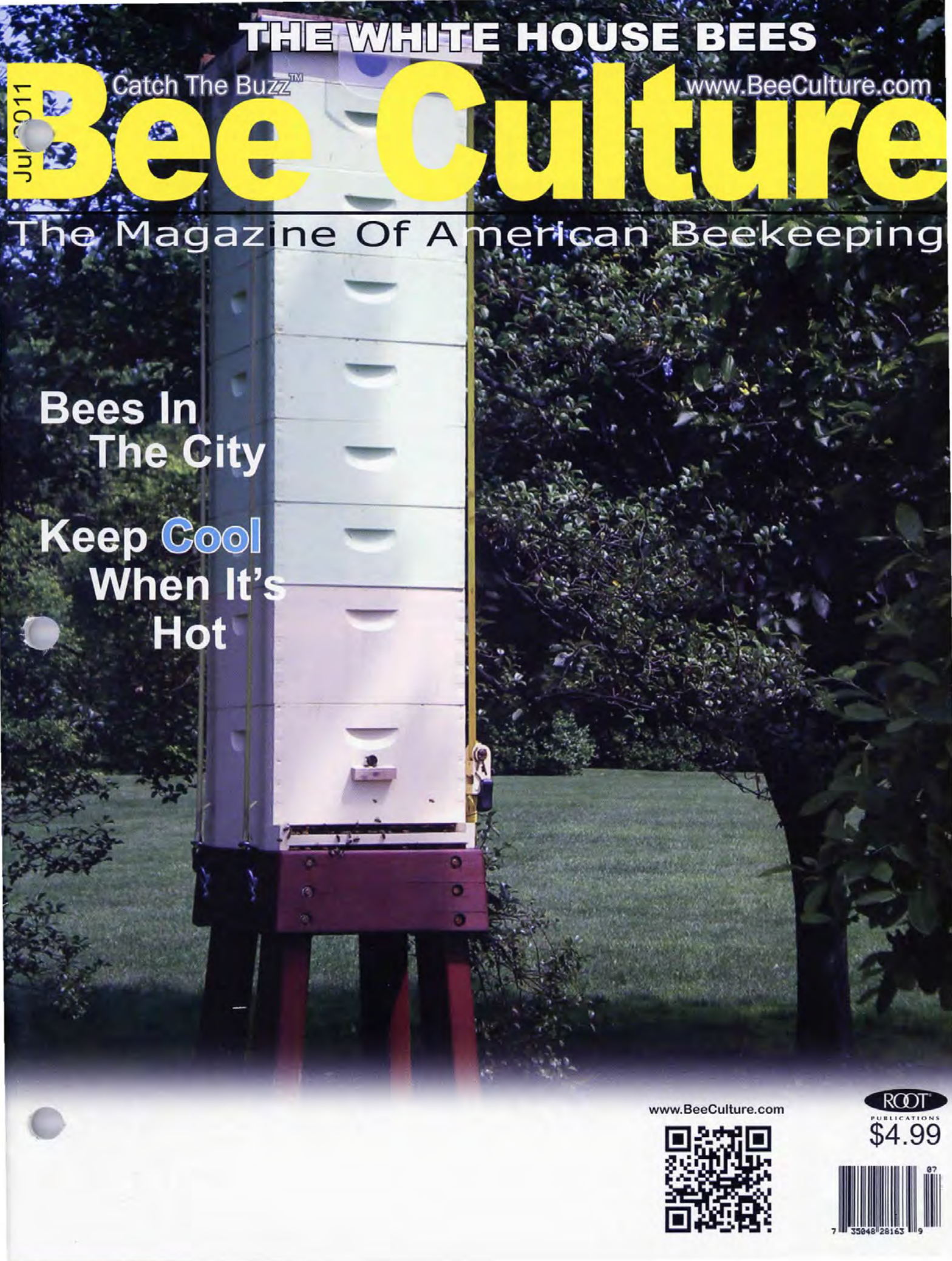
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Bee Culture

Visiting the White House Hive for a midseason update. (photo by Alisa DeGeorge)

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FEATURES . . .

DEPARTMENTS & COLUMNS

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Pests Or Beneficial?

Plymouth Township, Montgomery County, PA is contemplating this question. Since many municipalities in PA use common templates for their health codes, I am concerned that this may spread to other municipalities. As a backyard beekeeper and a member of the Montgomery County Beekeepers Association, I am arguing that the health code does not apply to Honey Bees.

The ordinance says: **Sec. 10-84. Elimination of harborages.**

All buildings, lots or premises in the township shall be kept free from any condition conducive to rodents, insects and other pest-life.

Harborage shall mean any condition which provides shelter or protection for rodents, insects or other pest-life. *Eradication* shall mean the elimination of rodents or insects and other pest-life from any building, lot or premises through the use of traps, baiting, fumigation or any other method of extermination approved by the health officer and subject to applicable laws relating to poisonous substances and fumigants.

The Township health code which regulates pests, defines harborage as shelter for insects "**or other pest life,**" clearly indicating that the code is referring to **insect pests;** Not other insects like lady bugs, praying mantis, butterflies and honey bees, which are beneficial insects.

I can't imagine that there is anyone who has not heard the alarms surrounding the disappearance of honey bees. School children are urging their parents to "help the honey bees" **www.helpthehoneybees.com/** There are many other supporters of the honey bee. This is because most people understand that Honey Bees are beneficial insects and not pests. **Otherwise, who would care**?

Who else thinks Honey Bees are beneficial insects?

There are honey bees on roof tops in Paris, in the city of Philadelphia, in small boroughs like Jenkintown and Ambler. Even the White House has an apiary. New York City has recently overturned its ban on beekeeping, because of their increased awareness of the importance of honey bees **cityroom.blogs.nytimes.com/2010/03/16/bring-on-the-bees/**

The State of PA (and the U.S. Government) consider honey bees to be **beneficial insects,** critical to our state's and nation's agriculture. Hundreds of thousands of dollars are being spent in Pennsylvania (Penn State) and at other Universities, researching the causes of CCD (Colony Collapse Disorder). These funds are earmarked to help the Honey Bee because it is such a beneficial insect. There are no experts that consider the honey bee to be a pest to be eradicated.

Another point – maintaining a healthy population of honey bees in our neighborhoods is important not only for their survival, but also for their genetic diversity as a species.

To conclude; Honey Bees are beneficial to local community gardens and fruit trees, and pose little risk to the health, safety and welfare of the public. They are not aggressive like other bees and are not a pest.

Update: Soon to be new beekeepers, Kevin and Colleen Schaffer, shared the good news about Plymouth Township's position on beekeeping. Their most recent action with the Township Council was to share a 15 minute presentation with the Council members at their monthly workshop meeting on March 7th. The purpose was to request the reconsideration of an

interpretation of the current code to allow beekeeping as a hobby in residential areas in Plymouth. This was to be done instead of applying for a zoning variance.

With the advice of the Montgomery County Beekeepers Association and Vince Aloyo, they planned a presentation for the Council. The two of them, along with Charlie Breinig, Joel Eckels, Anne Javsicas and Jim Bobb attended the meeting and shared as much information as possible in their allotted 15 minutes.

The Schaffers are happy to report that the Plymouth Township Council voted unanimously to meet with the zoning officer to see if the interpretation could be reevaluated. They waited a few weeks for the Township to formulate an official position on beekeeping, and let them know that Beekeepers would not need a zoning variance; rather, beekeeping is now permissible in the Township. It is viewed as an agricultural endeavor based on their presentation and the paperwork they handed in for their review. The only requirement is to register with the Township by obtaining a $25 permit; just as dog owners would need to do

Charles Breinig
Montgomery County, PA

Listening In

I read with interest in the May issue of *Bee Culture* about "Listening In" by Stephen Engel. A lot of it was over my head. Like geophones – vibro-acoustics, but I'm sure they are important in his study and I urge him to keep it up. The only part I could really relate to was toward the end of the article where

he had a conversation and collaboration with USDA-ARSI that "the waggle dance is really a tapping communication on the *Cell Walls* by the forager with its legs more so than the actual movement observed on the surface plane of the combs."

I studied many swarms and watched the waggle dance in an effort to see which direction they had in mind seeing as there is no comb to tap on in these hanging swarms. It doesn't seem logical that it would be any different inside of an established colony.

James Tew had a interesting article – "Hiving A Swarm" and I would like to respond to another way to know if bees are accepting their new home. I always shake the bees in front of the hive instead of into it. This way I have a good chance of seeing the queen and if she goes in, more than likely the swarm will also (but not always).

"What I look for is excitement," Tew said when shaking bees into the hive a lot of them will return to the limb where the swarm was. I ignore this as much as I can for about 10 minutes or more. By this time the bees know where the queen is. If she's in the box these bees show very little excitement but do fan. But no running in and out of hive. Now look up at the limb where some have reclustered. If these bees look excited and run around a lot, the queen is probably in your hive and in another 10 or 15 minutes the bees on the limb will take to the air and come to the hive. In other words wherever you see excitement – bees running around – the queen is *not* there.

It's more or less a waiting game. The older we get the easier it is to wait.

Jim Cowan
Aberdeen, WA

Friends & Beekeepers

Some days, are just great. I mean despite all the negative stuff going on in the world, wars, floods, politics, CCD, sometimes the planets line up and you have a really great day. For me, it was Mother's Day 2011.

You see, I have been encouraging a new beekeeper that lives 70 miles to the West of me. What started as a face in the crowd at a class on beekeeping, a brief visit afterward, an introduction later to the husband who "remembers these things better" and a few emails after that, progressed into an invite to observe the installation of a package of bees On Mother's Day on a beautiful day in the country. The supplier had repeated delays because of bad weather in California, so we were all glad to have the packages arrive.

Steve and Paula Bartlett live SE of Wilder, ID on a hilltop with an incredible view of the Snake River Valley below, surrounded by orchards and cropland as far as the eye can see.

Steve is a local boy, lucky enough to live close to his family in a rural setting a short distance from the "home" place. He is a talented carpenter by trade, who turned a trashed rental into a castle for his sweetie, and when Paula mentioned he was raised in the Deer Flat Community Church, I knew from having visited that church once to observe the congregation commemorate the 60th wedding anniversary of some other friends of mine, that he would be a truly good person. My assumption was correct.

Paula is living a dream. She gets to live, and raise kids in the country, have a large garden, chickens, ducks, bees, and has a spouse that is supportive and involved. She grinds her own grain, and makes amazing peach cobbler.

I opened the car door and was greeted by a big yellow dog, and a passel of cutie little girls. The heavy wind on the hill had a bit of a chill to it so I carried my observation hive to the kitchen table where everyone enjoyed looking at, and identifying what was going on within.

When we did the install, neither newbee was fearful, and the bees clearly knew it, as they cooperated fully. Steve is a natural with bees, and as he explained questions to others in attendance, I could tell he had been devouring books since being "introduced" to it by Paula.

Sometimes the planets line up. Mothers Day 2011. What a great day!

Frank Grover
Boise, ID

Oh My Back!!!

Does *Bee Culture* obtain sponsorship from the Society of Suppliers of Surgical Supports? Almost every issue of *Bee Culture* carries photos of hives where the top of the bottom brood box is just about on a level with a persons knees. Every time I see these my back twinges in sympathy.

I can understand the commercial beekeepers having their hives on pallets to aid moving. I find it difficult to understand why permanent or semi-permanent apiaries do not use hive stands. Perhaps someone would care to comment?

Colin Taylor
Manchester, UK

Feeding And Packages

I'd like to respond to two articles in the April 2011 issue.

The first entitled *Feed Your Bees Because . . .* spoke of using sugar syrup (Spring, Fall) as a supplemental food. I have used it for years. My concern is that the author didn't stress using pure cane sugar (although you may have been able to read the bag in the picture), and the reason for it. Cane

Continued on Page10

sugar does not contain corn starch which is in powdered sugar. The bees cannot digest the corn starch and it gives them diarrhea possibly weakening the hive and inviting additional problems.

The second article was *Perfect Package Installation.* I agree with all steps up to #10, where the bees are forced through the small can opening. I've found that once you've removed the can and queen cage, tape the cover back on. I then take a razor knife and cut the screen down both sides, along the bottom, and around the center staple. This allows me to lift up the screen to first clean out the dad bees, and second, to lift the screen completely over the top of the package box. While holding the screen I then am able to dump almost all bees at one time (using far less pounding on the box) onto the new foundation. There are very few bees left in the container, the bees aren't too disturbed or possibly harmed. After all you are just going to throw the container away. Try it and see.

Tom Marshall
Pleasureville, KY

Update From Alabama

Just thought I'd let you know some news of the tornado here. We've received calls from beekeepers across the country that know us and saw reports on the news about the damage and destruction here and around Alabama.

Several parts of Birmingham and surrounding areas are basically gone. Much to my surprise and thankfulness we didn't have even a leaf blown out of a tree at our home or at our farm about 20 mile away. But there is damage on either side at both locations. We have beeyards also about 80 miles north and 40 miles south of Birmingham where there was also tornado damage. I have not bee to them yet so I don't know if they are OK or not.

We are bottling jars of honey to take to donation centers to give out *in the relief efforts.*

Jimmy Carmack
Birmingham, AL

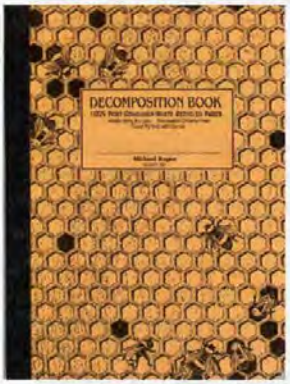
(Mr. Carmack is one of our *Bee Culture* Honey Reporters from Region 6.)

Bears & Beekeepers

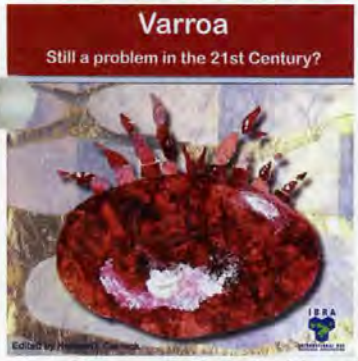
Beekeepers with beeyards in bear areas should invest in livestock guard dogs. Ten years of fenceless beekeeping in black bear country – livetock guard dogs.

Karen Bean

Look What's New This Month–



Decompostion Book. 100% post-Consumer-Waste recycled pages. Made using bio-gas. Processed chlorine-free. Cover printed with soy ink. You keep records for your colonies? What better book than this notebook. 80 lined and margined 7.5" x 10" pages. Heavy duty cover printed with honeycomb on the outside, fun facts (not bee facts) on the inside. Easy to spot across the room or on the floor of your truck. $8.00 at **www.michaelroger.com**

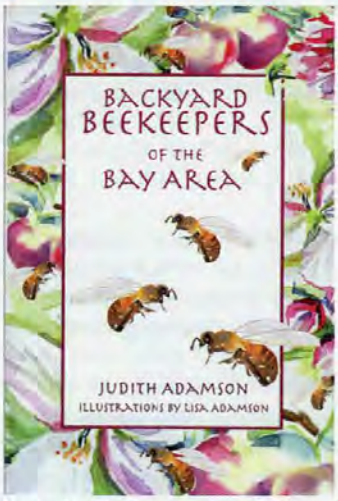


Varroa. Still A Problem In The 21st Centruy? Edited by Norman Carreck. Published by IBRA. 8" x 8.5". 78 pages, soft cover, color throughout. ISBN978-0-86098-268-5. Available from IBRA at **www.ibra.org.uk/**

This book is the outcome of a meeting organized by IBRA last November, bringing together more than a dozen scientists to update the world on the status of *Varroa*, and the ramification of this pest 50 years after being discovered on *Apis mellifera*.

Chapters include *Varroa* biology, *Varroa* and viruses, chemical control, IPM, biological control, breeding bees for resistance and the future. References abound in this collection, and anyone interested in learning more of this worst pest of honey bees would do well to review the information contained here.

If you have honey bees, you should also have this book.



Backyard Beekeepers of the Bay Area. Judith Adamson, with illustrations by Lisa Asamson. 6" x 9", 183 pages, lightly illustrated. ISBN 978-0-9762362-3-8. Also available as an Ebook. Published and available from Slanted Light Press, 7523 Farimount Avenue, El Cerrito, CA 94530 and from **www.backyardbeekeepersbayarea.com** $16.95

This is a book by a San Francisco beekeeper about some unique San Francisco beekeepers. These beekeepers include members of the Mt. Diablo Beekeepers Association, the beekeeper who has bees on the Fairmount hotel roof, Melissa Gardens, a beekeepers with scores of alternative hives, those who sell at local farmer's markets, a beeliner, a couple of essentially commercial beekeepers, and bees on the "google" campus...all living and working and keeping in this very urban location. If you live near there, our would like to, this is a fun read, and offers a variety of local resources.

Confessions of a Bad Beekeeper, is the U.S. edition of *Bad Beekeeping Club*, both, as it were, by Bill Turnbull. U.S. edition ISBN 978-1-61519-032-4. Paperback, 5" x 8", 238 pages.

We reviewed this book earlier this year, and this edition is little changed, except that it is readily available in the U.S. this Summer. Bill is the cohost of BBC Breakfast, Britain's most watched morning TV show. He is President of the Institute of Northern Ireland Beekeepers, where I met him last Fall. He has made a few changes to reflect the different continent he's on now, but the humor and the tales of his beekeeping experiences are still in place. Bill will be at EAS in Providence this Summer, telling all as a Banquet speaker, and signing copies of his book. Check out this one time opportunity this Summer.

BackYard Queens. This offering from the makers of Freeman Beetle Traps includes a step by step guidebook to raising queens (a $19.95 value), plus an Australian Cell Punch Tool ($19.95), cell bar frame, cell bases and a lighted magnifier. Based on the uncomplicated cell punch method of raising queens, which requires neither grafting or loads of specialized equipment, this technique is tried and proven and any beekeeper with a only a few years experience can easily succeed at. The book and equipment sell for $59.95, plus S&H. Check it out at **http://freemanbeetletrap.com**

INNER COVER

Know that I am making all this up because I need something to fill this space this month, and I was too busy to do any actual work. Remember that.

Imagine this.

Suppose that, in our modern, cheap-food-production oriented world, that the companies that control crop protection tools . . . the products used to kill insect pests, fungal pests and weed pests in our homes, food crops, forests, gardens, lawns and golf courses . . . held a meeting down on the farm.

Part of this meeting focused on the fact that the crop protection tools they were manufacturing and selling were extremely safe when they came in contact with humans. In fact, people like you and I actually consume spoonfuls of these tools without dying, becoming ill, or even noticing. And consume them we do because they are in the food we eat, the vegetables we eat, the fruit we eat.

This is in stark contrast to the harsh, deadly crop protection poisons used only a decade or so ago that would drop you in your tracks if you even got close, if you walked through a treated field too soon, if you breathed them, ate them, spilled them on your skin. And if you didn't wash these old-line poisons off your food, well, too bad for you. You were warned.

So they relished these now-very-safe tools, and spun the safety every which way for their propaganda people, delivering the gospel according to Mark that their products saved food, were efficient and inexpensive to use, and caused no problems to the people who applied them or to the people who ate them as part of their daily bread. This was good, and they were glad.

But then anarchists, trouble makers from all over the world began to notice the little things. And they brought to the fore the fact that these very same tools seemed to have a half life of . . . years. That these very safe tools stayed active long enough to move away from the crops they were applied to and wash into the soil, and from there to the water in the ground and from there further and further away – way far away. Long after they were applied. They moved into well water and streams and creeks and rivers and everywhere water was found. Were the anarchists right? Were some of these tools left over? Could it be?

Now, for a reality moment. Have you taken a long drive in the country this Summer? And, as some who have already read this story ask . . . what was the windshield test? Did you have scads of bugs on your windshield when you got home? Probably not, right? Maybe even none. Remember what you had to do to clean that same windshield 10 years ago – after that same drive. How many bugs could a windshield smash, if a windshield could find bugs?

Long ago in another life I used to work in a gas station. I was the guy that filled your tank, washed your windows (all of them, and the headlights, too), checked and if necessary topped off the oil, and filled your tires if they were low (yes, I'm that old). On Summer Saturday nights around the midnight hour when I was working I'd have to scrape dead bugs off every windshield of every car that stopped to get gas. I had to use soap and water, a Winter ice scraper (this was Wisconsin) and a rag. And I scraped lots of bugs of every kind and shape and form. How many bugs have you cleaned off your windshield so far this year? How many bugs could a windshield smash, if a windshield could find bugs?

I'll tell you how many. But remember, I'm making all this up.

Those crop protection tools – those new, safe-for-humans crop protection tools that are protecting us from every pest bug known to man on almost every crop that mankind grows, that are casually washing down stream, that have a life of their own in the soil they were applied to, that are in lawns, gardens, fruits, vegetables, in forests and even on our pets . . . are still here and are still killing. These tools are doing exactly what they were designed to do. But as a second act, after protecting crops these tools are reaching out downstream and underground and protecting anything in their way. Windshields no longer find bugs to smash because there are fewer and fewer bugs, and bees are bugs, in case you lost sight of that for a moment. And it seems bees and these tools come into contact on some level . . . in pollen and nectar for starters, from those protected plants they visit. And just like all the other bugs these tools come in contact with – these plants have been protected from these bees. And our bees are protected to death, slowly, surely and without doubt.

OK, that's the lead in. Here's the story. The story I'm making up, remember.

Those bugs that aren't there anymore? So what, you ask? Well, they aren't getting squished on your windshield or clogging the radiator

Hard Places And Rocks.

of your car anymore, that's for sure. And they aren't lunch for – well, a host of creatures that used to eat those bugs – birds, and rodents, and snakes and – well, bugs are almost at the bottom of the food chain, so lots of things, lots and lots of things depend on the fact that there should be a large, healthy and abundant population of . . . bugs. But there isn't anymore because those bugs . . . those insects that visit those plants, live in that water, live in that soil, live in the environment that's now filled with these long-lived, far-reaching crop protection tools . . . are no longer here. They drank the Kool-aid and they died.

So what's left? A silent Spring? A silent Summer? Silence?

OK, here's another story. You won't like this one. But remember... it's completely made up.

Imagine this.

Commercial beekeepers have – troubles.

Labor is hard to get because most people don't like the work, and the people who like the work can't get beekeeping jobs because of monumentally stupid work rules.

Honey is being bought in the barrel for about $1.60 or so a pound. It costs about $1.30 a pound to keep that colony that produced that honey alive . . . not flourishing, just alive.

Varroa is the curse of course. It is the one thing that keeps killing bees. It kills bees every day, every week, every month. It kills bees, colonies, beekeepers. But the ways of the world are such that there are only a couple of ways to stop *Varroa* from killing bees. The best way is the most expensive way and takes lots of people hours – it's commonly called IPM, and there are lots of pieces to this. Bottom line though, it works, it's safe for beekeepers, bees, honey and beeswax, but you have to have lots of labor – see about that above.

Or, beekeepers can use some pretty potent stuff . . . stuff that's legal, but hard on bees, honey and beeswax. But you don't need nearly as much labor that you can't find anyway. But honey is at $1.50 a pound in the barrel, so some commercial beekeepers might choose to use a different means to kill *Varroa*. A different crop protection tool that's effective, safe, kind on bees, and beekeepers but that's not allowed, not registered, not legal, and not to be talked about . . . moreover, it's a chemical that's not found much anywhere at all once it's been used. But using it is a sin.

This, then is the hard place. But remember, a made up hard place.

Meanwhile, back on the farm, at that meeting we were at. Those crop protection tools we mentioned earlier? They are making life easier for farmers. And even better for those folks who are selling those tools to those farmers. If only those darn anarchists, and those darn beekeepers would just quit making all that noise, all that unscientific, unproven, unauthorized noise about those tools protecting things they weren't supposed to protect, life would be perfect. If we could only find some of that silence just mentioned, they reasoned.

But wait a minute. Wait just one darn minute, just one tiny minute. Wait just a minute here, folks, said the makers and the sellers and the users of those inexpensive, efficient and potent crop protection tools. Just wait a doggone minute here.

How is it that those beekeepers can do things not right but complain to us about doing what we are doing, when what we are doing is right? They want us to stop doing what we do to make a living, but they don't want to stop doing what they are doing to make a living. Not fair. Not right. Where is the justice? What they are doing is illegal, and what we are doing is not only legal but has the blessing of the government. The blessed blessing of the government. That's what we have.

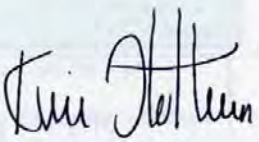
Well, we'll show those beekeepers and anarchists said the users and the sellers and the makers. We'll stop letting them put their bees on our land. We'll start looking hard at their honey, and we'll make their rule keepers keep their rules. And we'll spend a lot of money doing it because we have a lot of money. If they want to give us a hard time, we'll give them a much, much harder time. We are the 500 pound gorilla. And they are not.

There's the very, very large rock.

Remember though, a made up rock, made up for that made up hard place.

•

I finished this on a perfect Memorial Day eve, sitting outside in the 75 degree dusk. Only the slightest breeze was wafting across the back yard, carrying with it the cloying sweetness of locust bloom from the dozen trees we have back there. These blossoms came a whole month late this year because of rain and cold and more cold and rain. Beekeepers learn to live with weather's hard place. And they always have *Varroa's* rock. Those are real. Everyday. Shouldn't that be enough?



CALENDAR PHOTO CONTEST

Don't Forget - "Workin Bees" is the theme - Swarms, Inspections, moving, Harvesting

Get Your Photos Now!

JULY – REGIONAL HONEY PRICE REPORT

Compared To Last Year And Before . . .

It's time for a mid-year review of where prices are going. By now many beekeepers have a handle on what the honey crop will, or at least might be at the end of the season, and those who are careful are adjusting prices to reflect the demand they are seeing, and the crop they have to meet that demand. Early farm market prices this year are up a bit over same time last year, and bulk prices remain high.

The big regional chart below is the regular monthly chart we produce each issue, but the chart up here reflects the average honey price for each product drawn from our regular report for July 2007, '08, '09, '10 and '11 . . . a five year review of mid-year prices.

During these last five years the economy has gone through some significant turmoil, and generally prices for most goods have remained relatively low. Overall, inflation has risen only about 7% during that time, according to the Consumer Price Index, calculated by the U.S. Bureau of Labor Statistics.

If honey had held to that figure then, the price per pound bulk, which is now $1.67/lb, would have been only $1.33. The real increase then reflects a 35% increase. I wish my house had the same selling power. But not all products on this chart reflect that same increase. A 60# pail of light honey is up only 20%, the wholesale price of 1# jars is up only 8.5%, a retail bear is up 17%, a retail 1# jar is up 25%, and pollination is up 20%.

Overall, if you want to do the calculations, you'll see the trend is that bulk prices and retail prices show the greatest increase…averaging somewhere around 20%, give or take. Meanwhile, wholesale prices have not fared so well, averaging about 15% or so. Still, with the rest of the universe dealing with only a 6% increase for most products, honey has done quite well in the last four years. But the pinch at wholesale means that those sellers are paying more for bulk, and getting less when selling to retailers, who are marking it up more…ouch.

The big unknown at midyear is what the price of fuel, and labor will do to prices later this year, and how they will affect plans for next year's business – will it be more, or less honey, or more, or less pollination.

MID YEAR PRICES

EXTRACTED HONEY	2007 Avg.	2008 Avg.	2009 Avg.	2010 Avg.	2011 Avg.
55 Gal. Drum, Light	1.08	1.53	1.56	1.63	1.67
55 Gal. Drum, Ambr	0.97	1.26	1.41	1.51	1.60
60# Light (retail)	117.32	123.22	133.29	135.13	146.23
60# Amber (retail)	113.82	118.75	127.20	126.78	141.97
WHOLESALE PRICES					
1/2# 24/case	48.47	53.96	61.76	58.81	60.96
1# 24/case	71.65	74.33	80.55	77.77	86.31
2# 12/case	59.99	62.18	70.44	70.29	77.12
12.oz. Plas. 24/cs	57.64	60.46	65.31	63.61	71.60
5# 6/case	71.30	74.55	79.60	80.12	85.54
Quarts 12/case	89.51	95.88	102.77	101.74	107.71
Pints 12/case	55.35	65.07	63.08	65.61	67.82
RETAIL SHELF PRICES					
1/2#	3.04	2.87	3.36	3.32	3.62
12 oz. Plastic	3.28	3.59	3.78	3.82	4.07
1# Glass/Plastic	4.06	4.65	4.68	4.94	5.47
2# Glass/Plastic	6.74	7.30	7.55	8.15	8.71
Pint	6.34	6.93	7.46	7.67	8.10
Quart	10.37	10.51	10.26	12.90	14.94
5# Glass/Plastic	14.82	16.28	17.15	19.09	19.07
1# Cream	5.43	5.16	5.67	6.42	5.80
1# Cut Comb	5.96	6.32	7.17	6.83	7.39
Ross Round	5.66	5.99	6.49	6.60	7.50
Wholesale Wax (Lt)	2.34	3.17	3.92	3.55	4.20
Wholesale Wax (Dk)	1.84	2.76	3.59	3.83	3.51
Pollination Fee/Col.	64.46	81.12	68.85	75.80	79.41

REPORTING REGIONS

	1	2	3	4	5	6	7	8	9	10	11	12	SUMMARY Range	SUMMARY Avg.	History Last Month	History Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.72	1.85	1.72	1.52	1.63	1.69	1.72	1.63	1.80	1.60	1.59	1.65	1.52-1.85	1.67	1.66	1.63
55 Gal. Drum, Ambr	1.66	1.75	1.66	1.50	1.55	1.57	1.75	1.63	1.40	1.66	1.50	1.55	1.40-1.75	1.60	1.54	1.51
60# Light (retail)	145.00	161.00	140.00	141.25	140.00	143.75	144.17	142.70	148.75	139.80	143.33	155.00	139.80-161.00	145.40	146.20	135.13
60# Amber (retail)	145.00	151.00	140.00	138.75	140.00	147.50	140.43	143.33	135.00	140.69	133.75	158.15	133.75-158.15	142.80	142.19	126.78
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	63.36	61.48	47.80	60.05	68.46	53.75	47.65	68.25	68.46	58.00	49.80	85.45	47.65-85.45	61.04	61.49	58.81
1# 24/case	91.20	99.23	75.60	76.53	84.00	88.81	80.31	89.70	72.00	99.84	72.56	95.50	72.00-99.84	85.44	86.69	77.77
2# 12/case	84.60	81.85	70.20	66.33	78.00	94.92	72.67	83.13	69.00	81.00	67.00	86.76	66.33-94.92	77.95	76.68	70.29
12.oz. Plas. 24/cs	91.28	86.37	66.40	72.27	68.00	67.40	63.92	79.40	66.00	61.20	69.31	77.70	61.20-91.28	72.44	71.45	63.61
5# 6/case	114.30	93.98	81.00	76.18	96.00	79.48	79.75	92.67	72.00	85.20	77.31	98.67	72.00-114.30	87.21	85.87	80.12
Quarts 12/case	107.40	127.45	107.40	109.80	96.00	97.46	102.00	104.00	107.40	108.38	101.60	123.67	96.00-127.45	107.71	108.92	101.74
Pints 12/case	70.34	69.95	70.34	70.60	61.50	59.00	67.36	79.10	70.00	92.00	72.00	81.67	59.00-92.00	71.99	71.04	65.61
RETAIL SHELF PRICES																
1/2#	3.00	3.98	2.59	3.41	3.39	3.66	3.03	3.15	4.62	3.45	3.83	5.33	2.59-5.33	3.62	3.26	3.32
12 oz. Plastic	3.75	4.55	3.65	4.06	4.80	4.29	3.55	4.25	3.50	3.53	4.10	4.83	3.50-4.83	4.07	4.08	3.82
1# Glass/Plastic	4.75	5.24	5.43	4.79	6.03	5.74	5.07	5.62	4.95	4.88	6.01	6.10	4.75-6.10	5.38	5.25	4.94
2# Glass/Plastic	8.00	8.49	8.90	8.01	9.20	8.75	8.03	8.76	7.23	9.40	8.48	10.25	7.23-10.25	8.62	8.31	8.15
Pint	10.20	6.65	10.20	6.82	6.56	6.71	6.74	7.45	10.50	7.77	6.23	9.33	6.23-10.50	7.93	7.37	7.67
Quart	18.09	9.73	18.09	11.30	12.00	11.05	11.29	11.93	15.00	13.69	11.18	16.00	9.73-18.09	13.28	12.24	12.90
5# Glass/Plastic	19.75	18.36	17.59	19.40	22.00	18.48	17.82	19.83	18.95	15.93	17.73	23.00	15.93-23.00	19.07	19.25	19.09
1# Cream	5.83	6.15	5.83	5.91	5.83	5.38	5.52	5.53	5.83	5.12	5.45	7.25	5.12-7.25	5.80	6.18	6.42
1# Cut Comb	7.50	5.73	7.80	5.98	7.81	6.17	7.63	6.00	7.81	7.81	7.70	8.70	5.73-8.70	7.22	7.08	8.83
Ross Round	8.09	6.95	7.80	5.50	8.09	6.50	7.66	7.00	8.09	8.09	7.58	8.62	5.50-8.62	7.50	7.32	6.60
Wholesale Wax (Lt)	3.25	5.50	3.75	3.65	3.25	4.63	4.66	4.67	4.75	5.00	2.81	4.53	2.81-5.50	4.20	3.98	3.55
Wholesale Wax (Dk)	2.25	4.98	2.75	3.39	2.15	3.33	3.44	4.00	4.00	3.50	1.75	3.60	1.75-4.98	3.26	3.40	3.38
Pollination Fee/Col.	90.00	110.00	75.00	58.60	55.00	56.00	56.88	75.00	89.99	89.99	86.50	110.00	55.00-110.00	79.41	76.00	75.80

Managed Pollinator CAP
Coordinated Agricultural Project

Assessing The Risks Of Honey Bee Exposure To Pesticides

Marion **Ellis** & Bethany **Teeters**

The EPA Is Responsible For Testing Many New Compounds Annually.

Abiotic stress from the sublethal effects of pesticides is currently being scrutinized as a contributing factor to poorly understood colony losses. When crop protection chemicals are applied to blooming crops, they can contaminate nectar and pollen. Bees' body hair, designed for collecting pollen, is also an excellent collector of pesticides applied to flowers. For this reason, most pesticide labels prohibit the application of bee-toxic insecticides to plants during bloom. A more recent route of honey bee exposure to pesticides is the shift to treating seeds with systemic insecticides to provide plants protection from insects throughout the growing season. The most widely used systemics are the neonicitinoids including imidacloprid, clothianidin, thiamethoxam and thiacloprid.

For imidacloprid, laboratory studies show that the single oral median lethal dose (LD_{50}) is much higher than the estimated daily ingestion of foraging honey bees (Rortais et al. 2005), so it would appear that the risk to honey bees is low. However, there is potential for treated crop plants to constitute a major portion of a colony's intake of pollen and nectar during their bloom that may last for several weeks. Foraging bees are likely to experience multiple exposures from repeat visits, and they may also forage on more than one species of treated crop plant.

How do regulatory agencies currently go about assessing the safety of pesticides to honey bees? The U.S. E.P.A. uses a three-tier ecological risk assessment protocol to evaluate the safety of pesticides to honey bees.

Tier 1 is a honey bee acute contact toxicity test with results expressed as a 48 hour LD_{50}. The responses measured are mortality and signs of abnormal behavior. If the LD_{50} is greater than 11 micrograms per bee, the product is deemed safe for bees. If the LD_{50} is less than 11 micrograms per bee examiners are directed to go to Tier 2.

Tier 2 is a test of honey bee toxicity of residues on foliage. It is triggered when the Tier 1 LD_{50} is less than 11 micrograms per bee. It can also be triggered if the use pattern or literature suggests exposure. Tier 2 measures the time that residues remain toxic in 24-hour intervals.

Tier 3 tests toxicity under conditions resembling field use. Tier 3 is triggered when Tier 2 reveals prolonged residue activity.

This risk assessment model works well for foliar-applied pesticides that were extensively used until the systemic neonicitinoid and phenyl pyrazole compounds replaced them. The risk assessment model needs to be updated to address the shift toward systemic products that are present throughout the growing period. Given that systemics can be expressed in pollen and nectar, both oral and contact toxicity should be examined. In addition, honey bees will repeatedly visit fields in bloom, so tests based on exposure during a single foraging trip do not accurately reflect the exposure potential. The presence of sublethal doses of a neurotoxic compound can also have effects other than killing adult bees. Additional endpoints that should be considered include larval mortality, reproductive effects, navigation and orientation effects. Sublethal effects are not part of the current E.P.A. risk assessment model, but given the ongoing colony losses reported by beekeepers, they merit investigation.

While the extensive deployment of systemic pesticides raises questions that need to be addressed, they have largely replaced pesticides such as methyl parathion and carbaryl that are known to be highly toxic to bees. Both beekeepers and the E.P.A. need to be objective in weighing the risks and benefits, and the risk assessment model needs to be updated to reflect current pesticide use patterns.

The University of Nebraska CAP team members (Marion Ellis, Blair Siegfried, Reed Johnson, Lizette Dahlgren and Bethany Teeters) are evaluating a new tool for risk assessment. We are using a video tracking system called EthoVision to continuously monitor bee activity over time. The system will monitor 16 arenas continually and can be set to record variables such as time spent moving, time ⇨

spent feeding, and interaction time. The output is quantitative, and the results of our preliminary work can be found in the Proceedings of the 2011 American Bee Research Conference (Teeters et al. 2011).

EthoVision can track the activity of individual bees over a 24-hour period. Individual bees can be tracked based on their location within a designated space or arena. The system records the distance that the bee moves, the time spent moving, the time spent in social interactions and the time spent feeding, all variables that can be affected by pesticide exposure. Any time the bees were within 1.5 cm of each other, it was considered an interaction. Likewise, time spent in the food zone was recorded by logging time spent adjacent to a food cube. In our preliminary work we demonstrated that sublethal doses of imidacloprid had measureable effects on the behavior of bees.

For distance moved, bees treated with the lowest concentration of imidacloprid exhibited a stimulatory effect by moving more than untreated bees. This makes sense since imidacloprid acts on post-synaptic acetylcholine receptors within the CNS. Following binding to the nicotinic receptor nerve impulses spontaneously discharged and resulted in hyperactivity before they ceased to propagate a signal. Bees exposed to middle and highest concentrations of imidacloprid spent significantly less time interacting, and they spent more time than untreated bees in the food zone (as much as seven hours near the sucrose). At the higher doses we also observed that when bees consumed the imidacloprid treated food, they became intoxicated, and failed to move from that spot. This observation may relate to navigation and communication capacity.

Results from a system such as EthoVision may provide E.P.A. a screening tool to determine which compounds merit field studies prior to registration. While it is only one of many approaches to risk assessment, it has the potential to identify problematic toxins that merit further screening prior to registration.

Recent studies (Decourtye et al. 2010, 2004; 2003; Yang et al. 2008; Guez et al. 2001; Lambin et al. 2001) highlight the potential of systemic pesticides to affect multiple behavioral and learning processes. Impaired foraging performance is reported at field relevant levels of exposure (6ppb: Colin et al. 2004; 4 ppb: Decourtye et al. 2001), and it is consequently reasonable to predict that deleterious effects on honey bees can result from systemic pesticide exposure.

EthoVision provides an efficient and cost-effective tool to screen candidate compounds for sublethal effects on honey bees. Its potential for risk assessment is still being developed, but it has the potential to identify problematic compounds for further testing. The E.P.A. is responsible for testing many new compounds annually. A cost efficient screening tool such as EthoVision has the potential to make the E.P.A.'s risk assessment protocol more efficient and effective. Ethovision results will need to be related to colony performance in field trials to validate its usefulness in risk assessment. BC

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A Closer Look

NEONICOTINOIDS

Clarence **Collison**
Audrey **Sheridan**

There is no question about the lethality of some neonicotinoids to foraging honey bees, but why is there such inconsistency in the reports determining the lethal doses and hypothetical risk of exposure?

A novel group of insecticides, the neonicotinoids, has become popular among growers and farmers worldwide for its high degree of effectiveness against a wide range of insect pests and its low vertebrate toxicity. Neonicotinoids used in agriculture and horticulture are predominately xylem-systemic insecticides with high acute and residual toxicity to sucking insects, such as aphids and mealybugs; and chewing insects, including leaf-miners and several beetle species. Their mode of action is similar to nicotine, which affects the central nervous system in both mammals and non-vertebrates; but neonicotinoids block a specific pathway that is far more abundant in insects than in mammals, rendering them much safer than other insecticide classes to animals and humans. Neonicotinoid insecticides are applied as seed treatments, soil drenches, in furrows and as foliar sprays, and are considered one of the best control options for early-season pests. Even though they have been on the market for more than 20 years, very little resistance has been reported in crop pests, unlike their predecessors which include synthetic pyrethroids, chlorinated hydrocarbons, organophosphates, and carbamates. As far as we can tell, this new generation of insecticides, the neonicotinoids, poses little threat to the environment or human consumers.

Unfortunately, there is a caveat for beekeepers. In general, members of this class of insecticides are very toxic to honey bees, both via contact with the cuticle and through ingestion. Nearly from the moment that they became popular in agriculture, there has been much controversy over whether neonicotinoids are negatively affecting honey bee colony health by weakening or killing foraging honey bees and poisoning colony residents. Imidacloprid was the first of the neonicotinoids to be made commercially available to growers, and is probably the most controversial to beekeepers. During the mid 1990s, there were several reported incidents in France of massive numbers of honey bees dying in the field after foraging in sunflower crops that had received imidacloprid seed-treatments (Facuon et al. 2005). While imidacloprid has been detected in sunflower nectar and pollen, there is a lot of conflicting information about the lethal concentration and the sublethal concentration leading to chronic toxicity (Nguyen et al. 2009); inconsistent information makes it difficult to directly correlate the mortality of field foragers with imidacloprid seed-treatment. Neonicotinoids have also been implicated in colony collapse disorder (CCD), although there is, as of yet, no scientific basis for this hypothesis (Cresswell 2011, Girolami et al. 2009). Regardless, several laboratory analyses of the active ingredients in agricultural

"Two metabolites of imidacloprid, 5-hydroxy imidacloprid and olefin, are as toxic and more toxic, respectively, than the parent compound."

neonicotinoid insecticides, including imidacloprid, have demonstrated a range of mild to severe toxic effects on honey bees, often as a result of low-dose (sublethal) exposure.

Seed treatments with neonicotinoids can result in the expression of high doses of active ingredient in leaf guttation droplets produced by corn plants, according to Girolami et al. (2009). The aqueous droplets, comprised of xylem sap and formed on the tips and margins of leaves, are occasionally consumed by foraging bees to replenish water loss. Droplets were collected from young corn plants germinated from imidacloprid-, clothianidin- or thiamethoxam-coated seed and analyzed for insecticide concentration. The translocation of imidacloprid to leaf guttation droplets was found to be far greater than that of the other two insecticides, despite a much lower rate of imidacloprid applied to the seed. Individual caged bees that consumed five to 30 µL of guttation liquid experienced wing paralysis and abdominal bending within minutes of consuming the toxic liquid, and death within 24 hrs. Although the samples of clothianidin and thiamethoxam guttation contained less insecticide than imidacloprid samples, they resulted in more rapid wing paralysis when fed to bees, and in this study, were considered to be more toxic to foraging bees.

Iwasa et al. (2004) determined the contact toxicity of seven neonicotinoid insecticides, three acetamiprid metabolites, and investigated the synergistic toxicity of three neonicotinoids with certain fungicides that are sometimes applied simultaneously in a "tank mix." The chemicals tested were active ingredients of popular agricultural and horticultural insecticides; they included acetamiprid, imidacloprid, thiacloprid, nitenpyram, clothianidin, dinotefuran and thiamethoxam. Each insecticide was applied to the dorsal thorax of worker bees in series of five to seven doses (in ethanol), and mortality was assessed after 24 hours. The lethal dose for each active ingredient resulting in 50% bee mortality, or LD_{50}, was determined as follows in order from the most to least toxic: imidacloprid, 17.9 ng/bee; clothianidin, 21.8 ng/bee; thiamethoxam, 29.9 ng/bee; dinotefuran, 75.0 ng/bee and nitenpyram, 138 ng/bee; acetamiprid, 7.1 µg/bee; and thiacloprid, 14.6 µg/bee. None of the three acetamiprid metabolites tested were found to cause mortality in honey bees. Of the five synergistic fungicides tested, those that cause cytochrome P450 disruption in fungi seemed to do so in honey bees as well, increasing the mortality of acetamiprid-, imidacloprid- and thiacloprid-treated workers, drastically. These results indicate that oxidation by cytochrome P450 is a means by which honey bees detoxify certain neonicotinoids. Therefore, disruption of this mechanism increases the toxicity of the neonicotinoid compound.

"Although the samples of clothianidin and thiamethoxam guttation contained less insecticide than imidacloprid samples, they resulted in more rapid wing paralysis when fed to bees."

Cutler and Scott-Dupree (2007) conducted a long-term field evaluation of honey bee colonies that foraged on clothianidin-treated canola fields in Ontario, Canada. The study was designed to simulate a "worst case scenario," using the highest labeled rate of seed treatment (for Canada) and a high seeding rate to deliver the maximum realistic amount of clothianidin to foraging bees. A total of 32 colonies were assessed for mortality, honey production, brood production and overwintering success. Initially, half of the colonies were set in untreated canola fields, and the other half were set in fields of canola that had received clothianidin seed treatments. After 21 days, all colonies were moved to a new location. Results from 130 days of observations showed no significant difference in any of the measured parameters between control and clothianidin colonies. Furthermore, the maximum amount of clothianidin recovered in any sample of canola pollen was 2.59 ppb, which is considerably lower than the no observable adverse effects concentration (NOAEC) of 20 ppb.

A similar study was conducted by Nguyen et al. (2009) on the effects of imidacloprid seed treatment in maize on local honey bee health. A survey was conducted on 16 apiaries that were located within a 3,000 m radius of both imidacloprid-treated and non imidacloprid-treated maize fields in southern Belgium. Samples of honey, beeswax and bees were collected from three hives in each apiary for the two months corresponding to and directly following maize flowering. The samples were analyzed for imidacloprid residues, but the pesticide was not detected in beeswax or bees. Of the 48 honey samples taken, only four contained imidacloprid, but one third of the honey samples contained rotenone. The beeswax samples contained 11 pesticide residues, including four commonly used for *Varroa* control, and the fungicide triazole fusilazole; whole bee samples contained only one insecticide, lindane. Researchers found an inverse correlation between hive mortality and the proportionate area of treated maize to untreated maize in the foraging area. Therefore, the results did not support the involvement of imidacloprid-treated seed in hive mortality in the study.

There is quite a bit of conflicting information on the amount of imidacloprid that is toxic to bees. According to Suchail et al. (2001) the reported oral LD_{50}s for imidacloprid vary from colony to colony and range from 50 – 5,000 µg/kg bee weight. The broad range is attributed to variations in detoxification efficiency, possibly due to individual colony genotypic makeup. Also, they found that two metabolites of imidacloprid, 5-hydroxy imidacloprid and olefin, are as toxic and more toxic, respectively, than the parent compound. A later study by Suchail et al. (2003) revealed that imidacloprid is quickly metabolized in honey bees, and symptoms are always present immediately and correspond to the presence of the metabolites. The symptoms of imidacloprid poisoning in honey bees, as described by Suchail et al., occur in two stages: initially, hyperresponsiveness, hyperactivity and trembling; after several hours, *hypo*responsiveness and *hypo*activity, often leading to death. The 2003 study further elucidated the effect of imidacloprid metabolites compared to the parent compound. Honey bee subjects were treated with oral doses of 20 and 50 µg/kg of imidacloprid, observed, and flash frozen at intervals of 0, 4, 6, 8, 24 or 48 hours for metabolic analysis.

Residue tests were also performed at 20 minutes after imidacloprid ingestion; neurotoxic effects appeared in the first 10 minutes of imidacloprid ingestion, and in the next 10 minutes, the titres of two toxic metabolites of imidacloprid increased. This supports that the metabolites may be more directly related to bee mortality than the parent compound.

Some scientists claim that the natural exposure of foraging bees to imidacloprid in the field has a negligible impact on colony health. Faucon et al. (2005) administered imidacloprid in sugar syrup to 18 colonies during one Summer, and compared the colony parameters with those of control hives until the end of the following Winter. The two concentrations of imidacloprid used in the study (0.5 µg/L and 5 µg/L) were chosen based on the published mean imidacloprid concentrations recovered in sunflower and canola nectar of seed-treated plants. Each experimental colony received 13 liters of the imidacloprid solution, total. Overall, the mortality was very low across all colonies, and the only significant differences reported were an increase in pollen carrying and more capped brood cells in experimental colonies while imidacloprid syrup was being administered; these parameters returned to normal after imidacloprid feeding was stopped. There was no implication from this study of toxic effects of imidacloprid on whole colonies.

Clearly, there are some major discrepancies between scientific reports on the effects of neonicotinoids on honey bees. There is no question about the lethality of some neonicotinoids to foraging honey bees, but why is there such inconsistency in the reports determining the lethal doses and hypothetical risk of exposure? One thing to keep in mind is that these honey bee toxicology experiments are only loosely representative of what actually occurs in the field. That is, they are designed to be performed in laboratory or semi-field situations (controlled field experiments), and they tend to represent a "worst case scenario" of pesticide poisoning. Cresswell (2011) states that there are four aspects of the imidacloprid (and other neonicotinoid) studies that have confounded the extrapolation of these studies to colonies in a natural field setting. First, we do not understand the connection between learning and memory as affected by sublethal exposure to neonicotinoids in the laboratory with what is occurring in the field. Behaviors such as foraging, dancing and flight orientation are all susceptible to disruption by low doses of insecticides. Second, the subjects used in the majority of these toxicology studies were adult worker bees; it is unknown whether the queen, larvae or drones have the same sensitivity to imidacloprid, or any of the other compounds in this class. Third, not all foragers will bring back tainted nectar or pollen if multiple floral sources are in bloom at the same time. Therefore, the insecticide that is introduced into the colony could be diluted with "clean" food, and the probability of adverse effects on the colony as a whole would be diminished. Finally, the effects of neonicotinoids in the field may be compounded by the presence of synergistic pesticides, disease or starvation. Future studies should take these details into consideration in order to design a more representative experiment of the real-life impact of agricultural neonicotinoids on honey bees. BC

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To Be Or Not To Be . . . A Bee

A Look At The Head Of A Bee

Roger **Hoopingarner**

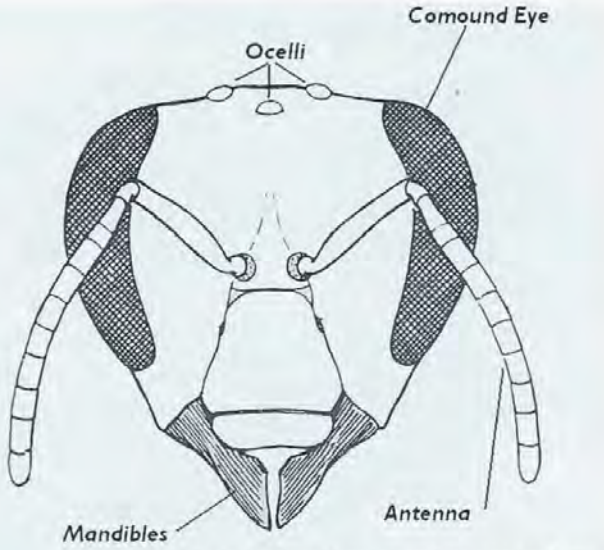

Figure 1 *– The front view of a worker bee.*

In the first article in this series the honey bee was compared to all other insects with regard to the three body parts – head, thorax and abdomen. This time I want to cover the features of the head. Many of the structures are similar to other insects, however the mouthparts are somewhat unique in the honey bee. Also, within the head is the important food gland that produces royal jelly.

Figure 1 is a diagrammatic front view of the head of a worker honey bee. At the top of the head are three ocelli, or simple eyes. These eyes have a short focal length and are primarily used for light detection, but also for close-up vision. They are most probably the tools that the bees use to detect the changes in day length within the hive in January when the colony begins to raise brood for the upcoming season. These ocelli are also most likely used in the low light levels within the hive.

The large compound eyes found on either side of the head are the visually acute and foraging eye of the bee. These eyes are made up of hundreds of individual eyes called ommatida. Each ommatidium (singular), or facet, of these compound eyes sees a very narrow angle of the field of view. There are two things that come out of the structure of these eyes. First, since each eye has only a very narrow view, any motion is exaggerated. For example, if one ommatidum has your arm in view and you move it ever so slightly that ommatidium loses the image but the next ommatidium now picks up the image. Thus, all movement is detected much more readily than with an eye such as ours. With the number and arrangement of the eyes covering a wide area of vision, the compound eyes also detect the different polarized light regions of the sky. Honey bees use the recognized pattern of polarized light to keep them oriented on their flights from hive to flower and back. That is, they recognize the pattern going out to a flower patch and then match the pattern as they return to the hive.

Figure 2 *– Dandelion flower with two views. As humans see it on the left, and how a bee would see the same flower on the right.* Photo by Bjorn Roslett, Science Photo Library.

The bee's eye detects colors of the light/color spectrum from yellow to purple and into the ultraviolet. Many flowers have ultraviolet colors near the nectary that helps guide the bee to the nectar and of course then the bee accidently pollinates the flower. A good example of what bees probably see as they approach a flower with their ability to detect ultraviolet is seen in Figure 2 where a dandelion is shown as we would see the flower and how a bee would see the same flower. Of the visual colors that the bee sees they are the plain, bold colors. They do not detect the multitude of shades of color that we do, and they do not detect the color red. Red is probably translated into black. Bees can detect and discriminate some patterns as long as they are distinct from one another. For example, they do not do well separating x from +, but would discern ③ from O.

The antennae probably have two major functions–smell and touch. If you watch two bees interact on a comb or hive surface you will often see one, or both, antennate the other bee. In this case the bee is doing both touch and smell. The antennae are loaded with sensory pits and plates that are connected to the nervous system (Figure 3). These various pits and plates are extremely sensitive chemical (odor) detection devices. Some of these sensing organs are probably designed to detect only one or two odors, for example, queen pheromone. They are very efficient and can detect very small quantities of the odor. Again, using the queen pheromone as an example, the drone bee can pick up small quantities of this odor and track a queen down in the drone congregation area (DCA). The drones are able to do this in spite of the fact

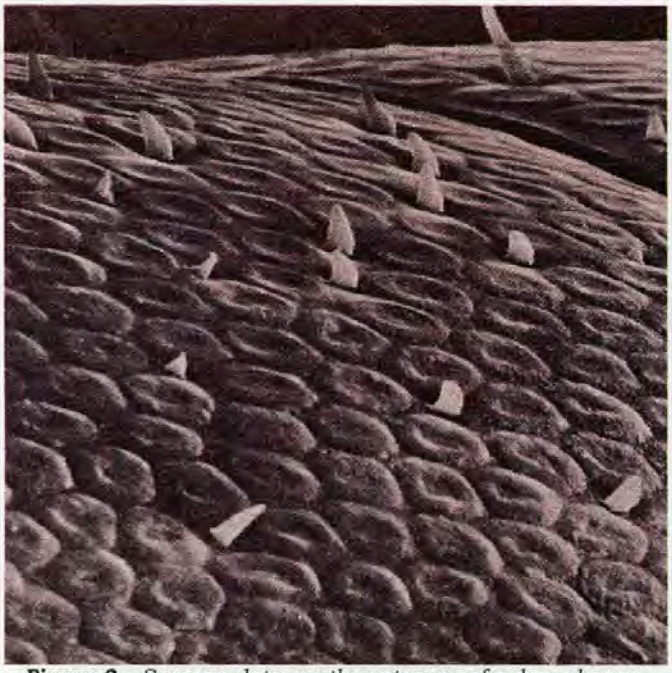

Figure 3 – *Sensory plates on the antennae of a drone honey bee.*

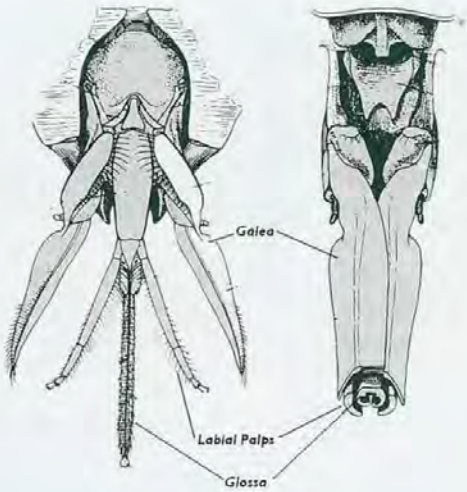

Figure 4 – *Sucking mouth parts of a worker bee, viewed from the rear. The two galea and the two labial palps form the sucking tube. The glossa is in the center of the tube.*

that the queen pheromone is not a particularly volatile substance.

The mouthparts of bees are very highly modified sucking tubes, and flat, non-cutting) mandibles. If you look again at the front view of the bee (Figure 1), you can see the mandibles with their flat opposed surfaces. The mandibles are used primarily for molding beeswax into the hexagonal cells used for brood rearing or honey storage. The flat, opposed surfaces are ideally fitted for that function.

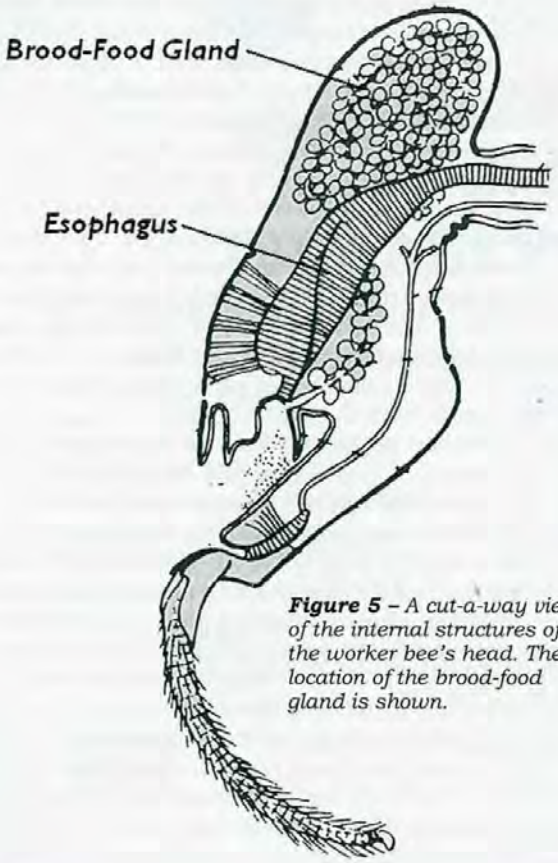

Figure 5 – *A cut-a-way view of the internal structures of the worker bee's head. The location of the brood-food gland is shown.*

The sucking, or lapping, mouthparts are a little more difficult to visualize. However, basically the primitive mouthparts of insects have been modified and bent to form a hollow tube. Within that tube is a piston-like part called the glossa that extends out past the end of the hollow tube to lap up nectar and bring it back to the confines of the tube. There sucking action can begin and the nectar is drawn up into the esophagus. From there it is pumped into the crop, or honey stomach. In Figure 4 the sucking mouthparts are shown, but only the parts that form the tube and glossa are labeled. In the center of the glossa there is also a tube which serves as the conduit for the salivary fluid which contains the enzyme invertase. This enzyme is responsible for the conversion of the disaccharide sucrose (table sugar) into the simple sugars of fructose and glucose that are found in honey. This enzyme is added to the nectar that is taken up and thus the conversion to honey is started, as the nectar is stored in the honey stomach.

Figure 5 is the side view of the internal structures of the head. The important organ that I want to point out is the brood-food gland. This is the gland that produces royal jelly. The gland develops in young bees and reaches its peak production in the first two weeks or so of the nurse bee's life. These bees depend on eating pollen to supply the protein to develop this gland and the food it produces. Without pollen this gland soon ceases to function. In older bees the gland atrophies as well as it is no longer used when house bees graduate into foragers. One of the ways that bee scientists have been able to analyze the quality of different pollens and artificial diets is to look at the development of the brood-food gland. They can determine if the individual pods, or nodules, are well developed or not. BC

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Producing Honey Bee Queens

Techniques Vary, Equipment Varies, Results Vary.

Backyard queen production – one of several hot topics at the moment

As specialized as beekeeping is, a new beekeeper quickly learns that our specialized industry has been subdivided into even more, smaller specialized subdivisions. Keeping bees in top bar hives is currently a popular subdivision in some circles. Chemical-free management procedures are presently vogue and "*urban beekeeping*" – all the rage. Queen production is one such subdivision that never seems to lose favor.

Other rages have passed. Most likely, at some future time, they will once again be hot. For instance, winter packing interest has lost its punch. Pollen collecting interest seems to be at a reduced ebb. And follower boards – who uses them now? But queen production interest persists. It has been popular as long as I have kept bees. Lots of bee things have changed, but producing queens continues to be fundamental to the craft of beekeeping.

Shout-outs for various queen production techniques

The reason I am taking this topic on is due to the unique terminology and hyperbola that supporters present for each method of queen production – and there are many, many methods. Some of the more common methods are: the Miller method; the time honored Doolittle method, the Jenter device method (sometimes spelled with a *"G"*); Hopkins (aka Case) method; cell punching – a current favorite; Alley technique, the John Harden method; and the Jay Smith technique. Techniques such as these sometimes use devices such as: Baldock cages, cloak boards, Marburg swarm boxes, Benton cages, division boards, baby nucs, three-way nucs – every little gadget or concept seems to have a formal-sounding name. Those of us who have been beekeeping for many years are well along in the queen-jargon-learning process. But for the new people, it appears to be a major commitment to undertake the process.

James E. **Tew**

As I see the situation, there are two points that need to be made to newly enticed queen producers.

1. A new queen producer does not have to know (or understand) most of this jargon to produce good queens.
2. All current queen production/introduction techniques to a greater or lesser extent are flawed. There is no premier technique that clearly surpasses all others.

A few brief aside comments

Beekeepers of all eras have had a passionate interest in queens and their production. Yet after all the years of using tens and tens of procedures to produce innumerable queens, no single procedure or device has conclusively taken the coveted top spot. I sense that the reason there are so many techniques labeled with so many personalized names is that the prize for the #1 spot is still open. In this arena, there is room for one more pioneering name like Langstroth, Root, or Doolittle. Yep, it could be you.

A simple set of questions for the newly interested queen producer

Honestly, over time, you would naturally ask yourself the following questions without needing me to list them for you, but for the sake of organization, I offer them here.

1. Do you plan to allow the colony to naturally produce its own queen or are you going to use management procedures to produce queens?
2. If you are not going to allow natural production, are you planning to buy your replacement queens or are you interested in producing your own?
3. If you are to produce your own, are you planning to graft larvae (potentially many queens) or are you planning to use non-grafting procedures (probably producing fewer queens)?

A queen production hierarchy

I have presented a brief schematic of queen production procedures and their classification. Obviously, not all possibilities have been included, but even with the ones included, the chart is becoming congested. In an effort to color-code, one could be a yellow, blue, or green producer of queens. Yes, as one's needs and interest change, they could readily change to another color- code.

Essentially, yellow methods of production are oppor-

tunistic. You happened to have some swarm cells in one colony and you need a queen in a neighboring colony, so you swap a frame. There's a good chance that you will get a (somewhat) free queen out the deal. Blue producers are not transferring larvae, but the number of options in this color code is daunting. The Doolittle method (Green) is time-honored and established. It requires a lot of bees, quite a bit of equipment, and good near-sightedness. As I stated earlier, every one of these classifications has benefits and shortages.

Natural requeening procedures[1]

Bees have been producing their own queens for a long, long time. Only in recent beekeeping history has queen production become a primary management scheme available to beekeepers. The three natural queen production stimuli are: swarming, supersedure and emergency cell production. If bees or beekeepers produce queens, one of these instincts will be the driving force.

Swarming and swarm cells

Honey bee swarming is both exciting and a curse. It is only exciting if the bees did not come from your colony. Picking up swarms that issued from your colonies is not the most efficient method of keeping bees. But if you keep bee hives for just a few years, you will pick up some personal swarms – if you are lucky enough to be near when the swarm goes.

Swarm cells are good cells for queen replacement. They are well-fed and proper aged larvae selected to become colony monarchs. The number of cells produced will vary greatly from colony to colony. But routinely using swarm cells will significantly instill the swarming instinct within your queen stock. Said another way, if you use swarm cells to requeen, you should be prepared to have swarms issue in the future.

Using swarm cells to requeen

Ideally, transfer the entire frame having the swarm cell(s) on it. Otherwise, the cell will have to be cut from the comb. The use of rigid foundation will prevent the option of cutting cells from the comb face. If cells are cut, don't try to be neat. Cut a hunk. Use the extra comb to press into the new comb face. Stay completely away from the cell. Direct the cell nearly downward. Expect frequent failure. This procedure works, but bees are touchy about such transferred cells and will tear down cells that look perfect to you and me.

Supersedure cells

The straight story here is that supersedure cells are normally excellent queen cells but I don't think I have ever used a single one to requeen a colony. If a colony is superseding, there are probably other problems within that colony. I don't know if I want to get involved removing cells that the parent colony clearly needs to subsidize

Natural swarm cells near the bottom of the frame.

a different needy colony. But there are special circumstances. For instance, if a package colony is superseding what appears to be a perfect queen, a beekeeper might elect to destroy the supersedure cells in an effort to give the package queen more time to establish herself. An alternative might be to re-cage the reigning undesirable queen and transfer her to the other colony and allow the supersedure cells to emerge and take over, but there are lots of loose ends here. You effectively have two queen colonies with hopes pinned on the successful mating of the replacement queen and needing the transferred queen to be better accepted in the second colony. At any rate, these cells are normally good cells, but they are not normally very useful to beekeepers as replacement cells.

Emergency cells

Our entire queen production industry is built on the emergency cell production stimulus. So far as the bees are concerned, something catastrophic has occurred that eliminated the queen. Occasionally, it happens. Queens just die. There is always a reason for her death, but it is not a reason that is always clear to us.

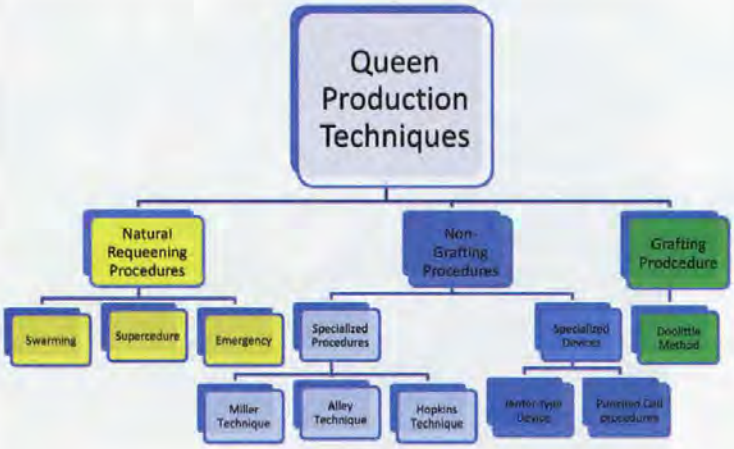
More often, we the beekeepers are responsible for her mishap. She got crushed between burr combs. She dropped from the comb onto the grass and you stepped on her. Or maybe you have elected to intentionally remove her. Whatever the reason, the colony had a queen and suddenly, they now do not. They will implement a disaster plan that will save the situation (most of the time).

Emergency cells production

We don't know all the particulars but seemingly nurse bees select larvae of the *"right age."* Apparently, some colonies either get too eager, or they don't have larvae of the correct age, or possibly, the nurse bees simply don't know what they are doing. Of the three types of natural cells, emergency cells are felt to be the lowest quality the all. The bees did not have time to select larvae and nurture them in specially constructed cells. In fact, the nurse bees had to select larvae that were very near to being on the worker bee pathway and redirect that developing worker into the queen bee pathway. A clue will remain. Look inside the emergency cell and the remnants of the worker cell walls will remain. There are no cell walls in swam or supersedure cells.

No, the nurse bees will not move eggs or larvae from

[1]Ihave posted a captured PowerPoint program on generalized honey bee queen production at: http://go.osu.edu/CPJ.



a worker cells to an unused queen cup. *(Here comes the mail.)* I make the statement flatly knowing that many of you are sure that you have seen situations where larvae or eggs were moved to a vacant queen cup. But I don't have clear citations on this behavior. When such documentation is available, I will readily change my thoughts.

Stock selection now and stock selection later

The yellow group of queen producers probably will not put a lot of emphasis on stock selection. The bees came from somewhere – you may or may not know where – but one (some) of your colonies has one of the three types of cells and you are anxious to use the extra ones for your management program. Boom! You selected stock. This procedure could not be any simpler.

But over time and across our industry, just selecting for stock that is serendipitously available and simply alive will not do much to advance the genetic stock of our herd. As yellow queen producers move to the blue or even the green group, stock selection will begin to play a much greater role. I would appreciate the privilege of revisiting this subject again in upcoming months when I discuss the other groups.

The ongoing evolution of beekeeping opinion

Our industry has always been evolving and changing. There was a time just a few decades ago when we used essentially no plastic equipment and now I have quite a number of plastic hives and hundreds of plastic frames.

A prepupae visible in an uncapped queen cell.

It's not just hive equipment. Now nearly everything in our industry is made from plastic. Things change. They always do.

In the memory of most beekeepers presently in our industry is the recollection that just a few years ago we used multiple chemical cocktails in our colonies to control *Varroa*. Not now. No one wants to use chemicals, but no one wants mites either. We have worked diligently to find middle ground. There is middle ground, but it is hard to find it and even harder to stay on it.

I have had a few comments made to me via social media networks and I have read comments made to others about the concern that some of you have when it comes to *"selecting breeding stock."* The concern expressed by some of you is that our bee breeding program is for our human betterment and not always purely for the bees. Bees that are more aggressive might make better hive defenders and foragers, but our human society would not like them very much.

It is true. We moved bees from their ancestral home and established them around the world (in deference to the writer who wrote to me that *"no bee should be moved anywhere"*). After moving tropical honey bees to temperate climates, as best we could, we have spent years breeding for changes in bees that help them fit our culture and climate. So – stand by. Opinions come and go. But for the present, we seem prepared to select bees that have hygienic instinct, can survive Winters and build up strong enough to pollinate crops and produce honey.

In upcoming articles, I will be discussing the two remaining groups of queen producers, with comments on both positive and negative attributes of those various systems. Other future articles will address the multitude of queen cage styles, queen introduction techniques and drone production. If nothing else, by working on this series, I will get a good update and review. Thanks for reading. BC

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Uneasy Lies The Head . . .

Peter **Sieling**

There's less to being President than you suspect –

Sooner or later they will make you president of your bee club. Having served twice as president of the Steuben County Honey Bee Association, I have mastered the secrets of successful leadership that can help you guide your own "ship of destiny" safely into port.

Don't think this respected position gives you power and authority. In fact, the role of president is much like that of a honey bee queen – pushed this way, shoved that way, driven by the whims of the workers, and tolerated by drones. At best, you'll eventually be superseded. At worst, they'll ball you – pull off your arms and legs and run you out of office.

Think of a bee club as a colony made up of one queen (the president), workers (those who serve on committees and plan events), and drones (the spectators). Unlike honey bees, the caste numbers are reversed; instead of lots of workers and a few drones, you'll have a few workers and lots of drones.

The most important rule for presidents: Always do everything exactly the way it's always been done. Never try anything new. That may work in young organizations or organizations with young (under 50) members, but in established clubs, you can't introduce change without ruffling feathers.

If you want to try something new, pretend you did it before. For example, how about organizing a hive tool throwing contest? Here's how you introduce it:

President: "Let's have a hive tool throwing contest like we did last year . . ." Before members start looking confused, you say, "Remember how Bert won a pair of gloves by missing Alice's nose by three inches?" (Neither Bert nor Alice have been attending meetings lately. I heard they got married and absconded to Florida.)

If one of the members says, "I don't remember . . ." you quickly remind him he missed that meeting *and* all the fun.

Speaking of deteriorating memory, most people over 50 feel that their memory is slipping. This allows useful leeway for a president who needs to get things done. Last month I was running the meeting and scrolling through the secretary's notes when I noticed an entry from two months ago.

"Oh look! Don chairs the constitution review committee. How's that coming, Don?"

Don looked confused. "Did I volunteer for that?"

"That's what the notes say." I found a copy of the constitution and gave it to Don. He's working on it now.

That incident gave me an idea. I could invent discussions and insert them in the notes. It worked in Orwell's *Animal Farm*. For example, how about organizing a polka band for the Fall Banquet entertainment? (I tried that idea but couldn't get enough interest. Maybe you could try it at your club.)

Look back through your notes. "Hey Chuck, made any progress on that polka band thing?"

"Huh?" Chuck's ears turn bright red.

"I've got it right here. Sue has a banjo. Don has reams of polka music. You were going to find a bass or baritone player and an accordion. Someone here has to play the accordion."

You carefully scribble it into the minutes while Chuck nervously scans the other members for the accordion players who are blushing and staring intently at the floor.

Like the polka band, not every idea will fly, but all clubs are different. What doesn't work for us might work for you. I thought we could build community with group hugs, but some of the older members balked. At another meeting, our program committee, Don, brought in some dancing girls in little bee suits. The beekeepers couldn't focus. They wanted to talk about hive ventilation. Afterwards a couple beekeepers complained, "We never did that before. Last year we had a speaker from Cornell."

A president's biggest challenge is maintaining order. We used to have a problem with side conversations occurring during business meetings. It can be distracting, especially when the talkers' hearing aids aren't properly adjusted and the guys are talking louder than the speaker. I wasn't sure how to solve this problem until I remembered something I had tried before. One night Doug was telling Harold about the guy who drove home with a bucket of honey in his trunk with his golf clubs. The lid was loose . . . Anyways I stopped the meeting and shouted, "Hey Doug and Harold! You guys need a hug?" They shut right up.

We have no complainers in our club. There used to be a few but when Phil said, "Why doesn't somebody buy a bucket of formic acid, break it down into single colony doses, then distribute it to everyone at cost?" I made him chairman of the Illegal Formic Acid Committee. When Sue wondered why we didn't have an observation hive at the farmer's market, I made her chairperson of the Observation Hive Committee. No, we don't have complainers but we do have a lot of committees. I made Don the chairman of the Committee Management Committee.

"Any new business?"

"I make a motion we ball the president," said Don.

"You can head the 'Ball the President' committee," I countered. "I make a motion we close the meeting.

Do we have a second?

All those in favor?

"Aye!"

"Motion carried." BC

Judging Honey COLOR

Michael **Young** • Robert **Brewer**

I don't believe it! You've got to be joking! That can't be right! I checked it myself! I have grading glasses! Surely the steward must have put them in the wrong class! If that's the case the judge is as blind as a bat – how many of us have heard this? And as exhibitors mentioned this word of discontent when one's honey is disqualified for being in the wrong class because of its color. For the exhibitor it really hits low doesn't it? After all that hard work prior to the honey show too. The endless hours of preparation; straining, heating; tasting; blending; jar washing and polishing, only to be turned down for being in "the wrong class"? Those unsavoury words seem to have a repeated echo in the subconscious. It's like the best horse in the Derby being turned down for a false start. It even feels as though the judge has "stolen the light from your eyes" after he tells you the awful news. Most of us take a sigh; pull in a breath and subliminally say "Oh God". "That's Honey shows for you."

So, who's to blame, the judge because she/he is blind as a bat? Maybe the steward's to blame because she/he didn't spot the problem? Or maybe even the exhibitor because she/he should have known better from the start? Or could it possibly be the grading glasses? Did anybody even think about the grading glasses? No! Why not? Because they are British Standard, so you know that they must be good! Well let's just look at grading glasses for color grading in honey and also the merits, regulations, and differences in color grading systems and appliances on both sides of the Atlantic. But why not start of with a little history first?

The great British bee master and honey judge William Herrod produced a little gem of a book dated 1912 entitled "Producing, Preparing, Exhibiting, & Judging Bee Produce." The first book of its kind to be published in this era. In fact it would be fair to say that very little has been written on honey shows since. Most writers realize that exhibiting or judging honey shows is a specialty subject and therefore is best left and developed by those extraordinary individuals who have devoted their time and efforts to perfecting the skill. For without them the quality and standards of honey and other bee produce would have never come to the par excellence of today's market. In Mr Herrod's book there is very little said on grading honey but I'm sure that its omission was by design. The beauty of his book is that it is written with a very human touch which is the most important aspect of honey shows. It's about competitors and their enjoyment (and sometimes unscrupulous behavior) towards one's own bee produce. It tells tales of honey that is deliciously complex, and wonderfully wholesome with the unique taste that is nurtured not only by the bees themselves but by, as I have mentioned before, those extraordinarily devoted individuals who tend them. And its not (or never should be) a scientific appraisal of honey. For too detailed an analysis could be the death knell of honey shows. By taking the humanistic approach away it will also take the enjoyment away. Which, after all, is why we do it in the first place?

If I may share and quote a passage in Mr. Herrod's book on advice to exhibitors about color:

(1) Honey shown in the wrong class according to colour. This can be avoided by obtaining and using the British Bee-Keepers Association's two grading glasses . . . the instructions for using which are as follows:

"One piece of glass supplied herewith when held up to ordinary daylight – not sunlight – shows the *lightest* shade allowable, and the *two* pieces in juxtaposition denote the *darkest* shade permitted in classes for Medium Colored Extracted Honey. The test of color must be made with honey in the bottles in which it is to be exhibited, and *no other way.*

I Chapter 111 (p.19)

Figure 4

Thorne's Grading Glasses B.S. 1656.

Furthermore Mr Herrod mentions that:

Grading – This should be carried out in accordance with the requirements of the class in which the honey is to be exhibited . . . For exhibiting in the light classes it does not follow that the lightest sample should be chosen. A nice, light amber is usually the most successful.(p. 59)

So what is he saying? Basically that these grading glasses were a good start in determining the different color classes of honey and simple enough to use. However, over time and from show to show the grading glasses faded, and often damaged. Also if made by different companies there could be quite a difference in color and thickness in the glasses themselves. With the invention of plastic, manufacturers were happy to "jump on the band wagon" and produce grading glasses from this modern material. Unfortunately their eagerness was at the expense of quality control and during this period there was mayhem caused by exhibitors travelling from one show to another with glasses of varying colors and quality. Exhibitors found themselves picking up a First prize in the Light class of one show, only to be disqualified in the light class of another honey show. The plastic grading glasses were popular for their cheapness but soon became obsolete in the honey shows because their grading accuracy was poor. Furthermore no self-respected Honey Judge would use them. This was recognised by the London National Honey Show Executive Committee and followed up through a policy that all honey judges should only use honey graded glasses numbered B.S. 1656. As below in (figure 4)

Grading honey for color is not fool proof and its accuracy can be down to the honey judge, steward or exhibitor, but not the grading glasses surely. When one holds up a jar of honey and compares it against the grading glass, what is it exactly that is looked for? What is determined as light, medium or even dark?

The British system for grading honey at honey shows is kept to the grading filter glasses. Each set is comprised of two calibrated glasses, one light and one dark. Every entry in a show is compared to theses glasses and the color is worked out as any honeys that are the same or lighter than the lightest colored grading filter glass is determined to be light. Any honeys that are the same or darker than the darkest colored filter glasses would be determined as being dark. And honeys that show a color between the two grading filter glasses are classed as being medium honeys. So there you go, Bob's your uncle, easy as eating a piece of cake. All in all, an elegantly simple way to separate classes of honey by color. Or is it as simple as that?

As a novice honey judge my mentor was the great Irish honey judging master Michael Moore. While serving as his Steward part of my training was to learn how to properly color grade honey for the show bench. Mr. Moore's advice to me was, "that when judging a jar of honey for color one has to think of the amber color of the traffic lights. Anything below that color is light anything above that color is medium." Considering that we approach traffic lights on numerous times a day it isn't too hard to understand this human thinking. And I find it a very approachable way at analysing the color grading of light and medium honeys. The color of the traffic light is very close to that of the lighter colored grading glass and I must admit that this analogy stays in the back of my mind while I am placing honey into color grades. But on the last word I would always give the exhibitor the "benefit of the doubt."

I believe that the officers of British BKA came up with a very clever idea in the introduction of the Grading glasses. However, being a honey Judge myself, I have purchased three different types of grading glasses in the past. The first two sets were not of the BS specification. A few years hence at the National Honey Show London this issue was recognized as a problem. The committee addressed this issue by publicizing the problem and following up with letters to honey judges that the use of grading glasses at the National should only be of BS specification 1656. Further more before judging commenced at the National a meeting of all judges was called. Again this issued was reiterated by the Judges Referee (in this case Margaret Davies). Her exact statement was: "could all judges please check that your grading glasses are of BS 1656 and if its not, do not use any other type. I have a couple of extra ones with me." The problem was quickly cleared up by using the correct B.S. and color grading glasses at the National and the show was soon back on an even keel. Or does the plot thicken?

There is no doubt that honey judges up and down the country have different color grading glasses that they use at local honey shows but these are few and far between. But most national honey shows and well run association honey shows have adopted the criteria of the London National Honey Show committee by publicizing the proper B.S. Grading glasses in their honey show brochure.

On a personal note, I have seen some very old grading glasses that seem to be totally different in color (the dark one being the color of boot polish) and to me they are about "as useful as a glass eye." But are different to what the majority of honey judges use. Are these the type of grading glasses that Mr. Herrod mentioned about "juxtaposition of the two"?

I think in the interest of standardization throughout all honey shows that these old type of grading glasses should be kept for nostalgic reasons only, purely because there are very few of them left. I can only imagine that there are less of them than your fingers on one hand. But let's face it in those days they made everything right (or so they thought).

But nothing is as simple as that! Having spoken to Paul Smith,

Figure 1

Pfund Color Grader

Figure 2

Lovibond Color Grader

Figure 3

Honey Color Analyzer

of Thorne's Beekeeping supplies, he mentioned that the grading glasses that he took delivery from Lovibond do seem to have deteriorated in color the light one more so than the dark one. Paul mentions that:

"Several years ago the glasses were made from plastic. The later glasses have been produced from laminated glass. When held up to the light, next to each other, both sets are identical. However if you place them on a white sheet of paper the plastic 'light' glass is considerably lighter than the glass 'light' glass if you see what I mean! I think this is possibly due to refractive properties of glass v plastic."

He is aware of the manufacturing problem and is working with Lovibond on this. Paul mentions that the answer may be to look at photographic filters produced by the Lovibond system. But who is to say that the colour of these might not deteriorate with time also? It tells me that the glasses should be checked and calibrated against a standard on a regular basis and replaced as needed.

Another idea from Paul would be to change the way honey is judged. Would it be possible to hold it up to the light? I know most of the honey judges do use this method. Here's a suggestion. What about, to help standardize the UK honey shows. If all BK associations who promote and run honey shows order new grading glasses for honey judges by a certain date. This would enable Paul to order a new batch, and then everyone would have the same. This could be done every 10 years or so. And really they are not that expensive.

This leaves us all in a bit of a dilemma doesn't it? What shall we do in the mean time? Well beekeepers are great thinkers, or so they say! I think I have the answer for a new wave (?) of thinking. It might just be worth taking a bottle of Guinness or cola (whichever you prefer) and a bottle of Iron Brew. The Guinness can be used to judge for the dark honeys and the Iron Brew for the light and medium. These drinks are universal and they never deteriorate in colour whatsoever. Plus the fact you can drink them at the end of the show! What better way to toast a successful show? I suppose I had better come off of this before you think me completely Looney and say that a solution to this problem needs to be found quickly in order to maintain consistency in grading.

What about our beekeeper friends across the pond!

On the other side of the Atlantic there are many systems in place for grading honey the most noted being the Pfund grader designed in 1925 by Dr. A. H. Pfund at Johns Hopkins University. The original instrument was the Pfund Wedge Comparator (figure 1) comprised of a wedge of amber glass, a wedge shaped cell for holding the honey sample and a millimetre scale with a pointer to indicate the wedge positions where a color match was obtained. It was deemed to be the official color grader of honey in the U.S. until 1951 until the color comparator arrived on the scene.

Another instrument is the Lovibond colour grader (figure 2) designed by Dr. Joseph W. Lovibond before the 1900s. With this device a sample of honey is placed in an optical glass cell of fixed path length and is compared with coloured glass standards representing a range of Pfund equivalent values until a color match is obtained.

The latest being the Honey Color Analyzer (figure 3) that digitalises the percentage of light transmittance of honey compared to analytical grade glycerol. The transmittance value allows for the identification of the honey's Pfund grade and boasts a Pfund range from 0 to 150 mm. Once color graded, the honey is assigned to one of seven color grades (shown below). This analytical method of determining the color of honey was devised as a means to separate honeys for the purpose of commercial sales (import and export) and price determination.

Color Grades of Extracted Honey

The U.S. system of grading colour in honey is based on the Pfund scale. This method, established by the United States Department of Agriculture (USDA), is being used and accepted by many countries in the European Union (EU) as well.

USDA Color	USDA Color Standards	Pfund Grade
Water White	Water White or lighter	8 or less
Extra white	Water White to Extra White	8 including 17
White	Extra White to White	over 17 including 34
Extra light amber	White to Extra Light Amber	over 34 including 50
Light amber	Extra Light Amber to Light Amber	over 50 including 85
Amber	Light Amber to Amber	over 85 including 114
Dark	Darker than Amber	over 114

Phew! That was not so easy to get down, never mind using it. Could you imagine what it would be like taking this instrument to honey shows? If beekeepers were scientists or even honey exporters and importers I could understand the use of

this instrument. Even then it's not the perfect solution for accuracy. This was found when an exercise was carried out by the United States Department of Agriculture (USDA). They sent known samples of honey to those who owned the Pfund instrument for testing. The conclusions were far from what was expected. There was a wide difference in the sample results. It was found that some of the Instrument's color grade standards had faded with time. Again we are back to the old problem of inconsistency, but this time with seven color grades rather than three!

There is no question about it, honey does need to be graded for color, but more so for countries that import and export honey in large quantities. And yes, there should be policies and standards set in place or else you could end up with a barrel of mud. But I am a great believer in not getting too complicated and using common sense.

International Standards

An international code exists for honey, but is variable and regulations are generally unique to each country. Often, specific levels of enzyme activity (diastase) and/or HMF (hydroxymethylfurfural) are allowed in imported honey. Both are influenced greatly by heating honey and can change significantly during storage or transit if the honey becomes too hot. Color is especially affected by heat.

So who is right on the grading of honey in this case? I favor strongly the British system. Especially when it comes to judging at honey shows. But grading honey for color on the World Market is a different ball game entirely. According to the CBI strategic marketing guide on honey and beeswax, December 2002 looking at Quality and grading standards in Honey quotes that:

All honey imported into the EU must comply with the definitions and standards laid down in EU Directive 74/409/EEC. In June 2000, the Council reached political agreement on a new honey Directive introducing the following changes:

It looks at honey in general from HACCP to HMF, packaging etc. But further on it looks at colour stating:

Color: The most important aspect of honey color lies in its value for marketing and determination of its end use. Darker honeys, with the exception of special types of dark honey, are used more often for industrial application, while lighter honeys are marketed for direct consumption. Dark color and strong taste often coincide. In many EU countries consumer preferences are determined by the colour of the honey as an indication of a preferred flavour. Next to general quality characteristics, color is the single most important aspect determining import and wholesale prices. Honey color is frequently given in millimetres on a Pfund scale: an optical density reading generally used in international honey trade. Alternatively, the U.S. Department of Ag classifications are used.

"To Be or Not To Be?"

It looks as though grading honey for color may be about the same type of scenario that played out with beekeepers and their hives in the early 50s. Many of you can probably remember what a mess that was! The question then was which hive was the right one, National, WBC, Commercial, Dadant or Langstroth? And those are just a few that were on offer. It was like the decision given to the Charge of the Light Brigade at Balaclava. Well, we all know the end to that story, don't we? The British went for the B.S. National. On a personal note, without upsetting any one I hope, I am one of those mad beekeepers that went the same way as 90 percent of all Global beekeepers and chose Langstroth. In the end both cases ask the same question, what is the right way?

Are we British and some American beekeepers/honey show judges breaking the rules by not using the Pfund scale in grading honey for color or does it matter? I have to stop and scratch my head here a wee bit. Admittedly I am not into this EU stuff and never was. I am British through and through, and when it comes to judging honey shows, my friend and co-author Robert Brewer here is too. Could you imagine all honey judges having to carry a Pfund instrument to the shows? Never mind the cost of a couple of hundred pounds or so. And could you imagine all jars of honey being graded and written down into seven classes?

For better or worse, many of the major honey shows in the United States use all seven USDA honey colours on the show bench. As one might imagine, the shows take much longer to judge since placing entries into the proper class involves more time on the part of the show secretary and the judges must judge seven classes rather than three. The advantage to this system is that the observer gets to see a wider array of honey and more entrants go home as happy winners. Of course to be accurate there has to be a colour comparator available and if there is only one then the task takes even longer. There is, however a movement afoot to change the U.S. honey shows to the British system, and progress is definitely being made.

It occurs to me that in the greater scheme of things, the methods used to determine color grade are not as important as the effort to continue the proud tradition of honey shows. However with our shrinking "global society" it seems that some standardization would be good. Certainly the less complicated way to grade for the show bench is the British method. Not saying that the Pfund scale is not a useful tool, but one must question whether is it the best tool for the show bench?

For several years there has been a coming together of judging techniques between Great Brittan and the U.S. There are now many judges who are certified through the WBKA (Welsh Beekeeping Association), at least two of which have Stewarded at the National Honey Show in London and one of which at the Irish National as well. The co-author here is one of those judges and he is now the certifying representative in the U.S. Since my introduction to the British method of Judging through the Welsh BKA I have found that it could be an export to the rest of the world. It also pleases me to no end that I have been invited to Judge at the Welsh National with my co-author. It would have been very unlikely to receive an invitation if we used the pfund system.

As Bob Dylan once sang, "The times they are a changing", and it seems that color grading for the show bench is no exception. But rather than becoming more complicated it is my hope that the Human touch will prevail. BC

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When It's HOT!

Kim **Flottum**

Both Bees & Beekeeper Need To Be Careful When It's Really Hot Outside

The cold, wet Spring we suffered through a bit ago seems to have left no residue, and as usual Summer is again generally hot. Maybe not really, really hot where you are, and maybe not as hot as it was once ago, but most everywhere it is hot nevertheless. You and I have some options though. We can go inside where the air conditioning is set on freeze to escape the heat, the humidity, the bugs (the other bugs), and the sweat-in-your-eyes discomfort that reigns outside. Or at the very least we can sit in the shade somewhere with a cold towel and a cool drink with lots of ice to ease the burden of the day.

I am always amused, maybe amused isn't the right word, but it works for now, at how soon we forget that other discomfort . . . the bitter cold of last Winter, the knife-sharp wind freezing unprotected ears, legs frozen stiff because our city pants aren't made for anything like this, and red, raw wrists exposed when cleaning yet another six or seven inches of snow off the car window in the late afternoon dark after work. I am, however, definitely not amused when I think of the cost of keeping that propane tank out back full of gas all Winter long. Forgetting all that misery isn't all that hard after all I guess.

But it's a hot Summer time now . . . for you and me, and for the bees. And good beekeepers work hard at keeping cool when working bees. Dehydration, heat exhaustion and certainly heat stroke should definitely not be on the to-do list when working bees in the Summer time. And, with the added emphasis of keeping your bees in full sun to help with both *Varroa* and small hive beetle control, setting bees where there is that dappled afternoon shade isn't as common as it once was.

The best thing to do is to not work your bees during the hottest part of the day. That's a big 'duh' factor if you can swing your schedule that way, but most of us don't have the luxury of perfect timing and we work bees when we can, not when it's perfect.

Full sun in the spring is a good thing when generally the weather is cool. These nearby trees will offer some later afternoon dapple shade...good for the beekeeper, maybe not so good for the bees.

So let's start with keeping the beekeeper cool. Small things make a difference.

For instance. A jacket with an attached hood that has solid cloth in the back of the hood is nice because it keeps the sun off your neck and head, but it offers no ventilation. This is the gear I wear in early and later season, but when it starts to get hot I switch to a cooler veil. I use one that loops under my arms and has netting all the way around. I take the hood off my regular beesuit and as a result don't have to zip up the front zipper all the way, keeping the neck open a bit. Between warm air rising and escaping all the way around the neck, and the back of my head open to the breeze, I stay comfortable. The white netting in back blocks most of the sun so I'm exposed to neither hot sun, nor UV rays. And the single layer hat is cooler than the hood and baseball cap combo I have to wear under the hood to keep the veil off my face.

I'll wear this when it's warm, but when it gets warmer I'll make some changes.

With the jacket and veil combo I can easily add a cool, damp, even wet towel around my neck and with this particular veil easily and quickly exchange it with another when it is used up. With my sleeves pushed up, and since I seldom wear gloves this outfit is certainly safe and it keeps me clean and pretty cool . . . but I still have on a substantial jacket.

Hotter yet? Ok, off with the jacket already. I have a simple white shirt, obtained at a Good-Will store for a couple of dollars that replaces the jacket. It's lighter weight material, the

Full armor, for coolish days.

Jacket but light veil.

Simple white shirt and light veil, for warm days.

As cool as I can ge

sleeves roll up easily, it isn't as long and it is much, much cooler. When coupled with the removable veil, this outfit is almost as cool as you can get, and still keeps me reasonably clean, with good, but not perfect protection from anxious bees if I have a cotton t-shirt underneath. Of course if you are unsure of what you are doing or you end up doing some heavy duty work, anxious bees can be an issue. I always have heavier protection close-by if needed.

But let's face it – when it is really, really hot – well, when it's that hot you probably shouldn't be in the bees anyway because they aren't out foraging because plants have shut down nectar production. When it's that hot and I just have to be in the bees, it's down to a t-shirt and light veil. I have pants of very light-weight material I wear for most all of the Summer because I always wear something on my legs – not so much for the bees because they seldom bother my legs, but rather because of the time I spend on my knees fixing things, sparks from the smoker when lighting, walking through weeds

DANGER!

Heat exhaustion and heat stroke are no laughing matter, and you should know the symptoms in yourself and in a partner if you are not working alone. For ***Heat Exhaustion*** watch for these signs . . .

- The skin goes cool, feels moist, and you look pale.
- You may start to sweat even more than previously, and you'll start feeling faint and dizzy.
- Muscle cramps in the large muscles for no good reason, and just plain muscle pain, maybe all over.
- Nausea isn't uncommon, headaches and a dizzy type of weakness, along with extreme thirst.
- You probably won't have one, but a thermometer will show a rise in your core temperature to about 100° or so, with a rise in pulse rate – not good.

If you or your partner show signs of Heat Exhaustion, here's what to do right away . . .

- GET OUT OF THE SUN. NOW.
- Get away from the bees, sit down, take off as many clothes as you dare (see next page).
- Drink fluids. Water. Sports drinks to replace those lost salts. *But no alcohol, and no caffeine.*
- Pour cool water over you, soak what clothes you have on, put a cold cloth on your head and around your neck, and maybe chew on a salty snack, like chips or pretzels.
- When back to normal, call it a day with the bees, put everything back together and finish tomorrow. They'll be OK, and you'll live to finish the task.

Worse than heat exhaustion is the life threatening ***Heat Stroke*** that you absolutely need to be aware of. Symptoms of Heat Stroke . . .

- Dizzy, confused, hallucinations, passing out, tipping over, stumbling, incoherent language.
- Skin is not cool, but hot to the touch, probably dry or drying, and hyperventilation isn't uncommon.
- Core temperature is 105° and rising, and blood pressure (you do have a sphygmomanometer (blood pressure machine in your tool kit, right? There, next to your notebook.) will rise, then fall, probably rapidly.

When you see that in someone else, call 911 NOW. Don't wait. Don't tarry. Don't make excuses. While waiting for the ambulance, get the person in the shade, get tight clothing off, bathe with lukewarm water, put in front of a fan with wet towels on them to cool them, give water ONLY if they can drink. Find out what's taking the ambulance so long.

Heat stroke can be fatal, and every Summer good folks who don't work outside very much think they can beat the heat because they're tougher than . . . what, tougher than the sun? Tougher than 100° heat? Don't play dumb with the heat this Summer. Stay cool.

to and from the beeyard, and moving supers while examining bees. It's just easier for me to have some level of protection on my legs all the time, hot or not.

Some beekeepers work this keeping cool thing in reverse, wearing little, or nothing, under a full beesuit. I haven't traveled that road yet, simply because my beeyards aren't very isolated and . . . well . . . you just never know when an errant nail will catch that pocket flap and suddenly it's very cool. I'll let those with a tad more exhibitionist character keep cool that way.

But there are other tricks. Being wet is one. One beekeeper I know always jumped in his backyard swimming pool before he went working bees. He wore a full suit and though cool, it was heavy. But it worked. You can just soak a shirt, that wet towel I mentioned, a wet handkerchief as a sweatband – anything you wear that's wet will cool you as the water evaporates – and if it's that hot, you'll be that wet anyway from the sweat you produce. But try a wet t-shirt once in awhile . . .

There are companies that make things to wear specifically to keep you cool. Ice packets in pockets, cold

Temperature protection gear can help keep you cool.

water inside vests, even helmets with solar powered fans exist that fit in your helmet to keep your head cool.

The most important thing to NOT overlook is staying hydrated. If you're out for any period of time – say more than 20 minutes, stop, relax, find some shade and take a long drink of water – not soda, ice tea or beer. Water. Every 15 minutes take another drink – at least six ounces, eight better, and 12 if you can. If, like me, you perspire freely, take something to replace those lost electrolytes. Most of us don't do this on a routine basis, and the physical energy gets kicked up a couple of notches when you are working hard and it's hot. And just being a little bit nervous adds another dimension to the event.

But what about your bees?

Start with water. Lots of it in the Summer time. Minimum, a quart a day per colony. Maximum, *a gallon a day*. For every colony out there. Think of how much that is for 10 colonies for a week of hot, hot weather. That's four, five gallon pails full of water, minimum, and more than a honey barrel full of water max, in just a week. And they will get that water somewhere. The closer the better. The easier the better. The safer the better.

If you're lucky you have a nearby Spring, river, lake or pond. Lakes and rivers are great, if there's not a lot of people traffic nearby wading, fishing, or boating. But smaller bodies of water . . . puddles, creeks and ponds can be problematic during hot Summers because they tend to go dry, right about the time the bees need them most. Keeping an ample supply of fresh water just for your bees is a no-brainer that we far too often overlook. So first, make that happen. How? Good question.

If you don't have that pond, consider making one near your bees if possible. A small, continuously filled fish pond is ideal. Installing an automatic filler is necessary, and being able to disconnect it in the Winter is also necessary, but it's a good first choice. If that's not in the cards . . . if you are on a roof for instance, a smaller version of this is possible, that is, a self-filling livestock watering device can work and is a good idea. They don't go dry because a float valve turns on when the water level falls below a preset point and refills the water holder (just like the pond). Of course you have to have a dedicated water line to that device – and a flexible garden-type hose doesn't work as well as a pvc pipe, so there's that hitch to get over, but it's possible.

A slow drip faucet works, but remember – a gallon a day per hive – it better not be too slow. Pails, pools, stock tanks, barrels – anything that holds water, enough water works. But the smaller the container, the more you have to fill it the more likely it will go dry on just the day the bees

A dedicated, automatic waterer can't be beat for consistency.

need it most. And once dry, they go somewhere else . . . bird baths, swimming pools, pet bowls, air conditioner drains . . . lot of places you don't want a bunch of bees. Bees need water and will get it somewhere. You don't let your dog, cat, chickens or other animals go without water . . . why your bees?

Then, ventilation inside the hive. Screened bottom boards have taken a roller coaster ride in popularity during the past few years. More than 120 years ago, A. I. Root suggested, and then made for sale screened bottom boards for his hives expressly for better ventilation. He used window mesh screen because he wasn't worried about *Varroa* or other creatures, he just wanted fresh air inside.

Langstroth was insistent on having fresh air inside his hives and made certain there were many and large openings for air to go bottom to top and escape rapidly. But then, he did the same with his houses and churches and other buildings. Fresh air was important. It still is.

For your bees, use screened bottom boards in the Summer for their ventilation benefits, and make sure there is escape above for all that warm, moist air to rise and release. If you use inner covers or crown boards, raise them up so air can move up. Lift up the cover, too, for even better air movement. The bees will guard the cracks and crevices you create, and you can always reduce them if you think robbing might be a problem . . . and it might if it is so hot that the plants have quit producing and scout bees find a weak hive to plunder.

Some beekeepers make sure each box has one less frame – nine

Ponds like this can dry up in a hurry when you need them the most.

That swimming pool just over there...that's going to be a problem if you don't train bees early in the season where to get water.

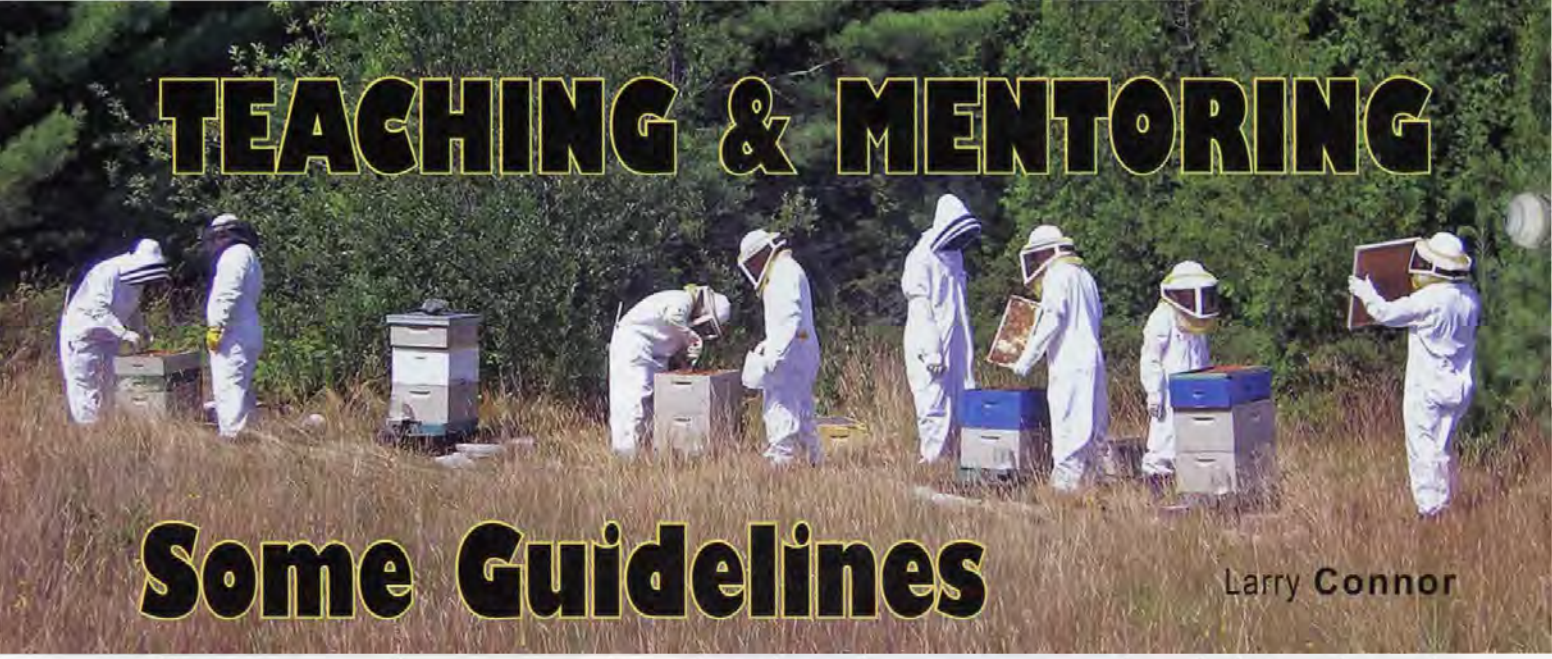
for 10 frame, seven for eight frame, to widen just a bit the gap between frames to assist air movement – not a bad idea, especially if you have seen hives so hot the wax melts. That is not a pretty sight.

Some beekeepers go so far as to offset supers, leaving a one inch gap or so, so hot air can escape from every super and not have to travel all the way to the top of the stack. Bees will guard these entrances, and even in very rainy weather little water will get in the hive, and then, it will simply run out the front door. The increased ventilation these gaps allow more than makes up for this small inconvenience.

If your climate is so hot, so very hot that sitting in the afternoon sun rises the temperature to wax softening conditions, then afternoon sun, *Varroa* or small hive beetles notwithstanding, should be avoided – that dappled afternoon shade isn't all bad.

And better ventilation is good for other things than just being cool. Think honey dehydration – you need to stay hydrated, but your bees want to dehydrate all that honey they're bringing in. And if warm, moist air can't readily escape, it takes more bees fanning to get it dry, and until it's dry there's less room to store incoming nectar – it's a downward spiral from the bees' perspective...so give 'em room, give 'em ventilation, and give 'em enough water to get them through another hot, hot Summer.

When it's hot outside, make sure you are juiced up and ready to sweat, have more water on hand, and be prepared to take off a bit of that beesuit to keep going. And make sure your bees are as cool as they can be in that hive out there. They need water, and they need to be cool as much as you do. Don't let your Summer bees die of thirst, or worse, over heat when the sun shines. Keep cool. BC



TEACHING & MENTORING

Some Guidelines

Larry Connor

Mentors are, of course, teachers. but they also serve as coaches, helping through losses and setbacks, and reigning in just a bit some of the 'newbee' enthusiasm.

Every new beekeeper needs a mentor. That simple statement is pretty radical for some folks, but it reflects a need that has been growing in the beekeeping trade for some time. The first big push came with the introduction of the tracheal mite after it was found in Weslaco, TX in 1984, then the *Varroa* mite's arrival in 1987 forced beekeepers to rethink bee culture as a business or a hobby. In October 2006 colonies started to die from a syndrome now labeled Colony Collapse Disorder (CCD). This last crisis awoke passions dormant in many people who wanted to keep (or may have done so in the past), but now want to help honey bees by keeping them. The need for pollination of fruits, vegetables, seeds and fiber lead many folks into the beekeeping craft.

Prior to 1984 a lot of beekeepers were successful by simply putting bees in a hive and letting them care for themselves. The most common problems were American foulbrood, winterkill due to starvation, and exposure to insecticides from agricultural crops. Many areas experienced a ten percent loss of colonies every year, which was easily replaced by the highly reproductive honey bee and its nature to swarm. Some beekeepers chased the swarms while the more advanced managers prevented swarming by population management and providing room for brood nest expansion.

Most bee clubs, both state/provincial and local offered bee schools, some as short as a day or six to 10 hours over several nights. Now these courses have grown into longer programs. Some of the longer ones involve up to 20 hours of instruction both classroom and field orientation.

Clearly the biggest change has been the widespread use of mentors or trainers in beekeeping. I had several people help me as a kid growing up in rural Michigan, including two neighbors and an uncle. There were instructional materials available through the 4-H program. The Boy Scouts offered a merit badge in beekeeping. Most of the 4-H programs still exist in theory, but it is hard to find the printed material suitable for today's kids. The Scout merit badge is no longer available, much to the frustration of many men who learned beekeeping through that program.

Many bee clubs have youth programs and even scholarships for serious individuals and their families that are willing to make the time commitment to take courses, assemble bee equipment, and perform bee fieldwork for a year. Some clubs offer scholarships that include a course, bees, bee equipment, smoker, hive tool, veil and textbook. Not surprisingly these are the clubs that have grown enormously over the past few years. There are several clubs that have grown from the 100 to 200 range to numbers approaching 500 membership units (often families).

Mentoring Models

Every existing beekeeper can mentor someone less experienced. Using second year beekeepers to teach new beekeepers (a.k.a. newbees) may seem radical, but this is not unlike medical or nursing training done under the careful supervision of much more experienced doctors and nurses. With beekeepers the success of the mentoring programs is often linked to the various Master Beekeeper programs that provide clubs with a go-to person for expert advice and teaching suggestions. While these folks are far from all knowing, they usually have the resources and training to help find the information that someone needs.

In areas lacking Master Beekeepers, the role of 'expert' falls onto local university and college faculty, bee supply dealers, bee inspectors, and sometimes folks with little training but a lot of enthusiasm.

Most mentors do best if they only have one student at time. This gives both parties a better chance to schedule bee work, and flexibility to chase after a swarm at the ring of the phone. These relationships often develop into friendships with lasting benefits.

Mentors rarely charge for their service. They may be gifted by the student, or enjoy the experience of sharing knowledge. Some may share in bulk purchases of equipment and bees.

Club-supported Mentor Programs

Clubs like the Backyard Beekeepers in Connecticut and the Collin County Hobby Beekeepers Association north of Dallas have meetings of new students with mentors and Master Beekeepers an hour before the regular monthly meeting is set to begin. The Collin County group has a huge youth program, and the students are all teenagers. Some of the mentoring is done by other teens, which I find exciting for both groups. Every effort should be made to get each student to check in with the latest experiences with their bees. These regular meetings, in conjunction with visits with the mentors, will provide a great deal of support to the new beekeeper.

Mentors as Coaches

A mentor is, of course a teacher, but she/he is probably also a coach, helping the beekeeper through the loss of a queen or a colony. Experienced beekeepers forget how incredibly involved newbees become with their bees. One friend refuses to let students name their colonies or queens, just in case one or more of them die. [I have been naming colonies and queens for years]. If a queen dies the mentor helps them get another one, either by purchase or by putting brood in the queenless colony so the bees can raise their own.

Teaching for Income

Most bee course instructors get part of the registration fee as their payment of teaching. They are rarely making much money on these events, but the income does justify the cost of travel, preparation time, and often a great deal of collecting and setting up of equipment. A registration fee of $100 for a ten-week course might cover the cost of the $30 to $40 textbook, $20 to $30 for the break refreshment and the meeting room rental, and MAYBE $30 for the instructor. That figures out to $3 per student per session, and that is not an unreasonable fee for the student, but may not be much for the teacher. Doubling the teachers income increases the cost of the course by $30 but increases the teacher's salary by 200%

Many course instructors also sell wooden ware, extractors, packages and nuclei, both as a service to the students and as a supplemental income. Few people get rich teaching beekeeping.

Good beekeeping teachers should have studied their beekeeping thoroughly, perhaps completing the Master Beekeeper requirements for a respected group. They should also be able to organize and run a classroom environment: set up a class schedule, stick to a class schedule, allow all students to participate and ask questions, control those that speak out of turn, and be willing to refund the registration fee to a person who is just not going to fit into the beekeeping course (fortunately, this is extremely rare). There should be a course evaluation provided by the instructor.

Then presentations must be organized. Very few textbooks come with a set of PowerPoint or Keynote programs that follow the chapters of the book (Dr. Dewey Caron's book *Honey Bee Biology and Beekeeping* has a set of presentations available from the author for classroom use only). Many instructors spend years developing and refining talks, adding local flora and beekeeping conditions to talks they have obtained from the few overworked extension apiculturists we have in the United States. Others

One of my students from 2009 needed some coaching when one of her colonies swarmed. Cathy King and I went to her house in Kalamazoo and helped capture the swarm. Janet and I went through some of her colonies. This year Janet and another third-year beekeeper are coordinating the young people's apiary at a nearby nursery.

have found and converted to computer files old beekeeping movies, video tapes, slide sets and other media, but much of that is from the pre-trachael/varroa/CCD era and is in great need of a good revision. Some excellent materials are offered from various Internet sources, but please do some fact checking on these programs, since I find many errors in locally produced teaching materials.

Experienced beekeepers with an interest in teaching should contact local nature centers, community colleges, conservation clubs as well as nearby bee clubs and extension offices. Like most things, once a person has offered a class and done it well, there will be follow-up requests that can provide a nice income off-season. It is a good second income or retirement gig. Get permission from prior class members to quote from glowing course evaluations.

At minimum beekeeping instructors MUST stay up on their reading of the bee journals and perhaps subscribe to one or more research magazines so they know what is going on in science, agriculture, farming and nature. Every year 10 to 20% of the previous year's presentation material should be fact checked and updated for accuracy. Computer-based programs make this easy.

Materials downloaded off the Internet should be referenced, and checked for any payment due to the creator of the artwork or photo. Some sharing of materials with other instructors is an excellent idea, as it speeds the process to developing a complete, up-to-date set of programs.

At each session plan to arrive early with a helper to make sure the classroom is preset with visual aides, hive equipment, audio visual materials preset and loaded (with most projectors you can them preset but with the bulb off, ready to be turned on with all the sizing, focusing and computer communications intact. *Every minute you spend of your classroom time setting up material is lost teaching time. Multiply those minutes times the number of students in the room and this is a huge waste of valuable teaching time.* It pays to have someone bring a backup projector and laptop just in case there is a technical problem. Mac users must remember to bring the patch that connects their laptop to the projector or a thumb drive for the

simplest PC using PowerPoint. And as a final backup have a printout of the entire presentation for your use, if not for every person in the class!

Beekeeping classes should include a field session. Usually these show how to install a nucleus hive or a package of bees. Make sure you have a location secured, a backup date in case of snow, rain or delayed delivery. Be ready for follow-up small group sessions for those with date conflicts, since this is a key part of each student's training.

By the time the course is completed you should have a complete list of each student and the name and contact information for their mentor. Email or phone each party on a regular basis to 'check-in'.

Get Good Help

Finally, it is really a wonderful idea to recruit and train an assistant or two who can step in and teach a class if you are not able to attend. This can then move into a team teaching situation, sharing the educational effort. Invite individuals who specialize in certain fields, such as a bee disease expert, but make sure they are suitable for newbees. The last thing you want to do is scare people from keeping bees because a presenter has given every horror story she has collected over a lifetime of research. BC

Off to the Heartland Apicultural Society in July. On August 20 and 21 I offer a Beekeeping Master Class in Denver Colorado. In September I will be at the Western Apicultural Society meeting on the Big Island of Hawaii, and will teach a one-day Master Class on September 16 on Rebuilding and Growth of Colonies. Information on the last two classes, as well as Pay Pal registration, is at my website www.wicwas.com

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Join us at our 10th Heartland Apicultural Society conference, for beekeeping education and fun.

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www.heartlandbees.com or Tom Webster at thomas.webster@kysu.edu, 502-597-6351 or Greg Hunt at ghunt@purdue.edu

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THOSE WHITE HOUSE BEES

Kim **Flottum**

I gave Charlie Brandts a call in May to see how those White House bees were progressing, how things were going as far as visitors, educational opportunities and other guests were moving along, and how his bees at home were doing, which aren't all that far away.

Charlie's locally raised, open mated, survivor Carniolan-like queen in the White House hive has been going gangbusters since early Spring, packing in brood and bees, and the bees are packing in honey (three supers by June). The biggest obstacle Charlie has with this very unique beeyard is moving bees out of it if he was to make a split because taking a split home on the train isn't in the best interests of the bees, and the overriding concern of keeping only a single colony on the White House lawn. One is enough so making more isn't in the equation. So . . . swarming was in the air when I called, and swarm control was the topic of the day . . . with the given difficulties mentioned. Hence the tower you see here. Providing lots and lots of room for a large and open brood nest, without a queen excluder on, was about the best Charlie could do, along with making sure there was adequate room for incoming nectar to store, and honey to put away. It is a challenge, without a doubt, until enough honey is capped to remove.

His weekly inspections always found swarm cells and though removing them as he found them the population kept increasing. With over 60 pounds of honey and quite a bit of uncapped nectar on already in May, and more on the way in late May and June, the promise of swarm control difficulties and a good honey crop both loomed.

Charlie was trying to be proactive this year with queen replacement, and was already thinking of replacing this older queen in June with another locally produced survivor . . . we'll see how that works out.

At home, very near the city, Charlie's own bees are doing OK this Spring. He worked hard at making summer nucs last year and is pleased with the results so far. His definition of a nuc is pretty much anything with less than 10 frames. Although there was some Winter losses,

Some of the honey crop already in May.

That Carniolan-like queen.

Queen cells – swarming is in the air.

his remaining nucs, and now colonies are doing well. Charlie is looking for a strong nuc coming out of Winter because he has an early honey flow and a strong colony then will take advantage of that flow. He pushed them a bit this year early on with protein and sugar, firmly believing in supplying the best nutrition possible and they responded well.

Overwintered nucs are a great way to requeen a colony that needs that kind of attention too, and sometimes can be used to really boost a package in trouble. You'll get good production from either with that kind of help.

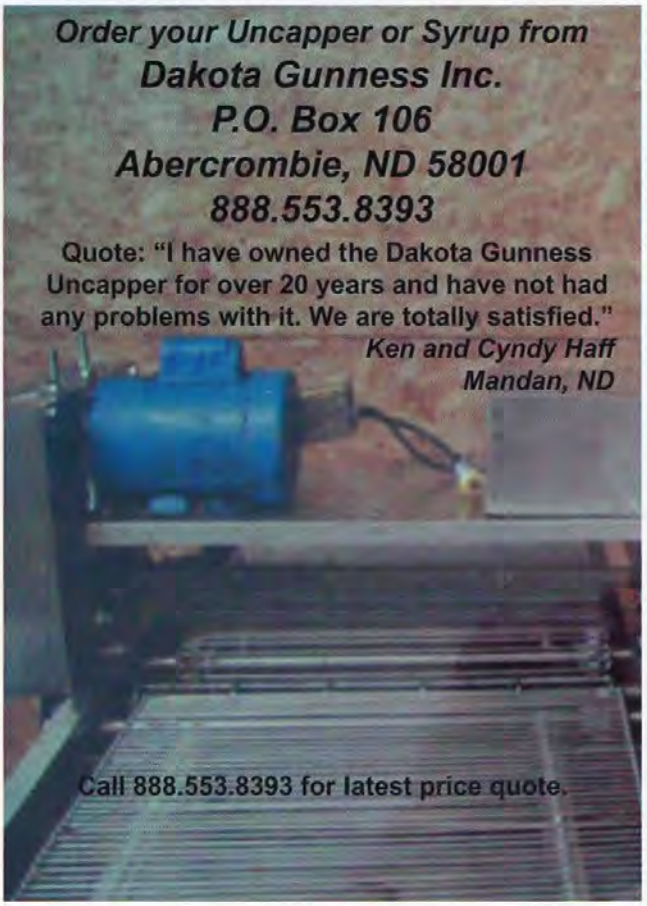
Including this one-of-a-kind location, Charlie has bees in several other places – a vegetable farm, an organic pick-your-own farm, that has an observation hive and sells his honey, a few at a relatives, plus quite a few at his own place. His operation is expanding rapidly.

Charlie's role as Educator at the White House Apiary is also expanding. Initially he would talk to visitors, and to visiting school classes when they visited the nearby Garden only when he had time from his other duties, but this has been so successful that he is now able to spend quite a bit of time talking to these groups. Most of the kids that visit are very urban, and have had little exposure to where food comes from, and how a beehive works. So every Tuesday and Thursday, from March to late Fall there's a class from somewhere out there, and Charlie's there too, getting them all up to speed on his bees, and his hive.

Several thousand children were at the Easter Egg Roll this Spring, and Charlie's beekeeping Associations – the Montgomery County Beekeepers and the Howard County Beekeepers were able to put up a small educational booth to answer questions about the bees. It was a great opportunity to meet and greet not only all those kids, but their parents, too.

Both honey and vegetables are still major players in the White House kitchen and the Chef there uses both to fullest advantage. This Summer's vegetable harvest, and all that honey should help that out a lot.

We'll check back in a little later this year to see how the harvest is doing, and how all those bees are making out. (*Photos by Alisa DeGeorge)* BC



A Moment In Time

Jeremy **Barnes**

We've only been here a moment, but we don't have much time left.

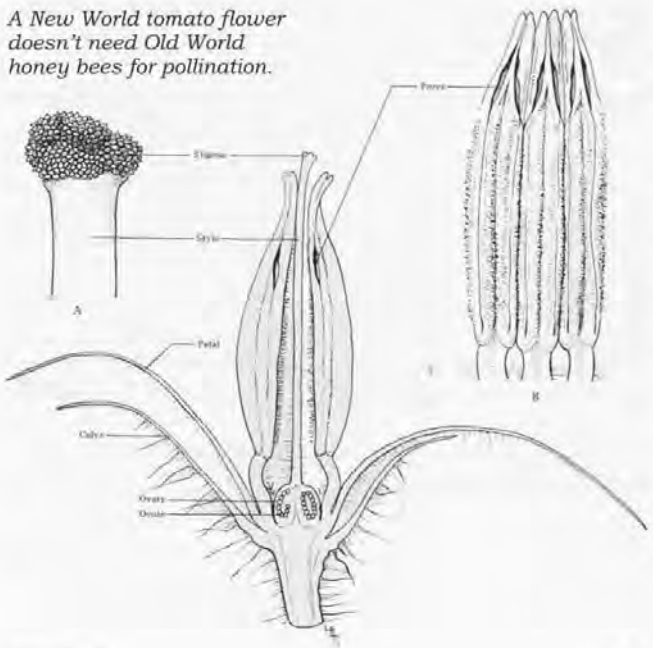
It's difficult to think in terms of geological time. For example, if we could watch a DVD of the earth's estimated 4.54 billion year history condensed into 24 hours, the first honey bee would appear 30 seconds before the end of the movie and the first upright primate (*australopithecus*) one-and-a-half seconds from the end. Civilized man would flash so fast across the screen as to be invisible to the viewer.

The last 10 minutes of the movie begin with the appearance of the first plants – ferns, conifers and cycads – that were dependent on the wind for pollination. It's an inefficient and wasteful system of transfer; the chance that the pollen of one pine will be blown by the wind to another pine cone is about 1:1,000,000

This was also the age of amphibians, insects and animals. Dinosaurs, birds and insects existed at least 100 million years without seeing a flower or fruit as we know them.

In the last minute of that movie a lot happens, not least the angiosperm explosion when, for reasons that have not been adequately explained, flowering plants erupted and insects developed a taste for their protein rich pollen but they simply devoured the anthers, as rose beetles still do, and accidentally transferred pollen at the same time.

A New World tomato flower doesn't need Old World honey bees for pollination.



After a while insects began to deliver pollen to an adjacent flower which meant that plants could not only develop fewer and more complex grains of pollen but these sperm-bearing capsules could be protected in a hard casing and relocated to shielded interiors within the flower to safeguard them from wind and devastation.

It was still inefficient in that these insects visited a wide variety of plants and much of the pollen that was dusted off was incompatible and wasted.

As Rowan Jacobsen describes so poetically in *Fruitless Fall*, the problem was that for millions of years plants had discouraged insects from eating them; now these plants wanted to be noticed. To do that they used scent, color, shape and eventually, nectar.

At that 30 second point from the end of our movie, or 80 million years ago, some species of wasps became vegetarian and were, in effect, the first bees. They grew hairs on their exoskeleton which meant that pollen would stick to them; they developed panniers on their rear legs, carried a minute negative electric charge so that pollen, which is positively charged, could 'jump' on them as they passed, and their superb antennae and compound eyes were finely tuned to scent, color and shape.

As both flowers and these new 'wasps' multiplied in numbers and variety, flowers used nectar as an extra attraction for the right customers. Nectar was initially an overabundant product from the photosynthesis process, but unlike pollen, which is a protein and expensive to manufacture, it is a carbohydrate rich in vitamins and amino acids, and amazingly economic to develop. Placed at the base of the flower, the bees had to brush past the stamens and stigma to get to it.

Sometime in the last 60 million years these 'new' honey bees made two remarkable discoveries. The first was that if they reduced the moisture content of nectar to about 18%, and covered it with a layer of wax, the resulting honey could energize the colony through the Winter and feed the brood in the early Spring. Second, they learned to communicate through dance and thus coordinate and concentrate their foraging to maximize ef-

ficiency. In other words, they specialized their services so as to enhance production. Talk about flower power!

All this using a brain the size of a sesame seed.

North America has in excess of 20,000 species of insect pollinators and at least 400 species of native bees but their solitary habits, often irascible temperament and preference for a narrow range of plant species are a poor fit in an intensive agricultural system. Hence *Apis mellifera* was introduced to this continent in the early C17th first from Germany and later from Italy by colonists who valued these relatively docile, collaborative and communal insects for the array of crops they pollinated and the honey they produced. (Cane sugar was not used as a popular sweetener until later in the same century and beet sugar only in the C19th.) Honey bees not only had a long and tried history in Europe, they also had a mystical and spiritual significance, although that was probably not why the monastic orders kept them in such profusion; the honey was used to make mead as a communion wine, the smokeless bees wax candles were valued in the cathedrals where they would not spoil the precious art work on the walls, and the propoplis as well as the honey was used for healing purposes in the infirmary.

390 years is a mere nano-second in evolutionary time. Honey bees have not had time to adapt to conditions in the Americas (for example, they have not learned how to work tomatoes, a New World plant) and thus rely on the beekeeper to provide the management and the sustenance in times of death which are essential to their survival. In return they offer the many gifts of the hive, plus their pollination benefits.

Fast forward now to the 20th century (or less than 1 millionth of a second on our DVD) and what President Eisenhower famously called the Military Industrial Complex as diversified family farms made way to huge conglomerates producing a single crop over thousands of acres and using heavy machinery to spray noxious combinations of insecticides, herbicides and fungicides, many of which were bi-products of toxins developed in the First and Second World Wars.

What we use today to kill insects originated from combinations of chemicals designed to kill people, and kill them in mass numbers at that.

Things are moving so fast that what took a hundred years to develop in the 16th century now happens in six months. Put another way, the Stone Age lasted an estimated 50,000 years, the Agricultural Age about 8,000 years, the Industrial Age 200 years, the Nuclear Age 50 years . . . and the Post-Nuclear Age?

And with it comes information as a global currency. When William Shakespeare was alive probably not more than a few hundred people could recognize him in the streets of Stratford-on-Avon or London. Today mention 'Shakespeare' and a universal image flashes across the minds of almost every English-speaking person. It may not be a close resemblance but it is what we all think he looked like.

These consortia of industrial farms, mechanization and chemicals invoked a different dance, one that involved the placement of enough honey bees in the right place at the right time before applying the insecticide treatments that would otherwise kill them. Hence the growth of commercial migratory beekeepers.

Simultaneously northern beekeepers came to rely on large southern operations for mail-order packages and queens delivered in time to expand their apiaries or to replace Winter losses so that robust colonies might be established before the spring nectar flow. But in each of the last four years Winter die-offs and colony collapse have destroyed as much as 30% of the nation's colonies, leading to a new emphasis on raising queens from proven genetic stock that are acclimatized to local conditions.

When millions of Americans moved to the cities in the first half of the C20th they left their colonies behind, and with the destruction of natural habitat those bees diminished. The solution certainly includes science but it might also include once again the concept of the backyard hive and not only in the less built up areas. It is, after all, the urban areas that have the greatest variety of flora and the least use of harmful chemicals in domestic gardens, even allowing for those we put on our lawns. Some cities are leading the way – Vienna, Austria, has an average of 34 hives per square mile within the city limits, the hives on the roof of the Paris Opera are legendary, and the colony on the the White House grounds is attracting considerable attention. Other towns, sadly, suffer from restrictive ordinances which equate bees with livestock or are based more on ignorance and fear than on an enlightened and intimate view of the natural world.

Before we 'improved' the world, the bees had figured out a way to do the amazing things that they do AND to take care of the neighborhood that's going to take care of their offspring, which means having their genetic material remain multi-generations from now. And that means that we have to find new ways to do what we do without destroying what gives the bees, and us, life and sustenance. Fortunately there are millions of little geniuses willing to gift us with their best ideas. Lets have a conversation with them because the next millisecond of our DVD might well determine what happens in the following 24 hours. BC

Jeremy Barnes is an occasional contributor to these pages from York, Pennsylvania.

Learning All About Bees

Kim **Greenwood**

New beekeepers have lots of lessons to learn and experienced beekeepers have even more lessons to learn: beekeeping is all about learning. From the Spring of 2010 through the Spring of 2011 the Vermont Beekeepers Association worked with the Vermont Agency of Agriculture Food and Markets to procure funds from the USDA Specialty Crop Development Block Grant to fund new beekeeper's start up costs for 17 Vermonters.

One of the requirements of this grant was for the new beekeepers to share the Top Five Things That They Learned. These are compiled below in no particular order. I think you'll agree that these beekeepers have a sense of humor and learned quite a bit in their first year. How did you do your first year, compared to these fine folks!

The Top Five Things I Learned About Beekeeping This Year

- Even with the help of a mentor, I should have gone to more bee club meetings to prepare to understand the complexity of hive management
- The cycle of bee-egg-larvae-worker-drone-queen-queen cells and cups
- My queens are not marked, so I do find them but it's very hard with many bees in the hive.
- How to make fondant for my Spring hungry bees and have it turn out right.
- How to help prevent swarming (to some extent) by going in [to the hive] every 10 days and destroying queen cups all over.
- I learned that no matter how many books you read or videos you watch about package bee installation, nothing goes according to plan! (My queens escaped into the hives but in both cases survived their ordeal).
- I learned that when adding honey supers, leave off the excluder for a few days. Let the bees start working the super before adding the use of the excluder.
- I learned that ventilation inside the hives is very important. I will be sure to remove the honey supers much earlier this time around. In fact, I just did that on April 10th!
- I learned NOT to destroy swarm cells when found in later stages . . . and that I need to check for these more regularly throughout the Summer!
- I've learned the importance of putting in horizontal wires on honey frames so they don't fall to pieces in the extractor. I MAY have learned to slow down the spinning while extracting.
- Just because bees *can* sting doesn't mean they will. A fully-suited beekeeper is invulnerable and can go about his or her work calmly even though surrounded by Clouds of Flying Death. Total stings since acquiring two nucs at the end of May: one, and this while weed whacking nearby (and not suited up), not while tending to the hives.
- Beekeepers are generally pretty decent folks, at least the ones in Vermont, willing to take questions, share advice, guide the new guy, etc. (although maybe it's because the ones I know are Vermonters, not necessarily because they are beekeepers).
- Queen bees are not easy to spot. Of the two in my nucs, I have had exactly one queen sighting, and that was the first time I opened the hives a week after transferring the nucs into my equipment. I have never seen the queen in the other hive.
- There are lots of good beekeeping books, but like most other endeavors, there is no substitute for hands-on experience. No book can convey the smell of a honey super on a warm Summer day, mixed with the smell of the smoker, and no book can describe the sound of a calm, contented hive.
- How the colony manages itself, in spite of the un-asked-for "help" of the beekeeper, is one of Nature's most extraordinary miracles. As one example cited by William Longgood in *The Queen Must Die and Other Affairs of Bees and*

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When you have your own honey (and it's free) you use a lot more than you would think.

Men, every worker is born of two parents, neither of whom have ever done or will ever do what the workers will do for the rest of their lives. They are born knowing how to care for brood, draw comb, store pollen and nectar, do and understand the dance steps, make foraging flights and find their way back to their own hive. And when Winter comes, they form a cluster even though not one of the bees in the hive at that time has ever been in a cluster before. I could go on.

- To slow down when working the colonies.
- Not to fear a queen cell but help make a new hive.
- I believe that bees are here to pollinate and honey is second.
- That Vermont makes some of the best honey out there.
- Even though colony two didn't make it through the Winter, the split made from colony two did make the Winter I still have two hives for this year.
- Beekeeping on a small scale doesn't require much time (10-15 minutes every three to four weeks).
- Beekeeping suits/gloves make working with the bees harder, better to just wear light clothes and a veil. No gloves!
- When you have your own honey (and it's free) you use a lot more than you would think.
- Bees are amazing!
- I enjoy working with bees and find it *very* satisfying.
- My bees are amazingly tolerant of my inexperience. I have yet to be stung. (Must be Mike Palmer's good breeding!)
- Bees respond very quickly to temperature changes and will *boil* out of the hive when the mid-afternoon sun comes out on a cloudy day. You can hear them coming.
- Bees will ignore some flowers that are very abundant and stick with the much-less abundant favorites. I have planted clover all of the yard and gardens since they clearly love this.
- Bees truly are checking *everything* out as a possible pollen source come spring, including my golden-lab cross (who did not appreciate it at all). I understand now why it's good to talk to your neighbors if you keep bees in the city. They might not appreciate that kind of attention either.
- To learn from the bees-they have been doing this for thousands of years and have innate knowledge that we do not. Also, that they are wild animals and should be respected as such.
- That everyone has a completely different way of doing things. Some people medicate, others don't. Some people winterize the hives, others don't. Some people like plastic foundation and drone comb, others prefer natural small cell comb and would never use drone comb.
- To keep good notes. After every hive inspection and even sometimes after jus sitting and watching the bees for a while, I would be sure to make notes in my log. I sometimes would record things that would make more sense later, once I later noticed other things they were doing and how they were progressing through the season.
- Ultimately I was not very surprised to learn that I really don't care about getting any honey at all – that I really love the bees and would do this just for the experience of keeping them, not for the end result of honey. They have also reminded me of the value of patience, the ability to take one day at a time, and also to really notice the daily weather patterns more and what's in bloom around us.
- Each of our two hives have totally different behaviors, yet they come from the same stock of bees. The one hive is much more aggressive than the other.
- The bees are so very dependent on the beekeeper to survive. Because of disease and hard Vermont Winters our assistance is absolutely necessary for their survival.
- They are so organized as a society of their own. Each bee has a job to do and it all works well to keep the hive from dying.
- The ability for the bees to keep the hive at a temperature in the Winter necessary for their survival, and cool enough in the hot Summer months.
- The queen is the center of the universe for the colony. She has an amazing ability to lay so many eggs and such a long survival rate compared to the worker bees.
- Always have spare parts. Several times I had to juggle things since I didn't have a few extra items. Case in point was when I ordered only enough frames and foundation to start my hives and ending up being short since I decided not to use the drone frame right off.
- Organization saves time. I can easily spend more time running around getting my stuff together than actually with the hive.
- Patience. It's easy to convince myself that I have a new emergency at each inspection. Most of the time the bees work it out on their own with little or no manipulation.

To keep good notes. After every hive inspection and even sometimes after just sitting and watching the bees for a while, I would be sure to make notes in my log. I sometimes would record things that would make more sense later, once I later noticed other things they were doing and how they were progressing through the season.

- Don't over commit. I have many things I would like to try with my bees, top bar hives for instance, but not enough time to do them all. I have had to put off some projects to the future so that I can focus on the things that must happen this year (keep the first hive healthy so we can get surplus honey in the fall and to replace the 2nd hive) and a few manageable extras (start a third hive, try my hand at overwintering a double queen nuc, and possibly keep a few bees at a second site to make a neighboring farmer happy).
- Have fun. It's a hobby. If I get too stressed by it it's no longer fun and there are many other ways to not make money that don't involve tens of thousands of stinging insects.
- Honey bees can be pretty friendly.
- Worker bees without a queen will lay eggs and these eggs will grow into drones!
- Perhaps for our northern climate I should buy a nuc of local bees.
- If at first you don't succeed, try again.
- Treating for mites is essential.
- Feeding is critical when colony is weak.

Each of our two hives have totally different behaviors, yet they come from the same stock of bees. The one hive is much more aggressive than the other.

- It is a bad idea to open deeps after it gets cold, even if insulating the hives.
- Ask for help if in a jam.
- Keep bees in direct sun.
- Keeping bees is *sticky* work.

Things I Still Need to Know or Want to Learn

- How to find old queens and get ready for new queening this June.
- How to reverse bodies and take off honey super now that it probably has brood in it.
- How to use my choice in *Varroa* mite control
- To be able to identify egg/larvae/bee ration to figure out a healthy productive colony.
- Learn how to split my hive that successfully overwintered.
- Something about queen raising (even though I won't attempt that just yet).
- Tag along with a beekeeper on a swarm removal to see how it's done.
- Maybe get a little honey this Summer to share with others.
- . . . Working with my daughters elementary school to get a hive set up there . . . would be so great to recruit future beekeepers.

Other Things Learned (Funny and Helpful)

- Went to the annual [VBA] meeting. It was very helpful. I love going.
- ". . . hive seems strong for this time of year (not that I know better). I am just happy it survived this long!"
- 6/5/10 8 a.m. Rainy. Got stung one time – in nightgown.
- Did a *Varroa* mite check with jar and screen. Two mites fell out. Hives smell funny like cheese.
- Note to remember: 10/28 too late to put mice guards on, lots of mice in hive.
- "Bahhh, why are they doing this???"
- Re: entrance reducer, "I don't know if it's [9/19] kind of early to do it, but it made me feel better".
- "Did not see the elusive Queen Etheline Tenenbaum!!!"
- They didn't hive like the video on the internet, but it went okay, I guess. BC

POTLUCK!

Made with Honey! A contest! Recipes! Try this, this time!

Ann **Harman**

Your local beekeeping association is having its annual potluck picnic at Beekeeper Burt's place. The weather promises to be fantastic and you found out that his grill is big and fancy. So what are you going to take for the picnic?

This year your club decided to do something a little different. Other years most people bring "their usual" and it is tasty. Now it's time for a different approach. Let's see what the game plan is for the potluck picnic this year.

First of all, every dish brought has to have been made with honey. Wait – before you think this is going to be cloyingly sweet and everyone will be tired of eating sweet, honey does not necessarily make every meat, vegetable and salad sweet. Honey, in small quantities, enhances flavors and is a perfect partner with herbs and spices. We do expect desserts to be sweet, but they come at the end of a meal. Beverages, like a punch, do not have to be overwhelmingly sweet. The tartness of fruits can be soothed with honey without feeling like a mouthful of sweet. So select your recipes and keep in mind that honey does not have to dominate every dish.

Next on our list is a request that everyone provide the honey recipe for the dish or at least give the name of the cookbook where it can be found. If everyone brought one or two copies of their recipe and some paper or file cards then those who wish the recipe can copy it down sometime during the picnic. It is possible that these potluck recipes could be used to make a handout for farmers' markets and craft fairs. Giving recipes with sales of honey mean more sales. Plus you are educating customers that honey is more than just for tea and sore throats.

You could add a contest to the potluck. Since there will be a number of different foods, meats, veggies, salads, desserts, baked goods, breads why not have different categories for the contest. Give each dish a number, or make groups such as salad 1, salad 2; baked beans 1, baked beans 2, etc. Give out little slips of paper and have a handful of pens and pencils available. So as the people are eating they can just write a number on a slip of paper and drop it in a container. When everyone is finished a couple of people can sort out the numbers and find which salad, or BBQ sauce or dessert, etc., got the most votes. You could give a prize to each winner but make it something small, even silly, or just a rose picked from someone's rose bush. Or no prizes, just hearty applause.

Your club can think of other ways to have a potluck contest. You could suggest that the breads and cakes are a good preparation for entries in the county fair or the local honey show. Ribbons won at those events make good publicity for using honey.

Be sure to invite all the newbees to the picnic. Sometimes those who are in their first year of beekeeping are a bit hesitant to be with a large number of experienced beekeepers, all talking about bees. Make the newbees welcome. Get some nametags for everyone to use. And remember (you experienced beekeepers) these newbees don't have silly swarm stories to swap yet. There are many other topics to talk about.

Although all beekeepers love to open up a hive and rummage around, if the club is expecting a large attendance with families and children, it may be best not to have open hive work. This type of workshop should be scheduled for another time. Remember, veils are required for any open hive work. No exceptions.

One thing you need to keep in mind if this is an outdoor picnic. The dishes contain honey in large or small quantities. Beekeeper Burt has hives on his property. The bees may very well smell all the good foods and fly in to check out this apparent new food source. Keep dishes covered and use caution so nobody gets accidentally stung. If a Summer thunderstorm chases everyone indoors I don't think the bees will follow.

Although the selection of honey cookbooks has diminished over the years, many local associations do have honey cookbooks. The National Honey Board also features recipes on their website, **www.honey.com**. If you plan to try a new recipe for the potluck it might be a good idea to try it at home first. For some recipes, such as sauces and salad dressings you may wish to modify the original recipe or add some interesting ingredient.

You may decide to use one of your favorite recipes that contain only sugar and no honey. Yes, you can make substitutions but in certain recipes, such as for a cake or a quick bread, substituting honey for sugar may not work. Try any substitution at home before deciding to take the dish to the potluck.

Sometimes there are leftovers. That does not necessarily mean it was an unpopular dish; it just means that there was so much of everything to eat. Take along some plastic baggies so if your dish has some suitable leftovers you can fill a few baggies and give some to the host and to others.

By the way, please take serving utensils for your dish. You cannot expect the host to provide endless salad servers or serving spoons. And do remember to take them home with you.

Would you like a few recipes? These are not guaranteed winners of the Potluck Contest but they might be. Anyway, they are very good.

SMOOTH CHILI CON CARNE

1 cup diced celery
1 cup chopped onions
4 cups ground beef
1 teaspoon chili powder
2 cups tomato pureé
2 cups water
1 tablespoon salt
1/3 cup honey
4 cups cooked or canned red beans

Fry beef, onions and celery, slowly until done. Set aside. Place beans, tomato pureé, water and salt in pot. When mixture boils, add meat and vegetables. Let simmer slowly for two hours. Add chili powder. Just before serving, stir in honey.

A Honey Of A Cookbook Volume III
Alberta Beekeepers Association

HONEY LEMON SLAW

½ cup mayonnaise
2 tablespoons honey
½ teaspoon grated lemon rind
2 tablespoons lemon juice
¼ teaspoon ground ginger
4 cups shredded cabbage
½ cup raisins

Stir together first five ingredients. Add cabbage and raisins. Mix. Chill. Makes about eight ½ cup servings.
(from Ann Harman's honey recipes)

HONEY BARBEQUE BASTE

1 tablespoon vegetable oil
¼ cup minced onion
1 clove garlic, minced or pressed
1 can (8 ounces) tomato sauce
1/3 cup honey
3 tablespoons vinegar
2 tablespoons dry sherry
1 teaspoon dry mustard
½ teaspoon salt
¼ teaspoon coarsely ground black pepper

Heat oil in medium saucepan over medium heat until hot. Add onion and garlic; cook and stir until onion is tender. Add remaining ingredients. Bring to a boil; reduce heat to low and simmer 20 minutes. Serve over grilled chicken, pork, spareribs, salmon or hamburgers. Makes one cup.

Sweetened Naturally With Honey
National Honey Board

If you are grilling meat with a BBQ sauce containing honey be very careful that it does not burn. You can precook meat then put on grill and baste with sauce or you can start basting after meat has been partially cooked on the grill. Sauces made with honey scorch easily.

Remember to sweeten the ice tea and lemonade with honey. The packaged tea and lemonade mixes use sugar. Why not, this time for a honey-themed picnic, make some from scratch using honey as the sweetener. Ask several club members if they would make the beverages as their part of the potluck. If you are serving beer, have at least one honey beer. If someone in the club makes mead perhaps a bottle or two could be served.

Your club's Honey of a Picnic should be a great success. Enjoy! BC

THOUGHTS ON MANAGING Bees In The City

Megan **Paska**

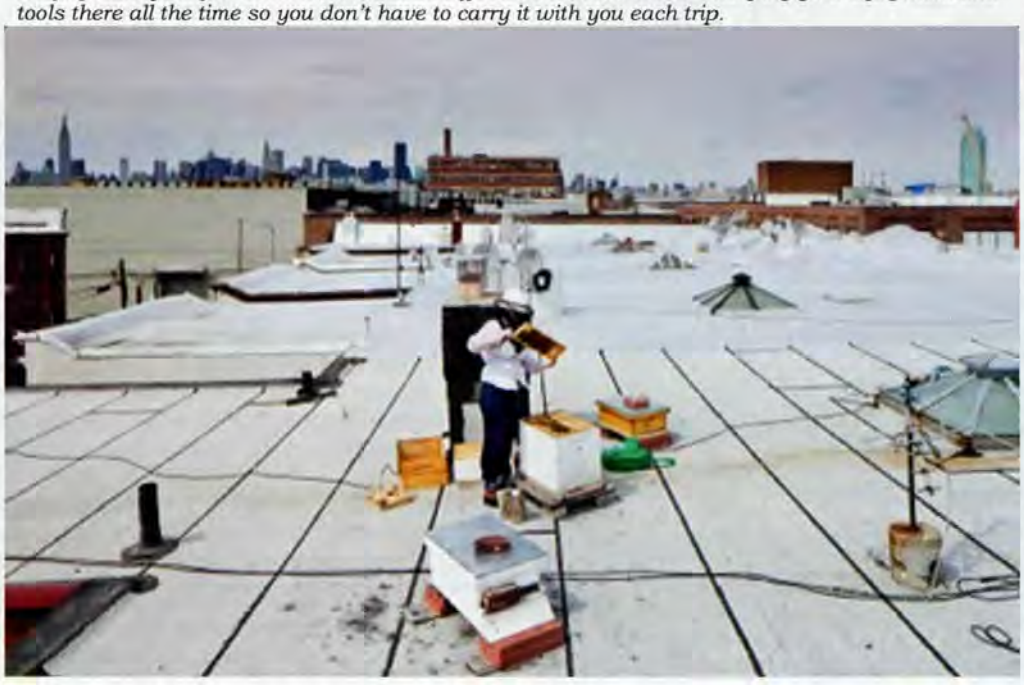
Being a beekeeper in a metropolis like New York City, as you can imagine, has its fair share of challenges. When actively maintaining apiaries in a place so densely packed with people, with so many eyes watching, there is little room for error. All the average neighbor needs to dismiss the legitimacy and safety of a hobby like beekeeping is to witness the skies fill with the cloud of a swarm or spot a robbing frenzy in their line of sight. While swarms and robbing frenzies are on the opposite sides of the spectrum as far as lapses of control are concerned (swarms being generally harmless reproductive division of robust colonies, where as robbing frenzies can be nasty and result in many dead bees) to the untrained eye, they all look the same.

With that in mind, it is my opinion that subtlety and consideration are tremendously valuable traits in an urban beekeeper. While public mishaps can create learning opportunities for some folks new to honey bees, it can also snap minds shut to the contribution of beekeeping in cities. Maintaining apiaries on rooftops when possible, or in secured community gardens means that minor calamities are often obscured from the scrutiny of neighbors. As a new beekeeper, it is inevitable that some mistakes will be made . . . and that is OK! Just practice a little preventative damage control and it's likely that none of your neighbors will be the wiser.

Some aspects of "blending in" from the start can be as simple as not taking your newly acquired packages on public transport. While the odds of anything dangerous happening are very slim, taking 10,000 insects into a contained, subterranean cavern where hundreds of people are packed like sardines in a can just seems unwise as far as I am concerned. With packages, there is often a random worker bee clinging to the mesh, desperate to stay with her kind, and if she flies off of the package and lands on commuter, sting or no you might insight some unwanted hysteria. Best just to avoid this all together. Ask a friend with a car to accompany you for pick up or take a cab. Stay off of busses and subways. It's just good sense.

As mentioned before, keeping your apiary in a place where they aren't in plain sight is also recommended. In New York City, beekeeping is now legal but it doesn't mean that a hive should just be put down any ol' place. Doing what you can to keep the community on your side, or at the very least, indifferent to your hobby is always worth considering. While your neighbors may not be able to do anything to stop you from putting the hives where you want to, who wants to endure constant complaining and scowling from over the fence? Certainly not this beekeeper! Beekeeping is and should be fun, so do what you can to dodge any drama that might sour the experience for you. Getting people upset over your hive placement leaves no room for making converts. The goal is to prove to the unknowing that bees can do more than simply coexist with us in cities. All of my urban hives are placed on rooftops and neighbors can scarcely tell them apart from chimneys and air vents. In the Summer, they are surprised with jars of honey from bees that worked tirelessly, right over their heads. It's a winning arrangement.

Rooftops are good for isolation, but can be difficult to reach. Consider keeping your equipment and tools there all the time so you don't have to carry it with you each trip.



This sort of set up, while ideal in many ways, may make accessing your hives a bit more of a chal-

lenge. Most rooftops can be reached only by a ladder or window, which for some may seem precarious and dangerous. Make sure your bees are in a place that you feel safe getting to. If you dread going to inspect your bees, you will likely do so infrequently which could result in mismanagement leading to mite infestation, disease, queenlessness or overcrowding. Carrying woodenware and other gear can also be difficult. Make sure assembled supers can fit through hatches and windows before you commit to a site for an apiary. Purchase an easy to carry bag that can hold hive tools, a smoker, spray bottles and any other materials needed throughout the season. Better yet, if possible make, then leave a container for all this so you don't have to take them every time. A locked box, chained to something permanent solves lots of problems. Keep a can for smoker fuel and some water to douse it before you leave.

The downside of going up. Make sure assembled equipment fits and you have complete access.

In addition, I cannot recommend cardboard nucs enough for transporting frames of honey up and down ladders. They are lightweight and much easier to carry under arm than a full super. I also use these to deliver full frames of foundationless honey to restaurants. Chefs and customers love to see the honey in it's original, unmolested state and often serve it right out of the frame.

Once your bees are in place, it will be important to not only set up, but properly maintain a water source for your bees in a location that will not interfere with the day-to-day lives of your neighbors. In the heat of the summer, water sources dry up very quickly if left untended. If the bees source of water disappears, they will seek another abundant source, and it could end up being a drippy spigot in a nearby backyard or the soggy ground below a kiddie pool. In tight quarters, you want to avoid this by setting up a consistent water source early on. As an added measure, consider dosing the source with aromatic feeding stimulants like Honey-B Healthy or lemongrass oil to help to get them to chose that source over others that may be available.

In addition to water, you may have to concern yourself with the possibility of robbing or feeding off of undesirable sources during a nectar dearth. In late Summer, there is a lapse during the nectar flow where the trees that were flowering early in the Spring and Summer have lost their blooms, but the flowering weeds and ornamentals have yet to become viable. A dearth can last a few weeks to a month or more depending on your locale. This means weaker, more spotty nectar and pollen hotspots. When floral food sources are scarce, bees can often become opportunistic, feeding off of dumpsters of corn syrup, spilled soda, hummingbird feeders and even robbing from weaker colonies; basically any food source that seems the most abundant at the time. As the blooms on the trees in your area begin to fade, consider putting a feeder on your bees. If you are concerned with sugar syrup contaminating the honey stores, remove capped frames before adding the feeder. You could also number frames that are filled and in the process of being capped, as those frames won't likely have any additional food stored in them before the bees apply cappings. The dearth will generally last only a short while, so with careful record keeping and management, you can keep reasonably close tabs on which frames will have a higher amount of sugar syrup in them and the integrity of your honey harvest will still be intact.

It's also a good idea to get a feel for what sort of businesses are in the immediate few miles of your apiary site. Last year, several beekeepers in Red Hook, Brooklyn were shocked to find full frames of deep red nectar in their hives. Upon some investigation, they found that their bees had been foraging copious amounts of red maraschino cherry syrup from a nearby producer who had left a dumpster filled with the sugary runoff exposed outdoors. The owner of the business was alarmed when he saw hundreds of bees furiously congregating around the pop-up bee buffet and called on a local beekeeper to help remedy the situation. The dumpsters were covered and as late blooms like Goldenrod and Knotweed began to pop up in empty lots all over the city, the bees moved on to those food sources instead. The damage was done, though and much of the honey was contaminated with the food coloring laden syrup, leaving the bees with less food stored up than they had intended to have.

This sort of mishap can be learned from. Breweries or any sort of factory producing syrupy sweet goods can be an attractive source of food for your bees. Do a little research, see what is being made in your neighborhood and contact them to pay a visit. Explain that you are a beekeeper doing what you can to ensure that your bees do not become a nuisance to any of your neighbors. Check to see if there are any spots that might be tempting to your bees and take note. If you feel comfortable with it, let the businesses know that their facilities might appeal to your bees and suggest methods of deterring them. Otherwise, just do what you can to avoid errant foraging by offering food to your bees during a dearth in the form of syrup and pollen patties if needed.

With these issues considered, urban apiaries do require a bit more attention and consideration than your run-of-the-mill rural backyard beehive. With some of the preventative maintenance mentioned here and a little thoughtfulness, you can ensure that your time with the bees is enjoyable, stress-free and productive. BC

Photos by Geoff Fitzgerald. ***www.geofffitzgerald.ca.***

Get Ready For This Year's Extraction

BUILD A WARMING BOX & FORCED AIR STACK

Ed **Simon**

This year's extraction started out fantastically. Then without the slightest indication it turned into a disaster. This problem was only second in scale to our 500 year flood that destroyed a dam and wiped out the main street bridge that connected the two parts of our little town. Well, at least that's how it seemed to me. After removing my supers, I had put them in a makeshift heating room that was made from one inch extruded polystyrene (pink foam board), duct tape, a small space heater and a fan. This arrangement had worked the two previous years and I saw no reason that it wouldn't work again. Much to my surprise the next morning I found over 40 pounds of honey on the floor. The cause was obvious; I had forgotten to turn on the fan. Consequently the top supers reached about 120° and at the time the heater on the floor still thought it was only 90°. Besides melting the comb, the honey ran down into the bottom boxes and overflowed the drip trays and on to the floor. Even in the best circumstances extraction is messy. Now everything within twenty feet was sticky.

Determined not to have a repeat of this disaster, I have built a collapsible warming box which can also be used to reduce the water content of the honey and a second set of controls to force air through stacks of supers.

Criteria

Subsequently the following points were taken into account when I was designing the new warming box:

1. Relatively cheap – Use as much material that I can of what I already have
2. Collapsible – It should be able to be stored in a smaller space
3. Easy to build
4. Sturdy
5. Large enough to stand in
6. Wide door for easy loading and unloading
7. Must hold a reasonable number of supers (enough for a day's work for one or two people)

Parts

1. Extruded polystyrene – 4' x 8' pink insulation board - (5)
2. Wood inside corners - plywood - ⅜" x 3½" x 72" – (8)
3. Wood outside corners - plywood - ⅜" x 3½" x 74" – (8)
4. Wood joint reinforces - plywood - ⅜" x 3½" x 74" – as needed
5. Wood joint reinforces - plywood - ⅜" x 2" x ??" – as needed
6. ¾" x 1½" x ?? – Door brace (Floor) – (1)
7. ¾" x 3½" x ?? – Door jam (Top) – (1)
8. Hinges - (4)
9. Hasps/Clasps - (as needed)
10. Construction glue that can be used on polystyrene foam board - (6 tubes)
11. Bolts and nuts
12. Construction screws

Construction

What we will build is a foam box with reinforced corners and a wide front door for loading. The trick is getting it square with enough support to allow it to stand alone and take some major abuse. If there are any questions please refer to the attached drawings.

Step #1: Build the corner supports

The outside of each corner is 74" long and the inside of the corner is 72" long. The extra 2" are used at the top of the corner to position and hold the top of the box in place. Use two 72" long, 3½" wide by ⅜" thick pieces of plywood and butt the edges together to form an "L". Glue the corner edges together. Use brads to hold them in place while they dry. Perform the same actions with two of the 74" long pieces of plywood. This results in one corner. Repeat the same operation to build the other three corners.

Step #2: Drill mounting holes

It is easier to drill holes while the corner pieces are disassembled. Use a scrap piece of the foam board of the same thickness that you are using for the walls as a spacer and drill the bolt holes in the corner pieces. Drill ⅜" holes in both legs of the "L". Remember to change the spacer to the opposite side when you drill the holes in the second side of the "L". I spaced the holes 4" from each end and then added three more holes equally spaced between the end holes. Make sure you mark each piece so you know which inside corner matches the corresponding outside corner.

Note: When you drill the holes in the second side of the "L", it makes for easier installation if you offset these holes by 1". That way the nuts and bolts will not run into each other.

Step #3: Paint the corner supports

If you are going to paint the box the corners are easier to paint before it is assembled. I paint most of the things I build because it is easier to clean painted wood than bare wood. The paint I use comes from the recycling center and doesn't cost anything.

Note: I painted the corners a different color than the foam board so you could identify the parts on the assembled product. It also added some pizzazz to the project.

Step #4: Build the back, front and side panels

Foam board usually comes with a tongue running down one side and a matching groove running down the other. Using two sheets of foam board cut them down the middle making four 2' x 8' pieces. Then match the tongue and grooves so you have three 6' x 8' pieces. Using foam compatible construction glue (Locktite PL-300), glue the matching tongue and grooves together and let the glue dry overnight.

Note: The construction glue will stick to the floor. To eliminate this problem place a layer of newspaper under the joint. If any glue does run out it will just stick the paper to your foam board. The paper can then be peeled off the joint.

Step #5: Cut the Back and side walls

After the glue dries cut the back and two sides to 72"x 72" (6' x 6') square pieces. Do not cut one of the panels; it will be used for the door.

If the side and back panels seem to be flimsy and weak at the joints, now is the time to add wood strips to reinforce the joints. Before cutting the reinforcing strips, fit the corners to the panels and mark the limits of the corners at the joints. Do not and I repeat **NOT** have the reinforcing strip extend all the way to the corners. Glue strips of plywood spanning the joints to reinforce them. To be in the safe side, I added the reinforcing strips to the inside and the outside of the panel at every joint. You should also apply pressure to the strips while the glue dries to ensure a tight bond.

Note: The reinforcing of the joints only applies to the back and two side panels. The front panel will be reinforced after it is cut to size for the doors.

Step #6: Assemble the back wall

Note: Before you start make sure the joints in the foam board are perpendicular to the corner assemblies. This will add strength to the joint.

Note: Be sure you use the correct matching inside/outside corners. Remember, you marked them when you drilled the holes.

Note: Place the 4' wide section of the panel on the bottom. This will minimize the stress on the joint.

Add the corners to the back wall by laying two of the 74" corner pieces on the floor and gluing the side that lays flat on the floor. Slip these corner pieces under one of the panels you cut in the previous step. Push both corners to make a tight fit. Make sure the bottoms are even with the bottom of the foam board. The top of the panel should be 2" from the top of the corner. Now add the inside of the corners by using two of the 72" corner pieces. Glue the outside of the matching leg of the "L" and align it to the back. Use a spacer of foam board to position the inside corner correctly. Eventually the sides will slide into the slots where the spacer is located.

Using the previously drilled holes as a guide, drill through the foam board and add the nuts and bolts to lock the corner assembly in place. Set the back aside to allow the glue to dry.

Step #7: Assemble the side walls

Use the same procedure you used in the previous step to construct the side panels. The only difference is that there will be only one corner assembly on each side. ***(Be sure to read the following note.)***

Note: The corners must be attached to the sides with their open slots facing each other.

Step #8: Add the door jams to the side walls.

This step will insulate the front of the door jams and put a bevel on the foam board to make for easier to open and close the doors and still maintain the heat.

Slide the remaining (uncut) wall panel into one of the corners that you just added to a side panel. Make sure it is in as far as it will go. Using a pencil, mark the outside of the panel where it enters the corner. Remove the panel and using the mark, cut the foam board on an angle (22 degrees works great). I used a circular saw to perform this cut. The angle should be cut so that it is showing when it is installed. Glue the insulation for the door jam in place. Keep the foam board with the matching angle available. It will be used for the matching door.

Using the same opposite edge of the foam board you used for the first door jamb, perform the same operation on the opposite door jam. Again retain the cut angle to be used on the door assembly.

Step #9: Install the sides and back

We now have the back and the two sides completed. We will install them and align the front in preparation for building the front doors.

To accomplish this you need to force the sides into the slots on the back corners. Make sure they are inserted as far as possible and are even on the bottom with the bottom of the corners. Using a ⅜" drill finish drilling holes through the foam board using the previously drilled holes in the corners as guides. With the bolts, washers and nuts secure the side panels to the back panel corners. Do **not** glue the side panels in place or you will be unable to disassemble the box for storage.

Step #10: Square the box and adding the door's bottom brace

Measure the inside of the back of the box at the floor level. Cut a board 1 ½" wide strip of wood to the length you measured. This strip is used to hold the bottom of the doorway. Attach the board to the inside of the door jams using bolts. It must be removable to be able to disassemble the warming box for storage. After this is accomplished the front and the back of the box should be of an equal dimension at the floor level.

Note: Some dimensions are not provided because they will change based on the accuracy of previous assemblies.

Step #11: Adding the door jamb top

Using the same measurement as in the previous step, cut a 3 ½" x ¾" board to length. Cut notches in the corners so it will fit on the top between the sides. Drill and bolt this board in place against the front of the corners

Step #12: Finish the door top

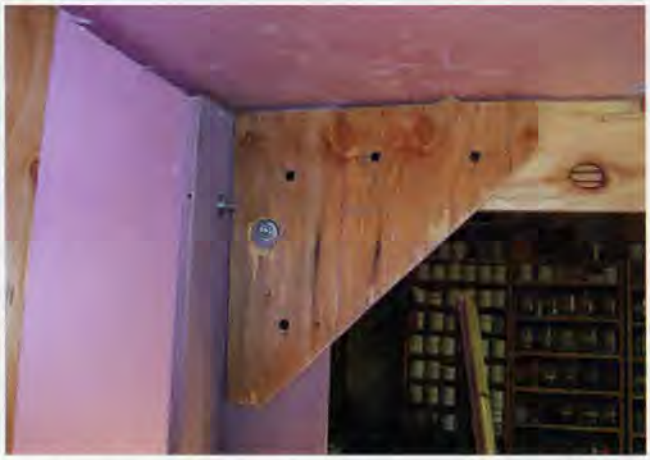
The door top you just added will not flush with the front of the corners. Add a veneer of plywood to the front of the door top to even it out. Also add a piece of plywood to the back of the top to provide a stop for the door when it is closed. You will need to add a spacer of ¼" between the back of the door top and the door stop. This is because the insulation is 1" and the door top was ¾".

Step #13: Not quite finished

Unfortunately, the previous actions only made sure the opening was of the same dimensions as the back of the box. We now have to install triangular plates on the top corners to hold the opening square. Glue and screw the plate to the top of the door opening only. Screw the other edge of the plate to the corner. The screws in the corner can then be removed to allow you to disassemble the box.

Step #14: Build the doors

The remainder of the panel that you used to fill in the door jams will be used to make the doors.



Measure from the floor to the bottom of the door top (not the door **STOP**). Subtract ½" from the height and use this measurement for the height of the door. Cut the panel to this height.

Now is the time for you to make a decision as to the width of the doors. I made mine unequal so I would have more room to move the supers about. I would suggest a minimum of 3' for one of the doors. Cut the door measuring to your width. Cut the second door to the remaining width while leaving a ¼" gap so the doors will close correctly. Since the doors will take a beating you need to reinforce the doors by gluing plywood strips to the vertical edges of the doors and to reinforce the joints. Do this on the inside and the outside of the doors. Be careful to position the reinforcements so the doors can operate correctly. These strips will also be used to support the hinges and any clasps you need.

Note: On the non-hinge side of the doors extend the reinforcement plywood to overlap the gap between the doors. The front should extend from the larger of the doors and the back should extend from the smaller of the doors. This will provide an overlapping seal for the door openings. See the drawings for details.

Use screws and tie the inside reinforcements to the outside reinforcements. This will add to rigidity of the door.

Step #15: Mount the doors and add a way to keep them closed

Use a set of hinges to mount the doors. Then add a closing/locking fixture to the joint between the doors. This is used to keep the doors shut.

Step #16: Build the top

By now you should have the swing of things. Glue a couple more pieces of foam board together for the top. Once they are dry cut it to fit the top. It should just sit between the front top and the rear corner posts. If the top sags then you should add support to keep it in place.

Note: Double check that the box is square before cutting the top.

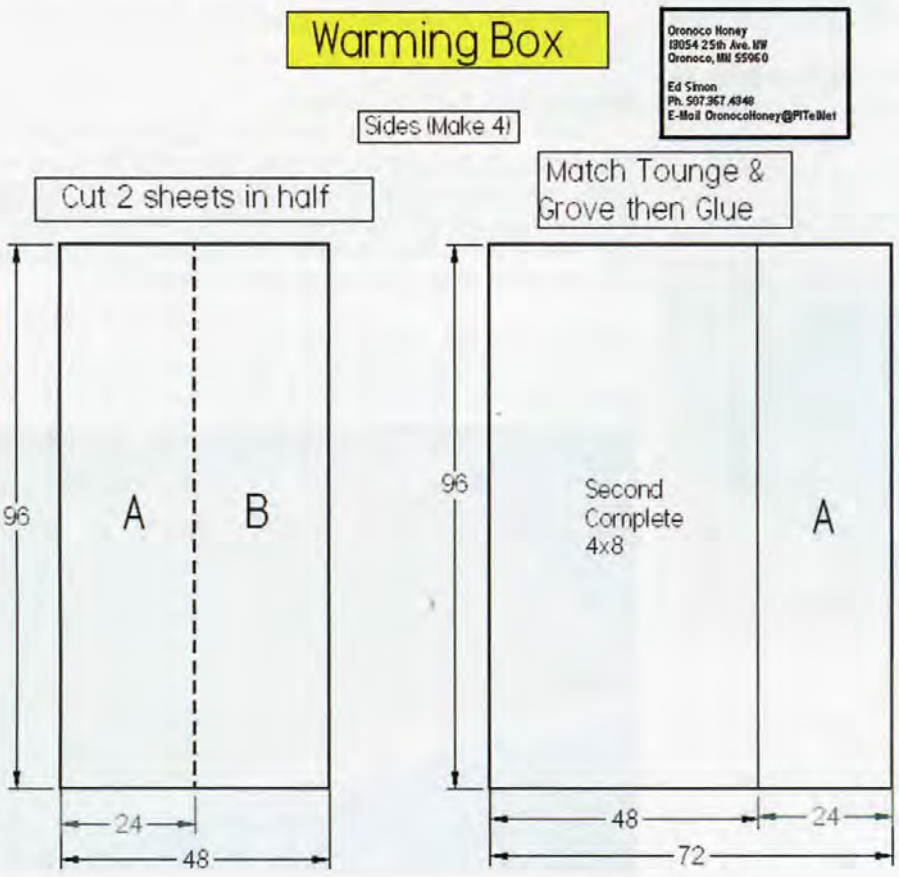
Step #17: Paint the box

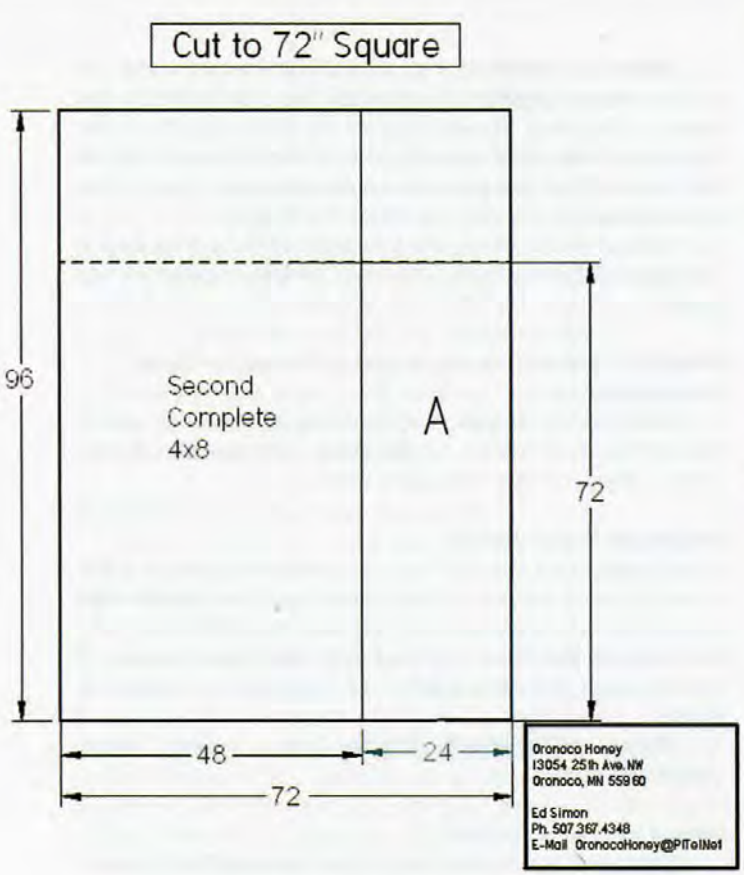
I painted the insulation of the box a different color than the reinforcements and the corners. This was to highlight the construction.

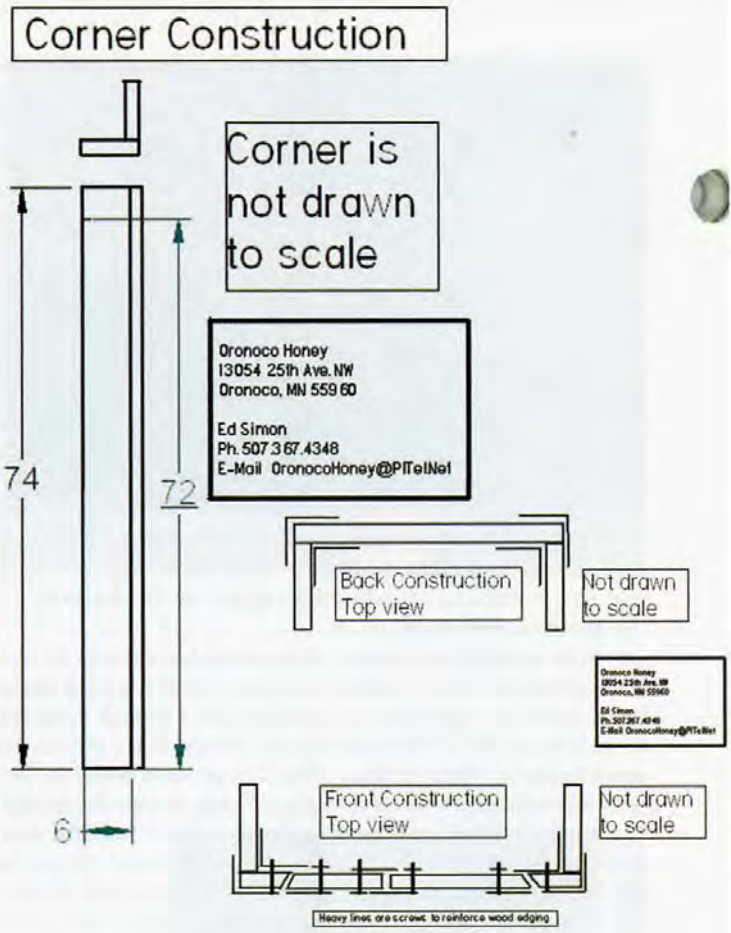
Hint: Using the same concept you can make the box any size you would like. For example an 8" x 4" box would be easier to make because it would require less cutting. The problem would be with the top. This is due to the 1" foam board sagging. This could be alleviated by switching to 2" foam board for the top.

Hint: The same box can be used as a drying box. All you have to do is use a dehumidifier instead of a heater.

Hint: Because of the requirement that the box be able to be stored, the top was not attached. It just sits on the top. Use the ever present **DUCT** tape to hold it in place and to make the top corners as air tight as possible.







Criteria For Forced Air Stack

The following points were taken into account when I was designing the forced air portion of the warming box:

1) The air should flow continually and not be controlled by a thermostat
2) It must be able to work with a variable number of supers in the stack
3) Easily installable
4) Simple controls
5) Inexpensive
6) Be able to contain a large amount of honey if something goes wrong

The forced air stack consists of three components in addition to the honey supers. On the bottom is a drip pan that is used to catch any escaping honey and provide vents for the air to flow out of the stack. On the top is a lid to support the fan that forces the air through the stack. Then there is the thermostat to control the heater. Each section will be described independently.

Section #1 - Drip Pan

Parts – for a Drip Pan

1. 25" x 22" plywood, particle board – any thickness ½" or greater
2. Wood edges - ¾" x 1½" x 25" – (2)
3. Wood edges - ¾" x 1½" x 20½"– (2)
4. Bottom braces - ¾" x 1½" x 20½" – (2)
5. Super Stand offs - ¾" x 1" x 19" – (2)
6. Aluminum Sheet - liner for the base - Optional

Construction

Step #1: Build the base

Cut a 25" x 22" piece of plywood or other material to use as the base plate

Step #2: Add the rims

Using the wood edging, screw and glue the edges to the base plate.

Step #3: Add the bottom braces

Note: The size and position of these braces is dependent on the size of the hand cart or dolly you use. If you don't use a dolly then the braces only need to keep the drip tray off the floor and allow for some air flow. If you use a dolly then position and possibly resize the braces so the dolly can slip under the drip tray.

Step #4: Cut the super standoffs

Cut a couple of standoffs to set the supers on to keep them out of the collected honey and to provide for

the vent of the forced air. These should be painted to allow for easier cleaning. The design of these stand offs is left to your imagination.

Step #5: Paint and seal the drip tray

If you are going to line the tray then you only need to paint the outsides and the bottom of the tray.

If you are not going to line the tray then:

1) Make sure the joints of the tray are sealed with a silicon sealer
2) Paint the inside of the tray with a couple of coats.

This will complete the tray if you are not going to put a liner in it.

Step #6: Line the tray

I used aluminum printing plates from a local printer (free) to line the tray. The aluminum is easly cut using a sharp utility knife and a metal straight edge for a guide. The cuts and folds needed are described in the drawings. Measurements may have to be changed due to the size and thickness of the wood you are using. Because the aluminum is so thin, I used a staple hammer to hold the aluminum in place.

Hint: Instead of using the staple hammer like a hammer and missing the intended mark, hold the staple hammer where you want the staple then strike it with a rubber mallet.

Step #7: Seal the tray

Even though the corners are overlapped, you should seal the corners with a good grade of silicon seal. Honey will leak between the liner and the base. Leakage is guaranteed!

Section #2 – The Top Fan Mounting

The mounting cover for the fan is basically a telescoping cover with a fan mounted in the center.

The changes that are needed are to a telescoping cover are minor:

1) A moisture proof metal cover is not required
2) A looser fit makes it easier to use
3) The edging does not have to be deep because it is not in the wind.

Parts – for the top fan mounting

1. 18" x 22 ½" plywood, particle board – any thickness ½" or greater
2. Wood edges - ¾ " x 1" x 22 ½" – (2)
3. Wood edges- ¾ " x 1" x 16 ½" – (2)
4. Muffin fan – 115 – 120V. 4" to 5" fan used to cool electrical equipment

Step #1: Build the base

Cut a piece of plywood or other material to 18" x 22 ½" for use as the top.

Step #2: Add a Rim

Using the wood edging, screw and glue the edges to the base plate.

Gee! This looks familiar. It's the same as the base except for the sizes.

Step #3: Paint

This is a good time to paint the top. You'll have to paint it again after some cuts are made. The first coat of paint soaks into the wood very rapidly. This also helps seal the top from the moisture that will be present once you start heating the supers.

Step #4: Cut the hole for the fan

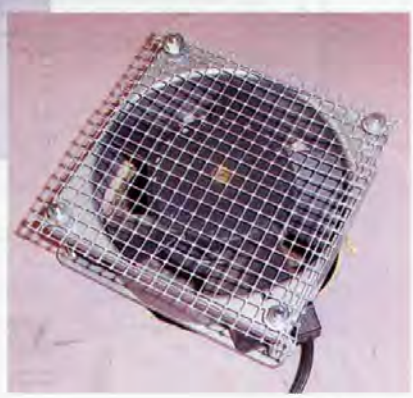
Any enclosed fan will work. I chose "Muffin" fans that are used to cool electronic cabinets and move 100 cubic feet of air a minute (CFM). They are available on the internet and at Radio Shack. Make sure you get 120V AC. fans and not 12V DC fans. Position the fan in the middle of the top and cut the correct size hole. This will vary depending on the fan you have. Drill the mounting holes at the same time.

Step #5: Paint

Paint the edges where you cut the hole for the fan, then give the whole top a second coat of paint.

Step #6: Mount the fan

The fan should blow air down into the stack. There is usually a safety bar or cover on one side of the fan. To protect your fingers, add a second safety cover to the top of the fan. I used some scrap hardware cloth and the mounting bolts to hold it in place.



Section #3– The Electrical Connections

The electrical connections consist of a power strip and an inline thermostat. All connections are 115-120V. This is the standard U.S. line connection. Two extremely important considerations are:

1) The fan must run continually
2) The heater must be controlled by the inline thermostat
3) The thermostat must be positioned at the top of the stack or stacks.

Parts – for the electrical connections

1) 120V. inline thermostat (1)
2) Space heater (1)
3) Power distribution strip (1)
4) Thermometers (2)

Hint: Inline thermostats are available at a farmers supply store. They are used to control the heating of animals. They are also available over the internet.

Hint: If you have to add the cords to the thermostat, make them longer than you think you'll need. This will provide flexibility when placing the thermostat and allow you to use the thermostat for other purposes, for example as a control for a pail warmer.

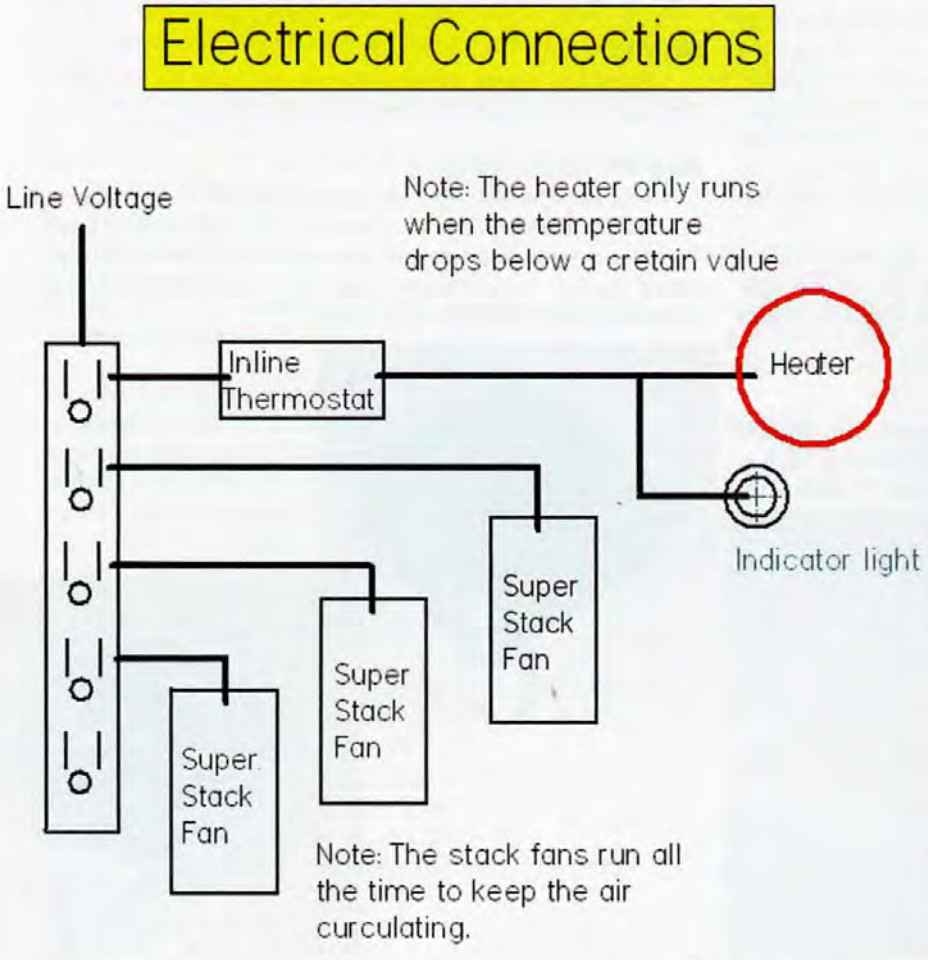
Hint: An additional indicator such as a night light could be plugged into the inline controlled power to provide an external indicator of when the heater was operating.

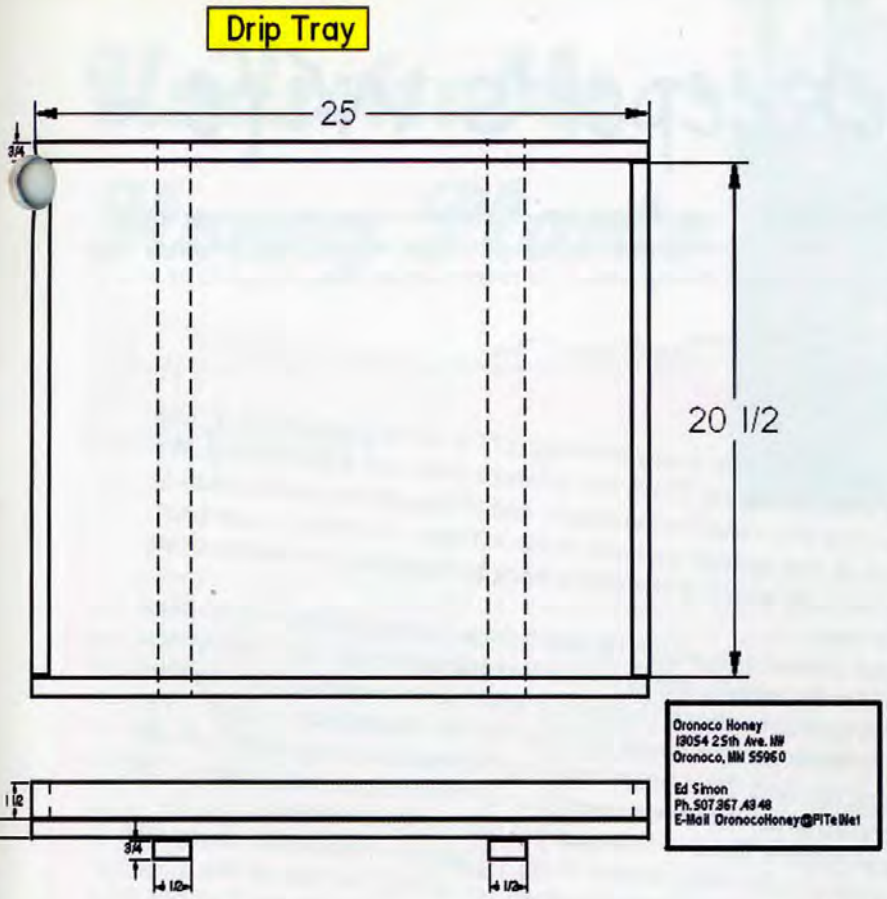
Hint: Set the temperature indicator (scale) as per instructions that came with the thermostat before testing the assembly.

Additional thoughts: It was pointed out that the same setup can be used to dry honey. All you have to do is replace the heater with a dehumidifier. You still need to keep the thermostat that controls the heater and allow it to control the dehumidifier. The reason for this is that the dehumidifier could produce heat that could build up and cause a problem.

Usage

To use the Forced Air Stack, place it in a closed room (Warming Box) with a drip tray on the bottom with a bunch of supers above it and the Forced Air Top on the top. Lay the inline thermostat on the top of the tallest



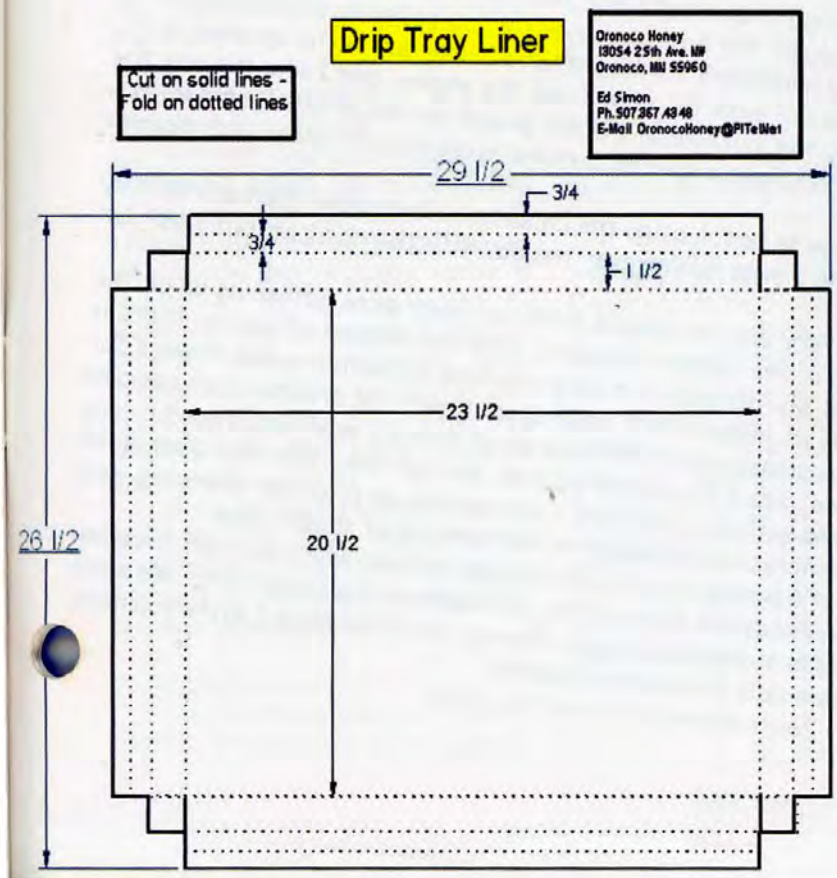


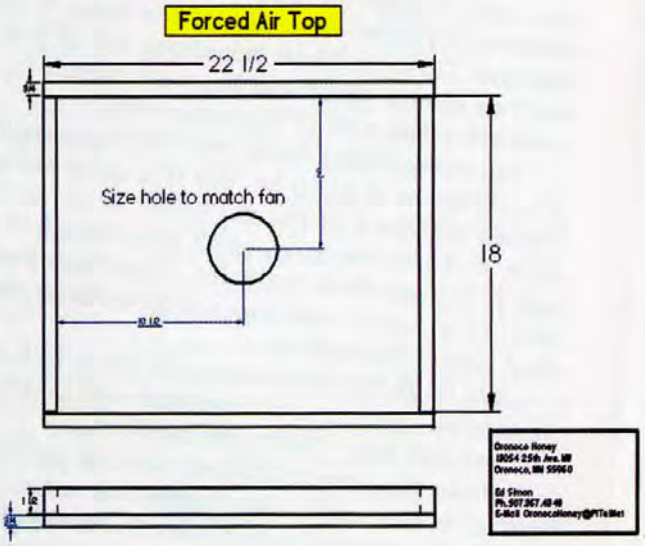
stack and plug it in. Be sure to check both the electrical connections and the temperature a couple of times to make sure the settings are correct.

The premise behind the forced air top is to force warmed air as evenly as possible though out a stack of supers, therefore warming the supers at an even temperature. Hot air will striate unless forced into circulation. With this in mind a difference of one or two supers in height may make a difference in the final temperature of the supers. Therefore, if you are heating more than one stack, I recommend that you keep the stacks at the same height and possibly even place a continually running fan in the hot box to circulate the air.

Conclusion: I've tried it out and everything seems to work according to plan. I've loaded the warming box with two stacks of empty supers. I put a drip tray bottom and a forced air top on each stack and connected the electrical according to the diagram. I also added two thermometers to the warming room. One thermometer was at the top of the warming box and one at the bottom of the warming box. After adjusting the thermostat that controlled the heater and waiting twenty-four hours, the temperature difference was two degrees and air was being forced in the top and coming out the bottom of the stack.

Hint: Standard meat thermometers have a pointed probe which can easily be inserted through the polystyrene of a warming box. The temperature can then be read on the outside of the box. BC





From A Beekeeper's Wife –

This informative series was published in 1917 in *Gleanings In Bee Culture*. The series was drawn from the letters of "A Beekeeper's Wife" to her sister. It is an intimate look at how an ambitious beekeeping family began, and then built their business. And it is profoundly interesting in noting how little many things have changed, and how much others have.

Dear Sis,

We hardly have time to breathe these busy days. Rob is up every morning a four o'clock and so am I, and we work until dark. You know we started our new yard by taking 25 of the colonies from our home apiary. We have increased now to a hundred colonies, each with a fine, new Italian queen, and although they were small at first, they are building up rapidly. Before the end of the season we hope to have them as strong as our best. Of course we expect no honey when making such increase which is the difference between modern beekeeping and the old way of letting the bees swarm ad libitum.

Some days Rob goes off at daybreak with our old auto on which he has built a funny-looking truck, piled high with supers. I pack him a substantial lunch for he usually stays in the Randolph yard all day, and at the others not quite so long, looking over the colonies to locate those that are preparing to swarm and to nip that tendency in the bud. Or neighboring beekeepers think he is a crank on this, but we know that it pays. Then too he has extra supers to put on where they are needed. It is back-breaking business, lifting supers all day and bending over hives, but he loves it, and is elated when he comes in at four or five o'clock, hot, hungry, and so sticky and mussed up, but with a truck load of supers filled with beautiful white clover honey.

Getting up at such an early hour – I can't picture you doing such a thing – gives me time to do all my own work and look out for swarms in the home yard, and yet have time to lie down for an hour or two in the afternoon. We have dinner ready at five when Rob gets home and the girls wash the dishes while Rob and I go out to the honey-house to extract. We should not be extracting at night when the honey is cool, but starting a new yard has cut down our supply of combs, and right on top of that came a good season. So we have to extract almost every night after Rob comes home to get combs for the next day. I never saw anything like the bee business! There is always something out of joint in our plans, but I know one thing – next year we will not be short of combs. After Rob has his business built up we can adjust ourselves better and then extracting will come after the rush of the honey-flow.

Out in the honey-house that little gas engine chug-chugs and turns the fan as well as the extractor, so it is not a hot as it might be, but it is quite warm enough! We both uncap as fast as possible, and Rob puts the frames in and out of the extractor. It is fearfully hard work for him after a heavy day in the apiaries, but I enjoy it. I like the honey smell even though it is mixed with the odor from the engine, and I like the way the wax falls away from the knife. I can't say I enjoy the stickiness! I'm not proud but am so stuck up! Clothes, hair, face, hands, even shoes acquire honey, though I have a special costume, a big oilcloth apron with sleeves that covers me entirely.

We finish the day's work by eight o'clock and go to bed, leaving the children to look after themselves. Billy misses his usual game of checkers with Daddy, and I miss talking over the day with the children, but this rush doesn't last long – that's one comfort.

From the amount of honey we are getting every day, you would think our bees were gathering up all the nectar in the world, when really it is not a drop in the bucket compared with the amount of nectar there is provided. Nature is surely a lavish housekeeper! She spreads out tons and tons of nectar in her flowers for bees and butterflies and all the other hundreds of insects that feed upon it, and the greater part remains untouched. Rob says one colony of bees alone consumes nearly 500 pounds of honey a year, and a good colony will give us over and above that in a good season, about a hundred pounds. We get the little end. Just think how much sugar our 300 colonies – four hundred with our new yard – are picking up from our doorstep, and there must be an enormous quantity left in our fields and meadows in the bottoms of flower cups.

I ought to be sleeping this minute instead of figuring the amount of sugar at hand which we can't have unless the bees will collect it for us, if I am to be ready for Rob and the gas-engine at half-past five. We seem to be getting a very good crop this year if it holds on as it has begun. The worst will be when I write you next. When are you and the boys coming out? Shall we look for you next month?

Yours immersed in nectar, Mary

Undesirable Honey Plants

They fall into three broad categories

Connie **Krochmal**

Azaleas

A small number of nectar and pollen plants are undesirable. These species Fall into three broad categories. First there are ones that yield bad tasting or bitter honeys that can be fed to bees. The second group includes those plants with nectar and/or pollen that are harmful to bees. Notorious toxic honeys, such as the famous 'mad honey' of certain rhododendrons, come from the final bunch.

Plants Yielding Bad Tasting Honeys

These bad tasting or bitter honeys are generally quite unpalatable to humans. They should never be mixed with good honey. Thankfully, there are very few of these species. The best known ones are the privet and bitterweed.

Bitterweed or sneezeweed (*Helenium tenuifolium*)

Although this plant yields a bitter tasting honey, the other species of sneezeweeds are excellent bee plants. A member of the daisy family, this annual was originally native to the South from Texas to Florida. Its range extends into Kansas, Missouri, Illinois, Kentucky, Virginia, Ohio, Michigan, New York, and Massachusetts. This blooms from June into November. It occurs along roadsides and on open ground.

When livestock browse on bitterweed, the milk, meat, and butter will taste bitter. The plant can be fatal to humans and animals if large quantities are consumed.

Privet (*Ligustrum spp.*)

This is the source of a bitter honey. Privets are very popular landscape plants. They're invasive in some regions. Generally, the plants aren't plentiful enough to cause many problems for beekeepers. The bitter honey might serve as a warning that the plants are toxic, sometimes fatal, when consumed by humans and animals. Though the honey acts as a digestive system irritant, the exact toxic principle hasn't been identified.

Apart from the bitter flavored honey, by and large these are considered good bee plants. Beekeepers will definitely know when the blossoms open during May and June. There will be a characteristic, rather offensive fragrance in the air.

(**Note**: Some species of privet, notably those commonly found in the SE U.S. produce a very fine honey. Those species common in the northern U.S. however, often produce honey that is unpalatable.)

Ragwort (*Senecio jacobaea*)

While the native species of the ragworts are quite good honey plants, the same isn't true for this invasive. Also called stinking Willie, it was originally native to Europe and England where it was responsible for killing many farm animals. Introduced to North America during the 1860s, it has spread to large areas from British Columbia to Northern California. It is found to a limited extent in Massachusetts. Extensive eradication campaigns have achieved some degree of control over this nuisance. This sturdy, strong growing biennial or annual blooms from July through October. Although the honey is quite nauseous tasting, it can be fed to bees.

Plants That Can Harm Bees

In certain cases, exposure to harmful nectar or pollen can cause temporary or permanent injury to bees. The good news is that very few plants fall into this category. Typically, the bees become temporarily stupefied while working the flowers and fall to the ground. For certain species, the nectar and/or pollen can possibly prove fatal to bees. Though conifer honeydew has reportedly caused bee paralysis in Europe, this presents few problems in the U.S.

Buckeye and horse chestnut (*Aesculus spp.*)

At least two of these plants are suspected of poisoning bees. California buckeye (*Aesculus californica*) is found mostly in the upper two-thirds of the state, particularly along the coast. This tree blooms in early Summer. There have been numerous reports from California beekeepers that this has apparently either paralyzed or poisoned bees. An account of the devastating effect of this species appeared in the December 1925 issue of the *American Bee Journal*. The affected colony experienced serious damage. The adults lost their ability to fly. Those larvae that survived developed into malformed adults.

According to beekeeping author Ted Hooper, the red horsechestnut (*Aesculus x carnea*) has sometimes caused harm to bees. The affected bees fall to the ground. This cultivated form is a hybrid of the red buckeye (*Aesculus pavia*) and the horsechestnut (*Aesculus hippocastanum*). It is hardy to zone seven.

Lime (*Tilia spp.*)

The limes are related to the basswood and American linden. Several species of the cultivated limes are known to present problems for bees in Britain.

The bees can become stupefied and fall to the ground when working the flowers of certain species. In some cases the bees die. The number of affected bees is generally quite small. For the most part, the benefits of lime appear to outweigh the risks. Those species known to harm bees include *Tilia orbicularis, Tilia tomentosa, Tilia petiolaris,* and *Tilia x euchlora.*

According to some sources, the ill effects are due to lime honeydew rather than the nectar or pollen. The trees are known to be heavy producers of honeydew.

Locoweed (*Astragalus spp.*)

Some of the milk vetches, a type of legume, are called locoweeds. These are generally found in the West. Known to be toxic to livestock, these cause various symptoms, including neurological disorders. At least one species (*Astragalus lentiginosus)* has been blamed for the death of bees. The spotted loco weed was identified as the culprit. In one instance it was given the blame for killing many of the bees in some areas of Nevada, particularly in one county.

This species occurs in many kinds of habitats. It is fairly ubiquitous in the Northwest and Southwest. The states include Washington, Oregon, most of California, Nevada, Utah, Colorado, Wyoming, Idaho, New Mexico, and Arizona.

The locoweeds are mostly short-lived perennials. The seeds germinate in the Fall with the seedlings blooming the following Spring and Summer. According to beekeeping author Frank C. Pellett, the locoweeds yield a good quality, flavorful honey.

Ti-ti (*Cyrilla racemiflora*)

Also called leatherwood, this native shrub grows extensively in the Southeast and South. Its range extends to Texas. It blooms during June and July.

Some bee experts believe that this is the cause of 'purple brood', which affects only the brood and not the adult bees. An article in the December 1935 edition of Gleanings described the effect of 'purple brood' on the colonies. This report indicated that the problem was restricted to those areas where ti-ti was in bloom with the hives recovering after the plants quit blooming.

Truly Toxic Honeys

This final category includes honeys that are known or suspected of being poisonous to humans.

Carolina jasmine or yellow jessamine (*Gelsemium sempervirens*)

Some beekeepers have attributed bee deaths to this plant. One report appeared in the Nov. 1879 issue of the *American Bee Journal.* This indicated that young bees became ill and died after working the flowers. However, other beekeepers reported that the malady also occurred to a limited extent in locations where the plants weren't in bloom.

The final verdict on the toxicity of Carolina jasmine honey remains in question. According to beekeeping author John H. Lovell, "some severe cases of vomiting with the usual symptoms of poison have been reported." Some sources assert that only the uncapped honey is toxic.

Toxic Plants of North America by George E. Burrows et al is a classic reference. The authors report that it isn't clear whether the honey is poisonous to humans. There has only been one documented case of suspicious honey. Several children died, and the cause was thought to be the honey although this wasn't proven. Since that incident, there have been repeated attempts to substantiate the claim. But, there is still no definitive answer.

What is known is that the poisonous substance in the plant has a cumulative effect. So, possibly a certain amount would need to be consumed before symptoms occur. There is also another fact to consider – that the death of lab animals in controlled experiments occurred a week or more after the plant was ingested. Toxic alkaloids are definitely present in the flowers and other parts of the plant.

Euphorbias (*Euphorbia spp.*)

A number of the euphorbia species, including the poinsettia, are the sources of honey. The euphorbia honey from South Africa is considered poisonous. These are from succulent, cactus-like species rather than the leafy hardy perennials commonly grown in America. This honey brings a terribly painful burning sensation in the mouth. So, it is unlikely anyone would consume very much. Like the active ingredient in hot peppers, the burning increases when one drinks water.

Penal Cactus (Euphorbia)

Rhododendron (Rhododendron maximum)

Opinions are divided on whether the honey from snow-on-the-mountain (*Euphorbia marginata*) is indeed toxic. While some report that it is, other beekeepers reject this claim. The honey is reported to have a rather characteristic, though not altogether objectionable or unpleasant taste. On the other hand, some poisonous plant experts in the past have declared that the honey is poisonous.

The Ericaceae Family

There are both cultivated and native species in this group. This family features both good and bad honey plants. Among the desirable ones are the wonderful heathers, which are known for their delightful honey. In addition, the group also features the undesirables, such as certain rhododendrons.

The degree of toxicity varies from one species to another. The toxic ones are more likely to be a problem if the nectar comes from a single plant source. Generally in most years the poison appears to become so diluted that the danger is greatly diminished. However, the exception is the notorious pontic rhododendron (*Rhododendron ponticum*) of Europe. Generally, the effects of the Ericaceous honeys will be temporary and rarely fatal. Although the uncapped honey is considered toxic to humans, the capped appears to pose less risk. It also seems that some of the Ericaceous honeys are possibly toxic to bees as well.

The honey from the other Ericeaous species don't seem to be quite as poisonous as that from the rhododendrons and the mountain laurel. The less toxic ones include the fetterbush (*Pieris spp.*), leuocothoe (*Leucothoe spp.*), and andromeda (*Andromeda spp.*).

Mountain Laurel (*Kalmia spp.*)

The effects of mountain laurel honey are similar to that of the pontic rhododendron. The typical symptoms are vomiting and nausea. If in doubt, beekeepers reportedly fed some of the honey to a dog to see if it made the animal sick. According to some sources, it is possible that the poisonous honey attributed to the mountain laurel could actually be from a related ericaceous species.

Rhododendron (*Rhododendron spp.*)

This is one of the most famous poisonous honeys. The pontic rhododendron has often been the source of 'mad honey' in Europe. In 401 B.C. during the retreat of the Ten Thousand, Xenophon's army of Greek mercenaries fighting for Cyrus, Prince of Persia, traveled along the coast of the Black Sea to Trapezus, now known as Trebizond. The soldiers ate honey from either the pontic rhododendron or the pontic azalea (*Rhododendron luteum).* The honey has an emetic effect, and causes giddiness, etc. The soldiers became intoxicated, and recovered within a couple days. A similar thing happened to solders during Pompey's attack against Mithridates in 67 B.C.

This 'mad honey' causes a problem along the Black Sea about every year. Similar cases have occurred several times in Washington State with the last occurrence being in 1968. According to some sources, the honey is toxic in the raw and uncapped state. But, it is safe once it is capped.

The rhododendron honey tends to be more of a problem during a wet year. In some years the weather minimizes the risks. Apart from those species responsible for the poisonous honey, the other rhododendrons are considered good bee plants.

Tripetaleia paniculata

This is a lesser known member of the Ericaceae family. A deciduous Japanese shrub, it is sometimes grown in the U.S., mostly in woodland gardens. This plant is hardy to zone six. The small blossoms usually have three petals. Opening in clusters, these appear from mid-Summer into the early Fall.

The honey tastes really bad. For that reason, it is highly unlikely that humans would consume large quantities. Some individuals have experienced acute cases, while others are less affected. Generally, people do recover after eating it. BC

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

GLEANINGS

JULY, 2011 • ALL THE NEWS THAT FITS

OBITUARY

Bennie Lou Weaver passed away May 16, 2011, at home in Lynn Grove, TX, with Binford Weaver, her husband of 52 years and nine months, by her side.

Bennie Lou Franks Weaver was born January 9, 1923, to Dovey Lucille Barnett Franks and Robert Ingram Franks in Del Rio, TX.

Bennie Lou spent her early years ranching in West TX, losing her father, Bob, to an auto accident in 1930. Bennie Lou and Dovey persevered, ranching a 26 section place between Fort Stockton and Iraan until moving to another large ranch outside McCamey, where Bennie Lou graduated as salutatorian of the 1941 class. Bennie Lou entered Baylor University on a scholarship in the Fall of 1941, taking a leave of absence during the first years of World War II to help her mother on the ranch. Bennie Lou returned to Baylor and graduated in 1946, majoring in English with a minor in Music. After graduation, she moved to CA and taught high school in the San Francisco Bay area, and later at Kearney, Nebraska then returned to Waco, TX, teaching English while earning her Master's degree in guidance and counseling at Baylor.

Bennie remained close to her former roommate at Baylor, Reba Lou Weaver Campbell, and Reba's family, especially Reba's brother, Binford. Bennie Lou and Binford were married August 9, 1958, and she made a loving home in Lynn Grove.

Bennie Lou served as a guidance counselor and teacher at Navasota High School in the late 60s and early 70s, and was a certified Red Cross swimming and lifeguard instructor.

She supported her husband as an active member and leader of the American Beekeeping Federation, attending every meeting of the ABF from 1969 until 2009. She was active in the Navasota Music Study club and the Navasota Garden club, serving as president of each, and an avid bridge player. Bennie Lou was a founding member of the Grimes County Republican Party and an early supporter of George H.W. Bush in his campaigns for Congress and the Senate in the late 60s and early 70s. Bennie Lou grew up in the Baptist Church, became a member of the Lynn Grove Methodist Church after marriage, and subsequently, the First Presbyterian Church in Navasota, where she remained faithful until failing health intervened.

Bennie Lou was preceded in death by her father, Robert, her mother, Dovey, her adopted sister, Barbara Robinson, and Bennie Lou's beloved son, Robert Roy Weaver. She is survived by her husband, Binford, of Lynn Grove, a son, Daniel Weaver and daughter-in-law, Laura Weaver, and three grandsons, Travis, Dylan and Stone Weaver, all of Austin, TX.

Bennie Lou never met a stranger, regardless of origin; could find a fellow Texan in the dark on a new moon anywhere she roamed. Bennie was a master of Southwestern cooking and loved classical, big band and jazz music.

WORLD'S GREATEST BEE SUPPLY COMPANY

Steve & Sandy Forrest

Brushy Mountain Bee Farm is the "World's Greatest Bee Supply Company." The syndicated television show "The World's Greatest" initial contact with Brushy Mountain was exploratory in nature. Asking such questions as, "What have you done that others haven't? What separates you from the other companies? What awards have you received?" and many others. Based on the initial interview the producer determined that Brushy Mountain Bee Farm had potential to receive the designation as the "World's Greatest."

To continue for consideration an application was completed outlining many of the unique characteristics and accomplishments which Brushy has achieved over the years. The list which is long and impressive but not surprising from a company which prides itself on "Best Quality, Best Service, Best Support," the mantra of the business.

Some things which separate them from other companies include being the first company to bring a natural miticide to market (ApiLife var) allowing beekeepers to move away from the hard chemicals to a safer form of *Varroa* control.

About 15 years ago, they reintroduced eight-frame equipment. In the late 1800s eight-frame equipment was the standard allowing women to more easily work the hive. The equipment is not only easier to handle, but bees tend to do better. The English Garden Hive which is one of Brushy's signature items is comprised of eight-frame mediums and it was A.I. Root that stated using medium boxes for greater lateral movement and access to honey in the Winter time.

Brushy's pioneering efforts don't stop with equipment and product development. They understand the complexities of beekeeping and the challenges beekeepers face and are devoted to the success of beekeepers. Brushy was one of the first to publish a free information rich newsletter. Each month there are timely helpful hints and industry developments. Brushy is the only supply company offering free monthly online webinars. A broad range of topics are covered including all aspects of beekeeping to candlemaking to mead making.

Brushy's commitment to its customers and employees has not gone unrecognized. In 2008 and every year since they have received the S.H.A.R.P. award for safety in the work place. In 2009 they were named NC Small Business of the Year by Business NC Magazine.

Applications were reviewed and Brushy Mountain Bee Farm was named the World's Greatest. In April a film crew interviewed Steve and Sandy Forrest (Owners) and Shane Gebauer (General Manager), and filmed various aspects of the business. The crew spent the entire day filming every department and activities which make Brushy Mountain Bee Farm the "World's Greatest."

URBAN POO PROBLEMS

A New Zealand beekeeper fears he will have to remove his 20 hives because his neighbors are complaining about the bees pooping on the property.

Barry Bradley says the neighbors in Maunu, 100 miles north of Auckland, are unhappy about the bees' excrement landing on clothes, vehicles and windows of houses.

"It's just bee poo, it's not toxic or dangerous and it's generally only during the warmer months," Bradley tells the Northern Advocate newspaper.

"It's a bit silly really that we may have to move them because of a bit of bee poo. Bees are vital to virtually all plants and people complaining about them would probably be the first to complain if their flowers or fruit trees didn't pollinate because there were no bees around."

The neighbors have made a number of complaints to Whangarei District Council over the bee poo and the newspaper says the council is trying to negotiate a solution.

Bradley says the bees at the location are used to train people in correct beekeeping methods.

"Most houses are about 100 meters (300 feet) away and it seems a shame that a few people can stop the pleasure of all those who we train," he says. "The bees are here for the greater good and given that they are so at risk it's even more important that we teach more people how to keep them properly.

"It seems strange that at a time when the rest of the world is wanting to save their bees we are being told to move ours because of a bit of poo."

Alan Harman

WINNOWING

We don't need the mice
An' we don't need rats.
If there are no mice,
We don't need the cats.

We don't need 'possum
An' we don't need the ticks
Or the polliwogs.

We don't need roaches
An' we don't need bears.
We don't need spiders.
An' we don't need hares.

We don't need skeeters
An' we don't need gnats.
Without them skeeters,
We'll never need bats.

We don't need the wasps
Or the centipedes.
We don't need the sharks
Or the canine breeds.

We don't need tigers
An' we don't need fleas.
We need only us . . .
An' the honey bees

Guy Graybill

PLASTIC QUEEN REARING EQUIPMENT WORKS WELL FOR WORKERS, TOO

German ecologists have developed a better way of rearing bee larvae in the laboratory that could help in the fight against bee diseases worldwide.

The way bees now are reared in the laboratory has major drawbacks. It involves a process known as grafting, where the tiny first instar bee larvae around 1mm long are collected using feathers, brushes or needles.

This is not only time-consuming and demanding considerable skill, but also causes deaths among the tiny larvae because of the mechanical stress involved in their handling.

The team of ecologists at the University of Würzburg, Germany looked outside the laboratory to devise a new system.

To avoid handling the larvae, the German researchers allowed honey bee queens to lay eggs directly into an artificial plastic honeycomb about the size of a cigar box.

The plastic honeycomb is widely used by professional queen breeders and by using it in the laboratory the team found rearing bee larvae much easier and more successful.

"The artificial comb has a hexagonal pattern with 110 holes the size of wax cells," lead author and keen bee-keeper Harmen Hendriksma reports in the British Ecological Society's journal Methods in Ecology and Evolution.

"The queen lays her eggs directly into these small plastic cells. Because the back of each cell has a small plastic cup, we can collect the larvae without handling them."

Before starting his PhD in 2008, Hendriksma spent four years working with a new Dutch company producing honey for medical uses. Seeing it used by queen breeders, he decided to try out the plastic honeycomb in the laboratory.

"Like many people I am a bit lazy and wanted to find a quicker, easier way of rearing honey bees in the laboratory," he says. "When I tried using the plastic honeycomb system I found it was just perfect."

Hendriksma and his colleagues found that when using the plastic honeycomb, 97% of larvae survived. Because it is straightforward and simple to use, researchers were able to collect more than 1,000 larvae in 90 minutes.

Hendriksma says by introducing a robust, standardized way of rearing larvae the technique should also help improve the quality of bee research because the results of experiments conducted in different laboratories will be more directly comparable.

The study also shows that applying statistical approaches used in other areas of ecological science can help bee researchers to better analyze their results.

"Bee research is like an arms race, where researchers try and keep up with monitoring emerging new risks to bees," Hendriksma says. "Because so many factors – such as environmental pollution, new agricultural pesticides, bee diseases, changing habitats and bees' genes – may be playing a part in the loss of our bees we need better ways of analyzing our results."

The work was funded by the German Ministry of Education and Research. – *Alan Harman*

Anti -Social Bee

STEALING BEES IN ENGLAND . . .

British beekeepers report dozens of hives are being stolen to order by thieves who sell them to first-time bee enthusiasts.

The thefts coincide with soaring prices for hives.

Kent Beekeepers' Association member Peter Hutton tells reporters the price rise comes because there are fewer colonies available.

"Two years ago you would get a second-hand hive and whole swarm for around £200," he says. "Now the cost of buying a nucleus swarm a third of the size and all the equipment you need comes to around £650. There is also a lot more demand for hives because beekeeping is more popular."

Hutton says it has to be a beekeeper behind the thefts.

"It is not the sort of thing you can steal if you don't know what you are doing," he says. "They are probably being sold to first-time buyers who are buying them in good faith."

Association Sidcup branch chairman David Rea says one of his members had 12 strong colonies in Langstroth hives stolen from two different apiaries.

"The incident was made even uglier by the fact that two more hives had been taped up, but were left behind and the bees suffocated," he says.

All the frames had month and year written in red felt tip on the top bar and members were asked to be on the alert for unusual offers of used Langstroth hives.

Similar thefts have been reported in Essex and Somerset.

. . . AND SCOTLAND

A $2.9-million research program into bee survival is in jeopardy in Scotland after thieves stole four hives containing British black bees.

Tayside Police are appealing for information, saying the hives were stolen from the grounds of Ninewells Hospital in Dundee.

The bees were part of a £1,800,000 project being undertaken by the Centre for Neurosciences at the University of Dundee Medical School. The university was awarded the money by the Insect Pollinators Initiative to carry out research to determine if pesticides were harming bees.

The study, launched last year, is looking at whether the pesticides are hampering the cognitive functions of bees and possibly hastening their demise.

Together the hives and bees are worth between £3,000 and £3,500 ($4,880 and $5,700).

The cedar wood Thorne hives were stolen in just 20 minutes in daylight from a grassy area at the hospital.

"Officers are keen to trace a white box van and two men that were seen in the area," a police statement says. "One of the men wore a bonnet."

Dundee's The Courier newspaper quotes East Scotland Beekeepers Association vice president Gavin Ramsay as saying the thieves are likely to have knowledge of beekeeping.

"It has to be people who know what they are doing, but the fact is that, at the moment, we just don't know," he says.

"It is fairly rare that something like this happens, but it does on occasion."

Ramsay says thieves target beehives so they can then sell them on to a third party or to replenish a beekeeper's dwindling colony.

Protecting against theft is proving increasingly difficult, he says. "You can mark hives, but even that won't stop thieves. They can tip the bees into another hive so it is very difficult to guard against theft.

Project lead researcher Chris Connolly tells the newspaper the crime is disheartening.

"While we are still taking stock of the full implications if the bees are not returned, this theft will undoubtedly hamper our research," Connolly says.

"The bees were there when I arrived at work on Sunday morning but were absent when I went to work on them 20 minutes later. Two middle-aged men in a white van were seen pulling up beside the hives at this time and clearly whoever did this knows what they were doing and how to handle bees."

Connolly says the bees are unique and so should be easy to identify if sold on.

"At this point, it is not clear if the bees were stolen for profit, for breeding potential as native black bees, or for another reason," he says. "The project is investigating the potential effect of pesticides on bee learning and health.

"This is very important research given the decline in honeybee numbers so I would urge anyone with information to get in touch with the police."

Alan Harman

IMMUNE DEFENSE

University of Aberdeen researcher and senior lecturer Dr. Alan Bowman, who is pioneering a way of saving the endangered honey bee, is included in Esquire magazine's list of the "20 men who will shape the next 20 years."

Bowman, 47, was included because some of his research – also involving the University of Aberdeen's Dr. Ewan Campbell and Dr. Giles Budge at the National Bee Unit in Scotland – is trying to protect the honey bee which has been declining by as much as 30% a year.

Bowman and the team have worked out how to turn the Varroa mite's immune system onto itself which causes the bug to self-destruct

He tells the magazine the threat is not about lack of honey, but the bees' pollination services. "More than 70% our crops are dependent on bees and other insect pollinators – without their help we'd be eating just potatoes, rice and grains."

When asked by Esquire if bee populations could bounce back, the researcher adds: "I certainly hope so. As Liam Gallagher said: 'It's important. Without them we're in proper bother'."

Bowman says he is delighted to be included in Esquire's list.

"I was bemused when Esquire contacted me to be in this group, but am pleased the importance our team's work here at the University of Aberdeen has been recognized," he says. "We hope we've made a significant contribution toward the fight against Varroa with our species-specific and environmentally friendly approach."

Bowman says his lab has developed a method of gene knockdown in Varroa that has potential as a control measure.

"We have dissected out the 'brain' of mites (not an easy task) and studied the genes expressed in that vital tissue by transcriptomics," he says. "We have developed a method of collecting saliva from these tiny beasts and studied the effect of the saliva on insect immune cell function."

Bowman tells reporters this is the first time any of his work has been picked up by the non-science community.

"It's especially nice to have some impact with the general public," he says. "It's great and should affect the survival of the bees."

Alan Harman

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Ed **Colby**

A Stripper & Chicks

The other day a Las Vegas stripper pulled up stakes and headed back to Aspen to take a job managing a bar. She dropped off her two nearly-grown iridescent black Java chickens here at Colby Farms.

It took the little darlings a couple of days to come to terms with my Rhode Island Reds. The newcomers quickly found themselves at the bottom of the pecking order, but they don't seem to mind. They adore my big red rooster, and he loves them back.

There are two really good things about chickens. First, of course, the eggs. They also eat just about anything. This can be handy.

It took me a while to figure out what to do with the scrapings from a drone comb in each of 80 hives. You can fill a couple of buckets in a hurry in a Spring honey flow. *Varroa* mites prefer drone cells to worker cells for egg laying. I put a comb of plastic drone foundation in the brood nest, let the bees draw it out, and once the brood is capped, harvest the mites by scraping the cells into a bucket. Then I put that now-gooey frame right back into the hive for the bees to draw out again.

But what are you going to do with that creamy, waxy mess in the bucket? It didn't seem right to put it out for the trash truck. Nor did I want to leave it out by the beeyard. Critters would surely make quick work of it, but herein lies yet another problem. Bears are ubiquitous here in Colorado, and I didn't want them acquiring a taste for honey bee larvae.

The funny thing is, my chickens all of a sudden got picky and wouldn't touch the drone scrapings. I fixed that when I withdrew their regular feed and served them drone brood *a la carte*. Now that they've learned to eat what's put in front of them, they seem to have developed a taste for larvae.

I guess I could eat larvae myself. They have a rich, buttery taste, and I occasionally pop one in my mouth when I'm out in the bee yard. I've never tried frying up a pan, or throwing a handful in my omelet, however.

But this Spring I couldn't buy a mite, so why should I bother trapping *Varroa*? I sugar-rolled 70 of 80 colonies and found fewer than 40 mites. That's 40 mites in a sample of at least 21,000 bees! I don't think I have a mite problem, for now.

I have another problem right now. It's May 21 as I write this, and it's raining. It's rained or snowed all Spring. The bees got a few days of sunshine -- and made some honey -- during the dandelion bloom, which is now about over at the lower elevations.

As the season progresses, I follow the dandelions, moving my bees to higher pastures. I have two yards at 6500 feet, where the dandelions are in full bloom. That's a thousand feet higher than where the bees are right now. Later, I'll move bees to the Flat Tops at nearly 9,000 feet, and to a location on Aspen Mountain, at 9,000 feet.

A few weeks ago I was putting queens into newly-made splits, but I got sidetracked doing something else. I can't remember what. I had the truck doors open, so I could listen to the radio. The queens were in a box in the cab. It was snowing and blowing.

When I finally got around to opening my box of queens, they were all dead! All 20 of her royal highnesses had expired, and their attendants were all dead, stacked in a pile.

Of course my heart sank. Nobody to blame but myself. I wondered how anyone could be so negligent.

But I had an idea, a hope. I once found a "dead" caged queen in a hive in which the bees had clustered apart from her. I set her on the top of a hive, and the morning sun brought her back to life. But this time my prospects seemed grimmer. It was really cold outside!

I closed up the box, put the bees back in the cab of the truck and drove home. When I got there, I put them on the bedroom dresser and turned up the heat. I heard a little buzzing, but I didn't want to look.

The next morning, I said, "I wonder if any of those little darlings made it."

Marilyn said, "I heard them last night."

I said, "Yeah, I know there's some live bees in there, but I wonder about the queens."

"Maybe your queens are OK," she said. "I heard tooting."

"Praise all the saints!" I cried out. "Right now I'd settle for a 50 percent loss, and be thankful for it!"

I still didn't want to look. Instead, I drove back to the beeyard. I'd take my medicine, whatever it might turn out to be.

You've already guessed the ending to my tale. My queens were all fine. I don't mess around with queen introductions anymore. I pushed the cages deep in the splits and let the workers eat their way through the queen candy.

The bees accepted all 20, and those golden beauties were soon laying the loveliest brood patterns.

I'd nearly killed the little darlings, but they made an astonishing recovery. I was lucky. I'll take good luck over skill, diligence and bad luck, every time.