers retreated in Europe and Asia following periodic ice ages, European species developed characteristics for adaptations for nest sites. The most common evolutionary sites for northern European races were hollowed areas in deciduous and coniferous trees, as well as some rock outcroppings, cave-like features caused by wind and water erosion. But colonies in Africa were selected to find nests in different types of nesting opportunities, as well as adapt to local climate needs. Many of these races have developed different survival strategies, and develop in different sized nests.

North American Races

In Central America, Mexico and the southern United States we have experienced (and still continue to experi-

ence) the interaction between classical managed European races and the invading African bees. During my visit to Texas, just before the trip to Connecticut, I visited an apiary with a range of bee nests in structures that ordinarily do not 'fit' European races. While the beekeeper did not consider them to be African, I suspect that there is an African influence on these colonies, since they occupied smaller spaces, such as birdhouses and water meters.

On the internet I found a useful summary of the nesting differences in Florida publication ENY-147 by M.K. O'Malley, J.D. Ellis and C.M. Zettel Nalen called Differences Between European and African Honey Bees. They are located at the Entomology & Nematology Department, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, FL 32611. The Internet link is http://edis.ifas.ufl.edu/in784.

I have lifted Table 3 from this document to summarize the differences between European Honey Bees and African Honey Bees. One must remember that hybrid (Africanized) bees will often be intermediate between these characteristics.

European Honey	African Honey Bee
Nests in large cavities, around 10 gallons in size	Nests in smaller cavities, 1 to 5 gallons in size
Typically nest in dry, above ground cavities	Will nest in underground cavities with a high moisture content
Nests in protected locations, rarely exposing the nest	Will nest in exposed locations, (e.g. hanging from a tree branch)
Due to larger colony size, nests are often easier to detect	Due to smaller colony size, nests often go undetected until disturbed

It is impressive that the European races require such a large nest site as compared with the African races. But when we consider the reproductive strategies of the two groups, we quickly understand why this difference has evolved. European bees seem to optimize swarming at one or two swarms per season (the year 2009 may be remembered as a year when most colonies swarmed repeatedly, reflecting the periods of confinement and conditions suitable for more swarms). Compare that with the practice of African bees of swarming 10 times each season. This, of course, reflects the way the colonies utilize the honey and pollen resources as they enter the colony. African bees convert a larger percentage of the food income into brood, while the European bees convert a larger percentage into food storage necessary for survival during the Winter or dearth period. If a Michigan colony swarmed 10 times each season it would deplete both its bee population and food reserves so severely that the colony would certainly not survive the Winter. In fact, very few of the swarms would survive either, since they are smaller in size and would require greater effort to gather the reserves to survive the Winter. Even with good conditions, perhaps only one colony in five or six survives to reach its first anniversary. This helps us understand how this selection occurs so rapidly, and how often colonies in our apiaries are not as productive as we want them to be because of late swarming, small swarms, and poor foraging conditions.

When Dr. Tom Seeley gave European bees a choice between nesting cavities of different volumes, he found that swarms preferred the 40-liter size over two other sizes. This, of course, reflects their evolutionary heritage. There is clearly an optimal size for the natural bee nest, and it is a function of the size of the swarm and its evolutionary heritage. Seeley summarized this work in his books *Honeybee Ecology* (Princeton University Press, 1985) and The Wisdom of the Hive (Cornell) which of which I recommend you add to your collection. In that book, he describes the idealized nest site for European bees in the New York and New England regions:

1. A nest volume of 15 to 80 liters,
2. A South-facing entrance,
3. An entrance smaller than 75 cm^2,
4. An entrance near the floor level,
5. A nest entrance several meters above the ground,
6. Is located between 100 to 400 meters from the parent colony,
7. And has a set of pre-existing combs built by the previous colony occupant.

The reuse of nest sites fascinated me. Clearly, there is an advantage to the new swarm that finds a legacy nest from a previous swarm. Since these swarms are most likely within 400 meters of the parent colony, it is likely that the honey comb was left behind by a swarm from the same parent site, so the practice of nesting nearby the

parent hive can have some subtle selective advantages when one considers the high mortality of new swarms. If a colony produces a swarm that invests all of its resources into comb building and cannot store enough food to survive the Winter, then in a future year the empty comb will attract a 'sister' swarm from the same colony to occupy the nest that does not need to put as many resources into comb building but instead can focus on food storage. Tom Seeley has told me how isolated these nests are in the wild (completely different distribution than beekeeper-managed colonies) and even wax moths have difficulty finding empty nests due to their Northern isolation. Thus the empty combs may persist for years waiting for a future swarm to select that nest site.

Is our Langstroth-type hive still a good fit?

The debate over frame sizes and hive designs ended about a century ago with the acceptance of the standard Langstroth deep, medium (Illinois) and shallow frames in 10-frame equipment. Equipment was based on standard wood dimensions of the time, dimensions that have since changed and are now less efficient for the manufacturer.

Many other beekeepers have made the same comment about ten frame equipment as I have observed: bees don't use the outside combs unless the colony becomes amazingly strong and/or the beekeeper moves the frames and puts honey on the outside wall to optimize equipment use. This year it was extremely common to find new colonies, started on foundation, building a comb chimney very reminiscent of that nest in a bee tree. It was four to six frames wide and went up into as many boxes as we provided. It was if the bees were fitting and building comb and designing a tree-based nest in spite of our best efforts to provide them adequate room for expansion outwards.

These chimney-like comb-building patterns are adapted for the way bees survive during the Winter – they move up as they consume stores. Heat from the cluster moves up, warms the comb and honey, and provides the bees with an unrestricted and logical flow on the combs. That there are breaks provided by different frames allows the bees to communicate between the sides of the combs, and better regulate temperature.

Most experienced Northern beekeepers have found colonies dead in the Spring that still had full frames of honey on the *outside* of the of the cluster where they could not break to reach the needed food. As a result many beekeepers place a full box of honey on top of the hive in hopes that the bees will have plenty of food to survive the Winter. But the colonies I see that do best are the ones with top insulation that allows the bees to move up and then out, over the tops of the frames, as the cluster eats its way through the honey. A moisture-catching insulation, made from human-made insulation materials or a book of straw or a box of dry leaves, will often provide the natural moisture take-up that a bee tree likely provides that colony in the woods.

I keep asking bee scientists this question: How has the *Varroa* mite changed other habits or behaviors of honey bees now that we have had a quarter century of bee and mite interaction? Do colonies swarm more to create a break in the brood nest? Are over-wintering clusters larger, smaller or the same as in the past? Are bees reselecting for old evolutionary habits that beekeepers had worked to reduce over the past century or so? I clearly do not have answers to any of these questions, but it reminds me that bees are constantly changing and adapting to their environment, be it *Varroa* mites or climate change (consider their historical dance with the glaciers in Europe and Asia!).

Combs tied into frames, the bees were added back and the colony fed and closed up. While November is not the ideal time to remove bees from trees, there was a period of mild weather that persisted into December that allowed these bees to take down food. Kathy King and Craig Fuller photo.

There may be good reason to again look at different box sizes and frame sizes. I would like to see how seven- and eight-frame colonies with depths greater than the current deep frame dimension will do in a multi-year, side-by-side comparison. I would also like to see how reinforced natural comb could be utilized in both top-bar colonies so the bees are able to move up on the combs and survive Northern Winters.

It may be time to go through an experimental phase of beekeeping similar to that following Langstroth's discovery (or adaptation) of the bee space. Top bar frames had existed in other parts of the world for centuries when Langstroth 'discovered' the bee space. European and American beekeepers were not aware of their use. It may be time to develop a hybrid colony that incorporates both Langstroth and Top-bar features.

Now, with African bees moving into more and more of the United States, we also need to look at the optimum nest size that minimizes swarming and promotes honey production by pure African and African-European hybrids.

Tinkerers, get out of the chair and into the wood shop! BC

It is in print. Queen Rearing Essentials *by Dr. Connor is arriving at your local bee supply companies or can be ordered directly from the Wicwas Press website:* ***www.wicwas.com****. Also join Dr. Connor at the fourth Serious Sideliner Symposium at the Orlando meeting of the American Beekeeping Federation, being held this month.*

Integrated Top Bar Hive Management, Part II

The Rest Of The Story

Melanie Kirby

One of the biggest beauties of top bar hives is the creativity that is allowed when building the hives. There are the Tanzanian, the Kenyan and the unique bee guru styles out there. Dr. Wyatt Mangum had a wonderful article in last year's December ABJ about "Home Grown Hives – Literally."[1] His article mentioned finding local materials as well as the diversity of the construction and the creativity involved.

All are worthwhile and workable. However, this diversity in creativity can also be one of the main obstacles when dealing with top bar hives. There are many plans out there, and many styles. The sizes are all different and measurements are not standard. Bee space is accommodated (as is necessary in any hive style) but the lengths, breadths and material of the boxes and top bars are all up to the builder. The standardization is absent and can thus put one in a pickle on occasion when trying to revise their colonies.

With Langstroths, there is measurement standardization – a trait that displays its security time and again. While one can use deep, medium, or shallow supers, or any of the above, the frames themselves are all the same length and width and so one can interchange these without much recourse. This is conveniently useful when revising my colonies. My partner and I have decided to go with a ¾ size. This means we use boxes and frames that are 7-5/8" size – larger than mediums but smaller than deeps, a not-uncommon size in the south and western U.S.

We are still in the process of converting our entire system into this size and moving the deeps out- which we find to be cumbersome as well as unnecessary for "supersizing" of colonies. The bees seem to like this ¾ size for both brood building and honey storage – not to mention that it is much easier on one's spine. This size also accommodates our mating nucs. This interchangability is also creative within a predesigned layout.

After trial, error and some failure, I have found that it is much easier to start top bars in my Langstroth system whereby they can be pulled out straight, maintain bee space and also give me extra comb on the sides. Since top bar hive combs are like half moons with angles, I can cut it off my rectangular top bar combs with side angles for my top bar boxes and attach these extra triangular pieces of comb on naked bars for further construction by the bees. Because I have decided to start my top bars in my Langstroths, I use top bars that are the same measurements as Langstroth frame top bars. This standardization of measurement allows me to put any of my top bars with combs into my Langstroths and vice versa; putting my Langstroth frames into my top bar hives (after accommodating the side angles). So far, this integrative exchange has been extremely useful and adaptable to whatever conditions I encounter with my top bars.

I have also decided to reuse pieces of recycled Pierco or foundation to start my top bars as well. Since we need 7-5/8" size foundation, we save the sawed off Pierco pieces from our deep frames and I screw these into my top bar

Our top bar box and screened bottom board.

Young comb being drawn from a top bar. Note the partial Pierco frame in the back, right, screwed onto the top bar.

wood pieces. This then serves as a beginning guide for the comb to be built. It also allows me to transport my top bars without incidence of the comb falling or breaking off or melting in the heat. I can also unscrew the whole comb and attach it to someone else's bar of a different size without compromising the integrity of the comb and its contents.

I developed this method after having local beekeepers ask for top bar starter nuclei. Being that many of them use different styles of top bars, I first started by taking their individual bars and trying to plug them into my top bars or into my Langstroths which was an utter fiasco due to the dimensional differences. I lost many queens and bees this way and sought a better system to get top bars established. I wanted to accommodate the diversity and uniqueness of local requests while also preserving and propagating my bees. I have refrained from just shaking loose bees and adding a queen into an empty box because I find the process stressful – not only for me, but also for the bees.

Instead of trying to accommodate each unique top bar measurement, I decided to standardize myself and for the better. I can now use my top bars and then each person can accommodate them in their own hive bodies regardless of the dimensions. Occasionally there is the need to cut off long comb or to trim the sides – but all in all; I have received favorable reports from those who have purchased top bar starter nucs from me. If one does not want to use the recycled Pierco strip, they can then "imitate" nature and cut the comb and reattach it with string or floss to their own bar and allow the bees to reattach it.

I also keep my top bar hives with partial screen bottoms so as to be able to implement the Dowda method for safe *Varroa* mite control. I can transport my top bars and follow Mother Nature's natural nectar flows such that my bees have access to regional, pure food for their well-being. And when deemed necessary, I can put a pail on top for feeding or put a feeding tray inside my top bars to prevent robbing.

While there is not a concise Top Bar Beekeeping manual out on the market as of yet, there is ample information out there on how to manage bees in this sort of system. I recommend Curtis Gentry's Small Scale Beekeeping Manual[2] which was published and is still issued by the United States Peace Corps. You can download it online for free.

While there is not a concise Top Bar Beekeeping manual out on the market as of yet, there is ample information out there on how to manage bees in this sort of system. I recommend Curtis Gentry's Small Scale Beekeeping Manual (www.beekeeping.com/articles/us/small_beekeeping/index.htm) which was published and is still issued by the United States Peace Crops. You can download it online for free.

Top Bar management is not so removed from Langstroth management. In fact, it is ultimately the same except that you shift your perspective to manage your hive in a horizontal fashion instead of vertical. For instance, you can still perform "reversals" when necessary- just move your full brood combs to the back of the open comb in a top bar system and repeat when necessary. This corresponds directly to reversals in Langstroths whereby you would simply switch the order vertically of your boxes and put the empty comb on top of the full brood frames so that the bees can work up into the empties and then switch when the bottom becomes empty.

This fusion of Top Bars with Langstroths has allowed both my beekeeping management and my honey bees the ability to be housed in a myriad of designs while still maintaining efficiency, crucial bee space, honey bee integrity, and respect for conscientious management. I do truly believe that it is not so much what you keep your bees in, but how you react and respond to them that is natural or unnatural. All managed honey bee hives are in man-made abodes. They have been cut, sawed, glued and nailed. Even though these abodes are man-made, they are still "natural" in that they house natural organisms and allow for the dynamic and natural interchanges with Mother Nature.

In today's world, there is so much modern and post–modern paraphernalia around us. We do not need to use all the new gizmos and gadgets in order to be productive and "wise". But, we should be able to discern what can add or diminish a system and wherein lies the wisdom

Mature combs from one of our top bar hives.

Dusting with powdered sugar.

to accommodate that. There is nothing wrong with "man-made" as long as it is retains compatibility with nature.

Whether you decide to keep bees in Top Bar hives, Langstroth hives, or both, the key to responsible and appropriate management lies in where you are physically located, regional rules and regulations, and what you and your community can afford. It also relies on the beekeepers' understandings and interpretations of honey bees and their relationship to this world- for good and bad. Whichever you choose to use – Langstroth, Top Bar or both – standardize yourself for the benefit of your bees and your management skills. With proper hive design, there is less stress on the bees; a well-kept top bar hive is better than a poorly kept Langstroth – and vice versa.

The most natural beekeeping practice that exists is where the bee steward learns to discern hive's status, needs and responsibilities and accommodate them without the routine misuse of harsh chemicals – regardless of the container in which the bees are housed. Whether you keep one hive or many, they are each special and the decision to keep bees is one which necessitates initiative, responsibility, leadership and flexibility. Working within one's own local, regional and national community is beneficial – especially if you and your bees can assist in establishing quality food production and the production of medicinal apicultural products including honey, local pollen, royal jelly, bee brood and beeswax.

I would like to thank my friend and one of my many mentors – Al Summers of Ichiban Honey Co. for his dedication and fortitude to sharing quality beekeeping management and advancement. He is one of Colorado's finest. I would also like to thank him for his continued dialogues and commentaries with top bar beekeepers which have enlightened and broadened my own understanding. You can view my slideshow of Integrative Top Bar Hive Management at **www.ziaqueenbees.com** under slide shows. Gracias y Viva las Abejas! BC

*Melanie Kirby and Mark Spitzig operate Zia Queenbee Co. in New Mexico and Michigan – **www.ziaqueenbees.com**.*

[1]ABJ Volume 148 No.12 December 2008 P.1087-1089 *Honey Bee Biology- Home Grown Hives- Literally*, Dr. Wyatt Mangum

[2]**www.beekeeping.com/articles/us/small_beekeeping/index.htm**

Blue Ridge Honey

This North Georgia Producer/Packer Makes It Look Simple

Kim Flottum

Bob & Suzette Binnie

About a year ago Jennifer Berry did a story on these pages about Blue Ridge Honey Company, run by Bob and Suzette Binnie. For the most part that article focused on the beekeeping aspect of this operation. But Bob and Suzette handle a lot of honey in their operation . . . a lot of honey . . . and Jennifer, being the good beekeeper that she is, didn't delve much into that aspect of this business.

But I got a chance to visit Bob and Suzette this year, and as fascinating as running 500 colonies this year and increasing to 700 next year is, and producing 1000 nucs this coming spring both to sell and to increase honey production can be, I was more fascinated to see how this very small operation handles nearly 300 drums of honey a year they both produce and buy from beekeepers across the eastern part of the U.S.

Bob got his start in beekeeping out west, and for a time ran a 500 colony operation in Oregon. That's where he learned the fundamentals...both the biology of the bees and the business of beekeeping. You need both to survive.

He moved east for what was to be another career that didn't quite pan out as expected, and in 1995 bought a few colonies, just because, and in only a couple of years was working 80 - 100 hour weeks to get his beekeeping business up and running. Early on he was primarily a honey producer and needed enough honey all year long to keep product on customer's shelves. And as he increased customers he increased colonies. It's a familiar story.

But then about 10 years ago there was a crop failure. There wasn't enough honey in all of his hives to fulfill all of his obligations, so he had to choose . . . let down his customers and lose that market share to another beekeeper that could fill those shelves, or buy honey from local beekeepers and keep his business. He chose to keep his customers.

Though it started slow, buying honey from beekeepers he knows and trusts has steadily increased since then. He pays his suppliers more than larger packers generally do . . . from a nickel to a dime more usually...but he pays over time so that his cash flow stays steady. His suppliers know this going in and because of the higher price it's a good relationship for everyone. You can see that there is a lot of trust involved here . . . on both sides. The suppliers have to provide the product they say they will . . . color, moisture, quality, flavor, variety...and Bob has to be financially reliable so his suppliers stay in business. Over time this has worked to everyone's advantage.

With as many colonies as Bob has now – he's heading toward 700 next season – his own production certainly adds to the total amount he has to sell. Sourwood certainly is a premium product and purity of that product is paramount for his reputation and integrity. Sumac blooms before sourwood where he is so he makes a sumac crop early. But he'll leave the last of the sumac supers on when the sourwood begins to bloom so there's some overlap before he removes the sumac supers and puts on the sourwood supers to make certain his sourwood crop is pure and not mixed with the darker and stronger flavored sumac. It's all about the color. Generally he'll make 30 - 35 drums of this premium product in a season, but with the disagreeable weather last year it was only 12 - 15 barrels, and this past Summer's downright awful weather produced only six barrels of the good stuff. It's going to be a lean year for that label.

Enclosed loading dock.

Side View – uncapper, frame holder and pipe.

Frame holder and closed extractor.

Cappings box.

Bob buys as much local honey as he can but 70% or so of Georgia's crop is gallberry so he sells a lot of that, but to diversify he needed additional varieties, so now he has orange blossom, sourwood, tupelo, tulip poplar, catalpa, blackberry and of course wild flower. Occasionally other varieties are available and he'll use them as a varietal or to blend with his wildflower crops for flavor or color enhancement.

As a 200,000-or-so-pounds-per-year packer he doesn't nearly match the scope of, say, Sioux Honey or Golden Heritage Foods, but when you add 500 and going-on-seven hundred colonies for honey production, and making up 1000 nucs next Spring you need way more hours in a day or you need some help. So to make all this work Bob has working with him his wife Suzette, who manages a lot of the business end of the show . . . invoices, paying bills and the like, and all the internet business, which makes up nearly 5% of their income and growing.

His son Chris works full time delivering honey in the Atlanta area to a host of outlets, including the 30 some Wal-Mart stores they take care of. Chris also warehouses all of the honey he delivers right at his home, but there's a commercial produce company that buys and resells their honey too right in Atlanta.

Another full time employee works part time delivering honey to some of the outlets not in Atlanta, and the rest of his time working with Bob on the bees, which is why Bob is able to expand his operation this year. Another part time employee works a few days a week bottling honey.

Who does Blue Ridge Honey Company sell all that honey too? Start with those 32 Wal-Mart Stores just mentioned, with his own label on the jars, no less. There's a mountain of paper work just tracking all those accounts that Suzette handles. Delivery is done by Bob's son who delivers to all those Wal-Mart stores and stocks and cleans their Direct Store Display shelves in person. This started because Wal-Mart has a "local supplier" program, and then one of the store managers took an interest in Bob, and finally one of the corporate people helped out. It took a year to get everything in place, so you can see patience has a great deal to do with this business. They charge more so they can cover the cost of the person making the deliveries and taking care of the shelves.

But they also sell to a variety of produce stands, several smaller grocery chains, many gift stores, once in awhile a whole barrel to someone, and lots of pails to other beekeepers . . . something like 600 – 1000 pounds a week just in pails. Of course there's the produce company that sells his honey all over the southeast.

The logistics of storage and distribution can be a headache when you have lots of customers and many places to deliver. The Binnie homestead is part of the operation, but it is located on a narrow, winding road in the mountains of northern Georgia and truck traffic is a challenge. So located about five miles away is one warehouse that is set up to receive

Moveable cappings honey box on stand showing pipe to sump; and extractor, showing large pipe to sump.

Inside of parallel-radial, holding 60 frames.

Storage tanks and bottling setup.

Filtering

honey and bottles and other supplies for storage and the get-ready part of the operation. These supplies are moved to the honey house as needed as there isn't a lot of storage there. A new honey house close to home is in the works, but already Bob will tell you it's not big enough . . . and, it seems, they never are.

The bottling operation is straight forward and well planned, but it was built to handle a smaller quantity of product. However, it is designed to accommodate a one man operation because that was, and in many ways still is how this works. Enough supers are moved from the truck or the loading dock into the extraction room to be convenient to the uncapper, and to fill the area to the point that you can still get supers out when operating the equipment. The set up is such that moving supers in, loading the uncapper, unloading the extractor and moving supers out can be done by one person. The Cowen uncapper, automatic frame mover and loader, and the parallel radial extractor setup handles 200 supers in an eight hour day with one person operating. Cappings are collected in a movable box which drains the honey into the sumps and retains the cappings wax to be rendered later. Frames are mechanically moved into the collection tray until there are enough to fill the extractor – it holds 60 – and then pushed into the radial merry-go-round extractor, spun, then loaded back into the supers. When there's a load the supers are two-wheeled out of out the room and back to the truck. Certainly two people make this work faster than one but one can, and often does keep it running.

Honey from the uncapper and extractor goes directly to the in-floor sumps but a draw back is that the cappings collection tanks are full after six hours of this and if working alone Bob has to stop to clear those so they can handle more. During all this the honey is pumped from the sump tanks to one of four 300 gallon storage tanks, filtered with cleanable nylon filters on each tank. Humidity is always a concern in any honey house, and a dehumidifier and air conditioner are running nearly constantly. In fact, the two combined can pull 1 – 2% moisture out overnight when the room is full of supers.

Bottling is done in the same room, and the bottling operation is low key but efficient. Honey in the tanks is kept warm, right about 100° by bottom heat only, and can be fed to the bottler from any tank. The bottling machine is moveable, and can be attached to any of the tanks. Volume is pretty high . . . one person can fill between 800 and 1000 bears a day.

Filled containers are labeled, though some are sold without labels, and about half are distributed from the home location, while the other half goes to Atlanta for his son or the produce operation that wholesales his product.

Running this many colonies, making and selling nucs, buying and selling honey and wax, bottling honey, delivering honey, making sure bills are paid, and collected, and helping out at the many local bee clubs Bob is involved with keeps Bob and Suzette busy beyond measure. But one of the rules of the game that's been learned is that it is always better to do something well even if it stays small, than to try to increase an operation past its ability to operate . . . 500 colonies run well will always out-perform 700 run poorly, and that axiom translates to making honey, making nucs, selling honey and all the rest of the operation. It is a lesson worth learning for any beekeeping business. BC

You can find out more about Blue Ridge Honey at ***www.BlueRidgeHoneyCompany.com****, or contact Bob at* ***BobBinnie@BlueRidgeHoneyCompany.com****.*

Future honey house.

The Northeast Treatment-Free Conference

Erik Osterlund

Held in Massachusetts last August, all manner of natural beekeeping techniques were discussed.

All over North America and Europe bees and beekeepers are having problems. The European Parliament made a resolution about the importance of bees on November 20, 2008, which, among other things says that '...the beekeeping sector throughout the world, and more particularly in Europe, is encountering very serious difficulties; ... apiculture has a beneficial impact on the ecosystem as a whole and is essential for the agricultural ecosystem in particular; ... it is essential to preserve biodiversity, to which apiculture makes a significant contribution through cross-pollination activities;...76% of the production of food for human consumption is dependent on the beekeeping sector;... 84% of vegetable species cultivated in Europe depend on pollination..."

We realize the European Parliament was too narrow in their resolution when they said Europe in particular is facing serious difficulties. The U.S. is well qualified to be included in this statement. The pollination value of the honey bee – it pollinates over 100 different fruit and vegetable crops in the United States, including oranges, apples and blueberries, almond trees and animal food crops like clover – has been estimated at more than $14 billion in U.S., and that figure is a decade old. It has without doubt, increased since first introduced.

Conference in the Northeast U.S.

Therefore if you want to contribute to the well being of your country, yes, even your planet and yourself, be involved in beekeeping. Become a beekeeper, if you aren't already! It's a good hobby as well as an occupation.

This was a part of my message at the Northeast Treatment Free Beekeeping Conference at Leominster, Massachusetts July 31-August 2, 2009. This was one of two beekeeping conferences in Northeast U.S. focusing on getting away from chemicals in the beehive, at least such put there by the beekeeper. The other was the EAS conference in the beginning of August with the theme Toward Non-Chemical Beekeeping.

It's no coincidence that the two conferences had these themes. Chemicals have been identified as playing a big part in the problems beekeeping is facing today. Both chemicals put in the hive by the beekeepers and chemicals used as plant protection for crops and in gardens.

Many New Beekeepers

It was good to see what great interest there is to become a beekeeper. A big part of the 120 participants in the Leominster conference had quite recently begun as beekeepers. And many were women. I recognize the same trend in Sweden. And many, maybe most of these new beekeepers are idealistic. They want to make a positive contribution to the environment, and they clearly think it's cool to be a beekeeper. And they're right. They are not interested in producing big honey crops initially. Rather, they want to help the bees have somewhere to live while they're doing their good work pollinating the plants in the neighborhood. These idealistic beekeepers want to help nature to be natural.

TBH and Foundationless Beekeeping

Therefore it's natural for many beginners to go for top bar hives (TBH), where the bees draw their own comb on just top bars. Or they use ordinary frames but without wax foundation, like before the days of commercial foundation that started in late 1870s. One way of helping the bees to build combs in the frames is to put popsicle sticks in the top bars as a starter strip, a tip Dean Stiglitz shared with us.

One idea behind letting the bees draw their own comb is that bees in the wild draw different size cells in different parts of their nest and there is probably some reason behind this. Yet another idea is that you are certain you get rid of contaminated wax that way.

Cell Size in the Broodnest

When investigating cell sizes in feral bee nests built by bees not from

At the workshop Dean Stiglits showed how the bees were building comb with the help of just popsicle sticks on the top bar. Erik Osterlund photo.

Kirk Webster going through nucs and making them ready for Winter when we visited him on the study trip after the conference. Erik Osterlund photo

Michael Bush gave many practical tips. One which surprised me was that you can give dry table sugar on top of the frames for the bees to take through Winter. Could be valuable for light colonies late in season in northern climate when they can't take sugar solution. Put a sheet of newspaper almost over the whole area of the top bars. Leave an inch at one end. Spray water on the newspaper. Put sugar on the newspaper and spray some water on the sugar too. Put on an insulated top. Bees eat through the paper and reach the sugar, which doesn't flow down thanks to the moistened newspaper. Condensed water will help the bees eat the sugar throughout the Winter. When the flow starts in the Spring you can take away the sugar. Michael Bush photo.

beekeepers' hives, many observers report the cell sizes in the core of the broodnest are smaller than those found in wax foundation you purchase from bee supply companies. That's one reason many use foundation with a smaller cell size today, especially in the broodnest. Small cell size foundation is available from many sources, even including plastic foundation with small cell size. Plus, there's fully drawn plastic combs to make conversion of your bees to smaller cell seize easier. They are called Honey Super Cell (HSC).

There are ongoing discussions regarding the importance of small cell size for fighting the *Varroa* mite, and how small the cell size in the broodnest should be. Some, like Dee Lusby, are convinced cells that are 4.90 mm should not be exceeded. This is for the latitude of southern U.S., since the size of bees and the cell size they construct, like many animals, depends on latitude.

Oh, one thing that is often forgotten when discussing cellsize, is drifting which can be enormous between colonies in the same apiary, but also substantial even between apiaries that are close together. This is a caution when comparing different treatments. A paper, published in 1991 by Walter Boylan-Pett and Roger Hoopingarner in Acta Horticulturae 288, 6th Pollination Symposium, showed that *'The percentage of foragers originating from different colonies within the apiary ranged from 32 to 63 percent'.*

Aliens and Weak Genetics

One thing everyone agrees on is that small cell size alone is not the answer for bees to stay healthy on their own. The theme of this conference focused on the importance of getting rid of alien chemicals, and chemicals in alien concentrations.

Plus, living creatures need good food with all the essential nutrients. Pollen is the best source of protein for bees, and be sure the bees have honey to feed on when a flow is absent. Use as little sugar for feeding as possible, if any.

Of course those bees with genetic characteristics we do not want should be avoided when producing splits, so in some ways we have to be able to recognize those. That doesn't mean that we should only allow the best colonies, and bees, to reproduce. We have to keep as many genetic variations available as possible, to give the bees every possibility to adapt to changing environments. Therefore it's good to let many hives produce their own queens.

In summary, bees are exposed to many different stress factors, and as beekeepers we should minimize these as much as possible, as well as reduce the genetic influences of those bees that are not performing well. You do that by letting the colony raise their own queen. There is an easy, but time consuming way to requeen. You can accomplish this by killing the queen and let the bees make a new one. Of course the success of such a method is dependant on the quality of the drones that fly in the area.

Michael Palmer gave very valuable tips for commercial beekeeping in the north. Here he is showing his nuc on which he is trying small supers to let them develop into stronger units before Winter. Each full depth box at the bottom is divided in two nucs holding four frames each. He has wintered one such box on top of a big colony. Now he is trying another technique for managing the nucs. Erik Osterlund photo

Speakers and Topics

Neither all of the speakers or all of the participants in the conference have totally stopped using treatments. But they are all focused on getting there and helping others in doing so. The topics varied from hands on practical tips for small as well as big operations, to discussions about the interacting microbes in the bee colony and what Africanized bees really are.

After the conference a group of us went on a study trip visiting Kirk Webster and Michael Palmer in Vermont and their commercial operations. They are both dedicated sincere beekeepers that want to share and help the beekeeping industry recover and prosper. BC

Erik Osterlund is a commercial beekeeper and queen producer from Sweden, and Editor of the Swedish Beekeepers Association newsletter.

The "Modern" Beehive

158 Years Old And Still Housing Bees The World Over

James E. Tew

Elemental beekeeping

The fundamentals of modern beehive management are built on: (1) a protective veil, (2) a smoke generator, (3) a pry bar, and (4) a "standard" beehive. Every beekeeper has these four basic pieces of equipment – every single one of them.

Veils

To protect face and eyes from painful stings, a coarse cloth was roughly wrapped around the head of the early beekeeper. Apparently, somewhere in time, someone stitched in piece of black screened wire in the front of the cloth. Though many veil designs exist today, the veil is essentially unchanged since its early evolution. It was only in the early 70s that fiberglass screened wire was used to replace the older metal screening which would seriously rust when it came in contact with beekeeper perspiration.

Smokers

The bee smoker was designed and patented by Moses Quimby in 1875. T.F. Bingham modified Moses' design a bit, but beyond that, the design of the beehive smoker has changed little in 135 years. They are still smelly – even obnoxious – but modern beekeepers continue to look for the best fuel that will generate the best smoke from these time-tested devices.

Pry bar (hive tool)

Who knows what different objects have been used to pry frames from propolis-filled beehives? Screwdrivers and knives are certainly the most commonly improvised hive tools. Today, different designs exist, but after all is said, they are still just pry bars. A scraper device has become our classic hive tool.

The Modern Beehive

Of the four pieces of beekeeping equipment I have mentioned, only the modern beehive captures the very essence of beekeeping. I know, I know, the popular media insists on using the skep as the perpetual symbol for a beehive, but in the U.S., that picture is just plain wrong. The common wooden beehive is the pure image of beekeeping. It is the classic trademark of our industry and historically, we thank L.L. Langstroth for this foundation stone. Future *Bee Culture* authors will address the history and evolution of Langstroth's hive far better than I am able to, so I leave that to them. My interest in this piece is the modern-day use of a device that has been little changed since it was patented 158 years ago. Was Langstroth's idea that good or have subsequent beekeepers just punched themselves out experimenting with new hive designs?

An imperfect relationship

I only speak for myself, but I have an imperfect relationship with our beehive design. On one hand, I love it and my very life is anchored by this simple wooden box. Just a few hours ago, upon returning home from a day trip, I noticed a beehive behind a house that I drive by at least twice a day. Has it been there all this time with foliage masking it? I don't know and the answer is not important here. The point is that *"I was looking."* In fact, on the entire one-hundred mile ride I took, I was looking for unseen bee boxes. My entire family knows to sound a cry when a beehive is spotted. I may not know or even particularly care for the hive owner, but I feel that I know that hive and the bees in it. Anywhere in the world, when I see a beehive, it's like seeing a friend – a familiar face. But here's the oddity – this device that has been used for so long a time has been imperfect for all that time.

Oscar Wilde said, *"When the gods wish to punish us they answer our prayers."* What if I suddenly had access to a radically new hive design – truly new, not just a tweaked adaption of Langstroth's concept? Would that make me happier? I think not. You people are a clever lot. If there was truly a simpler design to be had, someone would have come up with it during the past 158 years. I suspect that a truly new hive design would have to be more technical, more complex, more chemically founded than the simple unit we all use now. As a young man, I loved to tinker

The bees' way and our way. Which is right?

with cars. As an older man, I would not touch today's computer-laced vehicles. Such cars require a *"technician"* to repair them. My beehives are not perfect, but they are "the devils I know" and I want to keep them at my level of ingenuity.

Not perfect for either bees or beekeepers

The oddity is that our beehive design seems to be a truce of sorts between bees and beekeepers. Honey bees *can* live in "modern" hives, but they just as often will live in any suitable empty cavity. Beekeepers and regulatory specialists feel that a *"removable"* frame is needed to keep the colony healthy. Through the years, whether or not we have actually helped the bees is an ongoing debate. I sense that the modern beehive is convenient for beekeepers to use and to manage, but apparently, it is not anything special to the bees. Bees persist in building combs their way. Either they have not read our bee books or there are biological reasons why bees want the contorted, twisted combs they naturally build.

The photo screams something. I don't know what.

Are the bees unable to build straight combs or do they just not want to build straight combs? In the photo, the bees had access to wood frames, plastic frames, and no frames. They were able to do something with all three options. Clearly, bees are resilient. No doubt, that adaptive behavior has helped honey bees essentially colonize the world. Are the bees thriving in my Langstroth hive or do they simply exist in my hive?

In our early bee management years, we tried to manage "gum" yards. It was an early type of U.S. beekeeping, but we could do better. There must still be such yards somewhere in the U.S. today; but I don't know of a single such yard. Been there – done that. They've all been transferred to Langstroth equipment and for good reason.

The plain truth

The "modern" albeit 158 year-old Langstroth-designed hive is too heavy for one person to lift, is built around clumsy dimensions, tends to be top heavy when fully supered, requires wide blemish-free pine boards and without hive-top-rocks, the outer cover will blow off in a storm. But the removable framed hive design allows beekeepers to make splits, hive swarms, equalize colonies, monitor queen activities, share food stores and check for brood diseases. It's not perfect for either beekeepers or bees but no one has been able to improve on the Reverend L. L. Langstroth's concept. It continues to be genius. BC

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The Skinny On HIGH FRUCTOSE CORN SYRUP & HYDROXYMETHYLFURFURAL

Ross Conrad

Blossoming plants are the bee's grocery store, often providing nutritious ingredients for hive healthy meals. When beekeeper's supply meals on wheels for the hive, how is the health of the colony effected? It all depends on what's on the menu.

Sweeter and less expensive than sugar, *High-Fructose Corn Syrup* (HFCS) is responsible for one of the largest changes to the diets of both the average American and the average U.S. European honey bee over the last 40 years. It now accounts for more than half the refined sweeteners used in the U.S. food supply.

Health Issues Related to HFCS

Most of the corn grown in the United States today is genetically modified to produce a toxin to protect it from corn borers and other insects. This pesticide is produced in every cell in every part of the corn plant. As a result this poison also ends up in the final corn-based products that are consumed, including HFCS. Adding to this concern is a corresponding increase in human health issues and degenerative diseases such as weight gain, diabetes, and heart disease that has occurred during the past 40 years and has been linked to the consumption of HFCS by numerous researchers.[1, 2, 3, 4, 5] As if all this wasn't enough, two recent studies found toxic levels of mercury in almost half the samples of HFCS tested, and in about a third of the food products studied which contained corn syrup as an ingredient.[6] The most likely sources of the mercury contamination are mercury-containing hydrochloric acid and caustic soda, both of which may be used in the production of HFCS. All of this does not reflect well on the dietary use of High Fructose Corn Syrup.

Health Issues Related to HMF

Hydroxymethylfurfural (HMF) is a compound that is formed when fructose degrades after being exposed to heat while in the presence of an acid. In general, the warmer the temperature, the greater the production of HMF in HFCS with concentrations really jumping dramatically at temperatures of 120°F (49°C) and higher.[7] HMF is suspected to play a role in human obesity and heart disease. In test tube studies, high levels of HMF has been linked to significant DNA damage in human cells.[8] When HMF breaks down in the human body, it can create substances that are even more harmful than HMF itself.

Industry's Response

A visit to the Corn Refiner's Association (CRA) website waxes poetic about the virtues of HFCS with quotes such as "HFCS is the chemical and nutritional equivalent of table sugar (sucrose). The two substances have the same calories, the same chemical composition, and are metabolized identically."[9] The first part of this statement is basically true given the use of the word "equivalent" which can mean similar, but not the same. Both HFCS and sugar certainly have approximately the same number of calories and both are pure carbohydrate which means that they are both virtually devoid of vitamins and minerals. For this reason alone, such sugars should be avoided since they do not promote robust health. To state that HFCS and table sugar are "metabolized identically" is suspect however, given that sucrose is composed primarily of disaccharides and HFCS is composed of primarily mono saccharides. Such statements rely on reports that ignore the large amount of research and the epidemiological correlation showing that HFCS is metabolized differently than sucrose.

The CRA website even compares high fructose corn syrup to honey with the statement "...the saccharide composition (glucose to fructose ratio) of HFCS is approximately the same as

that of honey, inverted sugar, and the disaccharide sucrose (table sugar)." This statement may be true with regard to honey, depending on the type of corn syrup you are referring to since HFCS is available in three

different formulations. HFCS containing 42 percent fructose is used primarily in processed, packaged and baked goods. Fifty-five percent fructose corn syrup is used by soft drink manufacturers. Finally an extremely sweet, ninety percent HFCS is used in low-calorie "diet" products. Honey on the other hand tends to be composed of a mixture of primarily fructose and glucose. Given that the National Honey Board lists the fructose range of honey as between 30.91- 44.26 percent the comparison of HFCS to honey may be true, but only between certain types of honey and corn syrup containing 42 percent fructose.[10]

The Corn Refiner's Association goes on to attempt to refute all the negative studies and reports on HFCS and hydroxymethylfurfural. They question the quality and accuracy of the studies that point to potential human or honey bee health issues and cite other studies that seem to reach conflicting conclusions with regard to the effects of HFCS. They responded to the mercury contamination issue with misleading statements such as, "Our industry has used mercury-free versions of the two re-agents mentioned ..., hydrochloric acid and caustic soda, for several years", without referring to the fact that not all members of the industry have made the switch to using the mercury-free processing agents. The CRA will also point to Food and Drug Administration and Environmental Protection Agency approval for genetically modified corn as proof that HFCS made from GM corn is safe for human and animal consumption.

Corn processors would like the public to believe that the fructose in HFCS is the same as the fructose found in natural foods like fruit and honey. Most of the fructose found in fruit and honey is in the form of L-fructose or levulose; the fructose in HFCS is D-fructose which has a slightly different chemical structure. Fresh fruits can contain small amounts of D-fructose but "the D-fructose in HFCS has the reversed isomerization and polarity of a refined fructose molecule."[11] As a result, the fructose in HFCS is not used as an energy source by the human body because the body does not recognize the molecule and is not able to convert significant amounts of the fructose into glucose.[12] Instead the highly refined sweetener is converted primarily into triglycerides and body fat. This is supported by recent research that found that obese people who consumed a beverage containing D-fructose at a meal had triglyceride levels about 200 percent higher than those that drank a glucose sweetened beverage with a meal.[13]

What's A Consumer To Do?

All in all, the industry response to the growing concerns over High Fructose Corn Syrup is eerily similar to the tobacco industry's efforts that deceived consumers into believing that cigarettes were safe and in some cases even healthy to smoke. After looking at the evidence it seems that the prudent approach would be to avoid human consumption of HFCS in all its forms. Food products containing corn syrup that are cooked or heated up before being consumed are especially risky due to the increase in HMF formation. As individuals with free will, we can make such choices for ourselves. Unfortunately, the honey bees in our care do not get to make an informed choice when we feed HFCS to them.

What's A Beekeeper To Do?

The toxic effects of HFCS have the potential to harm bees as well as humans. Not only does corn syrup contain two types of sugar that are mildly toxic to honey bees; stachyose and farrinose,[14] but high levels of HMF have been shown to cause ulceration of the honey bee gut leading to dysentery issues and premature death.

The best food to feed a honey bee is unheated honey. Since both fructose and acids are naturally present in honey, the production of HMF is always taking place in honey and accelerates when honey is heated. As a result the level of hydroxymethylfurfural in honey is sometimes used as a gauge to determine how old a sample of honey is and whether it has been exposed to heat either during processing or while in storage. The international tolerance for HMF in honey is 40 mg/kg (or 4 mg/100g) which can be reached after 230 days at 68°F (20°C).[15] The ease of HMF formation in honey depends upon the botanical origins of the honey, with locust, fir-tree, and chestnut honey being among those most resistant to HMF buildup.[16,17] In general, honey heated to around 122°F (50°C) experiences a relatively slow increase in HMF. Honey has a high increase of HMF when heated up to about 144°F (62°C), and honey becomes seriously impaired with excess HMF when exposed to temperatures of 180°F (82°C) and above.[18]

If adequate amounts of unheated honey are not available for feeding bees, syrup made from white cane sugar is the next best thing to use. (see The Honey Bee Diet, May 2009 *Bee Culture* for ideas on how to improve the nutritional content of cane sugar syrup). If you insist on using HFCS to feed your bees, be sure to purchase syrup that is produced using the enzyme hydrolysis process that tends to result in less HMF ending up in the syrup and avoids the opportunity for mercury contamination as opposed to acid hydrolyzed inverted sugars. HFCS purchased as bee feed should be used up ASAP and stored at temperatures well below 120°F (49°C) in order to limit the build-up of HMF that occurs with time and temperature.

Considering the growing evidence that HMF is harmful to health, beekeepers and honey processors that are concerned with maximizing the quality of the honey they produce will modify their operations in order to use as little heat as possible.

Since the heating of honey is standard practice during honey harvesting and processing, this is something that our beekeeping industry should take a long hard look at. When hot, honey thins out it flows easier through pumps and filters during processing. Heating and filtering delays honey's natural crystallization process. Unfortunately, heat also tends to change the color of honey. The flavor of honey is affected by heating, and as we have seen above, heat degrades the quality of honey through the increased formation of hydroxymethylfurfural. Considering the growing evidence that HMF is harmful to robust health, beekeepers and honey processors that are concerned with maximizing the quality of their honey will modify their operations in order to use as little heat as possible.

This also means that when used in the kitchen, it is more desirable to use honey in recipes that call for little or no heating, such as salad dressings, dips, spreads, and toppings. What to do if you are a tea or coffee drinker who likes to sweeten your beverage of choice with honey? Luckily you can continue to do so without worrying about HMF's health effects, since the dilution of the fructose and acids in the honey would prevent the formation of HMF. BC

References:

1. Bray, G.A., et. al., *Consumption of High-Fructose Corn Syrup in Beverages May Play A Role In The Epidemic Of Obesity*, American Journal of Clinical Nutrition, April 2004, Vol. 79, No. 4, 537-543
2. Forshee, R.A., *A Critical Examination of the Evidence Relating High Fructose Corn Syrup and Weight Gain*, Critical Reviews in Food Science and Nutrition, 2007, 47:561-582
3. Hollenbeck, Claire B., *Dietary Fructose Effects on Lipoprotein Metabolism and Risk for Coronary Artery Disease*, American Journal of Clinical Nutrition, 58 (suppl), 1993, 800S-807S
4. Choi, H.K., Curhan, G., *Soft Drinks, Fructose Consumption, and the Risk of Gout in Men: Prospective Cohort Study*, British Medical Journal, February 9, 2008; 336(7639):309-312
5. Stranahan, A.M., et. al., *Diet-induced insulin resistance impairs hippocampal synaptic plasticity and dognition in mid aged rats.* Hippocampus, July 23, 2008.
6. Dufault, R., et al., *Mercury From Chlor-alkalai Plants: Measured Concentrations In Food Product Sugar*, Environmental Health, 2009 8:2 **http://www.ehjournal.net/content/8/1/2**
7. Blaise W. LeBlanc, et. al., *Formation of Hydroxymethylfurfural in Domestic High-Fructose Corn Syrup and Its Toxicity to the Honey Bee* (Apis mellifera), *J. Agric. Food Chem.*, July, 31, (2009), 57 (16), pp 7369-7376
8. Durling, L.J., Busk, L., Hellman, B.E., *Evaluation of the DNA damaging effect of the heat-induced food toxicant 5-hydroxymethylfurfural (HMF) in various cell lines with different activities of sulfotransferases*, Food Chem Toxicology, January 20, 2009 **http://www.ncbi.nlm.nih.gov/pubmed/19709598**
9. Corn Refiner's Association: **www.sweetsurprise.com**
10. National Honey Board: **http://www.honey.com/downloads/carb.pdf**
11. Los Altos Health Research Clinic Study conducted by Dr. Gene Spiller. Polarimetry Saccharimetry and the Sugars, Circular C440, US National Bureau Of Standards, by Frederick J. Bates & Assoc., May 1, 1942, taken from Fallon Morell, S., Nagel, R.,Worse Than We Thought, The Lowdown on High Fructose Corn Syrup and Agave "Nectar" Wise Traditions, Spring 2009, pg. 52, Published by the Weston A. Price Foundation.
12. The Metabolic Basis Of Inherited Disease, McGraw Hill, ISBN 0-07-060726-5, Editors Richard S. Lauffer, Ellen Warren & Donna McIvor, Chapter 5, The Metabolism Of Fructose, and Chapter 12, Some Specific Pathways Of Metabolism Of Carbohydrates And Lipids, taken from Fallon Morell, S., Nagel, R.,Worse Than We Thought, The Lowdown on High Fructose Corn Syrup and Agave "Nectar" Wise Traditions, Spring 2009, pg. 52, Published by the Weston A. Price Foundation.
13. Teff, K.L., et. al., Endocrine and metabolic effects of consuming fructose- and glucose-sweetened beverages with meals in obese men and women: influence of insulin resistance on plasma triglyceride responses, Journal of Clinical Endocrinology and Metabolism, doi:10.1210/jc.2008-2192, taken from Fallon Morell, S., Nagel, R.,Worse Than We Thought, The Lowdown on High Fructose Corn Syrup and Agave "Nectar" Wise Traditions, Spring 2009, pg. 52, Published by the Weston A. Price Foundation.
14. Bob Harrison, "Weslaco Bee Lab and Current Research," *American Bee Journal*, 147 (4): 323-326
15. Juarez-Salomo, A., Valle-Vega, P., Hydroxymethylfuraldehyde thermogeneration as honey quality parameter, Tecnologia-de-Alimentos; 30(6) 13-17, 17 ref. NU: ISSN: 0564-6758 accessed on line at **http://www.airborne.co.nz/HMFref.html**
16. Thrasyvoulou, A., Heating Times For Greek Honey's, Melissokomiki-Epitheorisi, 1997, 11:2, 79-80, Bj. 1997 accessed on line at **http://www.airborne.co.nz/HMFref.html**
17. Kubis, I, Ingr, I, Effects Inducing Changes In Hydroxymethylfurfural Content In Honey, Czec. Journal of Animal Science, 43 (8), 379-383, 11 ref. NU: ISSN: 0044-4847 accessed on line at **http://www.airborne.co.nz/HMFref.html**
18. Ibid

AN AMERICAN BEEKEEPER IN LONDON

To be a judge at THIS honey show you have to have won 75 prizes and entered in 10 categories, be a good beekeeper, get a certificate, keep good records, help set up shows, know the rules, know about honey, mead, wax, bakery goods, and have been a judge in at least five shows. Good Luck.

Jennifer Berry

The National Honey Show, which is held in England each October, is by far the world's most prestigious honey show. To have one of your entries even place is a major accomplishment, and an honor. Established in 1922, the first "National Show of Bees and Honey" was held in the original Crystal Palace in London the following year. Since then it has been held annually (except during WWII) to award those who pay the upmost attention to detail and quality when it comes to honey bee products.

There are 96 classes that you can enter. There are the traditional classes like extracted light, medium, and dark honey (unlike U.S. color classes, here there are only three colors). There are classes for candles and wax blocks, mead, melomel and honey beer. Artistic classes include encaustic art, photos, videos, needlecrafts, essays or honey labels. For chefs, there are classes for honey cakes, biscuits, cookies, fruit loafs and sweets. They have a junior class for those under 16 who wish to start competing early. There's even a class for new inventions. But the most distinguished class of them all is Class Number One – 24 jars of honey. That's right, 24 jars of honey all displayed as a single display. You can have one, two, three or four kinds of honey but they must all be in the same sized and shaped jars and filled exactly alike. The prize for this class is the Hamlin Cup, a "Silver Medal" and 50 Sterling Pounds. Rather than ribbons to adorn your first class honey the English award these lavish silver engraved cups and plaques.

The judging and display room.

This past October I was honored by being asked to speak at the National Honey Show. The 2009 show was held at St. George's College in Weybridge, a small town in the district of Surrey, which is a commuter suburb of London. I had not been to England before, so from my arrival at Heathrow airport every step was a new adventure. The only problem was getting there. Unfortunately, I had to fly.

Flying ranks up there with other fun and exciting experiences like root canals (*Is it safe?*), being buried alive or hunted down and then slowly devoured by a pack of wild dogs. That's of course when there's no turbulence. Add moderate to severe turbulence for seven hours, 56 minutes and 12 seconds in a torture tube and pretty much all the above "experiences" would be welcomed.

To top things off the flight left Atlanta at 11:00 p.m. arriving in Heathrow the next day at noon, hence an overnight flight. Since there was no way I was ever going to sleep a wink you could say I was a bit groggy when the death tank FINALLY pulled up to the gate. After exiting the plane I followed the masses, turning down this hall and that corridor until finally we came to immigration. I kept imagining long lines of anxious travelers waiting for the next security guard to sternly call them over to the interrogation table. You know the scene; baggage being tossed about and riffled through, questions asked about this item or that, pointing fingers, pieces of clothing tossed into the air, accusing stares, large intimidating dogs running to and fro. Then all of a sudden just behind you there's a skirmish as the un-expectant traveler is pushed to the ground by several dogs, guards rush in from all directions, nightsticks are pulled, a pile of blue polyester and then finally a roughed up, wide-eyed, handcuffed person is hauled away. Everyone in line looks down, not wanting to make eye contact with this poor soul as he's dragged into a nearby room. For a few minutes you hear him plead with the officers that he didn't know bringing *Bee Culture* into the UK was against the law, and then, silence.

But instead I walked right up to a booth where the immigration officer smiled, took my passport, asked in that oh so brilliant English accent the purpose of my visit, and then bang, bang, bang with the stamp, my

A sample of the jars to be judged.

document is returned and off I went to experience the antiquity of England.

As mentioned, the National Honey Show is by far the show of all honey shows. Beekeepers from all over the UK and the world bring their honey bee products to be judged by the best and to compete against the best. While attending the show I realized becoming a British Beekeepers Association (BBKA) honey judge is no small feat. It takes years of hard work and dedication to accomplish this task.

Just to be considered entry into the BBKA Show Judge Assessment Program the candidate must hold a BBKA basic certificate, have been awarded at least 30 prizes (1st, 2nd, or 3rd) from honey shows at a county or national level or where there's been at least 100 entries, and have participated as Steward for a minimum of six BBKA Senior Show Judges. The basic certificate has an oral and practical portion to the exam. Reading over the syllabus you have to have in depth knowledge about how to manipulate a colony, the names and functions of different pieces of equipment, a broad knowledge of natural history and general beekeeping, and be able to describe symptoms of disease, poisoning and pests. Remember this is just to be considered a candidate of entry. Now comes the difficult part.

After you have met the above criteria you have five years to complete the following requirements. First, candidates applying for judge assessment must pass a) the honey bee management, and b) products and foraging examinations, **or,** the general husbandry certificate. To achieve the Honey Bee Management Certificate candidates must give detailed accounts on 32 different aspects of honey bee management. Here are a few examples taken directly from the BBKA website . . .

These are made of beeswax.

Candidates must give detailed accounts of:	
1.2	the principles which govern the design of hives and frames, including the concept of bee space, and the main features of their construction
1.12	the year's work in the apiary and how this is dependent upon the annual colony cycle and the timing of local bee forage;
1.18	methods of swarm control used in small-scale beekeeping enterprises;
1.23	robbing by honey bees and wasps and the associated dangers, including prevention and curtailment;
1.31	laying workers and drone laying queens and the conditions leading to their development;

For the section on products and foraging, here are a few examples from the 28 different requirements needed to achieve the certificate . . .

Candidates must give detailed accounts of:	
2.1	the main requirements of the current United Kingdom statutory regulations affecting the handling, preparation for sale, hygiene, composition, labeling and weight of packs of honey;
2.26	an account of the factors affecting nectar secretion and the variations in the composition of nectar in different plant species and differing weather conditions;
2.28	an account of how the worker honey bees process nectar to change it into honey, including the enzymes and chemistry involved (to include a chemical equation).;

If you think that's difficult, looking over the requirements for the General Husbandry Certificate is even more imposing. First, the candidate must have been keeping bees for a minimum of three years and still have an active apiary with the following: three honey production colonies with bees and one nucleus colony with bees, plus sufficient spare equipment for feeding, queen introduction and swarm collection, to name a few. In addition they must have honey and wax processing equipment, plus samples of their honey (6 jars minimum) and wax (25g minimum), which are suitable for sale. They are also observed working colonies to assess their beekeeping skills.

Records of beekeeping activities must be maintained. An apiary layout, plans for work in the apiary and records of the season (i.e., quantity of honey collected during the season) must all be kept. There is also a separate record book which contains information about the condition of each colony every time there was an inspection (i.e., existence of a queen, temperament, brood size, disease, feeding details, swarming, etc). After the above requirements are met there are seven separate sections that they must be able to demonstrate an understanding about:general information about keeping bees, practical beekeeping, natural History and behavior, foraging, disease, pests and poisoning, honey and honey processing and stings.

In addition to the certifications, there are **99** other criteria that need to be satisfied. I can't review them all, but here are some you'll need to consider.

If you want to be a BBKA honey judge you must have been awarded at least 75 prizes of third place or higher in a variety of different classes at a county, or national honey show, **or,** a honey show where there are at least 100 entries. That's 75 1st, 2nd, or 3rd place ribbons. Plus, you must have entered in *at least* 10 different categories.

Next you must be a steward for at least four different BBKA show judges at four different locations. And the honey show must have had at least 100 entries.

If you want to be a BBKA honey judge you also need to have other relevant experience such as helping set up shows or accepting entries. You must also have an understanding of honey show procedures, record keeping, schedules, rules, and legal requirements.

If you want to be a BBKA honey judge you need to know everything there is to know about the different types of honey (liquid, granulated, soft set, Heather, and composite classes), comb, cut comb and section honey. You need to know about the different meads and what is and is not suitable.

You need to know about wax, candles and artistic displays. You need to know about observation hives and nucleus colonies. And don't forget about honey cakes and sweetmeats (a sweet delicacy). You must know about slides, photographs and how to judge them properly.

Then, finally, the candidate must have judged a minimum of at least five separate shows, where five categories were judged per show. After all this hard work and dedication you have finally become a BBKA honey judge. Congratulations!

Back on this side of the pond our honey judges don't go through such a rigorous program but times are changing. In 2001, Michael Young from Ireland was the guest lecturer for our Young Harris/UGA Bee Institute. Michael is a National Honey Judge, a culinary master and professor at Belfast Metropolitan College, artist and executive chef for the Malone Golf Club in Hillsboro, Ireland. From the moment he stepped onto our shores, Michael raised the standard for honey judging and honey shows in the U.S. Because of his influence there has been a new found interest in honey judging and shows, so the Young Harris/UGA Bee Institute has a honey judging certificate program which is modeled after the Welsh Beekeeper's Association honey judging certificate. This certificate is the only partnership of its kind between the U.S. and the U.K. If you get the chance, check out the rules and guidelines used in the U.K. You will most likely learn something about bees, beekeeping, and honey. Cindy Hodges from Atlanta, Georgia entered this year, for the very first time mind you, and placed second in Photography, and third in the International Honey Class. Congratulations Cindy!

But now, let me turn your attention to the south and the problems beekeepers may be facing. Due to the wet, cool, rainy Spring and the wet, warm Summer, oh, and the wet, cool Fall, it seems many colonies did not find enough food to make it through the Winter. You MUST inspect your colonies this month. When the temperature allows (upper 50s, lower 60s and that's not uncommon) get into your colonies and check food levels. It's January and if you don't have 30 pounds of honey next to or above the bees then you MUST feed. This time of year still use a 2:1 sugar:water solution, especially if you are trying to get some weight on your girls. That's two parts sugar to one part water. It takes boiling water to achieve this mixture. If the weather is too cold to open the colony lift the back of the colony off the ground. If it feels light to you then feed. Remember during colder temperatures it is difficult for the bees to leave the cluster, hence entrance feeders and division board feeders won't work. Buckets, or jars above the cluster are best. A few dollars investment in sugar now is far better than to lose the colony. And if you give them that little extra they need your bees can produce award winning honey this Spring. See ya at the honey shows!

The next National Honey Show will be October 28-30, 2010 in the same location. For more information check **www.honeyshow.co.uk.** BC

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BUZZ OUTSIDE THE BOX!

Ann Harman

Plan out a year's meetings – be timely, entertaining and informative.

Beekeeper meetings sometimes fall into a pattern, attendance drops, maybe even membership drops. Watch out! The East Cupcake Beekeepers Association is sliding towards oblivion. In several past articles we've reviewed a number of ways meetings can become useful, exciting and interesting. Here are some more ideas to keep both newbees and experienced beekeepers interested. You will undoubtedly think of other ideas.

Suppose you are in an area of the country that has really poor winter weather but your meeting schedule lists meetings in January and February. Attendance is almost nil. Many members said they did not care to drive at night in bad weather. Well, I can't blame them. Have you asked your members whether they would like to meet on a Saturday or Sunday afternoon for the bad winter weather months? Go ahead and ask them. Yes, you might have a problem with your usual meeting venue, but even that can be solved.

Quick! How many bees?

You have found that your beekeepers want how-to-do-it at their regular meetings. Yes, local association meetings are the very best place for discussing the hows, whens, whys of keeping those colonies healthy and strong. State and regional meetings are few and far between. Furthermore state and regional associations generally tend to select nationally-known speakers. These presentations are valuable because they bring new information to the beekeepers.

Everyone in the East Cupcake Beekeepers Association should try to attend the state meetings whenever possible. Information found there could be the nucleus of a meeting program. Suppose a researcher described new information about small hive beetle control. Is there a beekeeper or two in your group who would like to give members of your association some information about their experiences, good and bad, and answer questions? Small hive beetle control is a suitable topic for almost any season of the year. Don't ignore the newbees who may not know what to look for.

In planning your meetings it is so important to make the topics both timely and suitable for your area. It does no good to read in a good beekeeping book when swarms are likely to emerge. When is *your* swarm season? Feeding colonies, plants blooming and weather are all tied together. Your meeting topics need to fit not only your area but also current conditions. Local association meetings can increase awareness of colony care.

Plan out a year's worth of meetings and try to have timely topics for each. Then decide on the format for each. Sometimes a panel works very well. Or have two speakers, even if their views are different. Is there a biology teacher who would like to come and give a presentation on pollination or bee anatomy? How about an extension agent or an agronomist who could explain how certain plants like certain types of soil?

Take advantage of your surroundings, both inside and outside. Is there a wildflower meadow nearby? A botanical garden or a park or a forest? Hold your meeting there. Or you could substitute a day's field trip. Have the beekeepers pack their own picnic lunch to keep expenses down. Then rent a coach for the day. With a bus full of people the cost per person will be reasonable. Encourage the beekeepers to obtain tree and wildflower identification guides. Find out what the flowers and trees look like. You can identify trees when in leaf during the summer. Learn the shape and bark. Now do a return forest walk when all the leaves are off and see who can identify the trees then. By the way, you are looking for trees that provide pollen and/or nectar. The reprint of Lovell's book on honey plants (available from the Root Co.) needs a field guide to accompany it for identification.

Many small-scale beekeepers live in an urban or suburban area. Here's a good topic for a meeting – how do they do it? Are there problems with neighbors? Shortages of

forage? Vandals? What if you live in an area of advancing Africanized bees. I am certain that you have had programs about the problem but just be certain that everyone has had their questions answered. A repeat program on the subject may be necessary after a few months. Let your membership be your guide.

Perhaps one of your beekeepers has a completely different sort of beeyard, perhaps on a rooftop. Although a visit to such a beeyard might be difficult, perhaps the beekeeper can take photos and give an illustrated talk about a different beeyard. Photographs of a swarm capture can also make a good illustrated talk. Digital cameras make such photo presentations easy.

Beekeepers tend to think beekeeping is all their family does. Did it ever occur to anyone that family members might have hobbies such as painting, sculpture, knitting, pottery, wood carving, or other crafts that have nothing whatever to do with bees? Plan a craft jamboree and invite all to display – and even sell – their crafts. This craft fair could take the place of a Winter meeting or be a substitute for a meeting. With a bit of local advertising this craft fair could be open to the public but you do want your local association to have a bit of publicity.

If you cannot find someone to give an illustrated presentation or demonstration on bee anatomy just ask everyone to bring a magnifying glass or suitable microscope if they have one and a dead bee – worker, queen or drone. If someone is willing, a bee with pollen in her pollen basket would be nice. Looking at the various parts of the bee is a good review for experienced beekeepers and a good introduction for the newbees. Having an assortment of bees is nice also – Italian, Russian, a dark bee, a red-eyed drone, a bee with damaged wings. See if someone can find the Nasonov gland.

Here's a sneaky way to get some free labor. If someone has some hive bodies to put together, bring them to a meeting and have a race to see who can assemble – correctly! – a hive body the fastest. Just ask everyone to bring his or her own favorite hammer. And have some sort of prize for the winner.

Prizes for bee games can be anything – a book, a plate of honey cookies, a hive tool. Perhaps you can get donations from an equipment supplier if you tell them what you are doing to encourage membership and meeting attendance. You can make a "medal" for your winners. Bee cookie cutters are available. Make some bee cookies, put the number 1 with a bit of icing for the first place, two for second and three for 3rd. Wrap the cookie in some plastic to protect it. Tie a ribbon long enough to go around the winner's neck on the wrapper and now you have a bee-Olympic medal.

You can have all sorts of bee games to liven up a meeting or a field day. This game is good for an ordinary meeting. Take an inner cover (that's one of the secrets of this game) and put anywhere from 10 to 20 small beekeeping items on it. Items such as hive tool, a few eyelets, spur embedder, spool of wire, etc. Cover this so the items cannot be seen until the game starts. Explain that everyone will have just a short time to view the items. The length of time would depend on how many items you have on the inner cover. For example if you have just ten items, perhaps everyone can view them for 10 seconds. Cover again. Everyone has a pencil and paper. Whoever can write down the most items wins. Oh yes – the sneaky bit is that the inner cover itself is an item! You could have a special prize for the person who lists it. Very few do.

Games for field days can be fun. You can have quite a variety of games with an open hive. Just be absolutely certain that everyone is wearing a veil and their choice of protective clothing. Make it very clear that no veil means no entry to the beeyard.

One game with an open hive could be called a Quick Quiz. Actually this could be done with two separate hives – one for experienced beekeepers and one for newbees. The questions for newbees can be more simple than for the experienced ones. Or this can become a teaching experience by having a mixed group of experienced and newbees at one hive. Basically you design the Quick Quiz. Pull up a frame – your choice whether from a honey super or brood chamber. Answers can be from anyone or one person after another in order as they are standing around the hive. Questions can be: how many colors of pollen do you see, is there enough honey/pollen, is this a good queen and why, is this a strong colony, do you see any *Varroa*, is this hive ready for a honey super (depending on time of year), what's that (pointing out a queen cup, small hive beetle prison, etc.), who is the first to see the queen, who can catch a drone? The questions will depend on the season. The chosen hive can have a strong colony or a weak colony. You can decide not to have winners but give everyone who participates a bee cookie. Be flexible but have fun.

One game is how many bees can you catch in a jar in a given time – perhaps in one minute. The hive is closed and the bees must be caught at the entrance. The jars can be any sort – jelly jars, baby food jars, but the jars have to have lids. There is a secret to winning this but I won't tell.

I have seen this Catch-a-Bee done as a paired race. Two beekeepers will alternate catching bees at one hive using one jar. Generally more bees are lost than remain in the jar.

So often when members are asked for suggestions, everyone just sits there silent. However, all of them are probably hoping you will think of something. So go ahead and tell them what and where and why the next meeting will be different and send out an exciting-meeting notice. I do hope your association continues to grow. BC

Ann Harman is still planning meetings and waiting for Spring from her home in Flint Hill, Virginia.

Evergreen Perennials For The Bee Garden

Connie Krochmal

Some plants that are good nectar and pollen sources stay green all Winter.

Bergenia (Bergenia spp.)

While some perennials die back during the Winter, others are evergreen or semi-evergreen. A number of these are good nectar and pollen plants for bees. These include the following.

BERGENIA (*Bergenia spp.*)

Also known as pigsqueak, bergenias are members of the saxifrage family. They're generally native to Asia. Arising from thick roots, these plants can spread to form large clumps.

These species have very shiny, leathery, heavily veined foliage. This is thick and fleshy. Cold weather can intensify the color of the leaves.

The purplish-rose to white blossoms have five petals. They open on thick, fleshy flower stalks, which are often purple or rose-colored. These Spring flowers, an inch wide, open in broad, flattened clusters.

Preferring moist conditions, bergenias thrive in poor soils. Provided that the soil is kept moist, they can tolerate full sun, especially in the North. Otherwise, partial shade is recommended. Bergenias can be propagated by division and seed.

A number of fine cultivars and hybrids are available. Several species are also in cultivation, including the following.

Heartleaf bergenia (*Bergenia cordifolia*)

Recommended for zones three through eight, this stout species is native to Siberia. It can reach 1½ feet in height. This is noted for its large, thick, glossy leaves. Coarse and fleshy, these are up to a foot in length and eight inches wide. The edges are wavy. Overall, they have a rounded shape, tapering to a heart-shaped base.

The flowers open all along the length of the short flower spikes during the Spring. The spikes rise just above the foliage. Mostly pink to rose, the blossoms can be purple and white in some varieties.

Leather bergenia (*Bergenia crassifolia*)

This is also known as Siberian tea. Thriving in zones three through eight, it is native to Siberia. This reaches 1½ feet in height. The leaves, which are broadly egg-shaped, are larger than those of heartleaf bergenia. The flowers stalks are taller than the foliage. Its blossoms are purple or pinkish-red.

Strachey bergenia (*Bergenia stracheyi)*

Native to the Himalayas, this is suited to zones four through eight. The slightly hairy leaves can be eight inches across. This species is easy to identify. Its foliage lacks the characteristic wavy edges of the other bergenias. The sweetly scented blossoms are pink.

All of the bergenia blossoms provide bees with pollen during the Spring just when they need it most.

CANDYTUFT (*Iberis spp.*)

Native to the Mediterranean, these belong to the Mustard family. They have alternate, narrow, linear foliage that can give off a faint mustard-like odor. The Spring-flowering blossoms form flat umbels or rounded clusters. Usually fragrant, these flowers come in an array of colors. These include purple, red, pink, and white. With four small petals, the blossoms are ½ inch wide.

Adapted to most soil types, perennial candytufts are often used in rock gardens and for edging. If the soil isn't kept moist enough, they can fail to bloom. The following evergreen perennial species are recommended.

Gibraltar candytuft (*Iberis gibraltarica*)

This species is recommended for zones seven through nine. It can be almost a foot in height. The toothed foliage, which forms rosettes, is up to two inches long. The white flowers sport a touch of pinkish-lilac or purple. The blossoms open in mid-May in flat-topped clusters. This is native to Morocco and Spain.

Evergreen candytuft (*Iberis sempervirens*)

Around a foot in height, this spreading evergreen is best suited for zones five through nine. This is the most commonly grown species. Many consider it to be the most reliable of the perennial candytufts. Several varieties are available. The oblong, deep green, narrow foliage is up to 1½ inches in length. The white blooms, which are long lasting, open in late May and early June in umbels or long clusters, two inches across. Sometimes, these flowers have a lilac blush. This species is native to Asia and Europe.

Rock candytuft (*Iberis saxatilis*)

Also called perennial candytuft,

Candytuft (Iberis spp.)

this is suited to zones two through seven. This reaches about six inches in height. The very short, twisted stems can become woody. This species can be covered with tiny hairs. Rock candytuft has small, fleshy, narrow, rounded leaves packed tightly together. The foliage can be ¾ of an inch in length. In April and May the very small white blossoms appear in clusters at the tips of the stems. This species is native to southern Europe.

Candytuft blossoms of all sorts bring nectar and pollen for bees.

LAMB'S-EARS (*Stachys byzantina*)

Hardy to zone four, this is a member of the mint family. A popular perennial, it is around 1½ feet in height. Mostly stemless, lamb's ear is best known for its soft, white, woolly foliage that is semi-evergreen to evergreen in most areas of the country. The leaves, which are opposite, can be eight inches in length. These are roughly shaped like a lamb's ear. There is a cultivar with silver leaves.

The blossoms, which can be an inch in diameter, can be purple or pink. They open in whorls on tall flower stalks. Native to the Caucasus, this is easily propagated by seed and division. It can self-sow. Lamb's-ears need full sun in a well drained spot. It is very tolerant of dry soils.

Lamb's ears blossoms are a good source of nectar and pollen.

PHLOX (*Phlox spp.*)

Members of the phlox family, there are both annual and perennial species. While many are native to North America, others are from Asia. Some of them are evergreen or semi-evergreen. The leaves are lance-like.

The showy blossoms open in terminal clusters. These have five united petals that form the corolla.

Phlox can tolerate both full sun and partial shade. Though they thrive in a rich, moist soil, these plants generally aren't very fussy. These are propagated by seed, root division, and cuttings.

Periwinkle phlox (*Phlox adsurgens*)

Hardy in zones four through eight, periwinkle phlox has trailing stems that are a foot in length. This plant is native to the Northwest. Semi-evergreen to evergreen, it features deep green oval leaves that are 1¼ inches long. The blossoms open from mid-Spring through early Summer on erect stems. These form one-inch-wide heads on the previous year's growth. They're salmon-pink or white. This evergreen needs a moist spot in partial shade. It prefers an acidic pH.

Phlox (Phlox spp.)

Moss-pink, ground-pink (*Phlox subulata*)

This has other common names, including creeping phlox, moss phlox, and flowering moss. It is suited to zones three through eight. This species is often used in rock gardens. In some regions, this is fully evergreen, while in others it is semi-evergreen.

Moss-pink is about six inches in height. This creeping species is shaped like a mat. The prostrate, dense, woody stems are covered with stiff, linear, needle-like foliage, up to ½ inch in length.

This species has blooms that open on short flower stalks. The blossoms can be white, pink, lilac, or purple. Up to an inch wide, they have five spreading lobes. This blooms late Spring through early Summer.

Lots of varieties of moss-pink are available. It is native to some areas of the East from North Carolina to New York. This species thrives in most soils provided it is well drained.

All of the phlox species provide pollen for bees.

PINKS (*Dianthus spp.*)

Many perennial species of pinks are evergreen. These small plants feature grass-like, narrow, opposite foliage. The sweetly scented blossoms are up to an inch across. Usually white, rose, or pink, these open terminally. They can be solitary or in dense clusters.

The pinks grow in average soil so long as it is well drained. Most prefer a slightly alkaline pH. In cold climates, these evergreens usually benefit from a covering of evergreen boughs. These are propagated by cuttings, division, and layering.

Pinks (Dianthus spp.)

Cheddar pink (*Dianthus gratianopolitanus*)

This low growing species is four inches in height. It is hardy in zones four through eight. This is a very dense, low growing plant. Cheddar pink forms a mat or carpet. The leaves are tufted.

Opening singly, the scented blooms are one inch or less wide. They're dark pink or rose with ruffled edges. These appear in early Summer on blue-green flower stalks, up to nine inches tall. This species is often used in rock gardens. It is native to southern Europe and England.

Glacier pink (*Dianthus pavonicus*)

About two inches in height, this plant is hardy in zones three through eight. The greenish-gray foliage forms a round cushion. The flowers are pink or red. These open on six-inch-tall stems. This species is native to southern Europe. It adapts well to different pH levels.

Rock pink *(Dianthus petraeus)*

Native to Eastern Europe, this is less than a foot in height. This tufted,

Mountainmist (Dianthus spp.)

mat-like species is recommended for zones four through eight. The stems can be forked. The green leaves, ¾ of an inch long, form dense tufts. These are narrow and needlelike. The fragrant flowers, up to ¾ inch across, open in bunches or clusters of one to 10. With fringed petals, they appear on six-inch-tall stems. These blossoms emerge during the Summer.

Blossoms of all the pinks provide nectar for bees.

THREEFORK SAXIFRAGE (*Saxifraga trifurcata*)

While many saxifrages are semi-evergreen, threefork saxifrage is evergreen. Hardy to zone six, this reaches eight inches in height. It is native to the Pyrenees. It forms a mat.

This plant is named for the three pronged foliage that is shaped like a stag horn. The shiny, green foliage is erect and stiff. In the Spring, the creamy white blooms emerge. These are ¾ of an inch across.

Saxifrage means rock-breaker. These plants like a rocky or gritty soil that is rich in limestone. Choose a well drained spot as constantly wet conditions can kill the plants. They prefer partial shade. Various methods can be used to propagate the plants. In addition to division, these can be grown from runners, rootstock, bulblets, and seed.

Bees collect nectar and pollen from saxifrage blossoms.

THRIFT (*Armeria spp.*)

Members of the plumbago family, these are also known as sea pink. There are three species of thrift that are widely cultivated. Two are quite hardy. These low growing, tufted plants are often seen in rock gardens. They're shaped like mats or cushions.

The small foliage forms basal rosettes. The flower stalks are stiff and rigid. The long lasting blossoms open in rounded, dense, fluffy heads.

Easy to grow, these plants prefer full sun. Needing good drainage, they're intolerant of wet soils. A light sandy soil is considered ideal. These are propagated by division. The following species are recommended.

Juniper thrift (*Armeria juniperifolia*)

Hardy to zone three, this densely tufted species is two to four inches in height. It is shaped like a round cushion. Native to Spain, this has short, linear foliage, up to ½ inch long. The blossoms, which open in late Spring, are white, lilac, or pink. These small flower heads, mostly stalkless, are ½ inch across.

Thrift (Armeria spp.)

Common thrift (*Armeria maritima*)

Also called sea thrift, this low growing perennial is recommended for zones three through nine. It tolerates salt spray. Six to twelve inches in height, it is native to cold regions of the globe.

This species has very narrow, linear leaves, five to six inches long. Resembling grass, the foliage forms a basal rosette. The blossoms open in round heads. They can be purplish-red, pink, purple, or white. Up to ¾ inch across, these open on stalks that can reach a foot in height. Flowering occurs from late Spring into early Summer.

Pinkball thrift (*Armeria pseudoarmeria*)

Slightly less hardy than the other species, pinkball thrift is best suited to zones six and higher. The stout plants are 1½ to two feet tall. The large leaves, about a foot long, are only an inch wide. The fluffy blossoms open from early to mid-Summer. These are white and pastel pink. The flower heads are 1½ to two inches across. This species is native to southwestern Europe. It should be divided in September.

Bees collect nectar and pollen from thrift blossoms of all sorts.

Connie Krochmal is an award winning garden writer and a beekeeper in Black Mountain, South Carolina.

GLEANINGS

JANUARY, 2010 • ALL THE NEWS THAT FITS

BRUSHY MOUNTAIN NAMED BUSINESS NORTH CAROLINA'S SMALL BUSINESS OF THE YEAR

Steve Forrest and his wife, Sandy, have been so successful at their business this year that their Brushy Mountain Bee Farm Inc. Moravian Falls operation is up 24% from last year.

That kind of performance has propelled the company, which makes and sells beekeeping equipment and supplies, ***Business North Carolina's*** 2009 Small Business of the Year. More than 24,000 customers have shopped there in person and by mail and online the last two years. It has increased sales every year but one since it opened in 1977, and the company's only major hiccup in that time was a surge in orders a couple of years ago that nearly gave it more business than it could handle.

Steve and Sandy Forrest

Judging the competition, sponsored by Winston-Salem-based BB&T Corp., were Gail McDonald, N.C. Department of Commerce small-business ombudsman; Peter Mitchell, whose Stoneville-based TigerTek Inc. won last year; and Ben Kinney, the magazine's publisher.

Congratulations to everybody at Brushy Mountain.

Business North Carolina is a Charlotte-based monthly magazine that focuses on people, events and trends that shape business in NC. Since it began publication in 1981, it has won more than 90 national awards for its writing, reporting, and design.

JOHN GRUSZKA RETIRES

After more than 30 years as Provincial Apiculturist for Saskatchewan, John Gruxzka has retired. Over the years John has maintained a high level of professionalism and dedication that earned him the CHC's Fred Rathje award in 2000 for his contribution to the Canadian Beekeeping industry. He is a legend in the industry for supporting Saskatchewan's policy of healthy bees and has been a fundamental player in negotiating moves towards better breeding and less reliance on imports. His support for superior honey bee stocks has provided encouragement for Saskatchewan beekeepers to engage in breeding Russian bees and the successful SBA Saskatraz project.

As a dedicated CUSO volunteer in the 1970s he spent time in Tanzania, and his daughter was born in Moshi on the slops of Mount Kilimanjaro. After CUSO he returned to Saskatchewan to take the position of Provincial Apiculturist.

IBRA CHANGES GUARD

After almost 14 years "in charge" Richard Jones is stepping down as Director of the International Bee Research Association.

October 1 Sarah Jones became the Executive Director of IBRA. Since joining in 2005 she has produced a digital catalog of the material in the historical collection, taken care of inventories and overseen the transfer of the Eva Crane Library to the national Library of Wales, plus, the web site development and initiatives with new publications and products for the shop are all her work and so she is well placed to take on the full time and demanding role of Executive Director.

On October 1 Norman Carreck began as Scientific Director. He is Senior Editor of the Journal of Apicultural Research and will continue in that role with an additional broader scientific brief. His years at Rothamsted Research Institute and now his position at Sussex University make him well qualified for this important part-time role.

Sarah Jones

Tony Gruba continues as Finance Manager (he was appointed in 1995) and membership and subscription coordinator, as well as technical production wizard behind most of IBRA's in-house printing and web developments.

Jane Jones remains as "the IBRA bookshop lady."

Contact any of the above at **mail@ibra.org.uk**, #44 (0)2920 372409 or visit **www.ibra.org.uk.**

ABF MEETS IN ORLANDO IN 2010

The 2010 North American Beekeeping Conference and Tradeshow will be held in sunny Orlando, Florida, January 12-16, 2010.

The conference will be hosted by the American Beekeeping Federation (ABF), in cooperation with other industry-related organizations, including the Canadian Honey Council (CHC), the Canadian Association of Professional Apiculturists (CAPA), the American Association of Professional Apiculturists (AAPA), the American Bee Research Conference (ABRC) and the Apiary Inspectors of America (AIA).

The conference will kick off on Tuesday evening with a Welcome Reception for all attendees. The General Session will begin on Wednesday morning with a President's Address from both Zac Browning, ABF president, and Corey Bacon, CHC president.

The expanded tradeshow will open Wednesday afternoon with anticipated participation from more than 35 exhibitors.

The Wyndham Orlando Resort is the host of the 2010 conference. The ABF group rate is $119 with a reservation deadline of December 11. Visit **wyndhamorlandoresort.com** or call 800.421.8001 to make your reservation.

Registration rates and online registration are now available on the ABF web site at **abfnet.org**. For conference registration assistance or additional information, contact the ABF at 404.760.2875 or email **info@abfnet.org**.

Display Advertisers

A day or so ago, while waiting for the light to change at a Medina intersection, I heard an AM radio talk show host angrily challenge a caller with, "Name one government program that works. Name just one."

"The Marine Corps," I blurted at the dashboard. Then I added, "The Army, Navy and Air Force are also government programs, you jerk."

"And The National Parks System. That's a G.P. That understaffed bunch looks after 84 million acres of America and the Liberty Bell, too, and does a bang-up job."

Now I'm pointing a stern finger at the radio and building up a head of steam.

"The Food and Drug Administration guarantees that those pork chops you had last night won't kill you and that the prescription antacid you took later will actually do you some good. The FDA makes the pharmaceutical industry prove that their products actually work by putting them through rigorous clinical trials. No one can sell snake oil or claim that sugar pills cure cancer as was once done just about every day not all that long ago."

Now I'm cooking. I'm stabbing my forefinger at the dash. "That reminds me, you tubesock. Where do you think all these wonderful drugs come from? Do you really think drug companies waste their own money on basic research? Think again, Scooter. The National Institutes of Health funds a majority of the basic medical research being conducted at universities and teaching hospitals across our nation. Some junior lab technician is bent over a bench pondering the molecular structure of a cancer cell right now and he's being paid by the government. The pharmaceutical company that will someday sell his discovery is putting its money, the money it got from you, into marketing pills that enhance sexual performance. Now who's wasting your money?

"And then there's the Centers for Disease Control. Those guys go into disease-ridden villages with nothing but a cotton mask and a hypodermic needle. They're medical marines. They're the bureaucrats that narrow-minded AM radio ranters like you are always slandering."

I'm on a roll. "I get clean, safe water delivered right to my kitchen thanks to the EPA and my local water department. Our sanitation department carries away waste every time I crank the handle on my toilet. The miles of sewer which that particular government program maintains has kept communities disease-free for most of the 20th century and has probably saved more lives than all the drug companies put together."

"And you guys are always raggin' on the Postal Service," I said, thumping on the steering wheel. "The P.O. will take a letter from my mailbox and put it in my daughter's mailbox more than 400 miles away in North Carolina for 44 cents. You can't buy a generic grape soda for 44 cents. A private service will charge $7 or more to deliver that same letter. That's a 1,147 percent markup."

I'm shouting. The lady in the car next to me has rolled up her window.

"Talk about waste? You wanna talk about waste? The administrative costs of Medicare and Medicaid are less than three percent of their budget. The average health insurance company spends between 16 percent and 24 percent of its revenues on administration. One out of every four or five bucks you pay for health insurance goes into paper and staples and greens fees for execs. Now tell me again about waste!"

The only time most people meet their government is when they pay taxes or get a speeding ticket. These admittedly unpleasant experiences blind them to the fact that well over 99 percent of the time their government is working well, efficiently, and for the most part, completely unnoticed.

The traffic light winks from red to green. It's been doing that every few minutes every hour every day for months and years. The government put it up there to keep folks from turning their cars into scrap metal at intersections. I'm glad the light is there. I helped pay for it and consider it to be money well spent. It beats getting pancaked by a semi. I smile and wave to the lady next to me, step on the gas and proceed down a long, smooth road. It was built by the government.

Mac Overmyer is a freelance medical writer from Medina, Ohio. His article was originally published in The Medina Post.

Mac Overmyer

Stop Knocking The Government