THE INTERVIEW ISSUE • TRUTH IN LABELING

Dec 2013

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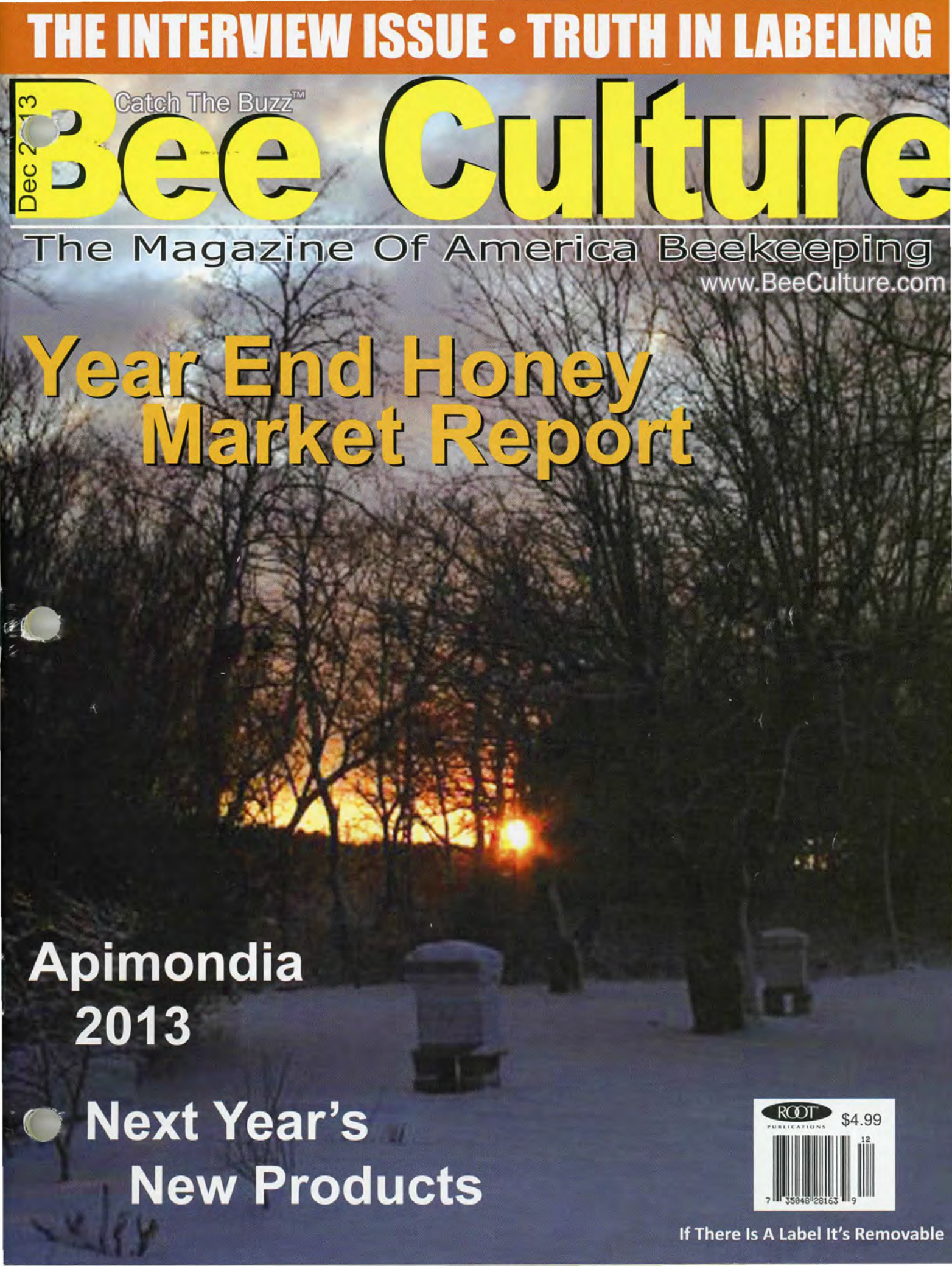
Bee Culture

The Magazine Of America Beekeeping

www.BeeCulture.com

Year End Honey Market Report



Apimondia 2013

Next Year's New Products

ROOT PUBLICATIONS $4.99

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If There Is A Label It's Removable

Bee Culture

Features . . . The Rest

CA Pollination Directory

The Almond Board of California has re-structured our *Pollination Directory* located on the Board's website. The *Pollination Directory* contains information for California almond growers to use as a valuable resource for beekeepers and bee brokers. In order to provide a useful tool to our industry members, your assistance is needed to ensure the information is current.

Please log on to the Almond Board of California *Pollination Directory* by following the link below.

http://www.almondboard.com/Growers/OrchardManagement/Pollination/Pages/Default.aspx

- Select Almond Pollination Directory
- Select your respective bee affiliation from the list of options on the left under "Additional Resources" (e.g., Beekeepers, Bee Brokers at the bottom of the list)
- If your business is currently on the website, please review your information and submit any changes that need to be made by selecting the "Update Beekeeper Info" button on the bottom left (in orange)
- If you are not on the site, and would like to participate, please select the "Update Beekeeper Info" button on the bottom left (in orange) and complete the form. Please note: business descriptions may be edited at the discretion of the Almond Board.

We would like the directory information to be current for the upcoming 2014 bloom, so please act now.

If you have any questions about the *Pollination Directory* or need assistance adding your information to the website, please call Debye Hunter at 209.343.3230 or e-mail her at dhunter@almondboard.com.

Thank you for your participation and best wishes on a successful almond pollination season.

Bob Curtis & Gabriele Ludwig
Almond Board Of California

No Pressure Treated

The recent article in *Bee Culture* Magazine by Ed Simon about building an otherwise good hive stand, has made me realize that we need to know that pressure treated lumber does not belong in the Apiary.

Three years ago, I decided to build elevated hive stands to save my back. I used treated 4x6 posts with 2x8 rails. Each stand was 12' long. I made six of them and hand dug holes for the legs that were three feet deep. The stand was 18" to 20" high. Of course each unit was screwed together with construction adhesive and deck screws. I was all set! I started to have every kind of Queen problem: Queens were introduced, accepted. and superseded. Virgins failed to mate. Colonies lost their Queens. It went on and on for two seasons. I lost many hives during the Summer! I really felt like the worst beekeeper possible. Last August, I read a question in Jerry Hayes' Classroom column from a beek with similar problems. One similarity was that colonies that survived moved their brood nest into the highest box possible. I once found a Queen on the inner cover! After a back and forth, It was learned that he had put his colonies on treated hive stands. Jerry replied that some of the copper compounds have been removed from the treatment and have been replaced by an insecticide because termites are a concern in most places. There were my colonies, with SCREENED BOTTOM BOARDS, sitting as the stands off gassed insecticide!

This Spring I pulled up the stands and replaced them with cedar rails and locust posts. It was quite a job and the cost of two sets of hive stands was significant. The result was worth it. This year my colonies have prospered, and I don't have to bend over to lift them. I would urge that any treated stands of any age need to be replaced.

Profit from my lesson.

Gregory Stoddard

Rubber Band Removal

Sometimes the bees make poor decisions. This colony was 25 feet off the ground hanging on the outside of an old barn. The farmer had enjoyed watching it grow from a small swarm in June until the middle of August when he wanted it removed. A colony exposed to the Minnesota Winters is very unlikely to survive so I agreed to try to remove it. The retrieval resulted in seven five-gallon buckets of bees and/or comb. I was able to rescue much of the brood by using old frames and rubber bands as support. Within five days the rescued comb was firmly attached to the frame and the bees were removing the rubber bands. It is amazing that a bee could remove a rubber band and drag it out of the hive.

Incidentally, seven days after the removal I saw the queen. It was pure luck that I didn't kill her when I was getting the bees.

Ed Simon
Minnesota

Jr. Beekeeper Educates

In September of 2013, West Central Ohio Beekeepers Association junior beekeeper Ava Hess enriched her school's fourth grade science unit on pollination by bringing an observation hive to the classroom. Ava presented an overview of honey bee biology, the life cycle of the bee, and the basic workings of a bee colony. Ohio fourth graders study pollinators as part of the curriculum on plants and pollination. The observation hive and colony overview supplemented an earlier hands on activity of hand pollinating flowers in the classroom with freeze dried bees. The students discussed the important role of the honey bee in agriculture and enjoyed spotting workers, drones and of course the queen. The observation hive generated curiosity, excitement and questions by the students and supplemented the education of over one hundred Ohio fourth graders. Ava has one colony of her own which she collected as a swarm in the Spring of 2013 with the help of her dad. She plans to participate in the Ohio 4-H beekeeping project in 2014 and has hopes of expansion with another Spring swarm.

Dwight Wells
West Central OH Beekeepers

Shades of Gray From Apimondia 2013

Apimondia – Philip McCabe, Former President, Apimondia, Ireland

A few days ago I returned from the Apimondia Congress in Kiev. What should have been one of the best Congresses ever turned out very differently? Many delegates pre-registered, some as far back as 2012, expecting that when they arrived it would be a simple matter of picking up the registration passes, well what a disaster. These same delegates had to queue for up to five hours, in very cold and at times wet weather, just to collect their details. The first problem was that although up to 8,000 were expected the local organisers only had three desks to cater for this number of people of pre-registered delegates. In fact it was identified that those who didn't pre-register only had to wait about an hour for their passes. The next problem was that everyone had to have their photo taken for their pass, on Saturday after about one hour all the computers were out of order and remained so until 4.30pm, that meant all had to be done on the Sunday. The opening ceremony started at 2pm and many never got to it as they were still in the queue. Some people experienced great difficulties in the crush and some had to be helped in what turned out to be a very dangerous situation. A number of the Irish delegation were caught up in this and indeed did great work in assisting people who were over whelmed by it all. At the first session of the General Assembly, our former General Secretary, Michael Gleeson, made a very impressive statement about the matter to the assembly, which received great support and applause from all those present. The symposia and plenary sessions were of a very high standard but some of these got lost with the sour taste left by the debacle of the registrations. The ApiExpo too came in for some severe criticism due to the fact that the exhibitors, from outside the Ukraine, had to pay a lot of extra money just to get their goods onto their allocated stands. If only half the stories are true then we have a very serious issue on our hands. One of the most positive outcomes from this Apimondia was the announcement from the Secretary General was that Apimondia is now seeking a core PCO to help run congresses where hopefully the many issues highlighted in Kiev will not be repeated and where Apimondia have more control of its own congresses and I'm delighted to report that I had a part to play in this initiative.

APIMONDIA, UKRAINE From John Phipps, Beekeeper's Quarterly

It was my intention to cover the Ukrainian Congress in this issue of the *BKQ*, but circumstances beyond my control led me to boycott the event. Despite our journal having reported on many aspects of Ukrainian beekeeping through our correspondent, Dr Alexander Komissar, for almost a quarter of a century, plus additional articles from Dr Viktor Fursov, and articles I myself have written about Kyiv and the Congress in the *BKQ* and *Bee Culture* to promote the event, the organising committee declined to give me a press pass. I wrote to the President of the organising committee, Tetiana Vasylkivska, outlining what we had already covered and promising a follow-up article after the event (as we did for the Kazakhstan Honey Festival). I also pointed out that I had spent a considerable number of hours voluntarily editing English translations of several Abstracts for the Congress prospectus, as well as a small book on beekeeping describing a new hive which simulated the conditions that would be found in a honey bee nest in a hollow tree. Not surprisingly, my request was turned down. Madam Vasylkivska wrote: 'In order to establish fruitful cooperation with the Organizing Committee of the XXXXIII International Apicultural Congress and become media partner of the Congress, you should publish in your magazine informational materials of the Congress, namely the full page ad and two articles written by our PR-manager in the format of the XXXXIII International Apicultural Congress. Our articles must be published in two editions of Beekeepers Quarterly, which will be issued before and after the Congress.' I cannot think of any magazine seeking to be professional which would adhere to these conditions. Firstly, whilst a journal might receive information about events, it is up to their writers to make of it what they will and not be dictated to as to how the material should be published. On this point, too, it is tedious to see the same material being published word for word in other journals. As regards the advertising clause, the committee were expecting a free full page advertisement that would have the value of at least three full delegates' fees. If I was to go as a non-accredited journalist the fee would be 265 euros for five days. Paying such money to write about an event is outrageous. Philip McCabe wrote to the committee on my behalf, but I received no further communication from the local organisors. Subsequently, I have learned that there were people who received press passes who did not adhere to the conditions stated above.

Not long before the Congress, it became noticeable that all was not going as well as it was meant to in Kyiv with the preparations for the event. Indeed, many serious allegations were made against the committee, the rights and wrongs of which I am not able to ascertain. One important accusation concerned the make-up of the committee itself, another that the event was being treated more like a commercial enterprise than an occasion that should be affordable to a wide range of beekeepers. The truth of the latter is apparent in the high cost of delegates' fees (for a country of essentially low-paid workers), the outrageous charges for exhibitors and entries to competition classes and for pre-ordered refreshments. Those not directly involved in the organisation called upon Apimondia President Mr Gilles Ratia to intervene - but apparently he dismissed the problems as a local spat and declined to do so. However, shortly afterwards a message was circulated from Apimondia headquarters in Rome saying that due to strong support from sponsors Apimondia was able to reduce the price for delegates from 299 euros to 190 euros (but only for groups of ten registering together) - presumably to drum up more support rather than in a spirit of generosity. On September 11, Gilles Ratia circulated a letter telling people to ignore the derogatory statements that were being made about the organising committee and was pleased to say that more people had registered for the event (4977) than at the same time before the Congress in Montpelier. (However, I understand that the final total of delegates attending the Congress in Kyiv was just over 8000 - compared with over 10,000 in Montpelier. There are many more beekeepers than that within Ukraine itself and the surrounding countries, so maybe it was, after all, too high a price for many people to pay.) He also wished people to take note of the fact that 'Apimondia has organised international apicultural congresses since 1897 and it has never been involved in scandals on the procedural aspects of the staging of such events. The historical record is there for everyone to see and Apimondia is by

Continued on Page 85

New For You Or A Gift For Another –

Bees. A Natural History. By Christopher O'Toole. 8.5" x 11". ISBN 978-1-77085-208-2. Published by Firefly Books. 240 pages, 125 color photos. Hard cover w/jacket. $40.00.

The beautiful photography compliments the information offered here, written for not hard core entomologists, but rather people familiar with, and interested in all of the bees – not just honey bees. It reviews the history of where bees come from – wasps – and then explores all of the other bees – solitary and social bees, miners and masons, leafcutters and carpenters, and then the drones of each of these, which are surprisingly much more complicated than we beekeepers might suspect. Caring for the young, territory defense and of course mating are male activities in some species. Of course for *Apis*, the sole goal is that single, fatal coupling.

Pollination is a special behavior and is carried out as many ways as there are bees it seems, and as many ways as there are flower types... squash bees are a type of specialist as are those bees that rely on orchids. The photos for these chapters are stunning.

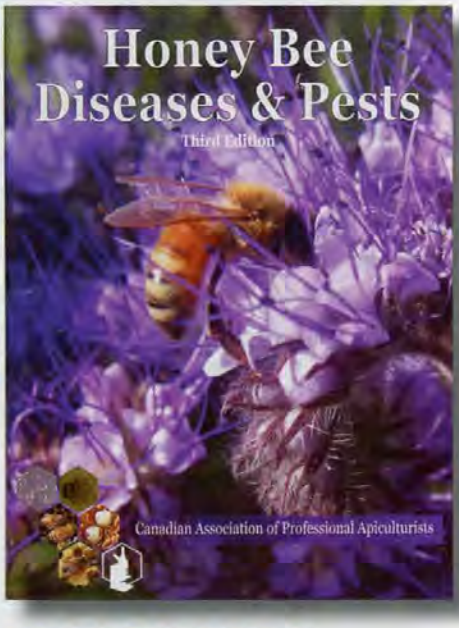
Of course enemies of bees, *Varroa* included, is explored, including pests like spiders, wasps and other hunters, including other bees are photographed and reviewed. Conservation and management of all of these is shown, blue orchard, bumblebees and others are covered. Bees and people, our history with them, harvesting from wild nests and bees and folklore, and of course bees in folk and modern medicine – all described and shared.

The information here is not new, but the gathering of all of this in one place makes it a good addition to your bookshelf, and the photographs make it worth having, too.

Kim Flottum

Honey Bee Diseases & Pests, Third Edition. Edited by Stephen Pernal and Heather Clay. Published by the Canadian Association of Professional Apiculturists in 2013. ISBN 978-0-9693336-1-6. 68 pages, color throughout. Usually $10 from most bee supply outlets.

A third edition of this excellent handbook. Now updated to include new pests, and additional information on some that have been around. The phorid flys, Nosema cerenae, more on pesticides than anything I've seen recently. Actually, you can't beat this book for the price. Every beginner's class should have this as part of the pack folks receive. Good information, good photos, a good book. Get one. – *Kim Flottum*



Keeping Honey Bees. Expert Advice Made Easy. Kim Pezza. Published by Heatherleigh Press.

I seldom do this – that is review a bad book. And I'm not even going to tell you where to get this book or how much it costs. It is, quite simply, the worst book about bees and beekeeping I have ever seen. And I have seen some that were just awful. This is worse. I found, without trying very hard, a mistake on every page. Every single page. Really. These people did not do one iota of fact checking, nor, do I think did they check even one reference book (the newest reference book they list in the back is the 1978 Art & Adventure by the Aebis, yet they have a few web pages I've heard of, and they list our magazine, but not ABJ). The author, it says, has raised pigs, poultry, game birds, rabbits and goats. Bees, however, are not mentioned. Don't buy this book. If you find it in a store tell the seller to burn it. And not in a smoker. What a waste.

Kim Flottum

New Products Continued On Page 15

A SHIELD TO PROTECT BEES

A new product has been developed to assist honey bee health naturally and organically. BEE SHIELD™ is a supplemental spray and syrup additive that prevents viruses from being able to infect healthy tissue, thus preventing viruses from harming a colony. Utilizing electron resonance response (ERR), BEE SHIELD has the ability to bind with pesticides to aid in preventing absorption into the bee's system. The shield responds to free radicals, preventing them from damaging healthy bee tissue in addition to aiding in removal of toxins.

The shield is a treatment that has become a necessity due to the increased number of crops that utilize harmful pesticides where bees pollinate.

BEE SHIELD™ increases the ability of bees to combat lethal pesticide threats as well as other challenges. Other types of problems that effect bees include acute paralysis, kasmir, and black queen cell virus. These diseases can devastate the productivity of a colony and lead to their eventual death as well as infect other hives. The shield is a broad

range anti-viral supplement for bees, which has the ability to bind to the cellular tissue of bees in a completely symbiotic manner (taking nothing away from the bees and asking for nothing in return) forming a shield between the virus and the bees. This shield will prevent infection of the hive by not allowing for uptake of viral DNA/RNA and, of course, by protecting healthy bees from becoming infected. BEE SHIELD's ability to prevent viruses and defend against disease helps control the mite infestation. The completely natural and organic BEE SHIELD™ is specifically designed to be a valuable weapon in the battle for the health of the honey bee.

Find out more at **www.1stlighttrading.com**, 888 657-3636 or **www.bee-shield.com**.

Maximum MPV. Multi-Purpose Ventilation System.

Used Summer and Winter for improved ventilation in beehives. Developed by R. Micheal Magnini of Sweet Clover Productions.

The MPV eliminates excess metabolic water vapor during overwintering. It is placed on the hive above the frames. The mesh in the MPV sits just above the top bars but with window screen between the top bars and the mesh holding the fiber. Two compartments in the 3.5" high box are separated but contain polyester fiber. The box is topped with the inner cover, a piece of insulation and the outer cover. Moisture rises to the fiber, and is removed through holes in the sides of the box. During the Summer the insulation on top is removed and heat rises and is removed through the ventilation holes.

Instructions and plans to build are available on the web page **www.thebeekeeper.ca** for $19.95.

Bee Amour Jewelry is made by designer and backyard beekeeper Anna Gieselman in her studio in Austin Texas. Both men and women's jewelry is available. The rings featured here are cast in sterling silver and oxidized to enhance the honeycomb pattern. They are available in most ring sizes and can be commissioned in gold or other precious metals if desired.

Bee Amour Jewelry is inspired by Anna's adventures as a novice urban beekeeper. The first piece was a queen cell that she cast in bronze and made into a pendant. Bee Amour Jewelry donates a portion of company profits to bee loving organizations and non-profits that provide beekeeping education and research.

You can find her jewelry on line at **www.beeamour.com** and in retail locations in Texas and New Mexico. Anna's vision for Bee Amour Jewelry is to expand into more boutiques around the country that sell unique artisan made goods.

DECEMBER – REGIONAL HONEY PRICES

What difference does a year make? Take a look at December 2012 prices compared to today. Check out your region. Are you keeping up, or leading the way. Honey prices are outstepping most food items, and you should be taking advantage of this.

REPORTING REGIONS – 2012

	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	1.85	2.10	1.85	1.61	1.83	1.81	2.07	2.00	1.85	2.05	1.93	2.00	1.54-2.10	1.89	1.87	1.72
55 Gal. Drum, Ambr	1.78	2.03	1.78	1.62	1.73	1.70	2.00	1.85	1.55	1.78	1.84	1.93	1.50-2.03	1.80	1.73	1.68
60# Light (retail)	192.50	182.00	150.00	158.20	160.00	160.00	166.50	155.00	125.00	138.00	116.00	201.67	100.00-240.00	165.64	158.93	152.99
60# Amber (retail)	176.67	170.00	150.00	162.33	160.00	146.25	171.75	140.00	125.00	154.70	118.75	182.50	90.00-215.00	156.91	152.90	153.98
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	72.71	90.82	48.00	66.87	72.75	56.25	51.98	72.75	72.75	49.92	67.92	90.00	37.20-120.00	66.89	63.58	65.23
1# 24/case	113.98	124.74	115.50	85.53	117.00	106.13	84.42	86.40	76.00	120.80	95.94	122.73	72.00-212.00	105.10	101.46	95.24
2# 12/case	113.72	86.01	78.60	76.00	84.00	82.96	80.47	96.51	63.00	86.16	103.00	101.27	62.00-144.00	90.03	89.57	86.31
12.oz. Plas. 24/cs	101.79	99.22	63.10	76.40	72.00	75.20	67.06	71.40	66.00	64.08	84.30	81.60	48.00-144.00	80.39	80.31	78.05
5# 6/case	122.85	101.49	93.00	84.23	105.00	91.25	92.35	84.80	72.00	88.98	108.25	111.00	62.50-150.00	98.44	105.81	97.31
Quarts 12/case	170.00	201.94	144.14	113.90	102.00	103.10	106.65	105.00	144.14	108.96	103.00	133.33	60.00-275.00	120.77	118.35	126.40
Pints 12/case	85.50	95.65	96.00	77.75	78.00	64.57	75.28	59.70	60.00	111.00	66.60	78.00	40.00-144.00	75.95	78.01	80.80
RETAIL SHELF PRICES																
1/2#	4.38	4.81	3.30	3.70	4.06	3.66	3.22	2.59	4.06	3.25	3.73	5.00	2.15-6.50	3.80	3.65	3.38
12 oz. Plastic	6.30	5.28	4.14	4.15	5.25	4.36	3.90	3.21	4.25	4.44	4.96	5.10	2.99-8.00	4.64	4.57	4.11
1# Glass/Plastic	6.51	6.31	6.51	5.33	6.25	6.55	4.73	4.36	5.50	5.96	5.93	8.08	3.00-10.00	5.97	5.88	5.70
2# Glass/Plastic	11.58	9.74	10.97	8.85	10.00	9.77	8.20	6.44	8.50	9.57	8.79	13.33	5.50-15.00	9.66	9.54	8.92
Pint	7.75	8.99	10.85	7.10	6.50	7.88	8.46	5.76	5.00	7.08	8.02	9.44	4.00-15.00	7.95	7.62	7.46
Quart	14.33	17.32	15.11	12.13	12.00	11.31	11.36	10.97	15.11	13.65	11.38	16.26	7.00-28.00	12.71	12.45	12.60
5# Glass/Plastic	25.38	20.78	24.10	21.33	25.00	25.00	20.09	18.99	23.39	19.00	20.27	25.00	14.35-36.00	21.60	20.43	20.77
1# Cream	9.77	7.74	8.10	6.61	7.58	5.75	6.09	5.59	7.58	5.04	8.04	8.25	4.00-12.00	7.16	6.85	6.56
1# Cut Comb	9.93	7.65	8.60	6.13	8.71	7.33	7.28	6.50	8.71	9.25	9.50	13.60	3.00-15.00	8.43	8.63	8.18
Ross Round	8.11	5.98	8.19	6.27	7.31	7.00	6.00	7.31	6.50	7.25	10.17	7.20	3.00-12.00	7.12	7.67	7.03
Wholesale Wax (Lt)	5.40	5.23	4.60	3.74	4.00	4.69	5.37	5.00	5.00	8.00	3.13	4.50	1.75-8.00	4.65	4.57	4.29
Wholesale Wax (Dk)	5.75	4.82	4.60	3.53	2.90	4.50	5.16	4.35	4.35	4.35	2.57	4.00	2.00-7.00	4.19	4.08	3.44
Pollination Fee/Col.	83.00	108.00	83.33	56.00	90.00	63.75	54.60	88.34	88.34	88.34	90.00	103.33	35.00-165.00	76.68	78.58	76.14

REPORTING REGIONS – 2013

	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	2.04	2.25	2.04	1.95	1.71	2.30	2.12	2.27	2.03	2.25	2.04	2.24	1.22-2.75	2.09	2.10	1.89
55 Gal. Drum, Ambr	1.93	2.00	1.93	1.83	1.62	2.02	2.09	2.17	1.73	1.93	1.94	2.18	1.20-2.60	1.95	2.02	1.80
60# Light (retail)	218.33	180.00	162.50	184.50	180.00	182.50	167.71	176.67	120.00	192.00	186.67	215.00	120.00-255.00	184.68	184.38	165.64
60# Amber (retail)	195.00	168.33	162.50	180.75	180.00	180.00	159.67	167.50	137.50	202.50	167.67	198.75	110.00-255.00	174.36	174.06	156.91
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	81.62	80.11	62.80	63.27	72.76	60.00	62.32	72.76	72.76	58.92	73.67	96.00	45.60-102.00	71.72	68.89	66.89
1# 24/case	122.54	114.49	108.00	88.00	96.00	117.33	92.00	96.80	84.00	101.44	106.44	125.20	52.80-168.00	108.00	105.88	105.10
2# 12/case	112.26	95.96	102.60	85.60	90.00	90.00	82.17	105.00	79.50	96.72	102.00	105.25	60.00-144.00	95.94	98.51	90.03
12.oz. Plas. 24/cs	101.16	93.85	71.40	77.52	74.40	92.00	69.66	81.60	72.00	79.20	91.12	89.20	60.00-144.00	84.29	82.36	80.39
5# 6/case	135.84	104.05	100.50	89.00	101.49	120.00	96.75	97.05	55.00	99.15	105.67	122.50	55.00-180.00	105.46	108.06	98.44
Quarts 12/case	145.00	167.29	122.39	117.90	108.00	115.67	136.05	113.20	122.39	86.57	130.05	123.60	20.00-220.00	124.78	126.32	120.77
Pints 12/case	99.50	91.48	96.00	83.50	96.00	70.17	82.60	61.20	66.00	83.37	74.20	85.50	54.00-118.80	80.34	76.60	75.95
RETAIL SHELF PRICES																
1/2#	4.80	4.31	3.26	4.18	4.20	3.50	2.77	2.59	5.00	3.90	3.90	5.00	2.19-6.75	3.92	3.84	3.80
12 oz. Plastic	5.94	5.01	3.86	4.63	4.50	5.13	3.86	4.57	6.50	4.90	5.31	5.15	3.15-7.75	4.82	4.66	4.64
1# Glass/Plastic	6.75	6.65	6.12	6.00	6.50	6.67	4.86	5.93	11.00	6.33	5.92	7.87	3.00-11.00	6.28	6.13	8.97
2# Glass/Plastic	11.96	10.13	11.11	9.91	11.00	9.67	8.48	9.49	7.00	10.47	10.30	13.66	6.00-15.50	10.32	10.20	9.66
Pint	10.67	9.98	10.25	7.86	6.95	7.42	8.80	6.80	6.00	7.38	7.81	10.06	4.00-15.00	8.26	8.13	7.95
Quart	15.00	15.89	9.99	13.50	13.00	12.57	13.62	14.66	14.42	14.52	12.08	16.75	8.00-22.00	13.84	13.44	12.71
5# Glass/Plastic	27.10	21.95	25.90	21.85	23.74	29.50	20.26	21.80	19.00	20.97	21.05	25.00	14.89-35.00	22.53	22.44	21.60
1# Cream	9.83	7.56	9.13	7.43	7.71	8.00	5.52	5.99	7.71	8.50	7.14	8.00	3.92-12.00	7.45	7.83	7.16
1# Cut Comb	9.38	10.00	9.13	8.42	9.27	6.92	6.56	8.00	9.27	9.83	10.75	13.50	4.50-15.00	8.79	8.71	8.43
Ross Round	9.17	7.48	8.25	6.38	8.37	7.00	7.00	10.00	8.37	9.00	9.75	7.20	5.00-12.00	8.24	8.49	7.12
Wholesale Wax (Lt)	6.80	5.24	5.92	4.68	3.20	6.50	4.80	5.33	7.00	6.00	3.80	4.33	2.50-10.00	5.28	5.10	4.65
Wholesale Wax (Dk)	5.25	5.40	5.88	4.43	3.15	6.00	4.55	5.50	4.87	4.87	2.62	4.50	2.00-8.00	4.74	4.62	4.19
Pollination Fee/Col.	91.00	78.75	95.00	58.60	60.00	70.50	61.50	85.00	93.20	80.00	120.00	114.50	35.00-175.00	81.39	72.11	76.68

photo by Kathy Keatley Garvey

INNER COVER

It was a different world when I started at the A.I. Root Company nearly 30 years ago. The company was making liturgy and home decorative candles in three really old buildings on one side of West Liberty Street and on the other they had both metal and wood shops making beekeeping equipment on the site of the original factory built over 100 years earlier. And though we're more in the candle business than the bee supply business, we were still a player in the beekeeping industry.

For the first couple of years here I was amazed at the level of suspicion and distrust every bee supply company received from beekeepers whenever suggestions were made regarding beekeeping business.

The under-current always seemed to be that anytime we offered anything at all "we were only in it for the money, for ourselves." If we offered (before being asked) to donate a door prize at a meeting, there would be a whisper in the room. If we helped a club somewhere with a meeting, there was that whisper again. The discount we offer on the magazine is still viewed with suspicion by some, certain that we have something up our sleeve because nobody gives away anything without an ulterior motive – and that motive is always money.

If you go back a bit further, to the days of World War II the feeling was the same when it came to trust (even less so, actually) but it wasn't the same when it came to asking for help from the industry 'Giants.' During the war most commodity supplies were in short supply – wood used for beekeeping equipment, sugar to feed bees and gasoline to get to beeyards were just some that the federal government was hoarding for the war effort. So who went to Washington to plead the case for beekeepers? It wasn't the suspicious beekeepers. Nope the big guys went – Root and Dadant and commercial beekeepers, packers and even USDA Researchers leading the charge. But of course they were all in it for themselves.

And though we are not in the bee supply business any more, that suspicion still exists in this industry toward pretty much every supply company. For instance, the Root Company was one of the first supporters of The Eastern Apiculture Society's annual conference back in the 50s. In fact we were the first business to register as a vendor at the second meeting they held and have supported EAS more than any other business in the industry. Yet even today college educated members on the EAS Board do not trust vendors at the meetings, suggesting they have only themselves at heart, and would try and cheat or steal – something – given the chance. Thus they still need to be policed. I'm not making this up.

Interestingly, these same groups do not hesitate to come to the businesses they do not trust and ask for door prizes, for support for the honey show, for support for the breaks. They will take, but they don't trust.

Actually, after 60 years little has changed, in this industry or any other. Most folks are uneasy with dealing with power.

I think it's in our genes that BIG is not to be trusted, or only trusted so far because they got BIG by being aggressive and have stayed BIG using the same philosophy – squash the competition, take advantage of their weaknesses, buy or bribe the government to look the other way. Look at anything BIG – Amazon, UPS, Chase, Walmart, the tobacco industry, the auto industry, big oil, big food, big phone, big coal, big ag, big electronics, big chemical, big government. Nobody trusts any of them completely. All of them have been lucky, clever, smart, manipulative, provided a product or service sooner or cheaper than anybody, or better, faster, or more convenient than anybody and then worked with whatever regulators necessary to make the business climate favorable for them, and less favorable for competitors or adversaries. That's the game.

And most of them deserve some level of scrutiny. Big tobacco lied for years about the dangers of their product. Big food feeds us sugar, salt and fat till most everybody's obese while big oil kills people cutting corners, but then so does big chemical and big coal. Meanwhile big money takes big chances with our money, and big boxes squeeze almost everybody else out of business. All the while big government takes what it wants and regulates the life out anything that's left. My fellow Americans, we don't stand much of a chance, do we?

Fortunately they allow me to live in their BIG world but even so I don't completely trust BIG. BIG businesses make mistakes just like you and I make mistakes. But theirs are BIG mistakes – bigger than you and I could possibly make because they start with more and influence more. In my operation on the magazine there are only five of us who can screw things up, and with some regularity somebody does. Today it's me, next week somebody else, and later it's yet another goof by one of the five. It's never major and nobody has ever died. But think of having thousands work for you. It's not me today, you next week – instead it's us today, them today, and them over there later today – and we haven't even got to tomorrow yet.

But for BIG to stay BIG there has to be (at least) two common practices. First, those mistakes need to be as few and far between as possible. When they are too common BIG does fail – big auto is an example of that. And the second thing is that they have to continue to provide products or services people want, use and will

Big.

pay for because they are worth the money. And to do that they have to be smart enough to figure out what people will want next – even before their customers know what it is they will want. K Mart isn't very good at that. Apple is, mostly. So is one of the BIG ag machines. Monsanto.

They used to be pretty much a BIG chemical company, but they morphed into a seed company when they saw there was more of a future in providing the plants the chemicals were being used on than simply the chemicals. And making hybrid corn, soybeans, cotton, alfalfa, canola and other crops that grow in more places and produce more crops per acre became the goal. The vision of providing plants that would resist their chemicals was really a no brainer once genetics became involved. But then it wasn't simply agriculture anymore.

Soon several other companies were using similar technologies to make better plants, produce larger harvests, spend less money and make more money, and farmers everywhere wanted in on the deal. Add in a couple of generous government subsidy programs and the demand grew even more. Increase the number of crops that were using these technologies and there were more and more happy farmers. BIG needs happy customers, or somebody BIGGER comes along and takes them away.

But BIG needs the ear of BIG government, too, and they need to have the wherewithal to change what BIG government wants sometimes. Very often BIG companies are leading the technology charge, and BIG government may, or may not follow, or even allow that charge to continue.

I read a lot of farm magazines, and even attend a few farm meetings to hear what's on the cusp. Almost never do bees get mentioned at a corn meeting. Even the planter dust issue recently barely raised a murmur. Some, yes, in the two talks about planter technology and seed coating reliability I managed to catch. Although the ads in farm magazines and web pages pay more attention to that problem –"Seed Coatings That Stay On The Seed and In Your Soil" are what they advertise – which, if I were a farmer, I'd want to know about. Killing bees? Not so much.

Monsanto doesn't make seed coating chemicals, but they apply those chemicals to some of the seeds they sell, and they've paid close attention to how these work, or don't. They don't like being the bad guy, but at the same time they want to fix what others are responsible for – the seed coating people and the planter people. And to keep selling lots and lots of seeds that little problem has to get fixed.

This is the interview issue. I chose to interview Monsanto – not all 22,000 of their employees, just a few upper level decision makers and researchers. They invited me in. It was an interesting two days.

Monsanto is BIG ag. No doubt about it. And now they are in the bee business.

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In one of my Monsanto interviews the Edelman Trust Survey was mentioned in the context that most people don't like BIG companies. That didn't surprise me, but that somebody was measuring it was encouraging. So I went to look. You should too. Edelman is the world's largest PR firm, or so they say, and PR firms are in the business of . . . well, PR. Nevertheless, a PR firm has to know what people think so they know what their clients are up against and how to get folks to think differently. They take this survey every year I understand, and this year's is on their web page. But if you don't have the time or inclination, here's some of their results to consider . . .

Interestingly, they found that only – or maybe it should be, as many as – 55% of their respondents thought America's food production was on the wrong track in this year's farm to fork survey.

- 42% thought that food content – processing chemicals, sugar, HFCS, fat, salt, etc was a problem
- 22% thought safety and production was an issue – lack of local production, contamination and GMOs
- 19% were concerned about the costs
- 16% were looking at fast food as a problem
- 9% thought obesity was an issue
- 8% were worried about government regulation
- And 5% thought Corporations and profits were a problem

More – when looking at what both moms and dads want in food –

- 81% prefer U.S. grown food
- 81% say health and nutrition labels ON THE FRONT of food packages influences purchases
- 69% want to know where their food comes from
- And 65% want to know how their food was processed

And who are consumers? Here's Edelman's take on who's out there buying food –

- Food Elites – 16% - informed consumers, concerned with every step from farm to fork
- Friends Of The Farm – 17% - older, 45+, generally a Midwestern white male, staunch supporter of American farming
- Badge Wearers – 14% - well educated, high income consumers, outspoken and informed
- Right Choicers – 20% - middle age, middle income consumers using simple rules for healthful eating
- Passive Eaters – under 35 - 10% lower income, little interest in creating meals
- Kid Influenced – 23% - children influence food choices

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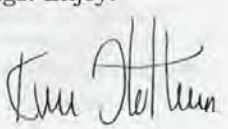
This is the interview issue. Our first actually. Our regular contributors have found interesting people – sometimes family, sometimes a professional colleague, sometimes a beekeeper, sometimes not, that they thought you would like to know, and to know a little about. I found them all to be fantastic and encourage you to take the time to get to know them better.

Now, once you have read all of these and experienced their great diversity, imagine for a moment being able to bring all of them together along with the authors for a grand evening of fine food and wine, a large sitting room with a fire and great soft chairs, an easy Mozart in the background, and all the time in the world to explore even more. I hope this issue brings just a bit of that to your December evenings. Enjoy.



It's Summers Time –

A Bit More About Kim

When Kim threw out the challenge to all of the authors to do an interview, I immediatly thought about him – for two reasons. He's very well known, obviously and I know him better than anyone else. If you've been in beekeeping for any length of time you probably already know a good bit about Kim Flottum, but my hope is to give you just a small glimpse of some things you might not know.

My first question to him was – What would you be doing if you weren't editor of *Bee Culture* Magazine? His response was – "I honestly can't imagine being anywhere but where I am now. My background is in plants – greenhouses, farming, nursery. Even further back I grew up in retail at my dad's grocery store and that was OK, but you'll note I'm not in retail. I suppose I'd have found something somewhere making plants grow. I farmed for awhile – row crop vegetables, sweet corn, and an apple orchard. That was a good time, but it wasn't a real farm in a lot of ways. It was a state run farm, supplying food for an institution so all the employees were state employees. And they clocked in and out. But it had all the troubles of agriculture – weather, pests and diseases, budgets for fuel and pesticides and repairs. But I'm not a mechanic by any stretch and when things broke, and things broke, there was a guy there that could fix anything, which saved me a lot of grief.

"So, back when I was working in Extension at UW Madison, I got to do some writing, and my boss there was an exceptional writer – my first attempt had more of his red ink than my black ink, so he was pretty critical – but I learned a lot. No formal training in sentences, plot and all that – just get the message out in some kind of order. I still miss him when it's late and I'm tired and having trouble. So maybe writing something about plants – that would be almost as good as writing something about bees and beekeeping . . ."

Next I asked – Where do you see yourself five years from now? – "We've just started putting together the next edition of our ABC and I figure it'll take a couple three years to get that done – that'll get me to almost 70 years old – can you believe that – 70. I have another book I want to do and there's a publisher interested, not a beekeeping book, so that'll take some time, but five years from now I'd like to have all that past me – gardening a little more, seeing my daughter more, and of course the age old – I'd like to spend more time with my family – but then, I get to spend all the time I want with my family already so that won't change – but it'll be doing things other than make a magazine, go to meetings, do the monthly honey report – but where? Good question – somebody recently asked me where I'd like to end up – I like California's agriculture, I've been there enough to appreciate the industrial side of it, but the variety and possibilities are endless, and even the water challenge is interesting. But if I'm retired and not doing that much – I like the Bay Area, but it's expensive, so a bit further north – Oregon is attractive, and my daughter is living there now – that may change too so who knows – but the west central part of that state seems both affordable and attractive."

Then I asked Kim what is the second best part of his job. The best part of his job, at least this is what he tells people, is that we get to go to work together everyday. In fact, we spend on average about 90% of our time together every week. The other 10% he might be travelling without me, or I might be off feeding some church group or dealing with kids or any one of the other volunteer things I do – sometimes just a girls' night out. But mostly we are together and it really works for us.

Kim's response to that question – "I get a lot of strange looks when I tell guys – not so much women – that I can't imagine having a job and not having my wife there, but I can't. So that's first – and that's my story and I'm sticking to it. But getting to deal with the folks in this industry – beekeepers – is a great way to spend the day, every day. This is a crazy bunch of people, and that's the good thing about it – so many backgrounds, skills, personalities – all tied to bees, but that's it. You never get bored or tired or take this job for granted – there's just so much going on all the time. And that doesn't include that small set of commercial folks with bees. There's a whole different side – it's so small, and so tight, and so dependent on such a small selection of inputs that the differences are monumentally outweighed by the things that aren't different. I get to meet these folks daily – in person, on the phone, email – so life is never dull. But you know what, I have the opportunity every month to invent a magazine – to design it, choose the information it will contain, to budget for it – how many pages, how many pages of advertising, what to compensate the authors, all of the financial things. And we have to work with our advertisers in selecting their promotional material for the month, contact the subscribers about their subscriptions, work with our newsstand customers – and write something for the Inner Cover, and maybe a story and a blog every now and then – and questions – I get to help people every day do what they want to learn how to do and what I love doing. And even if I can't I almost always know who can, so in a way I get to – that's very rewarding.

"I know a lot of people who are creative, bursting with energy to make something, or make something better, and can't because their life, their job just doesn't allow it – they have to be smart, polite, energetic – but being creative and getting paid for it is a blessing. And I get to do it every day. Maybe lots of folks could do it better – but, such is the way of the world. I'm grateful."

OK, last question – What one thing would you like to do that you haven't been able to? "Be the first person on Mars, or Venus, or some planet, somewhere. I grew up reading science fiction. We should be living on the moon, right? Well, we might not have flying cars, but my smart phone is way better than Captain Kirk's communicator. But space travel is one thing I haven't, and probably won't get to do . . ."

Well, there you have it, some things maybe you didn't know about Kim Flottum.

We've just about got the chickens, the cats and the bees settled in for Winter – the bird feeders are up, the storm windows are down and I'm ready to put up the Christmas trees.

I hope you have a wonderful, quiet and peaceful holiday season with family and friends. Life is pretty good in Medina right now and we wish the same for all of you. We'll see you next year.

Hoody Summers

A Closer Look

NECTAR

Clarence **Collison**

Oh, how sweet it is. Mostly.

Nectar, the sweet secretion of many flowering plants and the basic raw product of honey, is primarily a solution of dissolved sugars in varying proportions. The predominant sugars are sucrose, and its breakdown products glucose and fructose. All three have been found in most samples of nectar analyzed to date (Beutler 1953; Percival 1965). Nectar type generally falls within three basic classification groups: nectars with dominant sucrose; balanced nectars with about equal amounts of sucrose, fructose and glucose; and nectars with dominant fructose and glucose (Percival 1961). Sucrose-dominated nectars appear to be associated with long-tubed flowers having protected nectar, and fructose plus glucose-dominated nectars with open flowers having unprotected nectars. The type of nectar is sometimes a feature of the plant family as a whole, and families which are closely related often have the same kind of nectar. The proportion in which the various sugars are present seems to be characteristic of the plant species and appears to be remarkably constant. Nectar composition does not normally change with flower age or climatic changes (Beutler 1953; Percival 1965).

Seven sugars other than the three dominant ones have been isolated in some nectars. These include xylose, melezitose, trehalose, melibiose, raffinose, maltose and rhamnose. Besides sugars, nectar is composed of other chemicals which include proteins, amino acids, enzymes, lipids, organic acids, vitamins, alkaloids and antioxidants. Almost all nectars contain detectable amounts of amino acids, and as many as 13 different amino acids have been isolated from the same nectar (Baker and Baker 1973, 1977). Aspartic acid, glutamic acid, serine, glycine and alanine appear to be the most common nectar constituents. Enzymes isolated from nectars include invertase, transglucosidase, transfructosidase, tyrosinase, phosphatases and oxidases. The antioxidant most often found in nectar is ascorbic acid (vitamin C) (Beutler 1953; Percival 1965).

While sugars and amino acids of one kind or another are almost always found in nectar, lipids and antioxidants are found less frequently, and proteins and alkaloidal substances are considerably less common still. There is a tendency for nectars high in sugars also to be high in amino acids, and those that are high in amino acids more frequently also contain detectable lipids and/or antioxidants. When alkaloids occur, it appears that the nectar is usually rich in amino acids and likely to contain lipids, antioxidants and even proteins. Other materials found in trace amounts include mineral ash, salts, vitamins, mucus, gums, ethereal oils, dextrine and alcohols. Particle constituents of nectar are pollen, which often occurs in large quantities, fungi, yeasts and bacteria (Beutler 1953; Percival 1965).

Carbohydrates serve as the source of energy for honey bees. All carbohydrates are first converted to glucose, which enters the Krebs cycle and produces ATP, the fuel in nearly all cells, and carbon dioxide and water as by-products. Aside from being used as an energy source, glucose can also be converted to body fats and stored (Huang 2010). A worker bee needs 11 mg of dry sugar each day. This translates to about 22 µl of 50% sugar syrup per worker per day. A colony with 50,000 bees therefore needs 1.1 liter (about two pounds) of 50% sugar syrup per day (about half a gallon of nectar at 25% sugar concentration), which does not include brood rearing and other activities. A colony of this size, therefore will consume almost 700 pounds of nectar per year, assuming the nectars have a 50% sugar concentration.

Nectar is the main source of carbohydrates in the natural diet of honey bees. Sugar concentration in nectar can vary widely, from 5% to 75%, although most nectars are in the range of 25% to 40%. A honey bee

"Carbohydrates serve as the source of energy for honey bees. All carbohydrates are first converted to glucose, which enters the Krebs cycle and produces ATP, the fuel in nearly all cells, and carbon dioxide and water as by-products."

uses her proboscis to suck up nectar from flowers and temporarily stores the liquid in her honey stomach (crop) (Huang 2010).

Adult bees can utilize glucose, fructose, sucrose, trehalose, maltose, and melezitose, but bees are unable to digest rhaminose, xylose, arabinose, galactose, mannose, lactose, raffinose, melibiose or stachyose. Most of these sugars are also toxic to honey bees (Huang 2010).

The internal temperature of flowers may be higher than air temperature, and warmer nectar could offer energetic advantages for honey bee thermoregulation, as well as being easier to drink owing to its lower viscosity. Nicolson et al. (2013) investigated the responses of *Apis mellifera scutellata* (10 colonies) to warmed 10% w/w sucrose solutions, maintained at 20-35°C, independent of low air temperatures, and to 20% w/w sucrose solutions with the viscosity increased by the addition of the inert polysaccharide Tylose (up to the equivalent of 34.5% sucrose). Honey bee crop loads increased with nectar temperature, as did the total consumption of sucrose solutions over two hours by all bees visiting the feeders. In addition, the preference of marked honey bees shifted towards higher nectar temperatures with successive feeder visits. Crop loads were inversely proportional to the viscosity of the artificial nectar, as was the total consumption of sucrose solutions over two hours. Marked honey bees avoided higher nectar viscosities with successive feeder visits. Bees thus showed strong preferences for both warmer and less viscous nectar, independent of changes in its sugar concentration. Bees may benefit from foraging on nectars that are warmer than air temperature for two reasons that are not mutually exclusive: reduced thermoregulatory costs and faster ingestion times due to the lower viscosity.

When nectar foragers return to their colonies from the field, they give their loads to nestmates at the colony entrance, i.e. receiver bees. Receiver bees transfer the nectar to other nestmates who continue to pass it on until ultimately the nectar is placed in a cell on a comb somewhere in the hive (Seeley 1992). DeGrandi-Hoffman and Hagler (2000) simulated the flow of incoming nectar into colonies by feeding a sucrose solution labeled

"Sugar concentration in nectar can vary widely, from 5% to 75%, although most nectars are in the range of 25% to 40%."

with a novel protein (rabbit IgG) marker and then analyzing bee and colony samples using an enzyme linked immonosorbant assay (ELISA). The labeled sucrose solution was quickly transported to food storage and brood combs. Within two hours, equal percentages of worker bees from food storage combs, nurse bees, and nectar samples tested positive for the marker. Percentages of nurse bees and larvae testing positive also were equal within the first two hours of feeding it to a colony and these percentages increased over time. These results suggest that workers with nectar loads deposit them into cells on either food storage or brood comb with equal frequency. The labeled sucrose solution transported to the brood comb is subsequently used by nurse bees to feed larvae.

A honey bee colony can skillfully choose among nectar sources. It will selectively exploit the most profitable source in an array and will rapidly shift its foraging efforts following changes in the array (Seeley et al. 1991). How does this colony-level ability emerge from the behavior of individual bees? The answer lies in understanding how bees modulate their colony's rates of recruitment and abandonment for nectar sources in accordance with the profitability of each source. A forager modulates its behavior in relation to nectar source profitability: as profitability increases, the tempo of foraging increases, the intensity of dancing increases and the probability of abandoning the source decreases. How does a forager assess the profitability of its nectar source? Bees accomplish this without making comparisons among nectar sources. Neither do the foragers compare different nectar sources to determine the relative profitability of any one source, nor do the food storers (house bees accepting nectar from the foragers) compare different nectar loads and indicate the profitability of each load to the foragers. Instead, each forager knows only about its particular nectar source and independently calculates the absolute profitability of its source. Even though each of a colony's foragers operates with extremely limited information about the colony's food sources, together they will generate a coherent colony level response to different food sources in which better ones are heavily exploited and poorer ones are abandoned. Nectar-source selection is a process of natural selection among alternative nectar sources as foragers from more profitable sources "survive" (continue visiting their source) longer and "reproduce" (recruit other foragers) better than do foragers from less profitable sources. Seeley et al. (1991) concluded that this colonial decision-making is based on decentralized control and that decentralized decision making is used because it combines effectiveness with simplicity of communication and computation within a colony.

A foraging colony has the ability to adjust its selectivity among nectar sources in relation to its nutritional status (Seeley 1989). When a colony's food situation is good, it exploits only highly profitable patches of flowers, but when its situation is poor, a colony's foragers will exploit both highly profitable and less profitable flower patches. The nectar foragers in a colony acquire information about their colony's nutritional status by noting the difficulty of finding food storer bees to receive their nectar, rather than by evaluating directly the variables determining their colony's food situation: rate of nectar intake and amount of empty storage comb. The food storer bees in a colony are the bees that collect nectar from returning foragers and store it in the honey combs. This age group is generally made up of 12-18 day old bees which are older than the nurse bees but younger than the foragers. Food storers make up approximately 20% of colony members. The mathematical theory for the behavior of queues indicates that the waiting time experienced by nectar foragers before unloading to food storers (queue length) is a reliable and sensitive indicator of a colony's nutritional status. Queue length is automatically determined by the ratio of two rates which are directly related to a colony's nutritional condition: the rate of arrival of loaded nectar foragers at the hive (arrival rate) and the rate of arrival of empty food storers at the nectar

delivery area (service rate). These two rates are a function of the colony's nectar intake rate and its empty comb area, respectively.

Fewell and Winston (1996) investigated the effect of varying energy stores (stored honey in the hive) on nectar foraging. No significant changes in nectar foraging were found in response to changes in honey storage levels within colonies. Individual foragers did not vary activity rates or nectar load sizes in response to changes in honey stores, and colonies did not increase nectar intake rates when honey stores within the hive were decreased. This result contrasts with pollen foraging behavior, which is extremely sensitive to colony state. They were able to show that individual foraging decisions during nectar collection and colony regulation of nectar intake are distinctly different from pollen foraging.

Nectar of many bee flowers contains secondary compounds, which are considered toxic for honey bees on repeated exposure. Although many anecdotal reports indicate the toxicity of secondary compounds to bees, only a few studies have tested the extent of toxicity at different honey bee ages, especially at the larval stages. Honey bees encounter nicotine at trace concentrations (between 0.1 and 5 ppm) in floral nectar of a few *Nicotiana* spp. and in *Tilia cordata*. Adult honey bee workers tolerate these nicotine concentrations. In controlled nonchoice feeding experiments with caged bees, Singaravelan et al. (2006) investigated the effect of nicotine on hatching success and larval and forager survival. Naturally occurring concentrations of nectar-nicotine did not affect hatching success of larvae or their survival, but the later was negatively affected by higher concentrations of nicotine (50 ppm). Concentrations of nicotine in fresh honey samples from the hives were 90% lower than the concentrations in the offered experimental sucrose solutions. These results indicate that honey bees can cope with naturally occurring concentrations of nicotine, without notable mortality, even when consumed in large quantities for more than three weeks.

Secondary metabolites produced by plants for herbivore defense are often found in floral nectar, but their effect on the foraging behavior and physiological performance of pollinators is largely unknown. Köhler et al. (2012) further examined the effects of nectar nicotine on honey bee foraging choices and worker longevity. Free-flying honey bee (*Apis mellifera scutellata*) workers from six colonies were given a choice between multiple nicotine concentrations (0-1000 µM) in artificial nectar (0.15-0.63 M sucrose). The dose-dependent deterrent effect of nicotine was stronger in lower sugar concentrations, but even the highest nicotine concentrations did not completely repel honey bees, i.e. bees did not stop feeding on these diets. Nicotine in nectar acts as a partial repellent, which may keep pollinators moving between plants and enhance cross-pollination. In the second part of the study, newly emerged workers from 12 colonies were caged and fed one of four nicotine concentrations (0-300 µM) in 0.63 M sucrose for 21 days. Moderate (30 µM) nicotine concentrations had no significant detrimental effect, but high nicotine concentrations reduced the survival of caged workers and their nectar storage in the honey comb. In contrast, worker groups that survived poorly on sugar-only diets demonstrated increased survival on all nicotine diets. In the absence of alternate nectar sources, honey bees tolerate naturally occurring nectar nicotine concentrations; and low concentrations can even be beneficial to honey bees. However, high nicotine concentrations may have a detrimental effect on colony fitness. BC

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Truth In Labeling HONEY

Why We Need It

I have been examining honey samples from all over the world for nearly 40 years and two things are apparent; most beekeepers don't know what honey their hives produce and most labels on jars of honey sold in the U.S. are wrong or can't be proven correct. There are many reasons why beekeepers often get it wrong and why most jars of honey in the United States don't contain what is claimed on the label. How do we know this? As a melissopalynologist (one who studies pollen in honey) my task is to find the pollen in honey and use it to determine the nectar sources in the honey and to determine the geographical location where the honey originated.

Two years ago I teamed up with a Pulitzer Prize winning investigative reporter, Andrew Schneider, of Food Safety News to investigate exactly what type of honey is being sold to consumers in the United States. We pulled nearly 70 jars of honey off the shelves of a number of "big box" grocery and drug stores in 10 different states and the District of Columbia. Then we analyzed them. Some of the 70 samples claimed to be organic; some said the honey was clover or orange blossom, or wildflower honey. Other jars claimed their honey was sourwood, sage, tupelo, or buckwheat honey. What our pollen study revealed, however, was that more than 75% of those samples either contained no pollen or the pollen did not support the claim on the label. So how could this happen? Aren't there federal laws protecting the consumer that ensure manufacturers must make accurate claims about the products being sold? The truth is that for the vast majority of food products sold in the U.S. that is true, but honey is an exception. The rules set forth by the Food and Drug Administration (FDA) for the sale of honey state that honey sold in the U.S. "as honey" may not be diluted or combined with other non-honey products and that it may not contain insect parts," but the FDA also says that one may remove "all of the pollen," if desired, to improve the clarity of the product. The FDA also notes that even when all the pollen is removed the resulting product can still be classified as honey.

Perhaps removing the pollen might improve the clarity of some honey samples and thus might make those samples more competitive in contests where honey color and clarity are important judging criteria and form the basis for assigning awards. Some have also argued that leaving the pollen in honey will make it crystalize quicker. To some degree that might be true but crystallization depends more on the types and ratios of sugar in the honey and on the moisture content than it does on the presence of pollen grains. Others point out that removing the pollen weakens the nutritional value of the honey and because pollen removal usually involves heating the honey, it can alter the taste. Regardless of the pro or con arguments, the real problem of removing the pollen is that it makes it nearly impossible to determine the true nectar sources or the location where the honey was produced. It is like sanding down the tips of your fingers to erase your fingerprints as a means of personal identity.

The FDA does not require truth in labeling as a requirement for honey sales in the United States.

Just one recent example of the problem that has made news worldwide is the concern over the sale of "manuka" honey, which commands a high price in most U.S. markets because of its soaring popularity as a beauty aid and for its anti-microbial activity. The problem is that all of it comes from New Zealand, which produces only 1,700 tons of it a year, yet as much as 10,000 tons of manuka honey are sold annually worldwide. This is just one example of false claims and how the consumer can be overcharged for a honey product. Because of unfair competition and dumping honey on the world market at bargain prices, in 2001 the U.S. Commerce Department slapped a tariff of more than 200 percent on imported Chinese-origin honey. After that, as reported by Andrew Schneider of Food Safety News, an examination of international and government shipping tallies, U.S. customs documents, and interviews with some of North America's top honey importers and brokers documented that there was rampant honey laundering and that a record amount of the Chinese honey was still being purchased by major U.S. packers. At first, after the U.S. tariff was implemented in 2001, our pollen testing of samples of imported honey

from Southeast Asian countries confirmed that some samples were blends of honey from more than one source, and one of the sources often appeared to come from China. In other words, honey was "transshipped" from one country and source to a different country, which then blended it with local honey and exported the blend as local honey originating only in the second country. More recently, pollen studies reveal that samples of imported honey from some Southeast Asian countries contain only pollen from the purported country, but the pollen concentration values are too low, which implied that the honey is a blend of a small portion of normal honey from the country of origin mixed with a lot of honey from some other source that "contains no pollen." This suggests the possibility that transshipped honey is now being sent with the pollen already removed. Currently, some of my testing of imported honey shows that those samples contain no pollen and thus it is impossible to verify either the true country of origin or the nectar sources in the honey.

Help to resolve these problems may be on its way. Currently, in the Senate Customs Reauthorization Bill (S-662), there is an added provision that will curb the problem of transshipped honey being imported into U.S. markets. The Senate bill will require the U.S. Customs and Border Protection Agency (CBP) to create a honey database that will characterize and identify honey from foreign origins. The CBP will also be required to report to Congress on their honey testing capabilities. Another provision in the Senate bill recommends that the Food and Drug Administration (FDA) should create new standards that can be used to identity and label types of honey being sold in our domestic markets. A committee spokesperson representing the House of Representatives said they are studying those same provisions for possible inclusion in a similar version of the customs bill originating in the House of Representatives.

If Senate bill S-662, or a similar version from the House become law, that will solve the first part of the problem. It will require foreign countries not to remove pollen from honey that is being imported into the U.S. because without the pollen the true identity of the country of origin cannot be verified. The second part of S-662 "encourages" the FDA to create standards needed to identify the floral types of honey being sold in the U.S. In other words, it would encourage or require truth in labeling for honey products marketed in the U.S.

Trying to achieve both of those goals is possible, but it will require the work of a number of melissopalynologists and will require a better understanding of a number of major variables that affect the accurate determination of where a honey is produced and how to identify the correct nectar sources used to produce it. Let me review some of the potential problems that I have encountered in the past. First, I have learned that field identification reported by beekeepers as to the "nectar sources" of their honey are often incorrect. During the past four decades I have examined more than 2,500 honey samples mostly from hives in the United States but also honey produced in a number of foreign countries as well. I have discovered that more than 60% of those "field identifications" of major nectar sources in a honey sample are wrong. Just because honey bees are swarming around some blooming plants, or because some plants near a hive are in bloom does not ensure that those are the major sources for the honey being produced. Second, experimental data reveal that honey bees are efficient at removing a vast amount of pollen during their return flight to the hive from the nectar sources they have collected in their honey stomach. In addition, those same tests document that all honey bees are not "created equal" and that some bees are much more efficient than others in removing pollen from the nectar they have collected. Studies also note that the size and the shape of pollen grains will influence how efficiently honey bees are able to remove certain pollen types from the nectar they collect. For some of the larger pollen types, such as fireweed, evening primrose, sourwood, blueberry, mints, and tulip tree, much of the pollen can be removed fairly quickly before the bee reaches the hive. Other smaller pollen types such as mimosa, rapeseed, sweet clover, blueweed, and forget-me-not, will rarely be removed by the returning bees. Third, a growing number of beekeepers and honey producers are partially or completely filtering their honey and/or are blending their honey with honey from different sources before selling it. Blending and partially removing some of the pollen prevents the accurate assignment of both origin and primary nectar sources in a honey sample. Fourth, my colleagues and I have examined a number of the standard processing techniques currently used in many countries to extract and analyze pollen from honey and we have found flaws in most of those methods. That is why we developed a new extraction method that will ensure that no pollen is lost from honey samples. Finally, even when honey samples are correctly processed and their pollen types and percentages are carefully noted, the resulting pollen data do not reflect a one-to-one correlation between the pollen and the primary nectar sources used to produce the honey.

Pollen can be incorporated into honey in a number of ways. When a honey bee lands on some flowers in search of nectar, some of the flower's pollen may be dislodged and fall into

the nectar that is sucked up by the bee and stored in her stomach. At the same time, pollen grains that have become attached to the "hairs", legs, antenna, and even the eyes of bees while visiting one flower can fall into the nectar of a different flower. Later, some of those pollen grains can get sucked into a visiting bee's stomach and both pollen types will be regurgitated with the collected nectar into open comb cells of the hive. While still in the hive a honey bee may groom herself in an effort to remove the entangled pollen on her body. During that process pollen can fall directly into open comb cells of nectar or onto areas of the hive where other bees may track it into the hive area where unripe honey is still exposed. Pollen collected by other bees specifically for storage in the hive or airborne pollen accidently blown into a hive are other potential sources of pollen that can become incorporated into exposed comb cells of nectar being turned into honey.

Pollen is an essential tool in the analyses of honey. The types of pollen indicate the floral sources utilized by bees to produce honey. As a result, pollen frequency is used to identify and label a honey sample as to the major and minor nectar sources. That information has important commercial value because consumers often prefer honey made from specific nectar sources and those consumers are willing to pay a premium price for types such as manuka, white acacia, sourwood, sage, tupelo, buckwheat, or citrus honey. Only by identifying and quantifying the pollen in honey will the full range of nectar sources be identified and the honey's actual foraging resources be correctly labeled.

Another reason why pollen analyses of honey are important is to determine the honey's geographical origin. The combination of pollen types found in a honey sample will often produce a pollen spectrum that is unique for a specific geographical region. Because of trade agreements, import tariffs, and legal trade restrictions, most honey-producing nations in the world require accurate labeling of honey before it can be sold. However, the FDA does not require truth in labeling as a requirement for honey sales in the United States.

During the mid-1900s Todd and Vansell, while conducting studies of honey bees in California, made a shocking discovery. They found that caged honey bees fed a diluted syrup-water solution containing 750,000 pollen grains per cc produced honey that had only 25,000 pollen grains per cc. In other words, most of the pollen in the syrup-water had been removed by the bees before the solution was emptied from their honey stomach into new comb cells and made into honey. Todd and Vansell realized that the newly produced honey had a pollen concentration value that was only $1/30^{th}$ of the original amount of pollen in the syrup-water fluid. The only logical conclusion was that there must be a significant reduction in pollen concentration as a result of the internal filtration system in a bee's honey stomach, which was apparently far more effective than anyone previously realized. They went on to discover that the amount of pollen in the nectar of different plant species varied greatly. That information combined with their study of how bees remove pollen from the nectar provided pioneering efforts in the development of pollen coefficient tables. Their initial efforts then led others to use those ideas and experimental data to compile lists of plants that are over or under-represented by their relative pollen frequencies in honey samples.

We know that only a few percent of sourwood or fireweed pollen in honey means you have a "unifloral honey" from those sources because both sourwood and fireweed pollen are highly under-represented in honey.

In the half-century since the initial study by Todd and Vansell we have learned a lot about the ratios of pollen in honey and their relationship to the actual amount of nectar those plants contribute. For example we know that only a few percent of sourwood or fireweed pollen in honey means you have a "unifloral honey" from those sources because both sourwood and fireweed pollen are highly under-represented in honey. On the other hand, if you have 75% pollen from rapeseed (canola) sources in a honey sample that does not mean it is a "unifloral honey" because the actual nectar contribution from rapeseed plants, as compared to the large percentage of pollen, is actually minimal. Unfortunately the International Bee Commission still insists that to be classified as a unifloral honey one must have "at least 45% pollen" from one floral source. For some plant and nectar sources that requirement is valid but for others, such as fireweed and sourwood, one might never find those levels even in nearly pure honey produced primarily from the nectar of those plants. This is why using pollen coefficient data are so important and why pollen testing and the application of those data are essential tools needed to provide an accurate identification of the honey sitting on the self in some supermarket!

People frequently ask me where they can buy "good honey." My reply is to try to find local honey produced by a reputable beekeeper. Those types of honey usually contain pollen and do not contain foreign blends. Nevertheless, we have found that every now and then even some of the local honey we test is not "local" and is not what is claimed on the label. *Caveat emptor*! BC

Vaughn Bryant is a PhD Professor and Director at the Palynology Lab at Texas A&M University in College Station, Texas.

BOCHET
Caramelized Honey
MEAD

Not Burned – Caramelized!

Jack **Blackford**

Founder of the Flying Barrel, Bob (r) passed his Brew on Premise shop to new adventurous brewer James (l).

You have always been told not to heat your honey. Don't hurt those enzymes and all the goodness the bees worked so hard to put in there by overheating it. Most people are comfortable with heating honey to 120°F to get the honey to flow and strain it so it can be bottled easier. Some even go to 160°F to pasteurize the honey. Some mead makers still boil their honey because they are concerned about the native yeast spoiling their mead while most modern meadmakers woudn't risk loosing all the aromatics from their honey by heating it.

There is one time though when you can really burn your honey to a crisp, you can burn it so much it turns pitch black like tar. Medievel meadmakers cooked it in big black cauldrons over an open fire when they were making Bochet, a mead made from burnt honey. ***Yes, Burnt Honey***. Sometimes people have darkened honey by heating it to separate the wax or they accidentally darkened it while warming it up before bottling and had to settle for selling it as bakers honey at a greatly reduced price. We hope we can change some people's minds today so that they can see they have actually added value to their honey by heating it up and making it darker. If they heat it up even more it will go from a light red to a dark red to a deep mahogany to black. The deep mahogany honey tastes like caramel, but still has a honey taste. It is very unique and an enterprising apiarist could introduce this as new product to their local markets. I know getting some people to even try naturally dark honey is hard but by promoting it as caramelized honey you would already mentally introduce the tastes to them before they

Canning jars of honey after being pressure canned at 15 lbs. pressure for 90 minutes to make caramelized honey safely.

Canning jars of honey before and after being pressure canned.

Pressure canned caramelized honey fermenting happily.

Crockpot caramelized honey very easy to make.

actually tasted it, guiding them to be open to a new taste experience.

Our interest though is making mead. After reading about Bochet we learned about one big problem in making it over a fire, it can jump out of the pot. The medieval guys would boil the water off of the honey in a big cast iron pot and continue simmering it until they got to the stage where big puffs of black smoke would come off of the honey. Then they would add water back to the honey so they could pour it, otherwise they would end up with a big blob of burnt honey taffy (might be another good seller). The problem comes when you add water back to the hot honey, it likes to explosively form steam and jump out of the pot. If you are not careful when adding the water its very easy for the honey to blurp out of the pot and onto you, your dog, the ceiling and all over your stove. Not only would it burn very badly its almost impossible to get burnt honey out of dog hair or off of a stove top.

We couldn't see how any mead could be worth these risks let alone the cleanup so we thought there had to be a better and safer way to caramelize honey. We have made condensed milk caramel by putting cans of condensed milk in a pot, covering them with water so it always cover the cans and boil them for 90 minutes. This makes a great milk caramel, but what happens if the water gets low, probably another nasty ceiling cleanup job. So we decided to put our condensed sweetened mild in a pressure canner, cook it at 15 pounds pressure for 90 minutes and presto, perfect dark milk caramel. No chance the cans would explode, no mess to clean up, just perfect caramel in a can. So why not try this technique with honey in a canning jar?

We took some quart canning jars of honey, put real canning lids and rings on them and put them in a pressure canner and cooked it for 90 minutes. The result was a very deep dark mahogany honey. The proteins had coagulated into clumps making them easy to strain out. What we had was caramelized honey with most of the water still in it. The first taste we knew we had something really special. It had a deep caramel taste, was still very sweet, and had not lost its honey character. This is different from honey cooked over an open flame, ours did not have the toasted marshmallow or smoky flavor or the potential bitterness you would expect from being charred over an open flame. Ours was much more like you would know how caramel tastes like with a bit of honey it it.

Making a Bochet

We also wanted to see what cooking honey over a fire would taste like so we could compare two ways of caramelizing the honey. I picked up a local beekeeper, Charles Walters, who was willing to let me experiment on his precious varietal honey. It really can be hard to find someone willing to be experimented on or risk loosing a

Crockpot honey color transition from raw honey to black caramelized honey.

Kettle cooked honey color transition from raw honey through to black caramelized honey.

Big pile of dried elderberries used in making Elders Blood Bochetomel, our original mead recipe.

Five gallons of wildflower honey tries to come out of the big kettle, expanding to over 20 gallons in volume.

five gallon bucket of really good honey. We had previously made a very good traditional mead with his bamboo knotweed honey so we wanted to see what cooking it over a fire would produce. We arrived at our local Brew on Premise shop, the Flying Barrel in Frederick Maryland. They have custom made 25 gallon copper kettles for brewing beer so customers can come in and make 10 gallons of beer at the shop in these kettles. The new owner, James, had unbelievably agreed to let us cook 5 gallons of honey in one of his expensive, can't be replaced, custom made copper kettles. I honestly informed James that this was an experiment and that we had never done this before. It did not scare him off one bit – it's very good to see a spirit of experimentalism in our homebrew shop.

I also wanted to see if off the shelf commercial honey would make a good Bochet. The question arises that since you are going to burn the honey anyway why not just use the cheaper commercial honey rather than the good varietal honey?

James assigned his experienced knowledgeable brewing assistant Keith to keep us out of trouble, more likely to guard his kettles, and to make sure we cleaned up all of our messes. We got one kettle going with five gallons of knotweed honey and another kettle with four gallons of commercial honey. We also had another kettle with 10 gallons of boiling water to add some back to the finished blackened honey and to make cleanup easier. We figured using the boiling water would help keep the burnt honey from jumping out of the kettle and onto us.

We slowly simmered the honey until it reached about 250°F. It boiled up to the lip of the kettle (increasing by four volumes) and we hosed the sides down with cold water to condense the foam and put out the kettle fire which Keith had to keep relighting as we never got the hang of cooling the kettle off without putting out the flame. The honey boiled and made a lot of white steam as the water evaporated. The white steam disappeared after a couple of hours and was replaced by gray smoke puffing from the chimney of the kettles. James then kept telling me how expensive his custom made kettles would be to replace. I think we were finally making everyone a little nervous.

People kept visiting the shop and telling us they could smell the honey being cooked out in the parking lot and

Charles Walters of Walters Wholesome Foods risking five gallons of his prized wildflower honey. These kettles hold 25 gallons for brewing double batches of beer or Bochet.

We took no chances with safely caramelizing honey in the kettles over a flame. Safety visor, welders gloves and apron to keep hot honey away. It really wants to come out and get you, especially when you add water back to make it flow after cooking. Stir at the beginning and then just let it cook without stirring just like making caramel from sugar. (photo by Charles Walters)

down the road driving in. A couple of professional brewers stopped in and were intrigued by our process and tasted our first batch made with the pressure cooker and told us they had never tasted anything like that before. We were very encouraged by their professional opinion, though I had added a little too much acid before bottling. This batch is going to be backsweetened a little more with just burnt honey to enhance the Bochet taste.

The gray smoke kept getting darker, James kept reminding us how expensive his kettles were, I kept thinking how am I going to clean these things out if the burnt honey won't come off and sticks to the kettles. So, short of black smoke billowing out of the top, we chickened out a little and stopped the cooking and added about a gallon of water back to make up for the fluids lost during cooking. Not quite so simple as we thought. As soon as the boiling water hit the honey it flashed to steam and tried to burp out some honey from the top port of a 25 gallon kettle. People were not kidding when they warned adding water back was dangerous. Maybe waiting for the honey to cool below 120°F would have been safer but we didn't want the honey to harden up and become a blob that would be hard to get out of the kettles. So we stirred the honey with the water after it settled down and then piped it into buckets.

The cleanup was surprisingly easy, We just added more boiling water and Keith gave us a big brush to swab out the kettle, a little PBW cleaner to help clean it, and the kettles were as clean as when we started in the morning.

Bochet Recipe

Our first Bochet was made using pressure canner caramelized honey. In a three gallon batch three quarts plus one cup of honey was mixed up. 4.5 tsp of Fermaid and 20 grams of Fermocel P nutrients were added at the start along with 15 grams of toasted Oakmor oak powder to give it a little oak flavor. The starting gravity was 1.10 and we used Premier Cuvee yeast as we wanted a very strong fermenting yeast to power through the ferment with no problems for this first batch. We added acid blend at the start (the winemaker side over ruled the meader accidentally) and it was a mistake in the end. At bottling time six months later (yes we pushed it quickly as an experimental batch) it was back sweetened from a finished gravity of 1.006 to 1.026 with more caramelized honey, about a half a pint. It was then filtered and stabilized. It tasted fantastic, sweet caramel and honey with a little oak in the back. But, after aging a little while the acid came out to the front, its probably going to disappear as the mead ages, in the future we are going to be much more mindful of the acid levels at bottling time.

Bochetomel Recipe

After tasting the wonderful rich caramel flavor of these cooked and darkened honeys we had to then try to see what fruits would go perfectly to make a Bochetomel. Of course Banana Foster came to mind immediately, as does caramel apples. Berries also come to mind as being perfectly matched so we decided to make an elderberry Bochetomel.

We create a very rich outrageous berry Bochetomel using this special caramelized honey. We decided dried elderberries would stand up to a lot of caramelized honey. The 20 ounces of dried elderberries were soaked in warm water overnight and then simmered gently for about 20 minutes the next day. After cooling they were treated with pectinase. Caramelized honey was added to an original SG of 1.100. K1V-1116, a strong reliable yeast, was used to give a high alcohol level to be balanced with the sweetness of back sweetening with a lot of caramelized honey to create a unique dessert Bochetomel mead. After the primary fermentation was finished and the mead racked into a carboy, four ounces of heavy toasted American oak was added along with two vanilla beans and eight ounces of cocoa nibs. This is where it is at while this is being written, after four months and down to a specific gravity of 1.018 it already tastes fantastic and hasn't even been back sweetened with more caramelized honey yet. The plan is to let the oak, vanilla and chocolate all flavor the mead and then add more caramelized honey to a final gravity around 1.025 for a sweet finish.

Kettle Cooked Bochet

Back to the Bochets made in the giant kettles over the flame. The varietal honey ended up a little darker and fermented to completion a little faster than the commercial honey. Both of these could be due to different sugar ratios in each type of honey as individual sugar components of honey caramelizes at its own specific temperature plus we didn't go all the way to 350°F which would have caramelized all the sugars. We kept the recipe simple, starting gravities 1.095. 4.5 tsp Fermaid at the start, six grams of Fermocel P when the gravity dropped to 1.070. We also added some FTRouge tannins (3.9 gm) and Optiwhite (0.7 gm) to round out the mouthfeel. We won't be able to say whether the varietal honey is better or worse than the commercial honey due to the differences in the honey source to begin with, but we will be able to determine if they both make a good Bochet. These we will age about a year in the carboy.

Fun with Caramelized Honey

You can even use a crock pot to make caramelized honey if you don't want to take out your canner or risk cooking it on your stove or dont have a giant kettle. Its not just for meads. A spoonful of caramelized honey just tastes great, its smooth, tastes very rich and dark and still has a honey taste behind the caramel. Even just a jar of this at a farmers market for people to taste would create some conversation and possibly a new demand for a unique product. This goes good dribbled on top of some chocolate ice cream, it goes good mixed with some peanut butter on a muffin. If someone could cream a batch of caramelized honey you probably couldn't make enough to keep your customers happy. BC

Jack and Toni live on a small farm in WV growing a Wineyard, making meads and playing with bees. They can be contacted at ***WVMJack@yahoo.com***.

All The Buzzz in...

Hello Friends,

I love all the letters, pictures and poems you have shared over the year. You are so special to me. I hope you have a wonderful holiday season.

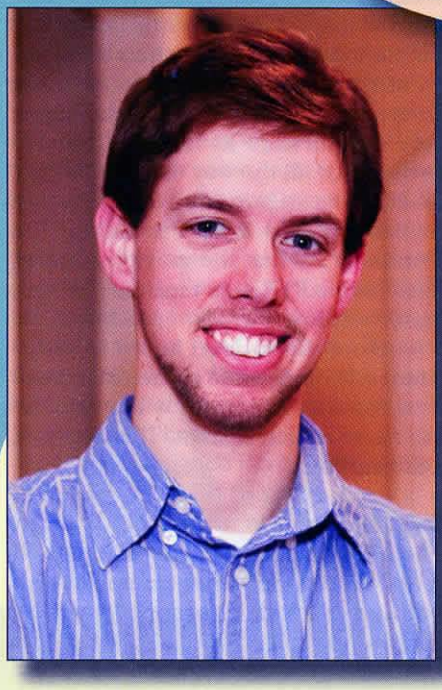
Bee B.Queen

Let me know of your beekeeping adventures.

Lowell Weaver, 11, IN

Amelia Rippl, 5, WA

From a Teenage Beekeeper to a Beekeeping Business



Blake Shook, from Texas, began keeping bees at age 12 when he was awarded a youth beekeeping scholarship with the Collin County Beekeeping Association. He now has his own business with 3,000 hives. Blake is involved in leadership positions on a local, state and national level. He has been a speaker nationally and internationally. And Blake is only 23 years old!

What excites you most about bees and beekeeping?

I would say there are two main things. As a career I would say one of the most exciting things is that there is something different every day. We have to know a little bit about so many different topics from marketing to bee biology to plant biology to government relations. It always keeps you on your toes.

As far as bees go, it doesn't matter how many times I open the hive, it is always fascinating. It never gets old. Watching the hive produce honey. Watching the queen lay an egg. Watching a new bee emerge. Watching worker bees gather nectar from a flower. Even though I have opened hives thousands of times, it is still breathtaking to see all those things happening. I hope that amazement never goes away. It is still a passion.

What advice would you give a young beekeeper?

Keeping your bees alive is simple and straight forward.
If you learn how to feed your bees properly and if you learn how to deal with varroa mites, you will be a successful beekeeper. Much of hive maintenance will not kill your hive but if your bees run out of food that is a different story.

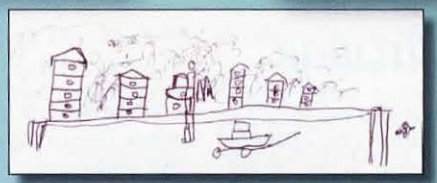
Keep with it. Stick with it. Tell other people about your hives. Bring your friends out to look at your hives. Keep your enthusiasm alive. Join a beekeeping group or association. That way you can see that you are not the only young person keeping bees. It will encourage and inspire you to keep with it.

If you are willing to work hard and stick with something, there is no reason you can't do everything that I've done. I'm not that special of a guy. You can do it too!

... Bee kid's corner

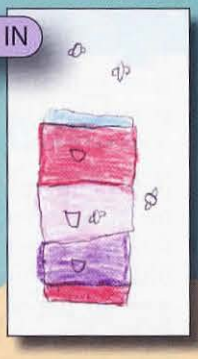
Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
December 2013

Elizabeth Burns, 12, KY



Gary Weaver, 9, IN

Teresa Weaver, 7, IN



Ben Bishop-Gay, 4, NY

Beekeeping Jump Start

Many beekeeping organizations across the country offer youth beekeeping scholarship programs like the one that gave Blake Shook his start. Contact your state or local beekeeping association to find out more.

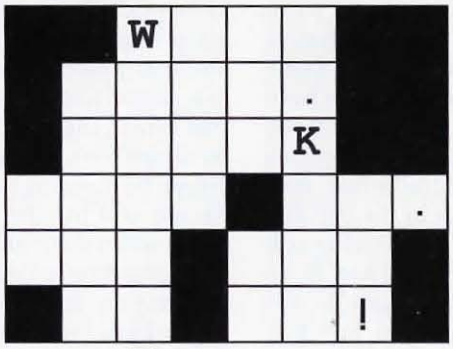
Budding Bee Buddy Beekeepers

Leia Wenninger, age 9, and Hannah Zaborski, age 10, live in Ohio. They are good friends and do many things together -- including helping Leia's dad keep bees. They are both homeschooled and are in Girl Scouts together. This spring they helped install a new package of bees. Leia says, "I don't like honey but Dad and Mom like it so we got bees." The Wenninger's have 3 hives next to a shed in the backyard. When asked about a favorite story, Leia replied; "I liked the time when my dad climbed a ladder to get a swarm of bees down from a tree. It was high up and looked scary." Leia likes playing games, talking and being with friends.

Hannah Zaborski and Leia Wenninger

Blake Says...

Find out what Blake Shook often says about keeping bees. Create a phrase by using the scrambled letters directly under each column to fill in the blocks above them to make words. A black square is the end of each word.



T

S W C K

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W I T O D A T

More about Blake.
Company: Desert Creek Honey Company
Facebook: https://www.facebook.com/dchtx

Beecome a Bee Buddy

Send two self addressed stamped envelopes and the following information to: Bee Buddies, PO Box 2743, Austin, TX 78768.

Name
Address
Age
Birthday Month
E-mail (optional)

We will send you a membership card, a prize and a birthday surprise!

Send all questions, photos and artwork to: beebuddies@hotmail.com or mail to the above address.

Answer: Work hard. Stick with it. You can do it!

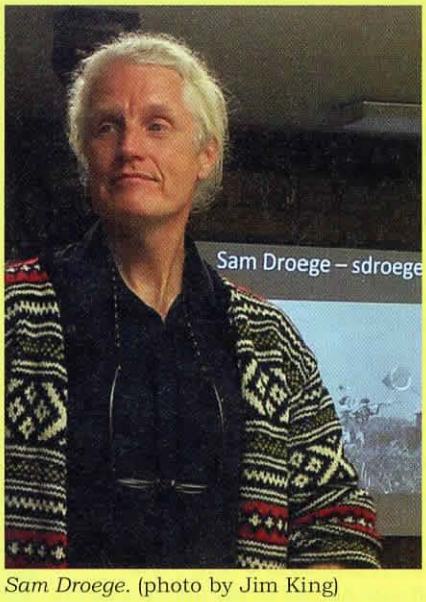
DOWNTOWN

Sam Droege

Urban beekeeping is quite obviously a contrarian thing to do...that is, until you do it and find out that people have had downtown apiaries since, well, thousands of years ago in Near Eastern population centers. Adding honey bees to a habitat is an environmental boon and is also promoted as a no-brainer, but is it?

People like no-brainers, and beekeepers, being human, are kind of fond of them, too. We seek clear and uncomplicated answers to Colony Collapse, to varroa mite control, to selecting our type of hive gear, and mostly learn to our sorrow that life (and nature) is going to persist in being complicated and confusing and wondrous whether we like it or not.

Biologists like Sam Droege of the USGS Patuxent Wildlife Research Center are few and far between, but are generous sources of contradiction and complication for the complacent beekeeper–or even the energetic and well-meaning ones. Sam is an internationally recognized expert and teacher on native bees, and coordinates important monitoring projects for birds, crickets, and amphibians, among an astonishing array of additional environmental activities. It was an honor to get a good chunk of his time to have a discussion we both knew would shake up a lot of the reasons why I keep bees.



Sam Droege. (photo by Jim King)

Please understand: for Droege, you are perfectly entitled to keep bees, and you can definitely derive enjoyment from beekeeping, much as you might keep a cat or a dog. And your hives make about as much of a contribution (or exhaust as many resources) as a pet might from the perspective of the habitat around them. So if you are a beekeeper because you think you are making the city a greener place, you might have to hear him out and go back and think some more.

Cities would not be bee-less without us. According to Sam, cities are actually pretty good for native bees, often for some of the same reasons that managed apiaries have done well here. "In the middle of the summer, when native bee species are at a low ebb in rural areas, they are still perking along in the city due to habitat features like watering and plant variety. You don't have to go to national wildlife refuges or out into the country, you can find lots of natives [downtown] if you have the right plants. For a native bee, a sidewalk is just a big flat rock. Don't just give up on seeing bees when you see pavement."

He hastened to add that 60% of all native bees are specialists in a specific plant or genus, and that even the weeds in places like my hometown are not native and "generalist" in terms of pollinator partnering. If you plant many popular varieties, however, natives will arrive. "*Apis pruinosa* is a native specialist on squashes – it shows up with pumpkins and other cucurbits. And even though the commonly planted mock orange (in the *Philadelphus* genus) is not a native, it will attract *Chelostoma* bees because we have a closely related native species."

Sam points out, however, that "big-box store plants are often derived ornamentals, 'false promise' flowers hybridized for colors or double blooms or something like it . They contain little or no pollen or nectar, provide almost no value to pollinators or to the other insects which coevolved with native plants and play a role in biodiversity."

"With native bees and native plants, there is the additional benefit of providing for other native insects, ones we tend not to value because we cannot attach an obvious dollar value or clear impact on our lives to their presence. These include specialist plant bugs, butterflies, moths, flies, and many other groups, for example, in a supporting native biodiversity. In this sense, the world is in much better shape if you make your yard into a refuge by planting native plants, and we are still just learning how these many interrelationships work."

According to Droege, "If you want pollination you don't need honey bees, there are plenty of native bees doing it. " I can offer some personal experience in support of this statement. Community gardeners here in DC have routinely confided in me that they like honey bees, and want them in their gardens, but found that their crops were pollinated just fine before the hives arrived. One Bible garden here, which is planted with

U.S.G.S. Patuxent Wildlife Research Center

trees and plants from the Near East, did not fare so well before beehives were moved in. Hmm. Kinda makes sense.

Asked whether honey bees actually compete with natives, in protected green spaces like parks or at large in typical urban neighborhoods, Sam mentions, "The literature says that the interactions between honey bees and native bees are difficult to parse out since honey bees have been here [in North America] for over 350 years. The really bad stuff would have happened 350 years ago, around the time of introduction."

"But the presence of honey bees is either going to be negative or neutral for native bees, and not a positive. It could be a neutral impact, but if resources are constrained, there is competition. When there are superabundant resources, the case gets murky, especially at different times of the year."

Here in the MidAtlantic, beekeepers might then get to thinking about the drastic contrast between the Spring bloom and the late Summer dearth. Most of us are serene in our sense of "plenty for all" in May, but are a little less secure about that in August. Could our bees be a threat to native species in times like that?

Sam responds: "Native bees have adapted to dearth. They cycle down their reproduction to accommodate seasonal changes. What really matters is whether the plants they require are available." Want to contribute to pollinator health? He suggests planting lots of native plants, making choices that ensure a succession of bloom.

Finally, I asked: "Sam, can the managed- and the native-bee folk be friends?"

To which he replied:

"There is no conflict: we don't have to get rid of honey bees. Just think about why you are in the business. Look at your personal motives, and perhaps for some beekeepers this could be a relief. Are you enjoying all this work as it should be for your pleasure as honey bees are unimportant to the pollination of native plant communities, local gardens, and even weeds and not really helping? Maybe its time to cause some navel gazing."

"If your goal is to do the world a favor, you should not keep honey bees, but any real damage was done when this alien species was introduced centuries ago. Recognize that the big positives are personal. If you want honey, you have to keep honey bees. But people put a kind of 'übervalue' on honey bees, they have a kind of charisma that is attractive."

"Honey bees are great spokesmen for the natural world and insects, and provide cool examples of the functioning of natural systems. But my point of view is limited to their role in the natural world. Is beekeeping a big problem? Probably not: there would have been more honey bees in the past anyway since feral honey bee colonies are largely gone... Who knows, beekeeping might get you more interested in native species!"

"People look at honey bees as a extinction issue, as if they were Bald Eagles. Bald Eagles aren't even a conservation issue now, but they are native, and they were therefore our responsibility. Honey bees, while declining, are not endangered: they are also an introduced, alien species like many we regard as undesirable."

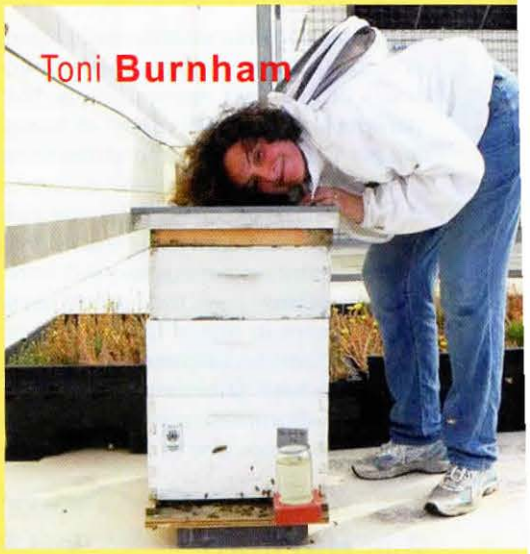
"Part of what is happening is that it is just so hard to keep honey bees now. It used to be easy: on our farm, the bee guy would come in the Spring, check on his hives, come back a month or more later, take off the honey, and that was about it. Now it is just so much work, that pollination service has become a significant expense, such that even the commercial operations are looking for other pollination solutions to pollinating industrial agriculture."

"Commercial agriculture used to be inefficient: there were plenty of weeds with abundant verges and margins and habitat for natives and feral bees, lots of places to live and forage. But now agriculture is extremely intense: except for the desired crop and the insects that live on that crop, it is a biological desert."

Did you think this was a bad thing? Once again, from Sam's perspective, maybe not. His observation runs counter to most of current discussions of the environmental impact of monocultures I've heard in urban and suburban beekeeper associations.

"Perhaps this kind of agricultural concentration is good because it concentrates and contains the amount of land given over to food production and leaves more spaces to nature."

He asked me, "Is this heresy?



Well, we need to pay attention to downstream consequences of decisions we make. If we are not farming intensively, food has to come from somewhere else, but what about the people who become losers because food is expensive or less is produced. Does the welfare of these people take priority? I wanna eat organically but I am not going to complain about the farmers. If less intensive use means that they are going to plow up grasslands or native lands for more fields, is it less bad to use less land but potentially use imidacloprid or GMOs? Because we suspect that these chemicals or plants might have unintended effects, should we go back to older chemicals that we know to be bad? Sometimes the alternative can be a lot worse."

"Urban and suburban landscapes and low intensity agricultural areas are complicated, with multiple species and systems interacting in unpredictable ways and the use of systemic insecticides such as neonicotinoids in these places is asking for increased unintended and collateral impacts. An intensively farmed cornfield on the other hand, is, biologically, a relatively simple thing. In that field, you have corn and the few things that feed on it, other species are simply just passing through. Farmers using improved pesticide application techniques and managing things like dust from seed have greater ability to reduce the impact to nearby species and areas."

It is dizzying to spend an hour with a man who clearly loves bees, but not so much honey bees, and has committed himself to the understanding and preservation of nature, ⇨

but is comfortable with the dedication of some lands to almost superhuman levels of artificial manipulation. His perspective has the virtue of being supported by an enormous amount of insight and information.

Another reason I really wanted to speak to Sam Droege is that many of the best beekeepers around here (and elsewhere) have tried pretty hard to get a spot in one of his native bee courses, and have come out in awe and enriched. If beekeeping opens one door after another in your awareness, this is not one to leave locked.

Those folks have still chosen to tend their beehives, but they also now carry native bee identification cards and keep bee collections on pins in little boxes, always checking out the corner of their eyes to see if they can spot a species never identified at home before. Their beekeeping lives got more complicated, but their world got bigger.

Because you are reading this and I wrote it, we are both participants in something called Bee*Culture*. Standing outside that culture, and listening to a gifted scientist like Sam who can take it or leave it will certainly shake things up and possibly change (no promises!) some understandings and practices. But even this tense revisiting of motivations, preconceptions, assumptions and level of understanding helps me not miss, through habit of mind, the pulse of life in the hives on my roof and the independent buzz in the teeming world–even in the city–all around. BC

Toni Burnham keeps bees on rooftops in the Washington, DC ara whee she lives.

Ann **Harman**

James "Dan" Daniel

Photographer, Naturalist, Musician, Poet, Engineer, Artist, Gourmet Diner

Let me introduce you to James Daniel, better known as Dan. Although this is a beekeeping magazine Dan is not a beekeeper. However he has photographed and drawn many kinds of bees, along with birds, plants, mammals (large and small), and other denizens of the natural world. His interests and accomplishments are truly varied, making Dan the most interesting person I have ever known. My daughter introduced him to me as 'This is Dan. He knows where bears are.'

Dan, we'll leave the bears aside for now because I want to ask you why you call yourself a 'hillbilly."

'That's easy. I spent the first part of my life on a small farm outside of Gatlinburg, Tennessee.'

Was your father a farmer?

'No. He was an electrical engineer. My mother was a teacher. Since they were both musicians as a hobby I was introduced to various kinds of music at an early age. I play the guitar, banjo and dulcimer, just for pleasure.

My ancestors on my mother's side of the family were interesting. One of them, along time ago, was Lord Mayor of London. When Daniel Boone, American pioneer and explorer at the end of the 18th century, lost his money in some land venture but wanted to continue his explorations, some of my ancestors raised the money for him to do that.'

I've heard you quote from many poems and recite verses that you particularly enjoy. How was that part of your early life?

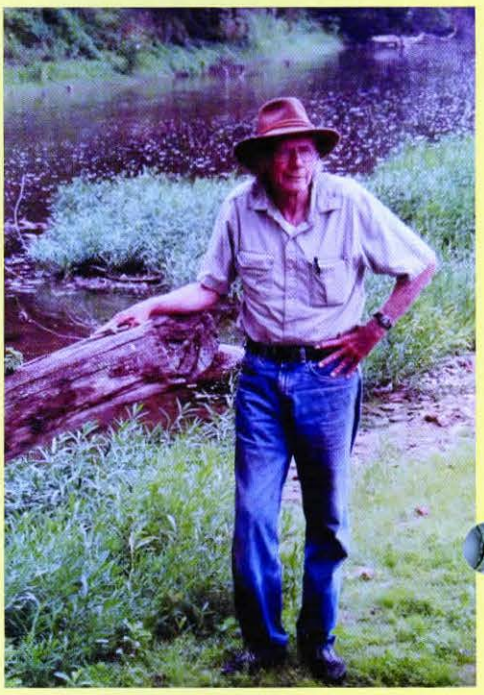
'Grandpa Hollingsworth loved poetry and would read poems from an assortment of poets. That is how I came to love those works of Rudyard Kipling, Robert Service and many others. As a child I was particularly impressed when he recited the entire poem of *Hiawatha* from memory. He had such a magnificent speaking voice that the poems came alive and are part of my life today.

(*As he hikes through the mountains now, Dan composes small poems, similar to Haiku, inspired by the natural world about him.*)

'Grandpa was also an herbalist. I would accompany him on his walks through the fields and forests while he gathered medicinal herbs. Unfortunately I was much too young to take advantage of his knowledge. So I ran about and played but didn't learn a thing. I wish I had been older.'

When did your family move west?

'The depression came and jobs were lost. We moved out to Wyoming to a farm and raised horses. I had to do the morning chores for them before I went to school. While we were living there I met the Nez Perce Indians



Dan.

who bred horses for themselves and also for sale. Now that I was a teenager I was able to appreciate the Indian's life and found their medicine men very interesting. I was a Boy Scout and became an Eagle Scout in 1944 when I was 16.

'One of my friends in school was Hungarian. Only Hungarian was spoken in their home so if I went over there and wanted to eat I had to learn Hungarian. Languages are easy for me to learn. I was fascinated by the Chinese written language and learned that. Let me show you how to make words.'

(*Here he proceeded to draw words to illustrate how a few strokes could be added to a simple character to make new words.*)

'I became fascinated with photography. I bought my first camera for 25 cents plus a toothpaste box top. You took the photos and sent the camera back to the company. They would mail you back the prints – so tiny – and the camera reloaded with film. My next camera was a Canon, 35 mm film, and my subjects were the plants and animals I found around home and on my hikes. All my early photography was black and white. I built a darkroom to do my own prints.

'After I switched to color photography I converted my darkroom for that. I gave that up after a while – too many tanks of stuff and just fussing around. It was better to send the film off for processing.

'I've always used Canon cameras through the years. I'm using their latest digital one and all my older lenses can be used with it.'

Yes, I see you have quite an assortment of lenses. Do you use them all?

'Well if you are going to do any nature photography you have to have different ones. Here's one for macro. Here are three different telephoto ones, and a couple of other ones in my bag for other purposes.'

Have you sold any photos?

'Over the years I did some things for National Geographic and did educational nature photography for biological supply houses.'

After you graduated from high school did you go on to university?

'No! The U.S. military was drafting young men for the Korean War the minute they graduated. The army didn't know what to do with me so I volunteered for the Air Force but I told them I didn't want jumping out of planes. I was trained as a pilot and flew the P-51 Mustangs.

'One time, when I was on leave in Tokyo, I went to the top restaurant there and ordered Kobe beef. That was a treat!

'I also ate at Maxim's in Paris during my second tour, as a Major, in Air Force Special Operations. That was a treat, too! Now I had eaten at two of the most famous restaurants in the world.'

After your tours of duty in the Air Force did you go to college?

'Yes I went to MIT in electronic engineering. Got my bachelor's and master's. Then worked for a company where I invented and designed transistors. Had a few patents. Got unhappy with the business world. You see – the one channel of my life is nature – being an integral part of nature.'

I understand you moved to Florida. What did you do there?

'Well, I continued with photography, of course. I worked with a couple of film people making nature films. You could have any kind of background there in Florida – jungle, water, making it look like any place on earth. I worked on films showing Marlin Perkins of the TV program *Wild Kingdom* and with another filmmaker of nature films.

'I also worked for the Smithsonian Institution while in Florida, tracking and photographing Sputnik's path through the sky. Did their Operation Moonwatch Project. I've done other things, too.'

Although you are a nature photographer you gave me one of your botanical drawings and a wood carving of a bird. So could you be called a nature artist, too?

'I've drawn and carved my entire life. Botanical drawings are easy for me but you have to draw every single detail of the plant including its roots. I have notebooks of field drawings of birds and plants. I carved the masters for a collection of porcelain birds done by the Audubon Society.'

Tell me about one of your neighbors in Florida.

'I lived just a short walk from Walt Kelly, the creator of the Pogo comic strips. Walt was a good friend. When he died I offered to continue drawing and composing the strip but his widow decided to end it.'

Why did you move to Virginia in 1990?

'I have always loved the natural beauty of the Shenandoa area; that National Park is endlessly fascinating and beautiful. So much to photograph and draw. Bears are fascinating to study. I have found their Winter dens all over the park. I just spend hours and days there. It's just wonderful!'

We are both volunteers at SCBI, Smithsonian Conservation Biology Institute (Front Royal, VA). What made you volunteer to participate in their bird survey?

'I was out for a hike in the area one day and saw a maned wolf. Well, a maned wolf does not live in Virginia! Then I found it was behind a fence. So I followed the fence and discovered the conservation center there and asked what they did. One thing led to another and since I recognize birds in flight and also know their songs I knew I could help them with their surveys.'

Thank you for this interview. I'm looking forward to seeing tomorrow's photos from the mountains and how many bears you see, I know I'll have more questions in the future.

It was only fitting that a very small group of good friends took him to dinner, for his 85th birthday, at **this nation's** most famous restaurant, The Inn at Little Washington.

'That was quite a treat!' BC

Ann Harman has met and made friends with many interesting people in her travels around the world. This was an excellent choice for the interview.

Ross **Conrad**

Helen Young

Biology Professor, Middlebury College, Vermont

Helen Young is a professor of biology at Middlebury College. She received her B.A. at Washington University in St. Louis, and her PhD. at the State University of New York, Stony Brook. After receiving her PhD, she had a post-doctoral position at the University of California - Davis, examining the role of pollinator attraction on the evolution of flower size in wild radish. At Middlebury College, she teaches courses on botany, tropical ecology, Darwinian medicine, ecology and evolution, and food.

What caused you to initially choose to get involved in bumble bee research?

I've been studying pollination biology since the early 1980s. My PhD thesis was on the pollination of a plant in Costa Rica (by beetles, at night mostly). I've always been interested in how pollinators choose the flowers they visit and how their behavior affects the reproductive success of the plant. In Costa Rica, for instance, I learned that the beetles use the flower as an area for mating so very few flowers had only one beetle in them (what would be the point for the beetle to be alone?) There was significant "clumping" of the beetles within flowers: flowers either had lots of beetles or none. Clearly, this affects the reproductive success of the plant. How could they increase the chances that a beetle would visit their flowers? For these plants, it was through odor production that occurred as the flowers heated up. After Costa Rica, I worked in California with wild radish and what floral features affect bee (mostly honey bee) visitation: color, size, petal shape. We were asking questions about the evolution of flowers in this project, learning what traits had a genetic basis and how bees "looked at" those traits.

I am very interested in the evolution between plants and their pollinators. As you know, evolution can take a long time to take place. As I arrived in Middlebury in 1998, I was interested in finding a system that included a native plant and a native pollinator – an association that was longer than several hundred years, for instance.

Honey bees have been in the U.S. less than 400 years – not long enough for significant evolutionary relationships to be established. Bumble bees are native, however, and their relationships to the flowers of New England are quite old.

So, how long have you been working with bumble bees?

I've been working with bumble bees since I arrived at Middlebury, in the Fall of 1998. My first research projects were on the relationship between jewelweed (Impatiens capensis) and their bumble bee pollinators.

There has been a lot of media attention on the plight of the honey bee in recent years, while other pollinators such as certain species of bumble bees are also experiencing a higher-than-normal rate of population decline. What is your take on this situation?

Quite simply, we are creating a toxic, nutritionally deficient environment for pollinators of all kinds. As humans expand their influence – through urban development, marshland filling, crop planting, as well as through pesticide use – the world is getting increasingly difficult for these small animals that rely on clean abundant floral resources and undisturbed habitats for nesting.

Do you make use of the bee hives I maintain at the Middlebury College Organic Farm (MCOF) for research or class instruction?

I don't really use your honey bee colonies though several student projects did incorporate them. I had one student who was interested in how flower density affected bee visitation so he set up floral arrays of different densities near the hives at MCOF. He found that almost none of his flowers were visited – the bees were all leaving the hive and heading further away than he was working. This experience reinforced, for him, the complexity of bee movement and the importance of within-colony communication about where bees will forage.

There is a widely repeated story that according to science a bumble bee should not be able to fly . . . can you address this obviously mistaken assumption? Where did this tale originate and why?

My understanding of this is that someone looked at bee body mass and wing size and did some physics and determined that their tiny wings could not possibly lift the bees into the air. But they were modeling a "fixed wing" bee and bees don't have fixed wings – they move their wings (a lot!) during flight and position them so that eddies of air act as lift below their wings. So, as we know bees DO fly and this exercise helped people see how much bees move their wings during flight.

There is a lot of collaboration and camaraderie within the beekeeping community and among honey bee researchers. Do you experience such camaraderie within the bumble bee research community?

I do. We read each other's papers, go to some of the same conferences, collaborate when possible. It definitely feels as though we are working together to investigate all aspects of bumblebee biology.

Have you ever collaborated or worked with University of Vermont professor Bernd Heinrich, author of numerous books including Bumble Bee Economics?

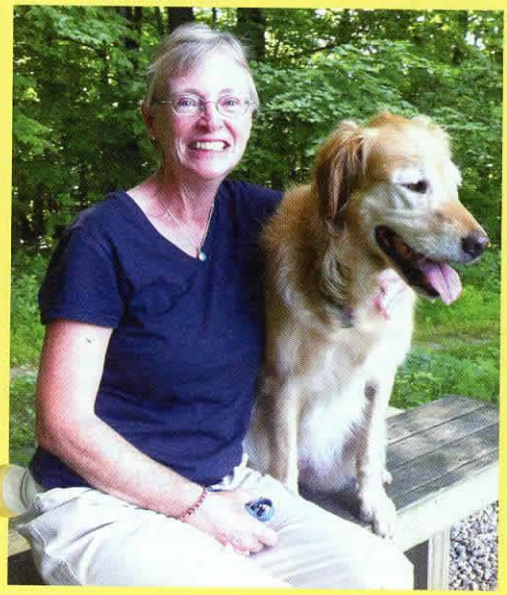
I haven't collaborated with Bernd. By the time I started working on bees, he had moved on to birds. But I do assign his book to my students and we talk about many of the ideas he writes about.

What research projects are you working on currently?

My current work examines the landscape ecology of bumble bee pollination. By that I mean what landscape features seem to enhance bee abundance (and what landscape features seem to deter bee abundance). So far, my work has shown that proximity to native habitats is important for bumble bees: forest edges for nesting sites and old fields with native flowering plants as nectar and pollen sources. I spent this past summer with four students investigating if these same resources are important when considering bee abundance on farms.

Since the honey bee is not a native insect to North America, how much competition for forage resources do believe exists between honey bees and other pollinators such as bumble bees?

My understanding is that, although the two kinds of bees don't interact directly (direct aggression, for instance), when honey bees are present, they remove enough nectar from a system to cause changes in bumble bee populations: longer foraging trips and lower reproductive success (this is the work of Diane Thomson in California). When honey bees are present, more of the workers of bumble bee nests devote their energies to nectar collection (to compensate for there being less nectar available), which limits the amount of pollen being brought in. So, evidence like this suggests that honey bees do compete with bumble bees for nectar. In another study, also in California, where honey bees are the major pollinator of almonds, the presence of native bees caused the honey bees to move between varieties of almond tree more often (these are the compatible crosses that will produce fruits) than when only honey bees are present (this is the work of Claire Brittain and her colleagues). I don't know of any studies that find that honey bees and bumble bees directly interact - indeed, when I watch bees visiting flowers, it appears that they seem to ignore each other's presence. My experience is that the bees (honey and bumble) do not directly interact. Indeed, they take the same resources from flowers and, in that way, the presence of one may influence the abundance and success of the other.



What do find to be the most interesting thing about the bumble bee?

I've spent some time watching individual bees as they forage on jewelweed flowers and it's clear that they are making very clear decisions about which flowers to visit and which flowers to reject. My experiments showed that they can discern if a flower has been previously visited by a bee and they won't visit it – for about four hours after a previous visitor. By this time, the nectar levels have returned to "normal" and they'll visit them again. Other workers have shown that bees leave odors on flower petals (with their legs) and these odors are used as "cues" that the flowers have been visited and are likely to have less nectar in them than flowers without those odors on them. So, the world from a bee's perspective is more complex than meets the eye. There's no end to the questions that can be asked about their behavior.

What is it about bumble bees that you are the most passionate about? . . . if different from above?

I am concerned that we are introducing enough chemicals into the environment and reducing the habitats they need that we will witness even further decline in their numbers and diversity. Yet, it appears that we will have to wait until a crop of major economic importance fails before people will pay attention. In parts of China, where pesticide use is high, pollinators of apple flowers are so rare that people are hand-pollinating them. Imagine American workers pollinating apple flowers by hand – if that should happen, THEN people would start to be concerned about the plight of pollinators. But until their pocketbooks are affected, I'm afraid that most Americans won't care about pollinator decline.

What would you say is the most important thing that you feel Bee Culture readers should know about bumble bees?

Improving the environment for honey bees (through the planting of flower-rich areas and a reduction in the use of pesticides) will also improve the plight of bumble bees. And vice versa. These taxa are not competing with each other directly and we should do all we can to improve habitats for all bees. BC

Ross Conrad is the author of Natural Beekeeping: Organic Approaches To Modern Apiculture *and a regular contributor to* Bee Culture magazine.

BIGGER PICTURE

Jessica **Lawrence**

Bobby Louque –Entomologist, Gardener, Cook, Homesteader, Father

Bobby Louque is one of the most interesting people I have ever had the pleasure of knowing. Obviously, I believe that he is the most amazing person ever (by the time you read this he will be my husband!), but I want everyone else to understand the awesomeness that is Bobby Louque. In particular, I will be focusing on his ascent into the beekeeping world, views on homesteading and gardening, and raising kids to be environmentally conscious of their actions. I would talk more about his fantastic cooking, obsessive need to do laundry, and his soccer skills – but I don't want to make anyone *too* jealous.

You definitely hold the record for the most stings to the face at work, both overall and at one time. Which face sting was the most painful so far?

Well those records are not something that I am particularly proud of holding, but it definitely gave me a healthy respect for the ladies' ability to protect their hive with great fervor and accuracy. Although the seven near simultaneous stings to the face (not due to any of my particular actions other than wrong place wrong time) were pretty painful, I think the worst was the rapid succession three round burst I received working the bees while doing intensive hive assessments. It was the one that tagged me in my upper lip that made me look like a turtle for a few days that will probably stick in my mind until next time I have a better story of incidental contact.

What is your favorite beekeeping experience this year?

Definitely queen finding! I absolutely love the challenge of spotting those lovely ladies in action and watching how they go about their business of laying eggs. It's so exciting to see her pop out of nowhere amidst the action of a full frame of bees. It's like finding a needle in the hay stack, although I learned through careful observation and the teachings from my wonderful soon to be wife that they can be somewhat predictable where they can be found in the hive.

Most beekeepers have a favorite smoker fuel. What do you like to use in your smoker and why?

I don't have extensive knowledge on this subject, but I have used mostly pine straw and shavings with a topper of green grass to cool the smoke. However, I met a really nice beekeeper in upstate New York this year that was primarily using sumac berries. I have to tell you that they smell really good in the smoker and they are everywhere in our area. I'm not sure if the bees appreciate it as much as me, but I sure do enjoy using it and the girls don't seem to mind a bit. Now if I don't have them available I really miss the smell when I'm working the bees.

When you are working the bees, what is your least favorite aspect of the hands-on part of beekeeping? (As opposed to things like extracting honey, putting together equipment, etc.)

I'm sure most beekeepers would agree that getting stung, especially in the face, would be a major drawback to the kind of hands-on bee keeping that I have been doing this year. Although most of the beekeepers I have met are a peculiar bunch. Perhaps the reason for my multitude of stings to the face might be part and parcel to me not really liking the restrictions of having to wear a suit and veil. I really like to be up close and personal with the bees that

I'm working and sometimes the veil, although extremely helpful in a lot of situations and specific times of the year, is not really how I like to commune with the bees. Most of the work I have been doing is pretty extensive and requires a good set of eyes. I understand that this work is not really common among most beekeepers, so please do not take my recommendations for going sans veil!

In regards to a homestead farming venture, what do you hope to get out of your beekeeping skills in the future?

I definitely want to incorporate the bees into increasing the productivity in our garden and flavor profiles with our honey. Having bees so close by will definitely help increase the yield in out garden and might make for some interesting flavored honey as we like to grow unusual plants.

Do you have plans to include other animals in the farm livestock besides pets and bees?

Increasing our chicken flock is really first on the list, but I am really looking forward to replacing some guineas and peacocks along with a goat or donkey or three. Of course as an entomologist, I really want to increase the number of other types of bees on our growing farm by creating more habitat for the various solitary bees native to our area. I think it will increase the garden yield and provide opportunity for our kids to appreciate the diversity in nature.

What are your plans to move into a more self-sufficient lifestyle?

I want to rely on more of what we can produce for ourselves and less on what we need to buy at the grocery store. Increasing our garden productivity and abundance, as well as canning and storing our bounty is a high priority (especially having four kids). Being able to provide for your family goes way beyond just working hard at a job to get the money to buy what you need. Living off the land and getting the most out of what you can do for yourself is very high on my list of things to take full advantage of doing.

In an alternate reality where you had unlimited spending capabilities, what would be your dream plans for a homestead?

Land, land, land...with good soil, a source of fresh water, and solar panels!

Gardening is something that you obviously enjoy, particularly when it presents a challenge to you. What are some of the more difficult plants that you would like to try to grow in the future?

Although I have attempted to grow blackberries in the past, I really would like to go full on with a REAL blackberry farm. It's a very short harvesting season, but the rewards are well worth the work you put into it. Of course I am prone to loving the odd ball heirloom varieties of fruit and vegetables that come in all colors and flavors, so that is a very difficult question to answer. Right now I have been struggling to grow artic kiwis with a lot of frustration. They look great, but they refuse to blossom and are my current project to conquer.

For self-sufficiency, gardening for food is essential. How much of your gardening do you plan to focus on food crops rather than on landscaping, and how much percentage-wise of your grocery bill do you plan to cut out with your own provisions?

I love plants of all kinds. However, I am really concentrating on ridding our landscape of lawn space and replacing with more productive and in my opinion more appealing vegetation. I really like interesting cultivars of plants, but if you can't make something out of it then it's pretty much a waste to me. Now don't get me wrong I will always have room for my orchids and ferns, but they grow in pots and not in the yard.

What is one of your favorite dishes that you make with something you've grown yourself?

Eggplant parmesan is a big winner and a personal favorite especially if you can time the basil, tomatoes, and eggplant to come in all at the same time. Love fresh jellies, salsas, and pickles. Lots of yummy recipes! Did anyone mention that I liked to cook – hahaha!!!

With six people to feed, do you find it difficult to plan out meals and cook with homegrown vegetables and fruits?

It can be difficult when your garden space is limited, but that will be remedied soon! Most of the difficulties arise with a larger garden because things tend to ripen at different times if not planned properly. However, canning your bounty can really extend your garden's effect on your planned meals and can come in handy year-round. I really enjoy eating what we produce when things are typically out of season, but there is nothing like harvesting and preparing fresh food from your garden and putting it on your dinner table. Satisfaction guaranteed!

What are some of the things you have done with the kids to try to teach them to be environmentally conscious or prepare for a sustainable life?

I think I have always instilled the concept of reusing and recycling with the kids. There has almost always been a small compost bin for scraps, but real sustainability comes from producing what you need as much as you can. Environmental consciousness pretty much goes hand in hand with gardening and preparing your own food. I spent most of my adult career and being a father working in and around some aspect of the environmental field, so the kids have always had exposure to that sort of thinking.

Do you think the kids are prepared for the farm life?

I think that for a lot of people it can either be a nightmare or a romantic dream and I think each of the four kids fall somewhere in between. To be honest it is hard work, but the rewards are immeasurable. It will at the very least give them stories to tell their kids about how hard it was growing up and perhaps spark a new generation of young farmers to take a risk and live the good life. I think they are ready, but may stumble a bit on the way as they learn how to live that kind of life. In the end I think we are doing the best thing for them and they are super excited to go all in and experience the good life. BC

Monsanto Interviews

7 Voices From Inside

Kim **Flottum**

In early August I was invited to visit Monsanto headquarters in St. Louis, Missouri. They asked several of their project managers that are associated with their quite new honey bee health business to join me, and let me tour the facilities I had missed when I visited during the Honey Bee Health Summit they hosted last summer sponsored by Project Apis m. Moreover, they said, they would be pleased to hear what I had to say about the state of the honey bee world from my perspective. They have a program called Lunch & Learn where an invited speaker is given the opportunity to offer his or her thoughts while some of the 22,000 people that work on the Monsanto campus can come and listen, eat lunch and get exposed to what it is the speaker is addressing. The talk is also beamed to all those on campus that don't fit in the couple hundred capacity auditorium I was in so the potential crowd can be large.

So who, and what, is this BIG company?

Today, Monsanto is a Fortune 500 Company headquartered in St. Louis Missouri, producing agricultural and vegetable seed, plant biotechnology traits and crop protection chemicals. Hugh Grant is Chairman and CEO, Brett Begemann is COO, and Dr. Robert Fraley, one of the awardees of this year's World Food Prize, is Exec VP and Chief Technology Officer.

Founded in 1901, the name Monsanto is the maiden name of founder John F. Queeny's wife. Their first product was saccharine. By 1945 they were in the ag chemical business, making, among other things, 2,4D. By the late 60s they had produced several herbicides, with Roundup coming along in 1976.

Meeting room at the Honey Bee Health Summit.

In 1981 a molecular biology group had been established and quickly became a strategic focus. The next year they were the first to genetically modify a plant cell, and they bought a soybean seed company. In 1987 they conducted their first field trials of plants with biotechnology traits and in 1996 they bought Calgene, a biotech company and introduced Roundup Ready soybeans and insect protected cotton.

1997 was a big year for the company. YieldGard Corn Borer protected corn is introduced, and Roundup Ready canola and cotton are too. They purchase Holden's and Corn States Hybrid seed companies, and introduce a cotton variety with both insect and weed control biotech traits. They spin off their chemical and fiber business as Solutia, Inc.

In 1998 they purchased Dekalb Genetics, introduced Roundup Ready Corn, plus an insect and herbicide resistant stacked corn. In 2000 the original Monsanto Company enters into a merger and changes its name to Pharmacia Corp – and begins relationships with Pfizer Inc and Solutia Inc. The previous agricultural division of the original Monsanto Co, Pharmacia, becomes a standalone company called – Monsanto.

Between 2000 and 2005 they introduced a whole slew of stacked seed lines in several crops, purchased several more seed companies, and established a seed holding company. In 2005 the billionth acre was planted with biotech crops, and the billionth acre harvested. In '06 and '07, Monsanto teams up with Dow AgroSciences, Bayer CropScience and BASF for a host of joint projects, purchases more seed companies, begins greenhouse gas emission reduction and trading, forms an investment company for fruit and vegetable seed companies and releases more stacked seed lines in corn and cotton.

In 2008 they purchased sugarcane breeding operations in Brazil, began selling disease and insect protected seed treatments coupled with weed treatment resistance. They buy a huge European vegetable breeding seed company, and announce a three-point commitment to sustainable agriculture, including helping farmers double yield in corn, soybeans and cotton by 2030, developing seeds that will reduce by 1/3 per unit produced the aggregate amount of land, water and energy, and improving the lives of farmers.

In '09-'11 they open research centers in Nebraska, Mississippi and Texas, begin a raft of philanthropic activities in St. Louis, India, Texas A&M, plus an International Scholars program and seed donations to Haiti,

Alex Inberg, of Beeologics.

Gerry Hayes, head of the Bee Project.

buy a local biotechnology research company studying nematodes, and receive several awards for being the Best place to work and being a great Corporate citizen. And, in 2011, they buy Beeologics, and are in the bee business.

In the last two years Monsanto has launched several new biotech seed products, funded research projects and additional commitments to improving rural life, begins plans to significantly increase its St. Louis corporate research facilities, and in 2013 forms the Honey Bee Advisory Council and hosts the Honey Bee Health Summit.

The company has facilities, including administration and sales, manufacturing and seed production, research and learning centers all over the world. Briefly, they are in 13 countries in N and S America, 28 countries in Europe, two in the Middle East, 18 countries in Asia and the Pacific region, and seven in Africa. In total, they have 21,200 employees in 404 facilities in 66 countries. They own 16 or so seed companies, including well-known names like Asgrow, Dekalb, Jung and Lewis, several traits and technologies including Acceleron and Genuity, and a double handful of weed control brands, most notable being Roundup.

Monsanto's general policy regarding both promotion and public relations is that they have preferred to let their customers – farmers – speak to the quality and performance of their products. That this has not happened in the past dozen years is an understatement, because farmers, rather than talk to the public about the products they use, avoid the exposure and possible confrontation of dealing with biotechnology altogether. This is probably because it is both difficult to explain and controversial. They are, however, eager to talk to each other, the company and to the government about the value of these products to their operations.

Unfortunately this reluctance to go further has cost the company critical lost time in dealing with both the misunderstandings, and not understandings that surround biotech crops, a chance to better explain and describe biotechnology, and the opportunity to present the message they have to not farmers, but consumers. Farmers for the most part have been more than satisfied with these crops, and in fact continue to ask for more and better attributes in more and more crops. Consumers, however, tend not to understand the technology, and skepticism of BIG has hindered meaningful communication. Continued, even expanding doubt about labeling issues, new crops, miscommunication, alleged unintended consequences of the actual technology and the affects from these on people and animals consuming them, lawsuits on patent infringement and the general feeling of David vs Goliath from consumers has not helped. This, slowly, is changing at all levels of the company it seems – mostly. There has been a push, I suspect from the top down, to open lines of conversation and communication at the consumer level. Every person I talked to alluded to the change in policy, but quickly added the difficulty of explaining the complexity of the process and the products. Most of us don't understand the technology, and most of us are wary of what we don't understand. Couple that with BIG, and you have a significant gap between maker and consumer.

But the big question is what did Monsanto buy when they purchased Beeologics, and when will it be ready for the bee industry to use? They've been pretty up front about this new part of their business, and though they wanted a quicker return on products to sell to control *Varroa*, they also are using the technology in other aspects of their business. RNAi is being explored for insect, virus and weed control, and certainly for honey bee health issues. RNAi is, essentially, a technique to shut down the expression of particular genes in specific organisms, rendering them unable to perform certain functions that allow them to continue – reproduction, eating, and other critical behaviors. These tools, which Monsanto has branded BioDirect, will take time to commercialize company spokesperson Maureen Mazurek says. Moreover, Monsanto will probably produce other RNAi technologies before it sees one that combats a bee virus. One reason for this is that early-on research is to develop a standard for what is a healthy colony – pretty fundamental, but necessary, says Jerry Hayes. So it may not be until the end of the decade before we see some progress in that area, he added.

I had the opportunity to speak to seven individuals over two days. I was surprised to find that five of the seven grew up on a farm and for the most part their families were still farming, many not far from St. Louis. Most left farming as an occupation for pretty much the same reason – there wasn't room as other family members were already taking over the farm from parents, or they wanted to make farming a better business - safer, more profitable and more productive. Each of them had

a motivation to continue and preserve the farm life they knew, yet improve it for those who remained. I suspect a much smaller percentage of honey bee scientists come from beekeeper families.

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Michael Doane is the Sustainable Ag Policy Leader for the company. He grew up on a family farm in Kansas and was keenly aware of the issues with atrazine run-off from fields to ground and surface water. Fixing that problem stayed with him. He also observed that a diverse collection of cover crops in a place made that place better in many ways than if only one or a few were used. After school he went into seed sales – wheat, sugar beets and rice mostly – but soon moved beyond the individual and began looking for a way to affect a greater portion of society. He's been at the company for 15 years and is now in a position to deal with water issues, food issues and the fact that ag is no longer the world's greatest profession – it has been replaced by the Service industry.

"We can", he says, "produce enough food for the world, but moving it is the problem. And it's difficult to talk about food. Static policies get in the way of change, and simply change gets in the way. Innovation at this level is personal. And big is too often perceived as not good and not to be trusted.

"Water is a global concern now, and will be", he adds, "but we can move water simply by moving grain from high water locations to low water locations, but tariffs and barriers get in the way and make moving less, or even totally inefficient. And energy, energy is renewable, but that too is an issue, and big government sometimes gets in the way of efficiency."

That path – to improve the policies to make food and water distribution on a larger scale he sees as a problem, and when I asked what worries him – food, and water were at the top of the list.

But Sustainable. What exactly is that? His definition is not complex.

"To me", he said, "Sustainable means an intergenerational commitment to preserve resources, and it's that simple. But it comes back to trust. And, especially with food, healthy and affordable are not the same."

•

Listening on the tour.

Kelly Fleming is the Product Manager for Biologicals and the Communication Development Leader. She's a chemical engineer who has been with the company for 20 years, beginning in the aspartame production facility – a very young female college graduate managing a large population of older, experienced, mostly male factory employees. She made that work and has since moved on to be Product Manager for several projects in this new department – Biologicals. This new department has harnessed technology using natural compounds derived from nature in crop protection.

"It is similar to using hot pepper in the garden to control those pests", she said.

"But they are harnessing the genome of the pest and the genomics of what is natural in the rest of nature to make this work. Agriculture, both big and small is involved.

She's now working with the BioDirect Division, specifically with RNAi technology in weed control, insect control and virus control. This technology is sustainable – that is it is able to continue, but it needs explaining and understanding, and personal engagement is needed to do that. Both she, and the company are making sure that the science is done right, she said. The honey bee project is part of this and has become one of the most popular projects in the company.

She was out front with her comments on the reluctance of the company to engage the public, to have Monsanto have a human face rather than a press release, and about developing trust. Her goal is to both help change that, and at the same time support farmers that are feeding people producing abundant and safe food.

•

Deborah Patterson is the President of the Monsanto fund, which seeks to improve lives by bridging the gap between people's needs and Monsanto's resources.

These include education by supporting libraries, science centers, training and academic programs that enrich school curriculums. Food security and access to clean water, America's Farmers Grow Rural Education, which supports math and science education, gardening projects in a variety of countries, and others are included. The 2010-11 budget for these and other projects was $31,000,000.00, something like 1% of pretax income.

Deborah has been helping Monsanto help people since 1997, with a career of public service behind her. To honor that service, she was chosen the 2012 Greater Missouri Woman Of the Year. She has a passion for bringing education everywhere, because that is what solves poverty issues, no matter where it is. Food security, fire trucks, clean water, school gardens – how local people use the funds Monsanto shares is up to the community. Grow Rural Education, and America's Farms Grow programs get more science and math into schools, with teachers and farmers calling the shots on who gets the grants. They had over 1100 applications this year for the nearly 200 grants given out. It is amazing what a couple thousand dollars can do for a 4-H program, or a high school that needs a greenhouse for additional teaching opportunities.

The Long Range Planning program she works with for giving has been a staple within the company, with

no budget cuts no matter how the year went financially. She works hard to help situations where clean water and food stability are issues worldwide, but also focuses on sites where Monsanto has a physical presence, and with facilities in more than 400 locations in more than 60 countries they have a lot of presence. Each of these has the opportunity to petition for something their local community needs – fire trucks, a food pantry, school programs, buildings and funding and more. The person in charge of the site (research, breeding or biotech station, a factory or other facility) can submit a request for assistance that will make an impact on the community.

One of the few I talked to without a farm background, Deborah was by far the most energetic and people oriented person in the room. Her enthusiasm is what this company needs so much more of. They need to listen to what she has to say.

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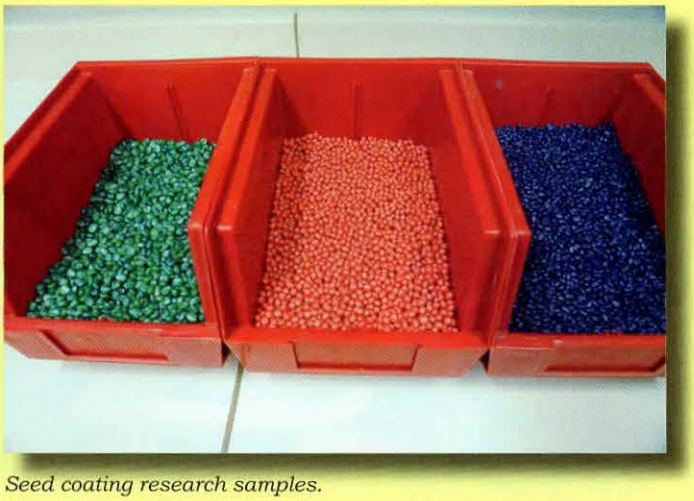
Mark Edge is the Water Efficiency Maize For Africa Partnership LTD Project leader. Though well-spoken about his project, which I found immensely interesting, he has had enough experience in the company to have some perceptive views on much of Monsanto and the rest of the world. He was definitely a sit-back-and-listen kind of guy. He comes from a seed sales background, and his first comments to me were about farmers saving seed from year to year, and the hubbub about Monsanto not wanting them to do that. This is something I understand, and, I think, most beekeepers should understand.

Basically, hybrid seeds are the result of crossing two parents – one with one set of attributes crossed with another with different attributes, producing offspring with the best of both parents – hybrid vigor brings to the table offspring that are better than either parent. But it's the offspring from those seeds produced by hybrid plants, when outcrossed with – who knows what – that produce offspring of unknown attributes and quality. This is EXACTLY what happens when you enable a colony to produce a queen that mates with 20 + drones of unknown origin to head a colony. Her offspring then have the known qualities she brings to the table, but what about multiple dads' contributions – they remain a complete unknown – so the offspring could be good, bad, or – unknown? Why would farmers do that, he asks. To be competitive farmers need the best of everything – productive crops from hybrid seed is no exception. Everything they do is a gamble – they buy the seed, take the risk and if weather and other factors are OK, they do OK, if not...this is not a new story to beekeepers. Moreover, for the most part regular folks don't understand even basic agriculture, let alone when it gets technical. Most people have zero experience with it. But still, food is personal to most people. It's difficult to get it all together.

This is where we left it for now, and started discussing his Africa Water Efficiency work. Monsanto made a commitment six years ago to the people of Africa where water is THE problem for food production. Looking for drought and insect tolerant crops, with funding support from the Bill Gates and Warren Buffet funds, plus USAID and the Borlaug organization, and working with governments of five countries these crops are being developed



Seed coating research samples.

and distributed at discounted prices. Some of them are transgenic, others are not, some are hybrids, others are open pollinated. Only 26% of African crops are hybrid so open pollinated seeds are saved. The thought was, and is, why not give the best seed there is, at the best price possible so more food is produced?

•

Billy Brennan, the Senior Manager of Sustainability and International Communication is the guy to call when the media have a question. He's the Corporate messenger, as it were, heading up the Public Affairs Team.

Basically, this discussion consisted of his bullet points of getting the message across, and out.

- You need to be honest
- You need to keep an open dialog with the media, always working with them to get things right
- Good news can actually hurt you sometimes
- Monsanto is doing a lot of partnerships, the Honey Bee Health Program is only one of many
- And yes, Monsanto has some reputational issues
- When it comes to food, there's different messages – the growers, and the eaters
- There's always change in the works – with partners, with the business mentality of the company, dealing with sustainable crops and protecting the environment
- Monsanto has a Global mission: Produce more, conserve more, and improve lives. That's the real message

•

Glynn Young is the social media guru for the company. About 20 years ago he was involved with the beginnings of an inhouse emailed newsletter, and in '95 was involved with starting the web page for the company. In 97, when Monsanto spun off their chemical business he went to work for St. Louis Public Schools for a bit do essentially the same thing with essentially no funds...a challenge and a half, he says.

He returned to Monsanto when the school gig was over and again works at getting out news and information on the web – facebook, twitter, youtube, all of the regular outlets are involved.

Lobby highlights.

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The last person I chatted with was Steve Reiser, a mover on the BioDirect team, directly involved with the RNAi project. He is not an excitable person, and is reluctant to discuss his work not because he has issues with it, but finds it difficult to explain to non-scientists. However, the evening before I visited with him, he had given a talk to a local beekeeping group that received rave reviews from everyone there. So he can explain it so you and I can understand.

For now, he's excited with this new technology, and spent some time discussing how it will, or can change agriculture as we know it. It will, he said, have an effect on how Varroa is managed, how monocultures are grown, how water issues and food safety issues are handled in the future.

After listening to him for a bit, I finally got him to agree to actually describe how this technique works, and how Monsanto is going to produce it, and then distribute it. He has promised to do so in a future article. So for now, I think I'll leave his interview right there. A promise for the future.

•

There you have it. Tiny bits of a very BIG company that is now in the bee business. That this has become popular within their corporate culture is obvious when you talk to the people there. Several have become beekeepers, and there's even an employee beekeeping group. That Gerry Hayes has led this is also obvious and the exposure can only be beneficial. The people I talked to are for the most part long term employees that enjoy what they do and are dedicated to the mission of the company – produce more, conserve more and improve lives. Most have a farming background, several were in seed sales, all are articulate, intelligent and pleasant. I actually got to sit around a supper table with most of them one evening – sharing good food and discussions. During that evening the interview was more in my direction than the other as they have a commitment to the beekeeping industry they are now a part of, but have very little background in what it is we are about, and an eager desire to find out more.

But Monsanto is a very large corporation, and these engines are driven by quarterly reports, shareholder expectations, global politics, public scrutiny, government oversight and the bottom line. Beeologics brings a better way to do something already being done by the company and its end value is still to be determined. I completely identify with their role in the company, as my role here has always been a very small publishing company buried in a very large candle manufacturing company. Monsanto knows seeds and biotechnology. Bees are – still an unknown. And maybe something that ultimately won't fit. Time and research will spell out the finish to that story.

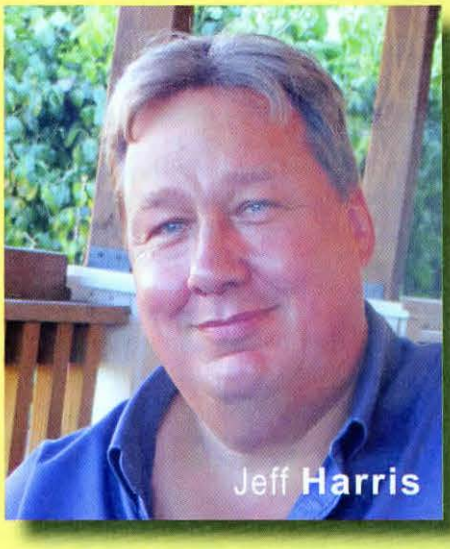
Earlier, Bill Brennan, and most of the rest actually, mentioned that Monsanto has 'reputational' issues. Good communication with customers – farmers – and practically no communication with the public has fostered neither good will nor understanding with the public – the people that eat what those farmers grow. But Monsanto is changing, I think. Still, sensitive, defensive and guarded is the norm for almost everybody. They get beat up lot, lied about a lot, attacked a lot. Am I defending Monsanto? Perhaps, but mostly I'm relating what I saw and learned about some of the people I met there.

Since I made this trip many people have been quick to point out to me their perception of the bad side of this BIG company. The government cover-ups. The David/Goliath, mega company/family farmer confrontations. The long term dangers of their technologies, a rise in health issues since the inception of their work. The lack of testing and the major holes in their research. They list study after study of the damages this company continues to wage on the environment, the people and the world. Perhaps. But I didn't see that. But I'm not a biotech scientist in a position to make a judgment call like that. I suspect most of Monsanto's detractors are in the same position. Food is personal. BIG is not to be trusted. That's a high hurdle to clear for any organization. And a watchful eye is always good advice.

I have been accused of drinking Monsanto's kool-aid. But here's my conclusions from this – first, I'm not going to be around by the time this all comes to pass so I probably won't have to have a say in whether it's good, or bad. That's a cop out I know, but it is what is. Second, like most folks, I pretty much don't trust BIG, but I do trust people, and the people I met there are a pretty decent lot. And finally, my presentation at their Lunch & Learn gave those who listened a good shot of what I believe in – they saw and drank some of my kool-aid and maybe left with just a tiny bit of my propaganda – and some of my opinions.

And though I hope this technology helps the bee industry wrestle with *Varroa*, the long term best choice is still producing bees resistant to *Varroa*, providing enough good food all the time, and avoiding agricultural chemicals at all costs. Those are the answers we know will work. BC

All photos taken by Ray Marklin.



The Voice Of The South

Interviews Dr. John Harbo, USDA Honey Bee Researcher, Baton Rouge, Retired

Almost anyone working through an advanced degree in science can testify to the importance of a good graduate advisor. These are the educators that teach about the scientific method, the moxie needed to succeed in life, and in some cases, a good mentor can teach a person about his or her own character. My development as a graduate student would not have been possible without Dr. John Harbo, a now retired scientist from the USDA, ARS Honey Bee Breeding Lab in Baton Rouge, LA.

I came to be a Masters student under John after dropping out of a Ph.D. program in organic chemistry. I originally thought that chemistry would interest me my entire life, and it does, but life as a bench chemist proved not to be a good fit for me. I just did not like the day-to-day grind of being a synthetic chemist. After dropping out of the program, I came home with my tail between my legs and spent several months working with a commercial beekeeper to figure out my next career move. I am sure my parents thought that I would never leave the nest!

Then one day it dawned on me: the only thing that I had ever had invested a lot of energy and garnered much joy was beekeeping. However, I also had always wanted to be a scientist. Was there a way to merge the two realms? After some digging, I called the Department of Entomology at Louisiana State University. Within a week of that call, Dr. Harbo returned my inquiry and said that he would take me on as a graduate student. He truly took a risk because I had just quit a graduate program.

John and Carol Harbo, at a recent VSH presentation in Sweden. (photo by Erik Osterlund)

My gratitude extends beyond that initial risk. I could not have had a better advisor. John was direct and sincere at all times. He taught everything that all good science mentors teach such as how to follow the scientific method, how to write well, and how to use statistics. My time as his student was even more meaningful because of the incredible personal trauma that affected him at the time. His oldest daughter, Carla, was hit by a car within a few months of me joining his lab. She barely survived the accident, and she was left in a coma for about two weeks. Upon her awakening, she endured years of rehabilitation that involved everyone in the family. Amazingly, John tutored me through my degree program while juggling several days a week in rehab with Carla. Just watching him continue to function professionally during that terrible time was the best education for me – it made me realize that many of my small problems as a student were really nothing at all.

Many of you know John, but I hope that this might reveal something about him that you did not know.

What was the source of your strength during the turmoil surrounding Carla's accident?

Prayer and the support of other people. This included people in the neighborhood, coworkers at the lab, people we hardly knew, and people from our distant past who we hadn't seen or contacted in 20 years.

Another thing that helped was that Carla became better. Now, 25 years later, she is married, has a full time job and an eight-year-old daughter.

Let's give equal time to your younger daughter, Emmy. What does she do for a living? What is going on in her life?

After high school Emmy went to the University of Maryland on a soccer scholarship and, after graduating, has stayed in Maryland. About five years ago she decided that she wanted to get a few colonies of bees. She started with two colonies and soon increased to five. She now has none. She plans to get back into beekeeping when she has more time.

I think many people would be surprised to learn that your original interest in entomology was not apiculture. Where and what did you study for your Master's degree? How did you transition into the study of honey bees?

I studied parasitic wasps as part of a Master's degree in ecology at Michigan Tech. My plan was to continue working with parasitic wasps, but Roger Morse offered me an assistantship to work with honey bees at Cornell. I was excited about going to Cornell and being part of a large entomology department, and I soon learned to enjoy working with bees.

What do you consider the highlights of your career as an entomologist at the Bee Lab in Baton Rouge?

Learning about the varroa sensitive hygiene, the VSH trait. In 1995 Roger Hoopingarner and I discovered that honey bees in the USA could control *Varroa* mites. We produced 43 queens that were each inseminated with semen from a single drone. We evaluated those queens in colonies in Michigan and Louisiana during a 10-week test period, and three of the 43 colonies were resistant to varroa; they had fewer mites at the end of the test than at the beginning.

You and I have learned a lot about the VSH trait since that first experiment, but that single trait effectively controlled mites, even in that first field test in 1995. The VSH trait is neither a breed nor a line, so it can come in any color and can be bred into any race or line of bees. Therefore, I never worry about losing the VSH trait because I think that the alleles for VSH are relatively common and easy to find. Also, we now have simpler ways to measure it. Probably anyone can find this trait if they know how to measure it and how to inseminate queens with a single drone.

You retired in 2005. How have you been spending your time?

I wanted to keep working with honey bees, so that occupies much of my time. I also enjoy woodworking, singing in a choir, gardening, reading, painting (not fine art but the home improvement sort), and repairing stuff (usually bee equipment).

You and I share the same "sophomoric" sense of humor. Actually, your wife, Carol, accuses us of laughing at things from a level more juvenile than sophomore. What sorts of things crack you up?

Carol would probably advise me to dodge this question, but humor (even in its lowest form) is too important to dismiss. Two examples of what cracked me up are the formal dinner scene in the movie *Barat* and the stoning scene in *The Life of Brian.*

As Billy Crystal would say, "You look marvelous!" How do you stay in such good physical shape?

I have always been physically active, and that probably helps, but I am fortunate. I am lucky to have good health, and I was lucky to be born into a family that gave me a good start in life.

What is your best advice to somebody becoming a beekeeper for the first time?

I tell them that beekeeping is finding a place to put your bees, letting the bees do what they do naturally, and intervening when necessary. So after learning where to put the beehive, a beginner needs to learn what honey bees do naturally. To help with that, I suggest Norman Gary's book, *Honey Bee Hobbyist.*

I suggest starting with a swarm (or package) rather than with an established colony. A swarm grows slowly because it starts with no brood. Although this is not good for honey production, it gives the beginner a more gentle and gradual introduction to a "full-sized" colony. It also enables the new beekeeper to watch the bees make new comb, see them store their first nectar and pollen, and observe the progression of brood production from egg laying to the emergence of adult bees.

You're a beekeeper now. Describe your current beekeeping business.

Our business in called Harbo Bee Company, and both Carol and I are actively involved in it.

When I left the Bee Lab in 2006, I decided to stay involved with bee breeding. Carol and I had no bees or beekeeping equipment, so it took a few years to get established with bee locations, bees, insemination equipment, etc. In 2012 we set up a website and began selling VSH breeder queens. We have also done some consulting to explain the VSH trait, how to measure it, and strategies for controlling *Varroa.* Anyone wanting more information about our bee business can visit harbobeeco.com.

What is your best advice to new students pursuing advanced degrees in bee science?

Experimental research is a systematic process; it's not mysterious. When you are new to the scientific method, expect your advisor to help you find a project that will produce publishable results. Avoid projects that will either succeed or fail. Expect guidance from your advisor when you design your first experiments and always consult with a statistician before you begin, no matter how simple the analysis may seem to be.

Share your ideas and interact with other scientists. I like the following quote from Howard H. Aiken, "Don't worry about people stealing an idea. If it's truly original, you'll have to ram it down their throats."

This is a moment in the spotlight. Is there anything that you would like to share with our readers?

Yes. The bee industry has mite resistant bees. We've had the VSH trait for almost 20 years, yet prominent people in our industry are still bemoaning that we do not. I guess we'll have to "ram it down their throats."

However, I do agree that we need to continue looking for *Varroa* resistance in bees. It isn't prudent to rely on only one mite-resistant trait when there may be others waiting to be discovered. I am especially interested in what we know to be a heritable trait of the bee that causes mites to remain on adult bees for a longer period of time before entering a brood cell.

In your opinion, why are people not utilizing the Varroa resistance in bees that have the VSH trait? What would you say to someone hesitant about trying VSH bees? Describe your experience and how you use them for *Varroa* management in your business.

Some beekeepers and queen producers are using the VSH trait, and I think the numbers are growing. Why isn't everyone using it? Many queen producers don't realize how easy it is to add the VSH trait to their bees. And some beekeepers don't know that it is possible to have mite-resistant bees. The benefit of mite resistant bees is enormous – no pesticides in your colonies. I have about 60 colonies of bees, and my only form of mite control is the VSH trait. It's beekeeping as it was before *Varroa* arrived.

Of course, I could have asked John an endless number of questions because I have known him for so long, but his answers to this small set give a glimpse of his personality. I am unabashedly biased when I say that it was a sad day when he retired from government research at such a relatively young age. He seemed at the top of his career with the development of the VSH breeding program. Selfishly, I wished he had stayed a few more years. However, it is important to remember that scientists are like everyone else, many different factors influence life decisions. John felt like it was time to shift his life in a different direction. Luckily, his continued interest in breeding bees that resist *Varroa* mites is surely good for the U.S. beekeeping industry. BC

Jeff Harris is the Extension/Research Apiculturist in the Department of Entomology at MS State University.

Photographing Bees On The Fly

It really helps to be a photographer.

For crying out loud

This is a bee magazine and here I am, planning to spend my space writing about bee photography. What gives? The simple answer is that we have all grown to expect common photos and video to be high quality. Yet composing and using a good photo is not always as easy as it appears. As it were, I am frequently a bee guy trying to get suitable photographic images for you, the article reader. All my life, when it comes to photography, I have been learning on the job. If you can hang on, I will have beekeeping discussions later in this piece. I promise.

I'm just a bee guy with a camera

First and foremost, you should know that I'm just a bee guy with a camera. I am not the reverse – a competent photographer with an interest in bees. I have recently said this fact in other articles. I say it again, because photos and their use have always been a foggy issue for me; and it has not really become any clearer. It's easier and safer just to generate my own pictures. I'll get back to this thought later.

Good photos are common

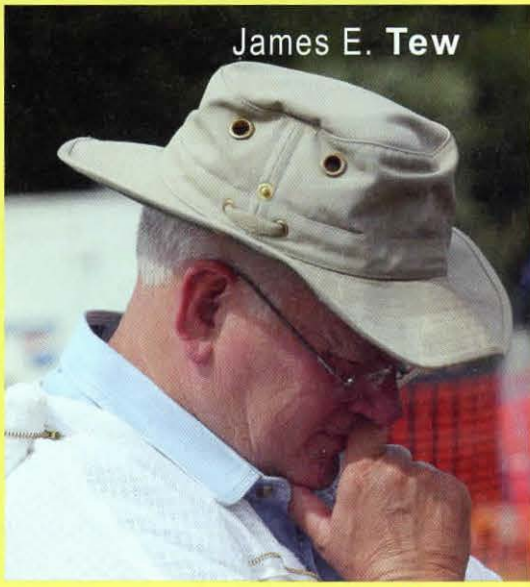
It appears to me that digital photography has made good photos a common item. It was only a couple of decades ago that I loaded either 24 or 36 exposure rolls of Kodachrome 200 or 400 (depending on my conditions) into my manual Nikon F1. My camera was manually set to expected exposure needs and I would judiciously snap a pic. Then I would wait – up to a week – for the film to be developed to see which of those snaps worked. In general, with bees, only one or two out of 10 pictures were keepable. Indeed, I still have a large box of "rejects" that I enjoy occasionally digging through to see if an old photo has gotten better with age. Unfortunately, I have discarded thousands of these rejects over the years. During those years, there was precious little editing or color correcting, so that any survived is a lucky break.

The ones that I kept were the cream-of-the-crop. I still have them filed away. Now, with digital photography *(which I absolutely love)*, the photographer gets to shoot until he/she wins. Even if you only get one or two out of a thousand shots, who cares? They are digital so you can erase them. There is no film expense.

Mexican Heather (*Cuphea hyssopifolia*), a small ornamental plant, is still in bloom in mid-October here in Ohio. There are always forager bees on it because there is nothing else to work. The plants are small and near the ground so photography should be easy – but no – the bees are foraging very fast and flitting all about. I had to fire about 25 times to get a photo suitable enough to crop and edit in Photoshop. It's just an okay pic – not great. This is the new world of bee photography – *shoot till you win.* There's no penalty.

Today, bad photos can be improved

Adobe *Photoshop* and photo enhancing programs like *Photoshop* are amazing. Photos that were poorly exposed decades ago can now be fairly easily restructured and recolored to compose a (somewhat) usable photo. I took the following photo on the front lawn of the Bee Lab at the University of Maryland, College Park, MD, in March, 1978. The photo was underexposed and slightly out of focus. The pic got tossed into the reject box. With enhancing software – though still not a perfect photo – it has been made into a usable photo. The hive auger-hole entrance is in the center of the colony near the bottom in the shadow.



Forager on Mexican Heather (Canon T31 - 100mm 1:2:8)

Using photos taken by others

Generally, my bee articles I write for you have two to three photos. Whenever possible, I compose my own photos, but frequently a photo perfect for the job can be found on the web. Then there's always the problem of permission. Photos on the web are an odd resource. Readily available and easy to use, but this is a resource mostly not worth it to me. Odd isn't it – pictures, pictures everywhere but not readily usable to most of us without permission, money or both.

So as tempting as they are, I don't often use web photos. Speakers and presenters are frequently asked by participants for permission to use their PowerPoint presentations. Increasingly, I am reluctant to give my presentations away due to the occasional uncertainty of the ancestry of some of my photos. Sorry.

Moving pictures

Obviously, pictures can be stored in such a way that they can be made to appear to move. Even my phone can store pretty good moving pictures. When combined with the power of the Internet, moving pictures have become a way life for most of us. For the many, many people who need to *see it* rather than *read about it*, videos are valuable training sources.

Shooting and editing video is *kinda* the same as taking still photos but only *kinda*. Shooting moving images of people and places is pretty much straightforward, but shooting bees in an apple blossom canopy is very nearly random. As an example of the difficulty flitting foragers can pose, I went back to the Mexican Heather plants referred to above and shot a 30-second jerky video to show the rigors of chasing foraging bees. It is posted at: **http://youtube/2tiUeUUxJMM**. This video is nothing special, but I will warn you that I am positioning myself to use streaming video to support some of my future monthly articles. In a way, this is a test.

Why are you telling me all this?

If you are still with me, I realize that this piece is very nearly boring to some of you. This visual technology is at once both easy and hard. But it is clear that these are the early tools of the upcoming generation of scientists and bee educators, as well as you – the upcoming generation of beekeepers. I just went to my search engine – Google – and typed *Honey bees* and in less than a second, I got 32,000,000+ hits. You've been a busy bunch, loading your thoughts and visual images onto the web.

Late in my career, I have enjoyed exploring this diversified and evolving medium. It's powerful far beyond my comprehension. Why am I telling you all this? I guess I don't want to be the old hard-of-hearing guy who ***could*** still send his articles to his editor in readable script handwriting. No, I want to submit mine through various electronic mediums. Maybe I get the electronic desire fairly. My Mom is 88, yet she is on Facebook every day. Plus, I need some of this technology just to keep up with my grandkids' interests.

Bee Culture's recent *Miles To Go* program (Day 1)

In my first paragraph, I wrote, *"If you can hang on, I will have beekeeping discussions later in this piece."* Many months ago, editor Kim asked me if I would consider capturing the essence of *Bee Culture's* training workshop on aspects of commercial migratory beekeeping that was held in early October, 2013, in Medina, Ohio. Due to all that I have discussed above, I decided to go for it. This would be my first reasonably large-scale event. I have been clear with you and with the staff at BC, I am not proficient in this technology. I am only a wayfarer wandering through it. I realize that many of you are good with this technology and that some are even professional. My primary experience – I have videotaped one wedding. The task was terrifying, but I got through it. How could this bee project not be simpler and easier? As it works out, there were several ways this thing could crash and burn.

I had never before shot video in a crowd. There were about 100 paying participants at the event and a good-sized gaggle of non-payers. How could I avoid videotaping backs and elbows? In early preparations, I decided that one of the cameras needed to be above the action, so Editor Kim got approval for us to shoot from the low roof of the factory. I quickly realized that a low roof can look really high when standing on the top rung of the ladder with an armful of camera equipment. My cohort in video work, John Grafton was relegated to the roof position. Regardless, all worked very well until the rain started – light and warm at first, then much more serious, and finally it *really* rained. Happily (and luckily), I had a rain cover for the primary camera so

Recovered photo. The "Butter Churn" hive at the U of MD, 1978.

shooting continued until the thunder started. That was it for the roof crew. I balked at standing on a roof holding a camera on a metal tripod during a thunder storm.

The ground camera crew

I was the ground crew. I used a small Flip camera, my phone camera and a GoPro camera. All this makes for a busy man in the rain. The Flip and the phone cameras were straightforward to use. The GoPro camera is one of those little cameras with high resolution that crazy people put on their helmets just before they bungee jump. I have been able to justify bee uses for it as have many others of you. Just search on YouTube for bees and GoPro cameras. There are hundreds there. I mounted the camera just behind the lift mast of the Bobcat skid-steer loader. This produced an unusual camera angle but it showed what the skid-steer operator was seeing.

Sound

Sound is *so-not-an-issue* when producing still photos, but in video, it's the audio that nearly drives me crazy. I have been using the *audio-technica* wireless microphone transmitter. It's cheap and simple and ***mostly*** dependable. It got me through this event reasonably well, but occasionally there was a static problem.

I had to put a simple voice-over sound track on the short YouTube video to which I referred to above. That was fairly direct to do but on larger audio editing events, it can be much more challenging. It's maddening after hours of editing to get the audio and video slightly out of synchrony. Were it not so maddening, at times it could be funny to see people waving and gesticulating while their voice is totally somewhere else.

Rain, roofs, some static, and noise everywhere marked the first day, but I was *GREATLY* relieved to do a quick review and see that at least I had something recorded. Then it was time for the second day and a different set of challenges.

Miles To Go program (Day 2)

This was lecture day so I used a PowerPoint capture program that would store the speakers audio and slides, but no live video of the speaker (unless I used a second video camera for subsequent inclusion. I didn't). This is the procedure used in various webinars and lecture capture programs. This procedure worked pretty well. Editor Kim had lined up a highly competent slate of speakers. I felt great trepidation at being their *IT person* when I (painfully) obviously knew so little about it.

John Grafton getting the roof/rain shot. The dog got in for free.

Hiccups where they were expected

After a presentation is finished, the computer and software requires about eight minutes to render the production into a format that can be saved to file. Some speakers used a good deal of program animation which kept my cheap computer hustling to keep up but resulted in a professional looking program after capturing. The timing was tight at times, but nothing could be done about that.

Okay, again – why are you telling me this?

This PowerPoint capture procedure is increasingly being used to store selected presentations for rebroadcast to bee groups at later times. It is no longer just a video camera on a tripod in the back of the room that records *"okay"* video and poor sound. The production looks and sounds good when completed and many universities, including The Ohio State University[1], are presently storing these presentations in a publically available format. *Heads up speakers! No longer can you give a bad presentation and just go home. It could haunt you for years.*

Ask the Editor

Will the various segments and captures be available to the beekeeping public? That's for Editor Kim and his staff to decide. I should soon have my part done – literally. I have learned a lot from documenting this project. It is not an easy venture – even when things work well, but when they do work, it is a satisfied feeling. For a 30 second view of the unloading process, see: **http://youtu.be/-v8DCgXPAKI.** BC

Dr. James E. Tew, State Specialist, Beekeeping, The Alabama Cooperative Extension System, Auburn University; ***tewbee2@gmail.com; http://www.onetew.com; http://www.facebook.com/tewbee2; twitter@onetewbee; http://www.youtube.com/user/onetewbee.***

[1] For posted Ohio State webinars, see: http://beelab.osu.edu/t08_pageview/Workshops_and_Webinars.htm

Camera mounted on skid-steer loader.

The Fifth Year Beekeeper

Larry **Connor**

In October we discussed the expectations of what a beekeeper should know at the end of their first year. In November we reviewed standards for a beekeeper at the end of their third year of beekeeping. In this month's article we will review the 'state of the art' of beekeeping of fifth year beekeepers, and keeping in line with the Interview format of this month's issue, I have cast out a small net for people who filled that qualification and were willing to complete an email questionnaire I developed.

Why five years? In addition to allowing me to make two year progressions from one to three to five, many of the regional and state Master Beekeeper testing programs draw a line at five years as the minimum for beekeeper experience and proficiency to start the exam process. One expects that the exam identifies the best of the best, but what are some of the answers the entire group can answer? Generally when I think of a fifth year beekeeper I have an image of someone who is able to coordinate a level of competence and outreach so that other people view these individuals as role models, mentors, teachers and suppliers of bees and beekeeping equipment. At the five year mark we expect that they will move forward into more subtle areas of keeping bees, perhaps becoming county bee inspectors, teaching beekeeping classes, public outreach or providing queens and nuclei hives for sale.

My first observation was that many beekeepers at end of the fifth year of beekeeping really don't remember anymore when they started with beekeeping unless someone tells them when it was or they have had it broken up into sections. In a way that is a positive development, since they have been keeping bees long enough they are no longer counting the days and months that they have kept bees. It also means that they have seen five seasons of bees and different weather conditions.

Not unexpectedly, the second observation was that these Year Five Grads are a remarkably diverse group of beekeepers, a full assortment of successes and failures, and a wide range of interests with plenty of room to grow in the art and science of bee husbandry.

Erin Willett

Erin Willett was terrified the first night of her bee school, then living in Worcester County Massachusetts. She explains that the bee club there was a powerful influence on her beekeeping skills – "Worcester County Beekeeping Association, the oldest beekeeping club in the U.S., was instrumental in giving me my start. They are passionate about research and learning, bring world class speakers in for their meetings. Whenever I needed help, all I needed to do was call and beekeepers were there to answer questions and help."

In that group she had a bee mentor, Dr. Lee Denike "who guided me through my first three years of beekeeping, discussed differences of opinion on medicating bees, and never said, "I told you so," however much I may have deserved it at times."

She started with two colonies – "This enabled me to spot trouble earlier. For example, I started with two packages – one settled down right away, the other acted like rowdy teenagers, they immediately superseded their queen. I would not have recognized the trouble without the side-by-side comparison".

Her first 12 months were filled with challenges, mostly due to the weather. She says that at first it was "too wet, then too dry, then too wet. The bees were ripping out their honey stores during the dearth and that slowed down their drawing out comb in the top super. I didn't recognize it as quickly as I should have, otherwise I would have continued feeding them during the dearth, but I mistakenly thought they were well on their way."

In spite of this she kept both of her hives alive through the Winter. "At the 12 month mark, I finally felt like a "real" beekeeper. It's one thing to read about it, but once I tended the bees for a full year and experienced their seasonal rhythms, my understanding of beekeeping became much more comprehensive."

As she progressed in her beekeeping she says her greatest success has been to learn to catch swarms and to do cut-outs. She adds that "I don't mind losing a hive as I can learn from it. It is so frustrating when bees die and there is no obvious evidence of disease."

Her other areas of success are her ability to manage thriving colonies without using chemicals, and having fun educating the public about honey bees and beekeeping. She enjoys teaching chemical-free beekeeping along with the important role that honey bees play in the food supply. She especially likes "extracting honey from chemical free hives."

Frustrations still abound at the five year mark. She shares many beekeepers frustrations about changing seasons and different blooming times of major bee plants. She dislikes the fact that pesticides are everywhere: "Working hard to keep my bees alive and seeing the heavy use of both agricultural and lawn pesticides by people unaware of the consequences."

One of the biggest surprises she has had was how much management and manipulation she needs to do during the Winter months – "(I) wouldn't have dreamed of this five years ago but now, Winter hive manipulation/management is necessary to keep them alive."

What is left for her? Well, she does not feel that she does a good job of making increase colonies. "I suck at hive splits . . . I really want to get good at doing splits. I feel like it's a 50/50 gamble every time I do one, no matter what method I use, very frustrating."

Erin is now a part of the Medina County Beekeepers Association in Ohio. Her farm is the Smaht Fahm, best said in a solid eastern MA accent. In her five years of beekeeping she has learned a lot since she "dumped my first package into a hive."

In the course of getting to know Joe and Nancy Calme at a church I was attending, I learned that they were both interested in learning about bees and keeping hives on property they had purchased and planned to build a barn and a house during their retirement. Soon after I had relocated from Connecticut to Michigan I offered an intensive class at my family farm where each student was required to buy bee equipment and a nucleus, and keep it on the Connor Farm from installation to October, when they would move the bees to their permanent home. This class gave each student the opportunity to see the vast variation in behavior and buildup these so-called "identical" nucleus hives demonstrated. While some students had hives so riddled with chalk brood that they failed to survive the first year, Joe and Nancy had colonies were very successful. Both Nancy and Joe set up one hive each. Here is Joe's description of what happened that first year:

"The nucs were successfully installed, flourished, filled two deeps and one honey super (the first season). We were able to create a split towards the end of the session. We successfully transferred the hives to our own property. Most importantly, both hives made it through their first winter."

Joe does much of the bee work now, but Nancy is with him to help with the smoker, and of course to ask really great questions. As their mentor, and personal friend, for these years, they use a combination of asking for permission or asking for forgiveness in their bee management. They have supported the idea of using locally-reared and mated queens and have let their splits make their own queens. They share their knowledge with friends from work, with fellow church members (everyone wearing a veil), running the extractor, and even teaching beekeeping at Western Michigan University's Life-Long Learning Academy.

Joe successfully served as a board member for the Kalamazoo Bee Club, where he was encouraged to phone me to ask about possible speakers and ideas for club projects.

They now keep four colonies on the farm, and the barn and house are now finished. They have a farm pond where Nancy likes to fish. The pond provides water for the colonies. This past season they harvested 17 gallons of honey, much of which they share with family and friends, although Joe is now interested in learning about making mead, and I look forward to a gift bottle in the future.

Their successes include hosting honey harvesting parties at their farm and sharing the bees and beekeeping practices with non beekeepers. They also take pride in the fact that they have learned to install virgin queens in hives that have swarmed, as well as in nuclei they have made.

They are still frustrated about how difficult it is to light a smoker and keep it going, especially Nancy. They have small hive beetles, as do most beekeepers in MI, but they have not lost a colony from them, yet.

Swarming is their biggest issue. They say that they have trouble "Identifying the signs of impending swarms, taking action to prevent swarms and taking advantage by making increase colonies (when these conditions appear)."

Of the many students I have worked with over the years, Joe and Nancy have been quite successful. While it would be nice to take credit for that, I cannot and refuse to when they freely drop the name of Dr. Larry Connor as the source of their support and guidance. The truth is that they have been nearly ideal students, participating fully and paying attention to what various speakers say, and asking questions if they fail to fully understand. Add to this the fact that they have been loyal participants of the Kalamazoo Bee Club and also subscribe to this magazine, more or less at my insistence. Every March they travel to East Lansing to Michigan State University (we all graduated from MSU), for the annual Michigan Beekeepers Association Agriculture and Natural Resources week meeting at Kellogg Center, where invited national and international speakers and a vast array of workshops provide the breath and depth of knowledge they benefit from as they grow in their beekeeping passion.

Royceann Mather keeps bees in a suburb of Kansas City, KS. She has not had the same level of success as the first two interviewees, and we can give some of the credit for that to some remarkably poor beekeeping conditions in the western Kansas area over her five years of beekeeping. Her list of greatest frustrations and failures looks like this:

"Bees dying every year but one.
Hive bodies too heavy to lift
Bees dying
Can't keep smoker going
Too many things to do and remember (add second hive body when 1st __% full, add supers when?)
Can't find the queen
Wax moths taking over a hive in Fall
Bees dying."

There is nothing as frustrating as when bees die, and it is not always the beekeeper's fault. Royceann began keeping bees after taking a class at a community college on beekeeping, starting with two colonies.

Both died over the first Winter.

She still has two colonies, and continues to be frustrated by keeping a variety of challenges under control, including "mites, hive beetles, nosema, active queen finding, feeding and entrance reducers."

She admits that she is "not being relaxed enough to take time when inspecting to notice conditions of hives." In the future she wants to perfect queen finding. "After five years, I really should be able to find my queens."

And "keep the smoker going."

It is not all bad news. She has had the support of Robert Hughes, teacher of her beekeeping class. "if it weren't for him I would have quit after two years."

And one year her bees made 170 pounds of surplus honey. Her greatest success was passing out honey to friends after this honey was harvested. BC

PLAN Ahead

Jim **Thompson**

Practice Now For Next Year's Baked Good Show

I judge and help judge at several honey shows and wish to direct your attention to the baked goods categories. One of the first things for a person to do is read and comprehend the guidelines that the show has published. Another item to consider is to meet the deadline for registration of the entries. If you miss this date, there is no possible way you can achieve recognition or obtain a premium. Most shows will allow you to register for any and all of the categories that you will want to enter or would have a possibility of producing. If you limit yourself in registering a few items, you may find that when show time arrives, you are prevented from entering some of categories that you now have and are not registered. You must make a note to yourself, when the entries are to be brought in to the show. I have seen many entries refused entry to the show because they were brought to the show too late.

Read the rules of the show. There are usually requirements on what type of plate and protection your product must have. Look at the requirements for the amount of sweetening that must be used. How many items are there supposed to be on the plate? Consistency is the name of the situation. If the rules state that there are to be six cookies on a plate, make sure that you have six. You should not have five, seven, or eight cookies, it just shows the judge that you can't count or you can't follow the rules. At very big shows, a judge doesn't mind disqualifying an entry where the rules were not followed. The cookies should be the same size as each other. It reminds me of a situation that could occur around a family table when something is served and a family member spouts up, "So and so has a bigger piece than I do," an argument follows, with no real winners. If you have a bar type cookie that must be cut, use a ruler and make the pieces even. Rolled out cookies are usually even due to the use of a cookie cutter. Dropped cookies will look better if the size of the ball is the same.

Make sure that you check your recipe for the amount of sweetening that is to be used. Some fairs mention that if honey is used as one of the ingredients, you are okay. Other fairs stipulate that the sweetening is 100% honey. If you have a fair that states that the sweetening is 100% honey, remember that by adding fruit or chocolate chips, this could threaten the sweetening percentage. Be careful to see if glazes and frostings are allowed and their compositions. Many people will try to convert a recipe to a total honey sweetened recipe by substituting the same amount of honey as the sugar. Sometimes the conversion works, but many times there is failure. A general rule for converting a recipe is to substitute honey for the sugar directly if the amount is less than ½ cup. Since honey is sweeter than sugar, you should reduce the amount of honey used to be between 2/3 and ¾ cup on recipes requiring one cup of sugar. You need to reduce the amount of liquid by 25% in the honey recipe. When you have recipes that use more than a cup of honey, it may be wise to add ½ teaspoon of baking soda per cup of honey used, to combat acidity. Usually a converted recipe will cook faster, so you may want to lower temperature by 25°F. Most shows will require that a list of the ingredients and their amounts are included with the entry. This will help the judge determine if the rules have been followed. Baking directions are also required at most shows. Several of the smaller shows will collect the recipes and instructions, so a booklet may be formed as a fund raiser. So you may need an extra copy of the ingredients and directions. If you have a secret recipe, do not enter it in the show.

If you see an interesting or intriguing recipe in a magazine, make it and try it out on the family prior to the show. I judged a loaf of bread that looked wonderful, but tasted awful. The person that made it was in the audience and mentioned that she had seen it in a magazine and made it for the show without tasting it. She had forgotten to include an ingredient.

At another show, the person was in such a hurry that they had forgotten to write out the ingredients, amounts, and baking directions. So in haste, a quarter sheet of paper was taken out and the ingredients were scribbled on the back of the sheet of paper. Thus the judge had an idea what ingredients were used but not the amounts. Because the judge was looking for the directions on how the item was baked, he looked on the other side of the

quarter sheet of paper and discovered that there was a partial sheet of directions on how to get from the person's address to the Kennywood Amusement Park. Thus the judge wrote: wrong directions.

It is always best to plan to make your baked items to be ready just before you have to deliver them to the fair so they are as fresh as can be. Sometimes mistakes happen and thus you might consider making two items so you have a choice which one goes to the show.

Remember that your items will be judged on appearance, taste, texture, and adherence to the rules. A loaf of bread should have a nice shape and be golden brown in color. If the dough rose so much that it overflowed the pan and then started drooping to look like a mushroom, it isn't as attractive as a uniform loaf. If the rising was too fast or the dough wasn't kneaded enough, there might be large air holes. It is common to have an item that is baked on the outside and raw in the inside, so you must monitor the baking. Sometimes an egg wash or aluminum foil is used on the item to keep it from burning and allow the center to finish cooking.

Because of the nature of honey being hydroscopic, goods baked with honey will be moister than items without honey.

The judge is looking for a pleasant taste of honey when sampling the item and not be presented with an overpowering taste of fruit, chocolate, or other flavorings. When an item or ingredient is scorched or burned, the judge will notice by either taste or by the visual appearance.

You can have a lot of fun entering baked goods at the show or fair, but you must plan ahead. BC

Jim Thompson is a long time beekeeper, collector and honey show judge. He lives in Smithville, Ohio.

Got A Question?

Ask Phil

Phil **Craft**

He Knows!

Send your questions to Phil at
phil@philcrafthivecraft.com
www.philcrafthivecraft.com

A beekeeper in Texas writes:

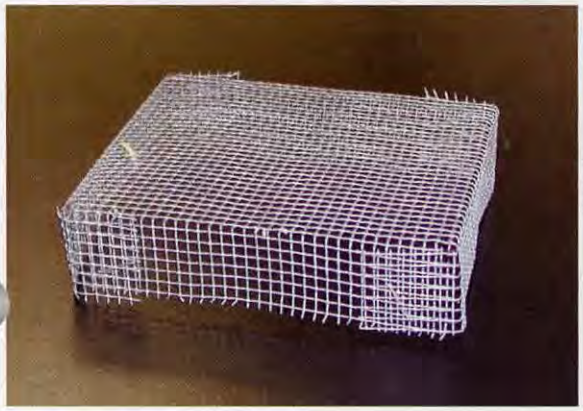
We have been following your expert column in Bee Culture magazine and it has come time for us to ask for your help. Early in the Spring of 2013 we purchased two complete Langstroth hives. The hives came filled with established colonies of bees and frames of brood, honey, pollen, etc.

Our problem is that one of the hives has become progressively aggressive during the summer and now, on Sept. 28, the hive has become extremely aggressive to the point where simply walking past the hive elicits an attack. We MAY have access to a local place where we can buy a new queen, but our question is: will finding the old queen, killing it, and replacing it with a new one solve the problem and in turn save the hive? The next question is: can you provide us with information on how to re-queen this hive?

We love your column and we hope you can point us in the right direction.

Phil replies:

In an earlier column in *Bee Culture* (see the July 2013 issue), I discussed the merits of replacing the queen in colonies which have become overly defensive, but not the specifics of how to go about it. As I wrote then, bees may become temporarily defensive for reasons ranging from disruption by predators to inclement weather. Persistent aggressive behavior, such as you have been experiencing, can also be a sign of queenlessness, so I would recommend (if you have not done so already) that you check the hive to make sure that it is queen right. If an inspection of the frames finds no sign of eggs or young larvae, skip ahead to installing a new queen – a procedure which I suggest you follow as soon as possible. If a queen is present, the bees' extreme defensiveness is almost certainly due to genetics, probably because of the colony's having produced a new queen after swarming or through supersedure. The new queen mates with drones from other hives, which alters the genetic make-up and can alter the behavioral tendencies of the colony. You will have to find and remove (kill) this second generation queen before you can introduce a new one.



A push in queen cage.

However, since you live in Texas, it's prudent to consider the possibility that some of the genetics of your aggressive hive may be from Africanized honey bees (AHB). Before taking any action, I would strongly suggest contacting your local bee inspector or the head bee inspector at Texas A&M University and heeding his or her advice. A listing of all U.S. apiary inspection programs and contact information for them can be found at: **http://www.apiaryinspectors.org/**. If these bees are Africanized or partially Africanized, they can pose a serious danger to you, your family, your animals or livestock, and to your neighbors as well. Distinguishing AHB from less defensive subspecies of European honey bees can only be accomplished through testing by a professional.

Your first step is to find the queen, taking whatever precautions the local inspector recommends. Finding an unmarked queen can be a daunting task for a novice beekeeper, and is even more difficult in an extremely defensive hive. In a column in January 2013, I made some suggestions for locating queens, but if you have to requeen now, your best option may be to seek the assistance of a more experienced beekeeper. Your inspector or local beekeeping group may be able to connect you with a mentor. If you are able to determine that AHB is not a factor and if the location of the hive makes it possible for you to put up with them through the Fall, I would advise waiting until spring. At that time, you will have fewer bees to deal with – perhaps half the number in the hive now – and finding the old queen is much easier with fewer bees. Also, obtaining a queen from gentle stock will not be an issue then.

If you are able to wait until Spring, one option would be to split the colony into two or more hives. Beekeeping friends who have practiced this on testy hives tell me that it seems to demoralize the overly defensive bees, making them easier to handle. The apparent reduction in defensive behavior is probably just due to the reduction in the number of bees in each hive. Another advantage is that you can postpone locating the old queen until after the hive is divided, meaning even fewer bees to sort through. To accomplish splitting the hive, evenly divide the brood and other frames between two or even three

Queen in queen cage. (Photo by Mary Parnell Carney)

hive bodies. I suggest leaving an empty frame or two of drawn comb adjacent to the brood frames in each box. Come back later (after a day, or even two) and look for fresh eggs on the empty frames around the brood in the now divided hives. The one in which you see them will be the one which contains the old queen. At this point, you should be able to find the her on your own, and the January column might be helpful. You should also check the other divided hives for queen cells, destroying them prior to re-queening. If you only want the original hive, you can recombine them after finding and dispatching the old queen, and afterwards install a single new queen. (It would be prudent to use a layer of newspaper between the brood boxes when recombining – even though they may only have been divided for a few days.) Or you could install queens in all the hives and use the additional hive(s) to increase your apiary or to sell to other beekeepers. The subspecies of the queen you purchase is not of great importance, but many queens contain genetics that aid in resisting varroa mites. This trait is worth seeking out. I also suggest that you buy a marked queen so that she will be easier for you to locate in the future.

Installing the new queen in the queen shipping cage is the easy part. It's the same procedure as installing queens in new packages of bees. The queen shipping cage will have white, soft, sugar candy in one end. *Remove the cork from the end containing the candy.* When installing the queen with the shipping cage, never remove the cork or plug from the non-candy end or directly release the queen into the hive. If the queen shipping cage is plastic, remove the plastic cap. (You'll see candy under it.) I *never recommend* removing any of the candy or poking a hole in it with a nail. The purpose of the candy is to delay the release of the queen until the bees are acclimated to her new smell and are ready to accept her. The time it takes to eat out the candy allows them to make that adjustment. Place the queen cage in the middle of the hive between two frames, preferably frames containing brood. You may need to temporally remove a frame to make room for it. Some queen cages come with a hanger built in, but if not, you can improvise one. A tack in the end of a wooden queen cage connected to a wire, string, or piece of plastic works well. When installing plastic queen cages you can make a hanger from a paperclip. Just be careful not to impale the queen when you stick the paperclip through the holes of the cage. Normally though, I just push two frames together with the queen cage in between, and it stays in place by friction. I find it's easier to check on the progress of the queen's release when I install her cage with the candy end pointing up. After two to three days, the candy will likely be gone and the queen out. If she is not, check after a couple of more. It rarely takes more than three or four days. Once she is out, you are finished. Just remove the cage and replace any frame you may have taken out to make room for it. I suggest leaving the bees alone for the next few days. After that, you should begin seeing eggs or small larvae in the hive.

Occasionally a populous, existing hive will reject a new queen. A push-in cage provides an alternative method of installation which improves the chances that she will be accepted. It involves handling the queen, so if you are not comfortable with that, get an experienced beekeeper to help you. Commercially manufactured cages, sometimes called queen introduction cages, are five sided boxes made of plastic, typically about 4"x4" on the front (no back), with sides about ½" deep. It's also easy to make one yourself from #8 hardware cloth (openings of 1/8", the same as in screen bottom boards). To make a cage, cut a square of about 5"x5", and fold back about ½" on all four sides. (See photo.) After disposing of the old queen, select a frame of capped brood containing emerging bees. A few empty cells are a plus, but you want to find an area on the frame with a number of new bees eating their way through the cappings. This is where you will install the push-in cage. Brush off the bees clinging to the frame. *I suggest that you perform the next steps inside a small room or in a closed vehicle.* If the queen gets away from you, she can be more easily re-captured inside. If she escapes in the open (and I speak from experience), she may be lost. To remove her from the shipping cage, extract the cork from the non-candy end of a wooden cage or the plastic plug in a plastic one. As she seeks to come out of the hole, *gently* trap and hold her between your thumb, index and middle finger. Never squeeze her abdomen. If the queen shipping cage has attendants, allow them to escape at this point. I do not suggest trapping them with your fingers – they may not like it. The push-in cage, as the name implies, is pushed into the comb of the capped brood. Position the push-in cage over the surface of the comb with one hand and place the new queen under it in one motion. Then push the cage a little way into the comb over the queen, leaving her room to move around. This type of cage protects the queen, but allows contact with the bees through the screen, just as in a regular queen cage installation. However, under the push-in cage, the queen will start filling up the empty cells, proving her worth as an egg layer, while attended by the newly emerged bees who will accept her unconditionally. I sug-

gest waiting a full week before removing the cage and freeing the queen.

I hope this helps. Let me know how it goes.

A beekeeper from Kentucky writes:

I have a hive that I wish to move to move to a better location (about 12 feet). But I've always read that you should move a hive less than five feet or more than two miles? What should I do to get this hive where I want it?

Phil replies:

I have moved hives less than two miles – even less than a mile – successfully, but here is the problem. When forager bees first leave the hive, they make orientation flights, flying around the hive, noting landmarks, and imprinting where *home* is. Upon returning, they go back to that exact spot every time. If you move the hive a short distance, or even rotate it 90 degrees, the flying bees, having noted the familiar landmarks on the way out, do not re-orient. They will return to the spot where they expect the entrance to their hive to be and, not finding it, will mill about in confusion. If the hive has only been rotated or moved a very short distance (less than five feet), they will eventually find their way to the new position. Within a few hours, the new site becomes imprinted on their memory as *home* and the old location is forgotten. A move of more than five feet can result in chaos and hundreds of lost and irritable bees. In order to accomplish a move of twelve feet, you can make repeated, short moves of less than five feet each – perhaps making one move per day.

Hives in the snow. (photo by Larry Connor)

This strategy is obviously impractical for beekeepers wishing to move hives longer distances – say 100 feet or so. This is where the part about the two miles comes in. If the hive is moved to a temporary location two miles away, the foragers, upon making their first flight in the new territory and not seeing the familiar landmarks, will re-orient. (Actually, I think that one mile is quite adequate.) Once they have imprinted on their new environs, they can be moved again to the desired location 100 feet from the original position. This will now be brand new terrain for them, requiring new orientation flights.

The onset of winter provides a simpler alternative. It seems that bees' memory for landmarks is strictly short term. After a few days of not flying, they need to re-orient. Beekeepers can take advantage of this fact to move hives any distance they like after bees have been confined inside the hive by cold weather for a few days. (A lengthy rainy spell can serve the same purpose.) You can make the twelve foot change in a single move as soon as you have three or four days colder than 45°F. I do caution beekeepers against using this maneuver during extremely cold weather, for fear of disturbing the colony's cluster. My recommendation is to wait for several consecutive day time highs between 35 and 45°F. BC

2014 Resolution

This Year, Walk Away From Walk Away Splits

Heather **Luther**

With the New Year creeping up on us the way it always does, it's about time to trot out the resolutions. While the majority of America is making garden variety resolutions related to healthy living, my husband and I are off the grid with ours. The Luther's primary resolution for 2014 is one you don't often hear: stop inbreeding bees.

Up until recently, Andy and I have been practitioners of the "walk-away split." Early on, we were tickled to learn that we could simultaneously discourage swarming and increase our colony numbers without incurring the expense or hassle of purchasing a queen simply by creating one of these miracle splits. Conceptually, its a piece of cake. You take a few frames of bees and brood from one hive, center them between the other frames in a new hive body, and walk away. When the bees realize a queen is lacking they will use the brood you've given them to grow their own. Is it amazing? Yes. Is it a long-term management strategy? No. Once in a while it's probably okay, but as an everyday practice I suspect it falls under the category of PPB (piss-poor beekeeping). Basically, walk-away splits are to bees what duct tape and bailing wire are to an out-of-work country boy and his '87 Chevy.

A walk-away split compromises the quality of your bees in at least two ways. For one thing, it throws your new hive into a state of emergency, resulting in a queen manufactured under duress. A primary consequence of this is suboptimal nutrition in a queen's earliest development. With the exception of queen loss due to death, under normal circumstances bees will *plan* to raise a new queen either for purposes of swarming or supersedure. They will have freshly-hatched, hot-off-the-presses larvae available which they will *immediately* begin lavishing with royal jelly thereby maximizing the duration of optimal feeding the developing queen receives. In an emergency situation, by the time the bees realize they are queenless and implement "Operation Grow A New One," already the new queen is at a nutritional deficit.

Secondly, relying exclusively on walk-away splits ultimately results in an inbred yard. It's easy to remain in denial about this since honey bees don't express inbreeding in the form of obvious, outward deformity like those splotchy, knock-kneed, knobby-headed ducks, formerly mallards, that, in lieu of migration, noodle around lakeside swing sets waiting on suburban toddlers and their fistfuls of expired sandwich bread. Nevertheless, certain facts of honey bees' biology grease the wheels of inbreeding in a walk-away yard.

For example, a drone is a *haploid* organism, only one set of chromosomes. Because a drone is produced from an unfertilized egg, fully 100% of its genetic material comes from its mother. While a male duck draws from two genetic accounts, a drone draws only from one. Thankfully, nature compensates for this. Because the queen bee mates with multiple drones, the genetic material she collects is naturally diversified. That is, until bumbling beekeepers begin tinkering with the natural order. Andy and I unwittingly manipulated reproduction in such a way as to suppress natural diversification and promote "genetic narrowness."

By deriving numerous bee colonies from only two original queens, and by swapping frames of brood willy-nilly from stronger hives into weaker ones as necessary, we promoted a yard teeming with brothers and sisters. While it's not possible for a drone to mate with his mother, he will happily mate with his sister; and, being haploid, he invariably brings 100% of his mother's genetic material to that mating. With his sister bringing 50% of the genetics of their shared mother to the union, each of the super-sisters brought about by this particular mating will have 75% of her genes in common with the "grandma" queen. Oddly enough, because of the haploid nature of their drone father, these super-sisters are more genetically similar to their grandmother and to each other than they are their own mother. It is precisely this haploid quality that compounds the already problematic, genetic overlap characteristic of inbreeding. When you factor in the rapid lifecycle of the honey bee, it's easy to see how a single genetic line can quickly achieve hyper-representation in a walk-away yard.

It's true that drones fly away from the hive to mate. They seek out drone congregation areas (DCAs), and together with a host of drones from other colonies wait for a passing, virgin queen. Ordinarily, this arrangement should minimize the chances of a brother-sister mating combination; however, we must remember that, in nature, honey bee colonies don't stack themselves like New Yorkers. In fact, a swarm colony will allow one square kilometer between itself and another hive. Conversely, in a managed apiary you may have a line of ten or more hives with little more than a foot between each. That is not a normal arrangement. Nature didn't plan for that. Though there will surely be drones from other locations present at the DCAs in your vicinity, the more hives you have in your yard the more heavily your yard will be represented at those DCAs. Particularly if you are the only beekeeper nearby, your immediate area may be relatively saturated with your own stock, making it plenty likely that your queens will routinely mate with your drones. If you are dutifully requeening with external queen-stock on a regular basis this is not such a big deal; but, if you've been running a walk-away yard model spanning countless generations, your local DCAs may be full-up with bozos and halfwits that you yourself bred. If you've saturated your local area with inbred bees the compensatory factor of multiple matings will be impeded.

It took charts, diagrams, and a class from a Ph.D. (Dr. Keith Delaplane of the University of Georgia) for me to half understand all this, but when it comes down to it, for practical purposes, the key thing to remember is this simple, folk wisdom analogy: the healthiest dogs are mutts. The mangiest stray will often outlive the most pampered Pomeranian, and with less vet bills in between. That's partly because the mangy stray has a wider variety of potentially advantageous genetic traits to draw upon, some of which may confer a degree of resistance to vari-

ous ailments. Fortunately, it's likewise for the bees. With the fearsome array of environmental antagonists circling our hives like sharks, what do we say to the possibility of any measure of increased resistance to pests and pathogens? We say, "yes, please." Andy and I absolutely want to maximize our bees' resilience, vigor, and likelihood of survival; yet, in narrowing the genetic variance in our yard we did the very opposite

As Dr. Delaplane pointed out in his presentation, when it comes to manipulating genetics, in selecting for one thing, you deselect for another. An example of this may be our dog, Fuzz. Fuzz is a white, Labrador Retriever – a stunning, polar bear of a dog – for which we paid an obscene sum. Fuzz may be harbor-seal-white but he is also so profoundly disinterested in communicating male dominance or territoriality that, in three years, we have not once seen him lift his leg to pee. At the dog park, we never have to worry about Fuzz making trouble with the others, but we do take a healthy ribbing from time to time over our dog who pees like a girl. As far as I know, God did not set out to make white Labs. He made brown ones, black ones, and yellow ones. People made white ones. When people make things, sometimes you get a few lumps in the batter. Suffice it to say, Fuzz has got some lumps.

In the case of our bees, we have often commented to each other that they seem extraordinarily docile. In fact, relatively speaking, our bees are fit for a petting zoo, and that may be a quality we unknowingly "selected for." Bearing in mind our recent learning, we can only wonder what the genetic trade off may have been. Although we did not set out to manipulate the genetics of our beeyard, inadvertently that is exactly what we did. Fortunately, we never reached the point of the tell-tale spotty brood pattern characteristic of badly inbred stock, so maybe we have come to the light in time to turn things around.

The science of honey bee genetics is intense. Given my namby-pamby liberal arts background, I am qualified to further explain none of it. Dr. Delaplane, on the other hand, will give you a mind bending talk on the subject. It was the series of presentations given by him at the 2013 annual meeting of the Alabama Beekeepers Association that really illuminated for me the science and significance of honey bee genetics and lead Andy and I to our bee yard resolution 2014. I recommend you go hear him speak. In the meantime, don't inbreed your yard. Practically speaking, that's really the critical take-away.

That said, the repercussions of a walk-away yard model aren't limited to inbreeding. It's bad news from a business standpoint too. Under the best of circumstances, it's going to take significantly longer for a walk-away hive to establish itself than it would a hive with a mated queen already on deck; but, if your stars are at all misaligned the day your virgin queen exits the hive for her nuptial flight, a single blue jay with the munchies could set you back another three weeks or more. In bee weeks that's half a lifetime. In dollars it may be a car payment. The one monetary advantage to a walk-away beeyard – minor cost savings in the short term - is greatly outweighed by the long-term disadvantage of heavy profit loss. You may save yourself 20 or 25 bucks on a queen up front but by delaying colony build up you are severely restricting your potential honey production for the season and likely cutting your profits by up to hundreds of dollars per hive. It doesn't take Suze Orman to recognize the folly in that. Note to self: don't walk away from profit.

Beyond matters of cost, our former management practice may also be discredited on the basis of principle. Although it's great news that the plight of the honey bee has gotten so much face time in recent years and that the ranks of new beekeepers are continually expanding, more and more it may not be enough to get on board with the bee movement by slapping a few boxes up in the yard or on the roof and just sharing real estate with our foraging friends. It seems that the more precarious the ecology of the honey bee becomes, the more skilled and knowledgeable we, as the bees' keepers, must become. It may sound oddly corporate and starchy for a hobbyist beekeeper with relatively few hives to talk about "best practices" for the management of his or her beeyard, but we may be at a point where, if you want to run a sustainable bee operation personally, and beyond that, if you want to contribute to the sustainability of honey bees as a *species*, a higher-level management approach must become standard operating procedure. The adage "think globally, act locally" applies to our bee yards too. If one gets better it helps them all get better.

So, come on 2014. We've got big plans for you. I'm gonna lose ten pounds and Andy's gonna catch a trophy smallmouth bigger than the last one. More importantly, we're both gonna be better beekeepers. I'll let you know how it goes. BC

Heather and Andy Luther have quit making walk away splits in their beeyards in Northern Alabama. They belong to several beekeeping clubs, and are working on the AL Masters program.

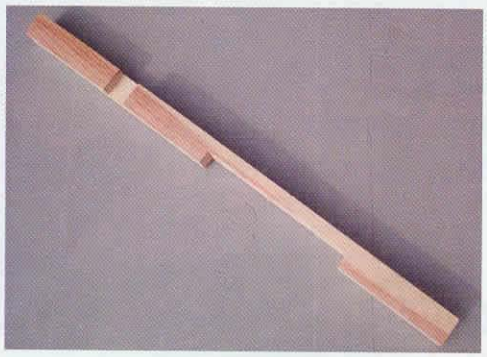
BUILD AN ENTRANCE REDUCER

Ed **Simon**

Entrance Reducer

The entrance reducer doesn't look like much, but it's extremely important. When installed it reduces the opening of the hive with a couple results:

- A limited number of bees can protect the hive
- The air flow is reduced; resulting in a more easily controlled hive temperature.



Parts (Thickness x Width x Length)

1.¾" x ¾" x 14⅝" – Entrance reducer

Construction

Step 1: Cut the entrance reducer (part #1) ⅛" less than the entrance opening in your bottom board.

Step 2: Cut a 3" x ⅜" wide notch on one side of the reducer three inches from the end.

Step 3: After flipping the board 90 degrees cut a ½" x ⅜" notch 3 ½ inches from the other end of the board.

Volume Construction

Entrance reducers are so easy and fast to make in quantity.

Step 1: Cut a wide ¾" board to a length ⅛" less than the entrance opening in your bottom board.

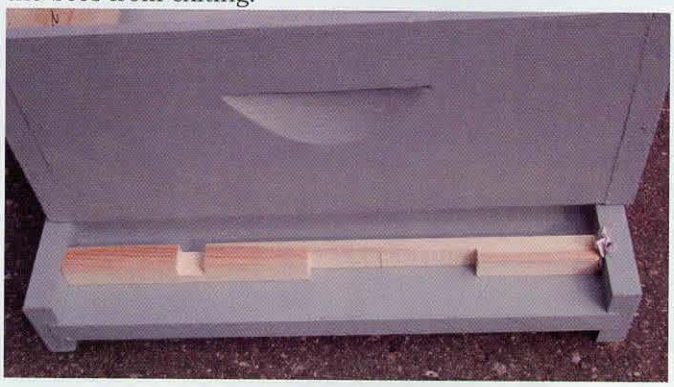
Step 2: Cut a wide 3" x ⅜" notch on one side of the board three inches from the end of the board.

Step 3: Now slice off individual ¾" entrance reducers from your wide board.

Step 4: Flip each individual reducer 90 degrees while aligning it on the saw with the other reducers. Then cut all the small ½" x ⅜" notches at one time 3 ½" from the other end of the board.

Usage

When using the entrance reducer, be sure the flat side of the reducer is down (notch up). This way the dead bees and debris will not clog the entrance and stop the bees from exiting.



Hint: Use a piece of crumpled paper as a spring to hold the reducer in position. If you use this technique then all your reducers will fit any bottom board.

This was really easy. Too bad all of the construction isn't this simple.

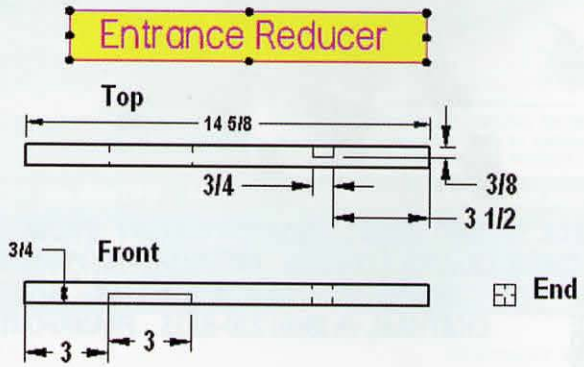
Thought

Make 20 or 30 entrance reducers at one time. Once you are in the swing of it, you can easily cut up to 15 or more entrance reducers with the same saw movement.

Take the extras to your bee club meeting. They are cheap and appreciated by the membership.

Notes

This article is the third in a series that will provide instructions on how to build a complete bee hive. Get a copy of Ed Simon's book *Bee Equipment Essentials* with detailed drawings, construction hints and how-to-use instructions for dozens of beekeeping tools and equipment from www.wicwas.com. Ed can be contacted through Ed@TheBeeShed.com. BC



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DECEMBER, 2013 • ALL THE NEWS THAT FITS

OBITUARIES

Carl and Euvonne Harrison.

Orva Euvonne Harrison was born on July 29, 1933 in Magazine, AR to Otto Omar Heathcott and Dessie Winfred (Denton) Heathcott. Euvonne passed from this life on Sunday, October 27, 2013 at the age of 80.

Euvonne was a member of the Order of the Eastern Star and an active beekeeper. She was a member of the Northeastern Oklahoma Beekeepers Association and was named Beekeeper of the Year in 2006. She retired from Oklahoma Osteopathic Hospital as Emergency Unit Secretary.

She is survived by her husband, Carl of the home; two sons: Gary Harrison of Tulsa, OK and Thomas Harrison of Broken Arrow, OK; two daughters, Donna Jo Harper and Carla Ann Harrison both of Tulsa, OK; one sister, Louella Ray of Wetumka, OK; two brothers, Dewayne Heathcott of Pryor, OK and Gene Heathcott of Jenks, OK; two grandchildren, Carl Thomas Harrison and William Harrison and two great-grandchildren, Piper Rei Harrison and Tyler Prince Harrison.

A personal note: Many years ago I was invited to speak at the OK State Beekeeper's meeting by then President Glen Gibson. Of the several talks I gave one he wanted in particular was on getting local associations up and running. He had not had a lot of success in doing so for the state group, and Varroa had so devastated the beekeeper numbers that going forward seemed hopeless. But he wanted to keep trying. Two people who came to that meeting were Euvonne and her husband Carl, who were members of a small, struggling group in Tulsa. They came, they took notes, they went home and did what needed doing to get new blood into the group and to get the few regular members excited. For several years I was a regular speaker at their one big Spring meeting that went from several to over a 100 attendees in a few short years. Good speakers, good food, a good place to meet, politics aside, and officers dedicated to making it work. Euvonne and Carl did it all, and the Northeast OK Beekeepers is a lasting testimonial to their work.

Kim Flottum

Ted Jansen, 87, of Chesterfield, Missouri, a long-time beekeeper and mentor to so many, passed away on Tuesday, September 3rd, 2013. Ted's contribution to beekeeping in Eastern Missouri and the St. Louis region is legendary, having guided many as they made their way learning about beekeeping and honey bees. His beekeeping knowledge, influence and inspiration to beekeepers throughout the area is well-known; but it's his warm, soft and gentle approach to teaching so much to so many that can never be replaced. To many, Ted was the heart and soul of their beekeeping experience. He was an active member of Eastern Missouri Beekeepers Association, Missouri State Beekeepers Association, and Three Rivers Beekeepers, for which he was a founding member.

Ted was dear husband of 50 years to Marlene; beloved father, grandfather, great-grandfather, brother, uncle, cousin and friend.

STATE AG TO FEDS: WORK WITH US TO FIX BEE PROBLEMS

Top state agriculture officials are urging the federal government to work with them in developing strategies for promoting the health and welfare of bees.

The National Association of State Departments of Agriculture adopted a policy amendment at its annual meeting recommending the U.S. Department of Agriculture's Agricultural Research Service work with state agriculture departments to develop pollinator plans as guidelines to promote the health and welfare of pollinators.

The association wants continued scientific research in both the private and public sectors on colony collapse disorder and the development of integrated pest management practices with lower risk to bees, new tools to manage *Varroa* mites, and pesticides and adjuvants with bee repellent properties as a way to reduce potential stressors to pollinators.

North Dakota Agriculture Commissioner Doug Goehring, who introduced the amendment, says the plans should emphasize enhanced communication between beekeepers and agriculture producers.

"The overall goal is to ensure that beekeepers continue to have access to areas with adequate forage that will support bee health to sustain a pollinator population for flowering crops and a peaceful co-existence between beekeepers and agriculture producers," Goehring says.

He says in a statement the amendment is in response to increasing losses of honeybees to colony collapse disorder.

"The primary use of the land is for crop and livestock production," Goehring says. "Beekeepers and farmers can work together to identify optimum hive placement with respect to bee habitat, water, forage, and cultivation practices that reduce the risk of pesticide exposure without interfering with agricultural activities." *Alan Harman*

CANADIAN BEES TO OZ

The first shipment of queen bees to arrive in Australia in seven years will spend the rest of their lives in a purpose-built quarantine facility in New South Wales.

The arrival of the queen bees from Canada is promising to provide significant benefits to the bee industry.

Federal Department of Agriculture animal division assistant secretary Andrew Cupit says introducing new bee genetics will improve production of local hives and help in developing disease resistance against potential incursions of dangerous pests and diseases.

"To ensure bee colonies are not put at risk, the queen bees are subject to strict biosecurity requirements during the import process and will never leave the quarantine facility," Cupit says.

The bees will be transported to a purpose-built bee post-entry quarantine facility where they will undergo testing to ensure they're free from any pests and diseases.

Once given the all clear, the queen bees' eggs or larvae will be grafted and added into Australian colonies.

A review of the requirements for the importation of queen honey bees took into account improvements in the understanding of pests and diseases of concern for bee imports while also considering the current biosecurity risks that these imports could pose.

"Imports are now approved from Canada, Japan, New Zealand and the member states of the European Union following a policy review in 2012," Cupit says.

Alan Harman

BEES EXTINCT

It turns out the current threat to honey bee survival is not the first.

An international research term has uncovered evidence that bees underwent a massive near-extinction at the same time as the dinosaurs.

Lead author Sandra Rehan, an assistant professor of biological sciences at University of New Hampshire and colleagues at Australia's Flinders University and the South Australia Museum have documented a widespread extinction of bees that occurred 65 million years ago as part of the massive event that wiped out land dinosaurs and many flowering plants.

They report in the journal Plos One, they modeled a mass extinction in bee group Xylocopinae, or carpenter bees, at the end of the Cretaceous and beginning of the Paleogene eras, known as the K-T boundary.

Previous studies have suggested a widespread extinction among flowering plants at the K-T boundary, and it's long been assumed that the bees who depended upon those plants would have met the same fate.

Rehan says unlike the dinosaurs, there is a relatively poor fossil record of bees, making the confirmation of such an extinction difficult.

Rehan and her colleagues overcame the lack of fossil evidence for bees with a technique called molecular phylogenetics. Analyzing DNA sequences of four "tribes" of 230 species of carpenter bees from every continent except Antarctica for insight into evolutionary relationships, the researchers began to see patterns consistent with a mass extinction.

Combining fossil records with the DNA analysis, the researchers could introduce time into the equation, learning not only how the bees are related but also how old they are.

"The data told us something major was happening in four different groups of bees at the same time," Rehan says. "And it happened to be the same time as the dinosaurs went extinct."

While much of Rehan's work involves behavioral observation of bees native to the northeast of North America, this research taps the computer-heavy bioinformatics side of her research, assembling genomic data to elucidate similarities and differences among the various species over time.

Marrying observations from the field with genomic data, she says, paints a fuller picture of these bees' behaviors over time.

"If you could tell their whole story, maybe people would care more about protecting them," she says, adding that the findings of this study have important implications for today's concern about the loss in diversity of bees, a pivotal species for agriculture and biodiversity.

"Understanding extinctions and the effects of declines in the past can help us understand the pollinator decline and the global crisis in pollinators today," Rehan says.

Alan Harman

CAREFUL BEES

Honey bees live in a world filled with danger in which predators seize them from the sky and wait to ambush them on flowers and new research finds the threats drive the bees away from good food sources.

University of CA San Diego scientists say in the journal PLOS ONE this fear makes colonies less risk-tolerant than individual bees.

"This strategy of colonies collectively exhibiting significantly more caution than the riskier individual foragers may help honey bees exploit all of the available food sources, with some intrepid foragers visiting more dangerous food while the colony judiciously decides how to best allocate its foraging," biology professor James Nieh says.

Nieh worked with scientists at Yunnan Ag University in China to study the impact on foraging Asian honey bees of the monstrous-looking Asian Giant hornet, *Vespa tropica*, and a smaller hornet species known as *Vespa velutina*, which has invaded Europe and now poses a threat to European honey bees.

Ken Tan, the first author of the paper, says the Asian Giant hornets are dangerous, heavily armored predators.

"Bee colonies respond by forming balls of defending bees, encasing the hornet and, in some cases, cooking it to death with heat generated by the bees," says Tan, at the Chinese Academy of Science's Xishuangbanna Tropical Botanical Garden.

The researchers found that bees treated the bigger hornet species, which is four times more massive than the smaller species, as more dangerous.

In a series of experiments, they presented bees with different combinations of safe and dangerous feeders – depending on their association with the larger or smaller hornets – containing varying concentrations of sucrose.

"Bees avoided the dangerous feeders and preferred feeders that provided sweeter nectar," Nieh says. "However, predators are clever and can focus on sweeter food, ones which bees prefer.

"So we also tested how bees would respond when sweeter food was also more dangerous. What we found was that the individual bees were more risk-tolerant. They avoided the giant hornet at the best food, but continued to visit the lower quality food with the smaller hornet."

Alan Harman

EU SUPPORTS BEEKEEPING

The European Union says support for the apiculture sector worth €240 million (US$330.6 million) has had a positive impact on the production and marketing of honey.

An external evaluation report published by the European Commission says support to apiculture of €120 million (US$165.3 million) between 2007 and 2011, complemented by a further €120 million from member states, has addressed the needs of the EU apiculture sector.

The evaluation recommends that the six measures that can currently be co-funded under the scheme should be maintained. The two most widely supported of those measures aim to prevent varroasis and provide technical assistance to beekeepers.

In 2013/2014, the EU and its member countries will spend €66.2 million (US$91.2 million) – half as EU support and half as national co-funding – on national apiculture programs to improve the production and marketing of honey.

The EU is the second largest honey producer in the world, with some 600,000 beekeepers.

Alan Harman

TROJAN FEMALES

A non-lethal approach to pest management has the potential to become a game-changer in providing lasting and effective control in a wide range of insect and animal pests.

New Zealand scientists are developing a technique that will make any red-blooded male shiver – it reduces male fertility while having little or no reproductive or other fitness impacts on females.

They are using naturally occurring mutations in the maternally inherited mitochondrial DNA (mtDNA) that reduce male fertility.

The result is that "Trojan females" and their female descendants carrying the mutations could potentially produce sterile males over multiple generations, leading to dramatic and lasting population declines.

The researchers report in the journal Proceedings of the Royal Society B they used mathematical models to show how introducing Trojan females into pest populations, as either single large releases or relatively few small repeat releases, could provide population control within a relatively few generations.

Lead author Prof. Neil Gemmell of the University of Otago's says the findings are a key advance towards better protecting agriculture, human health and biodiversity from pests that cause or carry disease, or damage or consume valued resources.

Malaria kills more than one million people each year, with upwards of 200 million new cases reported a year, while invasive pests are a key threatening process impacting biodiversity.

In agriculture, rats are estimated to spoil or damage up to 17% of food production in some countries at a time when surety of food is an increasingly pressing issue for the world's population.

"This could be a game-changer in reducing the global impact of pests," Gemmell says. "Conventional approaches to pest management usually involve lethal control, but such approaches are costly, of varying efficiency, and often have ethical issues."

Although the greatest effectiveness is predicted for high turnover species such as insects and rodents, the cumulative nature of multiple releases makes the Trojan female technique applicable across the broad range of animal pests, he says.

Based on the promise of far-reaching gains addressing these issues will achieve, a new NZ$1-million research project funded by the government is putting the researchers' theory into practice.

Project leader Dan Tompkins of Landcare Research says the first step is to achieve proof of concept in the laboratory.

"(Then) we will be looking to rapidly apply this new technology platform to the benefit of agriculture, human health and biodiversity both within New Zealand and globally, he says.

Alan Harman

KEEP OZ BEES OUT

New Zealand beekeepers are continuing to challenge any moves to allow imports from Australia because of the fear of new bee pests and diseases.

This means proposals to send Australian honey and other bee products across the Tasman Sea to New Zealand appear to be some years down the track.

Radio New Zealand says the Ministry for Primary Industries is three years into a five- year program of developing a generic system of import health standards for all animal products and the long-running and legally challenged proposal to accept bee products from Australia is caught up in that.

Ministry director of animals and animal products standards Matthew Stone tells the broadcaster the ministry has been working on gaps in the proposed import standard for Australia that an independent review panel identified in 2009 after court action by beekeepers.

Surveillance has been undertaken for nosema ceranae and Israeli acute paralysis virus and the ministry has commissioned research into the heat and activation parameters of Israeli paralysis virus.

However, the results were not conclusive and the research must be repeated in a project that will likely to run into next year.

Stone says the ministry also has to update the risk analysis for bee product imports from Australia, done back in 2004.

National Beekeepers Association president Barry Foster tells Radio New Zealand he is not convinced the heat treatment being assessed will be completely effective.

"Because we don't know in any given shipment if you heat-treat it, the amount of bacteria or viruses going into the heat treatment, and what will remain after it," he says.

Stone says scientists say there will still be infected material after heat treatment, which means viruses and bacteria will be brought into New Zealand that are now blocked for biosecurity reasons.

This poses big risks to New Zealand for beekeeping and agriculture.

Alan Harman

PESTICIDE FREE SEED

Dupont Pioneer is offering Canadian farmers a neonicotinoid-free option for corn and soybean seed.

The company, the world's largest producer of hybrid seeds, says it is reacting to a request from the Grain Farmers of Ontario in offering growers an option for non-insecticide treated corn and soybeans for 2014 planting.

Neonicotinoid seed treatments are being linked to bee deaths in Ontario and Quebec.

"This is a matter of Pioneer trying to meet the changing desires of our customers," a spokeswoman says in a statement. "Pioneer will continue to use seed treatment and follow best practices for packaging and planting."

Seed treatments, including fungicides, insecticides, nematicides and amendments play a critical role in agriculture and the production of a healthy crop, the statement says.

"In addition to helping manage against early season pests and diseases, they serve as a viable alternative to foliar and soil applications."

Dupont Pioneer says it is actively involved with CropLife Canada, the trade association representing the plant science industry, and the Canadian Seed Trade Association to develop and promote industry best practices and will continue to monitor the situation.

"Growers should speak with their local sales rep to better understand what products are best for their operation and discuss best management practices," the statement says.

Earlier, Dave Harwood, technical services manager for Dupont Pioneer in Eastern Canada, was reported to have announced the move at field day.

Harwood told farmers they will pay less for their soybean seed without the treatment, but the price of untreated corn seed will be the same as for treated seed.

When asked if the untreated option would be offered in the U.S., Harwood is quoted as replying that the neonicotinoid issue is "less visible" there. – *Alan Harman*

Continued From Page 13

no means accepting anyone casting unwarranted doubts on this year's event'. Well, I know of at least one person who would dispute this comment!

So, did everything run smoothly in the end? Sadly, no. I have heard that registration of delegates was a disaster with participants having to wait several hours to be processed, many of them having to stand outside in the cold. The hall and conference centre were reported as being quite scruffy and there was rubbish (bottles and the like) on the floor in the registration area. There was no transport laid on to take delegates back into the city, where most of them were staying, just unofficial taxis hanging around, the drivers of which wanted to charge three times the going rate. Space in Api-Exo was stupidly expensive, but then it always is. There was hardly anyone selling stuff, which was a shame as it is always nice for people to take a few gift items home. Very little was available, possibly due to the fact that import tariffs were excessively high except for unsold goods the companies took back with them. Instead of items on display, many companies just had posters and pop-banners, which together with their smiling and helpful staff, alleviated things somewhat.

Perhaps some of the problems with trade stands was to be expected as Ukraine is not in the EU. At the end of this month a decision has to be made as to whether the country will become a full trade member of the EU or join a Eurasian consortium. This is quite a problem just now as Russia has promised excessive taxation on goods between the two countries should Ukraine join up with Europe, and also Europe has expressed the wish that the former President, Yulia Tymoshenko, imprisoned allegedly for corruption (and with a further charge of murder hanging over her) be released before any final decision is made. Ukraine might be able to side-step this issue and reluctantly let Yulia leave the Ukraine and be hospitalised in Germany for her serious back problem.

Of course, despite the problems both anticipated and realised regarding the organisation of the 2013 Congress, hopefully the important issues of such an event were positive, ie, the chance to benefit from the scientific programme with its many diverse lectures and presentations, the chance to meet and discuss beekeeping affairs with colleagues from many countries, and also the chance to catch up on news with friends met at previous events in other countries. This is the nitty gritty of what beekeeping congresses are about - learning and friendship. It is sad, though, that poor organisation can put a downer on this important and primary function of any beekeeping gathering. I have been informed that Apimondia has only 1% involvement in the running of each congress, the 99% being the remit of the locally elected committee. I believe - as many others do - that the time has come for this serious imbalance to be changed and that Apimondia itself takes a firmer control of future events with procedural guidelines that have to be adhered to so that participants can enjoy the occasions to the full - and without leaving a stain on the International Organisation itself.

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Sunset in the beeyard. (photo by Helen Miranda Wilson)

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The registration line at Apimondia, the international bee conference in Kiev, Ukraine, took five hours, mostly outside in the rain. Once inside the building, it got tight. The hydraulics were so powerful, our friend Therese levitated and tilted sideways in the crush. Think of it! People couldn't breathe. Some cried out for mercy. Four registration booths handled thousands of conferees. One copy machine, and not enough toner. The Germans nearly rioted. No one died.

That was on Sunday. By Monday, when my sidekick Marilyn and I registered, it was a relative breeze. At least it wasn't raining. With one of us to hold the other's place in line, we drank espresso, ate open-faced lox sandwiches and learned how to say "toilet" in Russian. We struggled to communicate with cheerful Ukrainian beekeepers, threw our arms around strangers and posed for pictures. An English-speaking economist with shocking red lips, in a sleeveless black fur dress, invited us to visit her in Belarus.

There were odd moments, like when we finally arrived at the door to get inside and met a horde of already registered conferees being denied admittance to the building. They wanted to get to a lecture upstairs. The official language of the conference was supposed to be English, but all the door guards could say was "Nyet!"

Two hours later Marilyn and I had our conference passes, and we could look back and laugh at it all. Airline travel has trained us to accept and even expect the absurd. You learn to shut up and wait in line. But Therese's levitation story riveted this claustrophobe. I wonder if I'd snap!

Inside the hall, the tradeshow featured hundreds of exhibitors. I learned about high-tech Lyson Polish honey extractors, Austrian BeeVital herbal chalk brood treatments, a Romanian machine to extract beebread, the expansion of beekeeping in Tanzania.

The lectures ran the gamut, from dynamic to inscrutable. We native English speakers get spoiled. We expect the world to come to us, and it does. But if you attend a talk titled, "East Java Propolis Inhibits Cytokine Pro-Inflammatory In Odontoblast Like Cells Human Pulp," or "The Swarming Indusry: study of the unique structure of Ukraine's beekeeping branch, it's origin and stagnant stability," be forewarned: you may be in over your head.

The University of Maryland's Dennis vanEngelsdorp hammered on a favorite theme: the inability of some beekeepers to adapt to change. He showed a bell curve that graphed people according to their willingness to accept new ideas. Then he polled his audience about their cell phone use – who got a cell phone early on, who waited a while, who had an I-phone, and finally, who today still doesn't have a cell phone. That would be me. Marilyn and I were in the front row, and I was too sheepish to look back and see who else raised their hand.

We went on a three-day Ukrainian beekeeping tour with other Apimondia visitors before the conference, so luckily we had a cadre of new friends. Nothing like a familiar face halfway around the world!

I was eating at the sandwich wagon outside the main hall when I spied a spare, graying gent letting his freak flag fly. He sported a blue jean jacket that advertised "CC Pollen, High Desert Pollen, Phoenix, Arizona." I thought, "I wonder who that is. Must have worked for Bruce at CC Pollen once."

Then it hit me: That had to be Bruce! I'd only heard his gravelly voice on the phone before, and in my mind's eye, he'd looked a bit more, oh, businesslike, maybe. That phone voice for sure had short hair. I wolfed my sandwich and ran after him, but he'd already vanished into the crowd. Later, we caught up, so I got so say, "Bruce Brown, I presume?"

Bruce is a smart guy and an international operator, but he doesn't

show you all his cards right away. We kept running into each other, finally outside the catacombs of the Kyevo-Pecherska Monastery, where a beggar approached us. Using unmistakable sign language, the beggar informed us he was hungry. What can you do? Jesus commands us to feed the hungry. We gave him some hryvnias. But it didn't end there. The beggar demanded more. It got ugly. A shopkeeper with a stick finally chased him off. Tourists, we're always a mark.

Later, Marilyn got her pocket picked in the subway. The thief unzipped the pouch hung around her neck. He never found her passport or most of her cash, tucked inside separate compartments. She lost her debit card and her Garfield County library card. I said, "Some pickpocket's going to check out a bunch of books on your card, and you'll get the fine when they don't come back!"

Hey, this could happen anywhere. You need to be careful in the big city.

So we had a little bad luck. We had good luck in Ukraine, too. I'll tell you all about the good luck. Another time.

Ed **Colby**

Apimondia