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Mural by Matthew Wiley. See story on page 85

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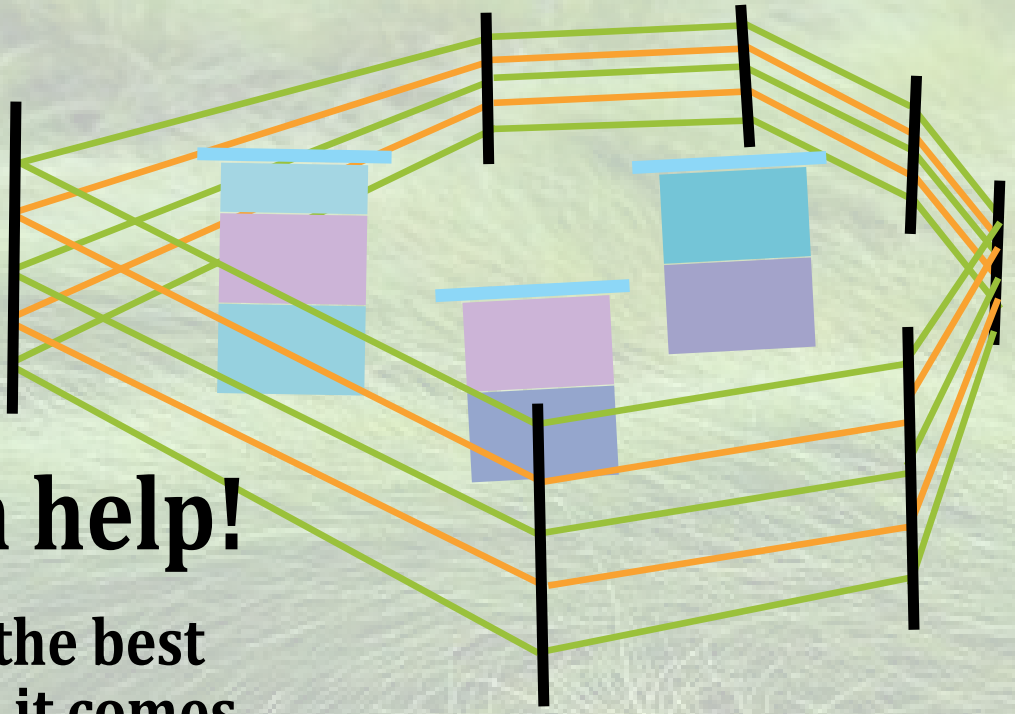

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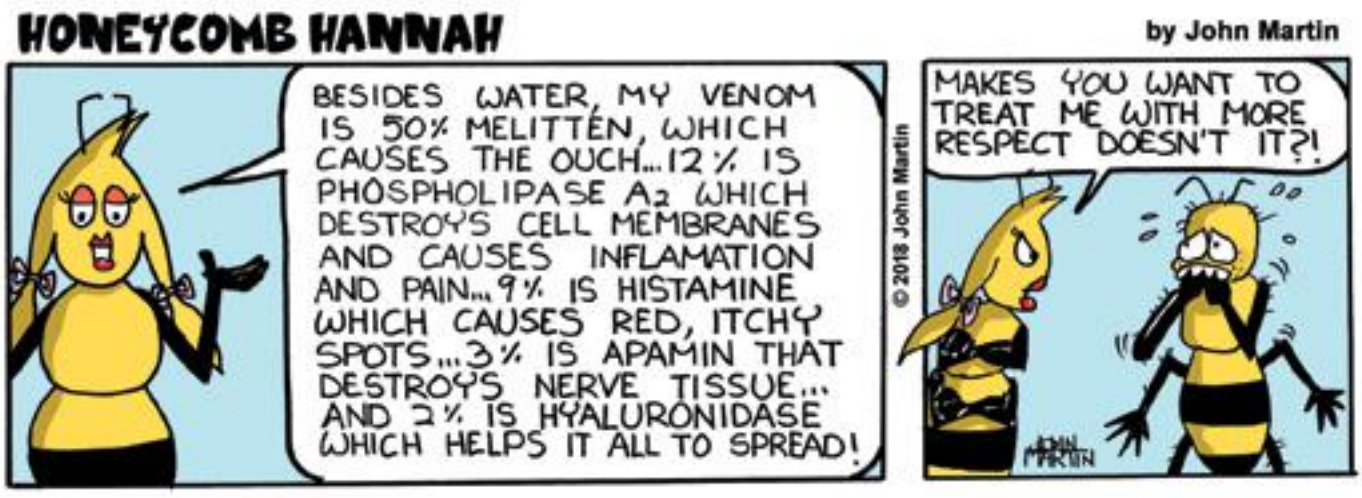

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New Bacterial Threat

At the University of WI-Stout, we are investigating a potential new bacterial disease of honey bees which may be transmitted by *Varroa destructor* mites. Our studies led to the discovery and reporting of the *Serratia marcescens* strain sicaria (Ss1), a new bacterial threat to hives. A link to the study published in PLOS-One follows: **http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0167752**

The UW-Stout INDES program is working to obtain fresh samples of *Varroa destructor* mites from across the U.S. for analyses of Ss1. The goal of this study is to provide a clearer understanding of locations where Ss1 is appearing in the U.S. to better understand its potential impact on bee health in this country. Samples of mites obtained will be examined for Ss1 without charge and confidential testing results will be provided to those submitting samples. **Please consider participating in the study by providing a sample of mites from your hive or hives**.

If you are interested in providing a sample of *Varroa* mites for testing or have any questions about our work, we would appreciate hearing from you by email at **stacys5929@my.uwstout.edu**. Specific collection and shipment instructions and responses to questions will be provided in our response to your communication.

Jim Burritt
Univ of WI-Stout

Chemical Free

In the grand scheme of beekeepers, I suppose many of you would call me a New-"bee". I am just starting my fifth year as a keeper of bees, and I feel like I am learning all the time. I have read many books, with a wide range of opinions about best practices. I wait eagerly for my *Bee Culture* and *American Bee Journal* to arrive each month. But, as I read those bee journals, I am discouraged to find some very negative attitudes about chemical-free beekeeping.

Don't get me wrong. I do not discount the impact of the *Varroa* mite, and I am working hard to manage my mites. I have treated for mites with Thymol and formic acid. As a very new beekeeper I was scared not to treat based on what I was hearing from fellow bee keepers. But my goal is to use minimum chemical treatment, and someday even be a chemical-treatment free beekeeper, so this past year I decided to try some integrated pest management and treat only those hives that seemed to be at significant risk. Toward that end I am using screened bottom boards, pulling drone comb, and taking brood breaks. Last year I used the brood breaks unintentionally, when all three of my over wintered hives swarmed! This year my breaks were intentional, as I am pulling the queens out of my over wintered hives, to make splits or nucs, allowing them each to re-queen. Later this Summer I will pull queens from the splits to let them do the same. I also leave all the Fall honey to my bees, so that I can minimize how dependent they will be on me for supplementation with sugar syrup in the Fall or Winter feeding. I don't know how important that is, but it just seems logical that the best food for healthy bees has got to be what they make for themselves from their natural food sources. I do periodic mite counts, and last year at the end of the Summer, I had mite counts of 1/100 or below in six of my eight hives. One hive I did not count, as it was so clearly failing, and it was gone by end of September. One hive, despite the fact that it appeared to be going strong, had a count of over 10/100. That was the only hive I treated with Formic acid in August. I subsequently re-queened that hive this Spring.

I ultimately treated 1 additional hive in September because the mite count had increased from 1/100 to 2/100 bees, and I got nervous. But when the temperatures unexpected rose into the mid 90s during treatment, I lost all the brood and the queen. Many beekeeper told me I would lose my hives since I didn't treat, but I treated only two of seven hives that were alive and kicking at end of Summer, and lost only one of those, which I killed myself with formic acid. I live in IL, a state that reports 40-50% annual

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bee loses and counting the hive the didn't make it past September, I lost 25% of my hives this past year, and half of that 25% was lost DUE to treatment, not from lack of treatment. I suspect many of my 100% treating beekeeper colleagues did not so as well.

So, when I read in the bee publications that chemical-treatment free beekeepers are responsible for losses of those who are treating with chemicals, that does not seem fair. When virgin queens fly from my survivor hives, hives who are doing well with non-chemical integrated pest management, I would much rather they breed with drones coming from similar hives, rather than drones from bees with no inherent ability to manage *Varroa*, who are surviving only because their keeper is routinely treating them with chemicals to control their mites. So, maybe the chemical treating beekeepers are killing my hives with their "drone bombs"... But in all seriousness, I think both extremes of opinion are over simplifying a complex problem that unquestionably has multiple contributors which include *Varroa*, and chemicals in the hive, both those we add and those that our bees bring in with them when they forage, and probably other factors we may not even have begun to understand yet.

Dr. Becky Green
Springfield, IL

June Inner Cover

I liked what you said about food coming from everywhere! Recently got a call from someone wanting

to have a photo shoot of apples on a branch. Tried to explain apples are the size of walnuts at this time of year! So then she asked about melons and apricots! People have no clue about seasons of fruit and vegetables since we can get any food year around from all over the world! I asked what she wanted the photos for. She told me it was to show the natural fruits they use to make their cosmetics. Same problem with selling honey. I try to explain it is seasonal and I sell out quickly when I have.

Ettamarie Peterson
Petaluma, CA

Sudden Fall Collapse

We have a HYPOTHESIS #2 on late Summer hive collapses based on our own 18 plus years keeping bees without chemicals since 2002! Bill Truesdell hinted in his letter that he thought untreated bees were the cause of his robbing and "reinfestation" of mites. WRONG. First we do NOT take as much honey off as most beekeepers do BECAUSE of the severely hot, dry, and long derth of nectar from mid June until rains in September in Oklahoma. We DO follow Jerry Freeman's advice to dust with powdered sugar using his screened bottom boards, especially going into winter and early March to START the season with low mite and beetle counts. Monitoring is very important!

What was NOT addressed was maintaining 80% coverage of all built out comb! Observing the live cycles of these pests as they rise in summer, beekeepers MUST MAINTAIN this 80% bee coverage, as queens shut down egg laying in the heat out here. If the bee population falls below the peak of combined pests, where that LINE on the graph CROSSES, COLLAPSE WILL OCCUR. The simple fact is that beekeepers fail to take this into consideration. What we do to curtail that scenario (and queenless situations) is to

1. Remove one brood box, keeping ONE super with at least two to four frames of honey and ONE brood box until the 80% coverage of frames has been met. VSH lines, and healthy bees can handle mites and beetles when this requirement is met and maintained.

2. Freezer Time: During that time, the frames from the removed brood box are kept in the freezer (ALL pest eggs, larvae and adults are killed), then returned to the hive ONLY when the coverage has been met, old frames being culled. We have seen hives go queenless by double swarming, old queen loss, or even a laying worker. Each time, we followed this rule, (requeened WHEN NEEDED by adding eggs of our OWN GENE LINE, or combining a nuc) and the hives returned to good health. REMEMBER: Our genetic line of bees have not been treated since 2002, but we DO monitor by doing 24 hour mite drops. We are hobbyists, but our son sells two to four nucs each Spring to those beekeepers desiring to keep bees more sustainably.

3. Make splits from Survivor Lines: Last year we also "rescued" one hive not worked (or treated) for four years! Definitely a candidate for survivor genetics! The first split made last June, mated with drones in our isolated apiary, which surpassed all other hives this Spring by giving us seven fully sealed frames of honey by the third week of May (two more frames were full but not 95% sealed).

4. Maintaining two to three Nucs for combining with hives whose queens die in Summer heat has also proved helpful. Do not KILL those old queens, make small nucs with your good genetics! Two nucs of older queens requeened themselves last August and are STILL GOING in our Langstroth double hive that we are testing. Close observations of hives for problems by September to have time to prepare hives for overwintering is considered most important.

5. Keeping apiaries near another natural beekeeper: The veterinarian at the local zoo is also a natural beekeeper, and only orders Russian queens when needed. So our bees at the Nature Center close by have some good "guys" (drones) with whom our new queens can look forward to mating. Natural beekeepers are starting to get together also. We have invited the first CNG/ beekeeper in Oklahoma to speak to local beekeepers here about good, better, best practices of sustainable beekeeping established by Master Beekeepers. Hundreds of schoolchildren and families have a chance to see our observation hive at Oxley Nature Center in Tulsa, Oklahoma. They see firsthand how bees CAN be maintained without using chemicals in the hive surrounded by a natural pollinator habitat.

So there, you have a second hypothesis backed with five good (inexpensive) practices for preventing losses.

Helen & Mack Hickey
Sand Springs, OK

Farming, Population, Hunger and Poverty

Two articles in the May, 2018, issues of the leading national bee journals have a common motif. In an otherwise excellent article on pollination, Rusty Burlew writes in *ABJ* "Modern farms are the antithesis of natural environments. But far from being a bad thing, modern farms are necessary to feed burgeoning populations of humans."[1] And in a surprisingly emotive piece of writing in *Bee Culture*, Jessica Louque defends the use of neonicotinoids on the grounds of cost effectiveness, suggesting that "If neonics are banned from the U.S., it's going to be financially more difficult for everyone[2] but the chemical companies."

I am not convinced that modern farming techniques are the long term answer to population growth, nor do I believe that funding issues should determine environmental health and policy.

First, In 1985, in the executive summary of its Farming Systems Trial, the Rodale Institute asserted that "Organic farming is far superior to conventional systems when it comes to building,

maintaining and replenishing the health of the soil. For soil health alone, organic agriculture is more sustainable than conventional. When one also considers yields, economic viability, energy usage, and human health, it's clear that organic farming is sustainable, while current conventional practices are not. As we face uncertain and extreme weather patterns, growing scarcity and expense of oil, lack of water, and a growing population, we will require farming systems that can adapt, withstand or even mitigate these problems while producing healthy, nourishing food."[3]

More recently, two of the leaders of the Regenerative Agriculture movement, Gabe Brown and Dr. Jonathan Lundgren, in Kansas and North Dakota respectively, have shown practically and persuasively that moving beyond sustainable to regenerative agriculture can significantly increase yields without the use of chemicals.[4,5] Both men are also beekeepers, and the honey bees are integral parts of their system of rejuvenation which focuses on increased biodiversity, soil enrichment, improvement of watersheds and enhancement of ecosystem services.[6]

Secondly, feeding an increasing population is much more complex than simply increasing food supplies; indeed the latter may work for 2050 when the world population is estimated to be 9.1 billion people, a 34% increase over the current figure, most of which will occur in less developed countries. But should we not be thinking further down the road than simply one generation? A long term solution which integrates a healthy planet with a well fed population requires more elaborate solutions.

There is an immense amount of material available on possible solutions, stemming from research papers, national conferences and international agencies, and what follows is but the tip of the iceberg, enough hopefully to increase awareness as to what lies below the surface. The Agricultural Policy Analysis Centre, for example, points out that since 1974, agricultural production has been increasing at a higher rate than population growth. The number of hungry people, however, has not decreased; on the contrary, that number has increased steadily since 2000.[7]

Such hunger is not due to a shortage of food – the world has enough resources to feed, clothe, house, and employ the entire world.[8] The problem isn't a lack of resources so much as social inequality (both within and between countries) and inequitable distribution. By some estimates, stopping the waste of food after harvest due to poor storage or transport infrastructure, as well as in our own kitchens, could free up half of all food grown. Providing the additional calories needed by the 13% of the world's population facing hunger would require just 1% of the current global food supply. That such redistribution has not already taken place is shameful; there is no valid excuse for so many people to die daily in avoidable agony.

International aid, important as it is, is no longer the main story. As in the 'give-a-man-a-fish' adage, the long term need is to provide small agricultural producers with the research, extension and credit that will enable them to feed themselves and their families. The governments of Ghana and Brazil have taken the lead in doing just that, whereas many countries like India, growing at 8% a year and with a mushrooming middle class, need to take greater responsibility for their hungry masses, both in the short term through effective social services and in the long term via nurturing small scale growers, including urban farming.

Less than 1% of what the world spends every year on weapons is needed to place every child into school. Increased access to education means not only increased opportunities for income and food, but it also allows for the empowerment of women, including the provision of access to contraceptives that allows for family planning and greater economic choices.

One of the enduring consequences of colonialism is that more people are eating a diet heavy in meat, dairy and eggs. The issue is that the standard Western diet

is extremely resource intensive; we currently produce enough calories to feed 11 billion people worldwide, but the majority of this food goes to feed livestock. One estimate is that those who eat beef use 160 times more land, water and fuel resources to sustain their diets than their plant-based counterparts. With the provision of fresh water becoming a significant issue, we cannot ignore that 70% of our domestic freshwater goes directly to animal agriculture and that one acre of land can produce 250 pounds of beef, 50,000 pounds of tomatoes or 53,000 pounds of potatoes.[9]

Then there are the global impacts of war and climate change. For millions of people in Africa, Asia and Latin America, the latter means more frequent and intense floods, droughts and storms, accounting for up to 90% of all natural disasters annually, and which can quickly spiral into full-blown food and nutrition crises.[10] The push in Europe and north America to reduce dependence on imported oil and gas has led to the introduction of targets and subsidies for biofuels, which compete directly with endowments for food production and result in increased food prices for the poor. Greenhouse gas emissions in wealthy countries drive climate change at a pace that outstrips even the most pessimistic projections of the climate modelers, and there are few signs of governments agreeing to the kinds of reductions needed to avoid catastrophic temperature rises that will harm tropical agriculture in particular, thus countermanding the efforts towards small scale sustainable farming.

Globally, social and political **instability** are on the rise. Since 2010, state-based conflict has increased by 60% and **armed conflict within countries** has increased by 125%. More than half of the food-insecure people

identified in the U.N. report (489 million out of 815 million) live in countries with ongoing violence; more than three-quarters of the world's chronically malnourished children (122 million of 155 million) live in conflict-affected regions.

The number of refugees and internally displaced persons doubled between 2007 and 2016. Of the estimated 64 million people who are currently displaced, more than 15 million are linked to one of the world's most severe conflict-related food crises in Syria, Yemen, Iraq, South Sudan, Nigeria, northern Kenya and Somalia. While migration is itself uncertain and difficult, those with the fewest resources may not even have that option. Research from at the University of Minnesota shows that the most vulnerable populations may be **trapped** in place, without the **resources to migrate**.[11]

War makes the poor poorer in many ways. It's the working-class, who struggle to feed, clothe, and house themselves and their families in the best of times, who pay for the war, both financially and with their lives. Violent disruptions to food systems and economies spill over to countries bordering such conflicts. Refugees might devastate livestock, trees, and other natural resources as they move. Once forcibly settled or self-settled, they compete for land and resources and affect local markets for food and livestock. Their additional demand creates scarcities that drive up prices, while their need for cash drives down prices of livestock and other assets when they enter markets to sell them to get the money to buy food. Such distortions interfere with local coping mechanisms that ordinarily allow people to respond effectively to drought and avoid destitution, and turn food shortage into famine, as is painfully evident in much of the Middle East and North Africa today.

If we are sincere in our determination to resolve world hunger in a growing global population, surely we would focus as much on working for international peace and justice, the reversal of climate change, building and protecting reliable lines of communication and distribution, universal economic growth, better diets, the revival of small scale agriculture, and increased educational opportunities, as we do on providing food for the hungry at the expense of the health and longevity of our own resources.

Hunger is both a cause and a symptom of poverty and, like so much else, it is underscored by issues of power, control, money and self-interest. According to recent data from the UN, some 850 million people (one in eight of the world's population) go to bed hungry every night. Many of them are children, for whom malnourishment leaves a lifelong legacy of cognitive and physical impairment. Damaged bodies and brains are a moral scandal most of all, as well as a tragic waste of economic potential.[12]

We work hard to provide for the nutritional well-being and longevity of our bees, and pride ourselves on acknowledging and absorbing the complexity of their society. We admire their constant business and their long term objective of the continued survival of the species in as strong and as healthy a form as possible. When we fail to challenge simplistic statements that eschew such complexity in our own world, not least when they emanate from organizations that have a financial stake in obscuring the deeper issues, we deny extending to our fellow beings the courtesies we offer to our charges in the hive.

My thanks in particular to Roger Williams and David Papke for their review of the first draft of this letter and input into the final product.

1. Burlew, R (2018) The Curious Beekeeper: So much pollen, so little nutrition. ABJ, 158 No 5, 564
2. Louque, J (2018) Bigger Picture: Pesticides and Beekeepers - a difficult relationship. BC, May 2018, 51-54
3. **https://rodaleinstitute.org/our-work/farming-systems-trial/farming-systems-trial-30-year-report/**
4. **https://youtu.be/QfTZ0rnowcc**
5. **https://youtu.be/qRJ0y9LMhI4**
6. **http://www.regenerativeagriculturedefinition.com/**
7. **http://www.agpolicy.org/weekcol/466.html**
8. **http://www.scientificamerican.com/article/world-hunger-is-increasing-thanks-to-wars-and-climate-change/**
9. **http://www.onegreenplanet.org/environment/world-hunger-population-growth-ditching-meat/**
10. **http://www1.wfp.org/climate-action**
11. **http://millionsofmouths.com/blog/2006/08/11/the-inherent-link-between-war-and-hunger/**
12. **www.theguardian.com/commentisfree/2012/feb/15/ending-world-hunger**

Jeremy Barnes
Seven Valleys, PA

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In 1934, Mr. J.G. Rossman, affectionately known as "Mr. Joe," began keeping bees. From that passion, he developed a successful family-owned and operated business, Rossman Apiaries. Mr. Joe trained his son, Fred, in the bee business, and with the help of Fred's wife, Ann, they continued to nurture and grow the family business. Their work ethic, business sense, and personal commitment helped to develop Rossman Apiaries into the thriving business it is today, 84 years after its establishment by Mr. Joe.

After over 30 years of dedicated service in leading Rossman Apiaries, Fred and Ann Rossman elected to retire. My father, Tony Lasseter, and I recognized that Rossman Apiaries has long been an exemplary Colquitt County business, and we are proud to continue the Rossman tradition of premium sales and service. We appreciate Fred and Ann's trust in us to continue their beloved family business. While we are not the Rossman's, we understand the significance of a family owned and operated business; our family has been associated with the John Deere Company for over 60 years.

The Rossman Apiaries sale to our family business was effective March 20. We are pleased that Fred and Ann have agreed to remain active in the business during a transition period, offering their knowledge and guidance as we familiarize ourselves with the business of beekeeping. Their expertise will be an invaluable resource in making this a seamless shift for employees, customers and vendors. Trey Portier will manage the day to day operations going forward at Rossman Apiaries; we anticipate no other employee changes.

We are excited to take this step in acquiring Rossman Apiaries, and we look forward to developing a beneficial business relationship with you in the coming months. It is our promise to continue to serve you with the same excellence, attention to detail, and quality that you have come to expect from the Rossmans.

Please join us in wishing our friends Ann and Fred the best as they seek new paths of adventure.

Judd Lasseter
Moultrie, GA

Bee Memories

Upon reading "Ask Phil" in the June edition, I have a little bit of a disagreement on bees' memories (short term). It was about bees robbing and after the reward is gone the bees forgot about the location. After hunting for "wild" bee trees, with the aid of a "Bee Box" and an "attractant" anise oil, I wouldn't add the oil to the sugar solution but simply rub some on the outside of the box and also on a rag that was hung on the false bottom board. Evidently this odor clung to the robbers and was part of the dance to recruit other hive mates to the reward. Several times on my days off work I would hunt, but fail to find a certain bee tree.

So a week later I would return to where I had been the week before and instead of catching a new bee, I would simply wave this anise rag in the air and very soon my bees would return and I could continue my hunt. Now you might say the anise is an attractant to bees, but I've done this in places where I never hunted and no bees ever came to the odor without first receiving a reward. I wouldn't call this "short term memory."

One other thing, when a swarm comes out and lands close to the parent colony, they seem to forget about the old home and only remember the new spot, "except" if it is a prime swarm with the old queen, which by the way hasn't flown since her mating flight at least months back, and it is possible she can't fly and doesn't fly with the swarm.

These bees will cluster, but in a short while realize the queen isn't with them and then they will return to the parent hive and wait for a virgin to hatch and then swarm again. Also when they make a move to their new home and can't make it in one shot they re-cluster, and then forget about the previous spot but still remember where their new home is. Well it's only the scouts that remember because the colony hasn't been there yet?

So I believe there is a lot more to bees' memory than can be explained?

Jim Cowen
Aberdeen WA

Points Up?

How well do you and your friends know bees? Try this simple experiment. Tell your friends to close their eyes. Then ask them to tell you how many sides are there in a honeycomb cell. Everyone will know the answer is six – a simple hexagon. Now ask if they know which side of the hexagon is up: the apex, or the flat edge of the hexagon? Do you even know the answer yourself, without looking.

From what I can see, it turns out than honey bees always make comb with the apex of the hexagon facing up. I have no idea if the bees would accept comb turned 90 degrees with the side facing up, but it has probably been done by someone, if only by error.

When I look at issues of *Bee Culture*, I find it interesting that many advertisements and features in the journal depict honeycomb cells in the wrong orientation.

I looked at depictions of honeycomb (excluding photographs) in the past three issues of the journal, and you get it correct about half the time. In May, 2018, 16 out of 35 (46%) are correct, June is 27 out of 53 (51%), and July, 29 out of 50 (58%). Overall for these three months the rate is 52% with the correct apex up orientation.

Is this a problem? Maybe or maybe not. Does it need to be fixed? Maybe or maybe not. Perhaps it just shows a lack of attention to detail, or does it illustrate a gap between those of us that raise bees and those that control the marketing?

Andy Freiberg
Hershey, PA

Editor's Response: *The Points-Up issue has been ongoing from time immemorial. Bees don't actually make hexagon shaped cells, but rather mostly circular shaped cells that, because of their shared sides, form a hexagon when gravity pulls all of the cells down with equal force. An example is to watch circular bales of hay stacked together. After a time, gravity will shape them to form hexagons, no longer circles.*

But in our defense, the points-up errors you refer to are on ads placed in our magazine that we have no control over. And, in defense of our advertisers, it is often not their choice, but those who design the ads. Artists are almost never biologists, and the hexagon lying on its side is easier to work with, and fits better in many designs. So we live with it.

New For The Beekeeper –

DEER BUSTERS

Bee a Hero: Save Pollinating Plants From Deer Damage

Next time you bite into an apple, or sip a cup of coffee, thank a bee. Without bees, families would not be able to consume nearly as much of the food crops that we serve daily. Bees pollinate 80 percent of the world's plants; and without bee pollination, we would lose an annual average of $20 billion worth of agriculture. Bees feed on the pollen and nectar of certain plants for survival; which is why gardeners must protect pollinating flowers from wildlife damage to save bees. Since bee colonies are declining at an alarming rate, gardeners should install plastic and metal deer fencing around flowers to keep deer and other wildlife away from flowerbeds and bee hives.

Poly deer fence (plastic) is recommended for gardens with light to moderate deer pressure. Gardeners may be hesitant to use plastic fences around landscapes; but with a certified breaking strength between 650 lb/sq.ft. to 1,400 lb/sq.ft, and a life expectancy of 15-20 years, it's no wonder why gardeners choose to use this type of garden fence for deer control.

When gardeners are dealing with heavy deer pressure and critter damage, they turn to steel fences with PVC-coating. Steel Fences are stronger than plastic fences and stand up against chewing animals. Not only does the PVC prevent chew marks from reaching the fence material, but it protects the fence from UV-damage and harsh weather conditions. While metal fencing is strong enough to stop deer, rabbits and coyotes, it is not recommended for bear management. (See electric fencing for bear control.)

Gardeners can grow a variety of plants around a deer fence to help bees pollinate that are also deer-resistant including aster, marigolds, garlic, peppers, sage, rosemary and lavender. Be a part of the movement to save bees by protecting pollinating plants in the garden.

DeerBusters.com has been leading the fencing industry for over 30 years with reliable DIY garden fence in poly and metal fence materials for homes, farms, forests, colleges, orchards, vineyards, and gardens.

Jennifer Smith,
Deerbusters Deer Fence

The Design of the Eco Bee Box "Bee Sanctuary" Long-box

This horizontal hive is completely Langstroth compatible with options that allow many frame sizes – deep, medium, or mini comb frames.

Medium or Deep Style - Can be made as a "deep" box or a "medium" box.

Reversible Base & Stainless Locking-clips – The bottom board can be reversed with the use of stainless-steel locking-clips. This change allows inspections out of the bee's flight path.

Flip-up Lid with Covered Porch – Gate strap hinged locking lid with a covered porch

Aluminum Rabbets – Rabbets that can withstand abuse, made of aluminum.

Copper or Aluminum – Corners and accents in solid copper or aluminum.

Follower / Isolation Boards – Isolation boards are used to divide this hive into multiple colonies, or for queen rearing and banking.

Adding Supers – A medium super will fit comfortably under the lid and still close.

Extensions – For those using the "medium" size, ½ box and full box extensions are available allowing use of a "deep" frame in a "medium" hive.

Inner Half Lids with Top Entrance and Stainless-Steel Entrance Reducer – Upper and lower entrances give better ventilation both during winter and summer. Half lids allow specific inspections without disturbing the entire colony.

Cedar Embellished for Beauty – Cedar is the wood of choice as it holds up well in the elements. A beautiful hive is for the beekeeper and those that are looking in. Interest begins with "catching the eye" of those looking.

Comes mostly assembled. Any part can be easily repaired if damaged. Price $500 and up. Can be found on **Amazon.com** and **Eco-BeeBox.com.**

INNER COVER

Numbers. I didn't major in math in college. Not even close. I took the requisite classes – algebra, calc, stats (or stix, or statistics) but that's about it. I actually took calc and organic chemistry during a Summer session while working full time for the city of Madison as a landscaper. It was three months of absolutely no sleep). Anyway, I like statistics more than any of them because those numbers actually can be used for things I do on a daily basis. The monthly honey report for instance.

So when I run into articles that talk about numbers, I'm usually curious – curious to see what they are talking about, and even more curious to see if they got the numbers right.

This is the background for the rest of this . . .

Newspapers and magazines. How many do you get every day, week, month? I'm a news junkie, so I probably get more than most. A quick review of the stack next to my chair shows four weekly newspapers, two daily newspapers, five weekly magazines (all news sources), four monthly farming magazines, and a few (several, many, some – take your pick) others from various sources about various topics. Next to that pile is the pile of beekeeping magazines that come to the office routinely – I can count 21 different sources from where I'm sitting right now. There's more but I can't see the covers from here.

Well, the world of paper is changing, as you well know. Digital sources of news – the headline only type – have made an impact on what people read and where they read it. And that has made an impact on what's produced on paper. Newspaper employment has dropped by 60% since 1990, and 2016 had the lowest daily newspaper circulation since 1940. A third of all the newspapers in the US have changed hands since 2004 (for instance, the Monterey Herald, in CA, owns just over 60 other newspapers including the Denver paper – what does Monterey know about Denver?), with many of them a part of some consolidation or other. And try and find someone to deliver those papers to the mud puddle on the side of your driveway anymore. That, and the fact that almost all national papers now contract with local papers for delivery, and when one is late, all are late (I used to get three daily papers, all delivered in the same plastic bag). Plus, just over 600 newspapers have closed in the U.S. since 2004, and newspaper ad revenue has declined by 63% in just the last 10 years.

Speaking of ad revenue, for magazines it's in the pits. In 1990 magazines spent about $42 per person in the U.S., it reached its peak between 2000 and 2008 at about $65 per person, and last year it was at its lowest in nearly 30 years at $22 per person. This is mostly for general interest mags. Us niche players are still doing OK. All this from the Post Office, don't you know.

And there's good reason for all this of course. Newspapers (daily, weekly combined) per household per week in 1987 were at 0.6, now down to 0.1. Magazines of all kinds per household per week in 1987 were at 1.0 (every house in the US got some kind of magazine every week), but last year, it's down to 0.5 per week (only half). Monthly magazines, which this happens to be, have gone from 0.6 per household per week in 1987 down to 0.4 per week. Not quite as bad, but still . . .

What's keeping these operations going, of course, is that trend toward digital. If you can't beat 'em, join 'em, and we've joined 'em hands down. More people read our paper issue than subscribe to our digital issue, but more people by way, way far read our web page than the digital, paper and app combined. That's true almost everywhere.

And what's keeping the digital important is the credibility of their paper parents. We all know the warnings given to us in beginning beekeeping classes about what you can find on the internet. Those YouTube videos, blogs and whatnots by whoever simply don't have the credibility of the old time, well known sources of information. Subscribe to a magazine is the statement of record in those classes, or at least go to their webpage.

But still, most folks, except for those of us relaxing in that chair like mine in the living room, get their stuff on the web, and growing steadily, on our phones. Yes, there's a hard core bunch that still like the feel and smell of a paper magazine or newspaper, or the weight of a book on our lap, but we are slowly becoming dinosaurs, page by page.

More numbers.

One of the things I've been wondering about has been the news about the people at our southern border. For those who are here with H-2B Worker Certifications, what work are they doing? Specifically, how many are working in beekeeping operations. So here's some more numbers.

Landscaping/ groundkeeping/ forestry – 64,800; Maids/restaurant/ cooks/food concession – 18,200; Meat cutters – 7,000; Construction – 4.500; Amusement attendants – 7,100; non-farm animal caretakers – 1,600. This last category doesn't include beekeepers. They aren't on any list I could find.

When you want to hire a H-2B employee, you submit an application and your request goes into a lottery. You might get to hire one of the

Numbers.
Podcasts.

66,000 people that fit this category now, and you might not. It used to be that if a person came here previously, they wouldn't fall under the new ceiling of 66,000 H2-B visas per year. That's now the ceiling for all H2-B visas. One wonders where the other 37,200 jobs will be, who will fill them, and do any of these people know how to keep bees? With unemployment heading toward zero, there are no extra hands to help, anywhere.

Even more numbers.

Did you take a look at the honey report this month? We looked at what our reporters think is important in their businesses. Labels, size of jars, where they sell, what else is on the jar, price and all the rest. I have to admit, that price wasn't at the top of the list is encouraging. People are buying honey because they want the honey and price doesn't scare them away. And our prices aren't Walmart basement prices by any stretch. Our reporters, for the most part sell all or at least some of their honey at full retail. Some in barrels, yes, but lots is retail. I trust that will continue. Or at least hope it will.

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Enough numbers.

Have you had the opportunity to listen to our recently introduced podcast called BeekeepingToday-Podcast? You can find it at www.beekeepingtodaypodcast.com. There are several beekeeping podcasts out there and I've listened to a few of them. These are different. We don't have a point to prove, or a stance to defend, a widget to sell, or a way of life to share.

If you haven't listened to a podcast by anybody yet you can click on any of those listed on the web page and sit back and listen at your computer. Or, you can download one of several apps listed on the page to your smart phone and listen from there, with or without a headset. Or, you can send it to another device or a friend to listen to also. It's simply audio, nothing to watch, so if you have the phone/radio hookup in your car you can listen while driving.

What we do is, talk to people. The first few we did were posted during Pollinator week in June, so we talked to four people in the world of pollinators. John Miller of Miller Honey, (and of My Story coming this October) and Joe Traynor, an almond pollination broker in Bakersfield, CA covered the industrial side of commercial pollination, while Amber Barnes of Pollinator Partnership and Monarch Watch Across Ohio, and Matthew Shepherd, Director of Communications from The Xerces Society covered the topic of pollination from very different perspectives. Listen in and find out about moving thousands of colonies, what pollinators need to eat, and even migrating dragonflies. It's pretty cool.

Next we talked to Toni Burnham, our Urban Beekeeper about her group DCBees, and what they've done to make things work in that city, and of course we have Jim Tew, talking about what's going on in his beeyard.

Jeff Ott is the tech guy for this because of his experience in the digital world and editing music. He used to be a contributor to this magazine and a beekeeper for quite a while, then life and work got in the way, but he's back now. He once lived here in Medina but now calls Olympia, WA home. But he's also part of the program. He brings a different side of the art to our discussions.

We have quite a line-up of guests scheduled coming up. Some who have signed on so far include Karen Rennich with Bee Informed Partnership, James Wilkes with Hive Tracks, Dewey Caron, Dan Conlon, Marina Marchese author of The Honey Connoisseur, Shane Gebauer with Brushy Mountain, Denise Ellsworth with Ohio State Pollinator Extension, Jerry Hays just retired from Monsanto but still with the Honey Bee Health Coalition, Ray Olivarez with Olivarez Honey Bees, and several more I can't recall right now.

Of course these podcasts are free and you can find them on several platforms – Itunes and the like – plus the web page, and will be posted indefinitely so you can go back and listen to those made earlier, or to one you want to listen to again.

Unlike the KIM&JIM Show webinars we do here, where Jim Tew and I invite one, and often several guests to show and tell what they are doing, or we go out in a beeyard, or have a guest or guests show us a powerpoint about a project or experiment they've finished, our podcasts are simple conversations with the three of us, examining, usually, a fairly focused topic. Think of it as listening in on a conversation over a beer with a few friends. Simple, easy, casual.

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If you've got a moment, take a look at the story the link below leads you to. It's about a beekeeper that sends all but one colony to almonds because the season wasn't as good as it should have been, and finances are tight. It's his first time and he works with some old friends, The Strachan's, who get him set up and find a place to put his bees until bloom. Of course when things go bad, they seem to get only worse, and his bees are stolen. There's insurance, but you know that story. And the authorities were fairly certain the stolen hives would never be found. But they were, amazingly. The crooks were caught and await a hearing. The Strachan's however, are truly friends and they helped him get set up with new queens for his hives. Next year it works better, but it wouldn't have without good friends. Sometimes the beekeeping community gets it right. This is one of those times.

https://www.bloomberg.com/news/features/2018-06-26/how-to-steal-50-million-bees

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August. Mites. Hot. EAS. Lots going on. So keep your veil tight, your hive tool handy and may you harvest your crop before your bees even know you were there.

Exciting changes at Kelley Beekeeping!

Now it will be even easier to shop our sales and SAVE BIG, right from your inbox! Subscribe to receive the latest news and information, plus our hot deals & discounts!

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It's Summers Time –

Chickens, Summer and The Garden

We are in the midst of a really hot Summer here in Northeast Ohio, and from what we see in the news it's been strange and extreme weather in a lot of places. It's mid-July as I write and we've had over 10 days in the 90s which is usually our whole Summer's worth of 90° days.

Fortunately our chickens have a nice shady spot in the pen that they can go to and an extra shelter made out of old pallets, that allows them to get out of the hot sun. Water has been challenging. They go through a lot on a hot Summer day. We've been home most of the Summer – unusal for us – so we're able to keep up with it. But we still haven't found the perfect watering system, short of hooking into our plumbing system. I'm pretty sure we've tried almost every new watering device that has come on the market.

We're still holding steady at 20 chickens. There are four of the 'old' girls who are over six years old now. I don't know if they are laying anymore because we have all different colors, no white, of eggs. But they are enjoying life and that's okay if they're not pulling their weight anymore. They're just fun to have.

Early on we had lots of rain, so we are very late getting the garden in. We have a young friend, Jeremy who was finally able to get in the garden to till it for us. But, like I said, it's mid-July and we don't have everything planted yet. We're hoping for a nice long, mild Fall so things can keep growing. We resorted to having lots of peppers and tomatoes in pots on the deck, so we do have a garden of sorts.

We took a couple of days last week and headed to Amish country. Friday we took our time and took country roads working our way to Wilmot, Ohio where we spent the night. Ohio is the home of Smuckers in Orrville, Ohio – less than an hour away from us. They have the factory and warehouse there, but just outside of town they have a store, with a cafe. It's fun to go to because you can find things that haven't hit the grocery shelves yet. So we stopped there, stopped at an orchard, Jake's Amish furniture in search of a bench and then made our way to Breitenbach Winery.

The main goal of the journey was the next day, Saturday at Lehman's Hardware. They held an all-day Country Living workshop, with Joel Salatin being the keynote speaker for the day. Joel is an author, speaker, farmer and entertainer with a goal of getting all of us to pay attention to sustainable living. He's written many books. I encourage you to 'google' him and learn more about him.

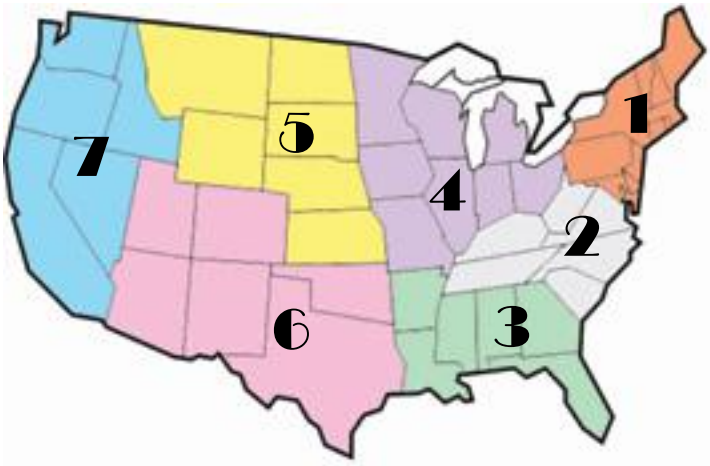
I'm not sure how well known Lehman's hardware is in other states, but here in Northeast Ohio they are one of the go-to places. It's a cool, somewhat old fashioned hardware store with everything you can imagine and lots of things you would never have imagined. This is the first big-scale, outside workshop they've held and aside from being in outside in tents when it hit 95° that day, it was a good day. When you got too hot you could go inside and roam around the store for awhile. The other talks included topics like all about herbs, chickens, even a talk on beginning beekeeping by a local beekeeper.

On the rare occasions when we just go to a workshop or meeting and not have any responsibilities, it is a treat. Sometime, though I have a hard time just sitting still for a whole talk.

We're home until mid-August and then we head to Charlotte, NC for the Cabarrus County Beekeepers Event on August 11 and from there head immediately to Virginia for EAS. I hope we see a bunch of you there. Kim is speaking a couple of times and we'll have our *Bee Culture* booth in the vendor area - selling books and subscriptions to both *Bee Culture* and *BEEKeeping.*

I hope you are enjoying the Summer. Christmas will be here before you know it.

AUGUST – REGIONAL HONEY PRICE REPORT



	% Important						% Less Important					
	2013	2014	2015	2016	2017	2018	2013	2014	2015	2016	2017	2018
Price	59	53	55	59	66	60	41	47	45	41	34	40
Label Design	46	49	35	38	45	40	54	51	65	62	55	60
Name on Label	67	64	60	71	71	73	33	36	40	29	29	27
Local Honey on Label	61	77	66	61	55	55	39	23	34	34	45	45
Variety of Honey/label	32	19	24	23	25	20	78	81	76	77	75	80
Second Label	5	8	9	14	18	18	95	92	91	86	82	82
Location I sell	57	58	54	58	66	61	43	42	46	42	34	39
Time of Year	17	28	17	23	29	31	83	72	84	77	71	69
Glass Container	35	31	36	35	40	37	65	69	64	65	60	64
Plastic Container	19	17	19	14	16	13	81	83	81	86	84	87
12 oz. size	32	35	32	38	38	43	68	65	68	62	62	57
1 lb. size	56	60	55	48	56	62	44	40	45	52	44	38
2 lb. size	35	55	37	35	42	52	65	45	63	65	58	48
5 lb. size	38	42	36	23	27	40	62	58	64	77	73	60
Quart jar	46	45	44	45	44	46	54	55	56	55	56	54
Pint Jar	42	40	36	41	36	31	58	60	64	59	64	69
Specialty Jar	10	13	13	11	10	16	90	87	87	89	90	84
Gallon	-	-	24	15	11	25	-	-	76	85	89	75
Raw	-	-	67	67	64	67	-	-	40	33	36	33
Color	-	-	27	41	26	30	-	-	73	59	74	70
Other Products	-	-	-	2	8	13	-	-	-	98	92	87

Selling Honey

So, what's it take to sell your honey? Of course is it good comes in first, and when selling retail (1:1), giving a taste is the best way to introduce your customers to your products. But there are a host of secondary factors that can, and do influence whether someone will, or even wants to consider buying the efforts of your bees.

Price certainly enters in, but perhaps not as much as you'd suspect. Look at the history of its importance here. Over half, yes, but it's only #5 of the top five most important factors. The first, of course, is having your name on the label. That's because almost everywhere it's the law, but it also conveys where the honey comes from. Interestingly, putting LOCAL on the label remains less important than the other top 5 reasons.

But putting RAW HONEY on the label tells another story. The product in this jar hasn't been heated or filtered and it is as good as nature intended. A friend defines RAW as totally unheated and unfiltered, so it may contain pollen and occasionally bee parts. And bee parts taste like chicken he claims. It works for him.

The size of the container still is in the ranking, and we suspect price has something to do with it. The 12 oz., 1, 2 and 5 lb. continue being relevant in importance, but surprisingly, the gallon jug got a bump this year. Still, the 1 pounder leads the way, no matter glass or plastic, but glass is important. Is that because what beekeepers want to sell, or what customers want to buy?

Location. Location. Location. It's where you sell that still matters. It has to do with who you know, and who knows you. If you're at a farm market, you probably know their names, so it's who you are. But if you're in a grocery store, you never see them in person, so it's your product – price, presentation, color and label – that makes the decision for the customer.

REPORTING REGIONS								SUMMARY			History	
	1	2	3	4	5	6	7	Range	Avg.	$/lb	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS												
55 Gal. Drum, Light	2.19	2.20	2.35	2.60	2.27	2.21	2.19	1.25-3.05	2.23	2.23	2.28	2.18
55 Gal. Drum, Ambr	2.02	2.14	2.06	2.48	2.02	2.06	2.02	1.25-2.65	2.08	2.08	2.26	2.09
60# Light (retail)	186.48	186.05	191.25	192.33	159.00	196.68	220.00	75.00-280.00	195.46	3.26	203.03	201.32
60# Amber (retail)	179.99	185.60	190.00	182.33	179.99	189.74	220.00	75.00-260.00	192.47	3.21	201.90	200.94
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS												
1/2# 24/case	91.85	75.31	90.80	86.00	57.84	84.00	91.85	57.60-134.40	87.71	7.31	83.04	89.45
1# 24/case	137.80	107.03	123.05	120.48	131.72	124.71	128.40	86.40-211.20	126.79	5.28	126.08	123.67
2# 12/case	124.10	95.07	109.78	105.80	107.16	98.40	114.00	79.20-192.00	112.61	4.69	111.26	108.25
12.oz. Plas. 24/cs	109.46	97.53	93.00	82.40	78.00	104.32	97.20	66.00-172.80	99.52	5.53	100.33	99.70
5# 6/case	134.76	108.32	186.00	113.70	107.28	115.50	134.76	71.50-210.00	128.77	4.29	125.30	123.18
Quarts 12/case	165.75	144.79	130.61	179.73	158.50	130.61	144.00	109.20-250.00	151.89	4.22	146.58	148.87
Pints 12/case	113.26	92.67	77.00	128.00	111.00	75.98	84.00	65.00-189.00	99.52	5.53	95.08	88.05
RETAIL SHELF PRICES												
1/2#	5.49	4.37	4.92	4.55	3.86	4.05	5.49	3.09-9.00	4.94	9.88	4.85	5.00
12 oz. Plastic	6.93	5.18	5.46	5.66	4.72	7.39	5.60	3.50-12.00	6.12	8.16	5.77	5.73
1# Glass/Plastic	8.23	6.84	7.65	6.80	6.46	7.08	8.50	4.00-14.00	7.46	7.46	7.39	7.28
2# Glass/Plastic	13.28	10.06	12.64	10.90	11.42	10.12	14.50	6.10-22.00	12.51	6.25	12.09	12.24
Pint	11.61	9.36	9.37	8.00	10.00	10.45	8.40	6.00-20.00	10.22	6.81	10.29	9.99
Quart	20.25	16.68	16.63	16.08	17.60	17.16	20.65	9.25-36.00	17.88	5.96	17.05	17.07
5# Glass/Plastic	27.65	25.32	33.75	23.60	24.57	22.89	27.65	14.48-43.25	26.43	5.29	26.61	26.39
1# Cream	11.20	8.25	11.20	6.75	7.71	11.20	9.00	6.00-20.00	9.40	9.40	9.64	9.49
1# Cut Comb	13.31	9.33	9.00	10.00	15.00	6.50	14.00	6.00-24.00	11.61	11.61	11.33	11.28
Ross Round	9.35	6.76	9.35	9.00	9.35	7.63	12.49	4.75-14.00	9.33	12.44	9.08	9.47
Wholesale Wax (Lt)	6.97	5.15	5.33	6.19	6.00	6.00	7.50	3.00-12.00	6.44	-	6.56	5.94
Wholesale Wax (Dk)	6.02	4.73	4.39	6.00	6.02	4.00	9.00	2.55-10.00	5.77	-	5.69	5.51
Pollination Fee/Col.	95.98	75.83	72.50	78.75	100.00	90.00	95.98	50.00-160.00	86.96	-	83.65	92.04

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Jay **Evans**, USDA Beltsville Bee Lab

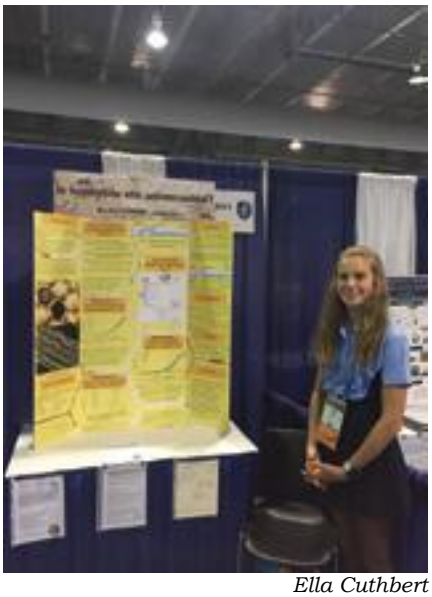
I am a bit of a cynic for fairs and award shows (and don't get me started on beauty contests), but I was deeply moved by the energy and insights provided by high school students from 81 countries at this month's Intel International Science and Engineering Fair (**https://student.societyforscience.org/intel-isef**). When my daughter Simone was invited to compete I wasn't sure it would merit spending a week in Pittsburgh (and yes I did joke that the second-place Maryland girl received TWO weeks in Pittsburgh), but fortunately Simone pushed, and off we went to the 'Olympics' of youth science.

The Fair included about 20 presentations related to pollination, and I tried to visit all of them. One favorite was presented by Elizabeth Wamsley from Timber Ridge Scholars Academy in Missouri. Elizabeth used RNA interference to target *Varroa* mites, a hot topic both in industry and at research labs, including ours. She was able to see an effect of RNA knockdowns after soaking mites in solutions containing RNA segments targeting *Varroa* mitochondrial proteins, broadening the list of potential mite targets. Elizabeth won scholarship offers and cash awards for her efforts.

Natalia Jacobson from Empire High School in Arizona also focused on a major honey bee health threat, in her case Nosema disease. Natalia provided new insights into the impacts of protein nutrition on Nosema. Specifically, by supplementing diseased bees with the amino acid cysteine, she measured increased immunity and survival along with the enlarged hypopharyngeal glands typical of healthy bees. As with other emerging research, "your results may vary", so please hold off on introducing cysteine into your colonies until more work is done. Still, Natalia's project and analysis were careful and the results are truly exciting.

On the medical side, William Deering from IDEA Homeschool in Alaska tested whether plant compounds added to a 'synthetic honey' comprised of sucrose syrup could lead to new antibiotics. After informing him of the unfortunate connotations of the term 'synthetic honey', I leaned in to see which compounds he favored and to compare them to similar ongoing efforts aimed at bee health. William found that infusions based on extracts from Alaskan flowers led to lower bacterial growth in 16 out of 17 cases, indicating a wide potential for plant extracts as a new source of antibiotics. He is widening his scope to plant extracts from other parts of North America and beyond, and has the energy to really ramp up this search.

William Deering



Ella Cuthbert

Also in the 'what can bees do for *you*?' section, Australian student Ella Cuthbert (Lyneham High School) had a brilliant project looking at medical uses for honey bee silk. To avoid some extremely tedious collections, she inserted the major silk proteins into a laboratory production system, allowing her to make these proteins in a test tube. In the end, two silk proteins were shown to reduce the growth of bacteria. Combined with the strength characteristics of silk, this finding might lead to new wound dressings. Nobody defines youthful optimism better than Ella, who started her abstract with "The dream of living forever, only accomplishable by replacing broken parts of the human body, is closer than it has ever been before." Take THAT, curmudgeons.

Additional international entries came from Thailand (A New Method to Increase Propolis Production by Activating Nest Repair Behavior in Stingless Bees), South Africa

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Mike Palmer – Mike specializes in the Sustainable Apiary using production colonies, nucleus colonies and mating nucs. That strategy gives him enough bees to produce Vermont's prime comb honey and sell queens and nucs to others in the area. He isn't one of the largest but he is one of the best. Learn the how's of this northern, non-migratory beekeepers success story.

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John Miller - John owns Miller Honey Farms which is based in Blackfoot ID but also has locations in Gackle, ND and Newcastle, CA. Like many commercial beekeepers, John trucks his bees to several states for pollination but what John does differently from most is he winters his bees in advanced wintering buildings in North Dakota; something which is virtually unheard of in the commercial beekeeping industry. Come listen to how he makes it all come together into a successful operation.

Ray Olivarez – Carefully chosen locations in Northern California, Montana and Hawaii's Big Island allow Olivarez Honey Bees to offer customers premium-quality queens and bees year-round. OHB is surely one of the largest package and queen providers in the US with specialty climate controlled trailers that allow them to truck packages across the country. In addition to selling queens and packages, Ray's team also provides almond pollination and produces honey. To top it all off they offer a retail store to die for and host a large "Hobby Day" every spring. Sure to be a fascinating 4 hours hearing just how they do it the OHB way.

Team Thailand

(Determining the Availability of Pollen Sources for Honeybees on Deciduous Fruit Farms in Summer), and Puerto Rico (Comparative Study Between *Bellis sylvestris, Artemisia dracunculus* and *Lantana trifolia* in the Ability to Attract *Apis mellifera*). These entries, also, were well done and well presented.

In the end, if I had to pick a 'Best in Show' it would go to Brooklyn Pardall from Central Lee High School in Iowa. Brooklyn showed a stunning increase in soybean yields when honey bees were part of the picture. Honey bees are not needed for soybean production, since production soy plants are self-pollinating, nor are bees really thought to crave the rewards provided by soybean flowers. Nevertheless, having hive boxes amidst rows of soybeans seems to have increased yields by over 20%. This is a huge margin in a crop already pushed to production capacity. What gives? It could be that bee visits tap into a dormant plant reproductive cue, even when the pollen they deliver is no longer critical. In a similar vein, asexual coffee plants were shown by Smithsonian scientist David Roubik to respond favorably to honey bee visits, increasing bean yields substantially (**https://www.nature.com/articles/417708a**). Brooklyn is planning follow-up experiments this year. Having met her and her team, and knowing that she carried out all of her experiments on her own family's 6,000 acre soybean farm, I would not bet against her. If it turns out that honey bees significantly improve soybean crops, this could be a three-way win; better crop production, a new revenue source for beekeepers, and a stronger incentive for soybean farmers to maintain a healthy environment for visiting pollinators.

Since I don't have a gig at a plant magazine, I can't give much space to Simone Evans' awesome orchid project nor her success at these Olympics, but she already knows who's the favorite – and despite my snarky comment at the start, Pittsburgh was really fun. It reminded me of the 1970s and 80s Seattle of my youth, before that city became so sparkly. If you are able, I would strongly recommend attending the public days at INTEL/ISEF in the future to see some great ideas and outputs (Phoenix in 2019, Anaheim in 2020). You can also peruse projects from this year and many former years at **https://abstracts.societyforscience.org/**. Many past competitors continue to have a great impact on the field. Regardless, please support your local science students, relatives or not, as they set out on ways to improve the world. BC

Brooklyn Pardall

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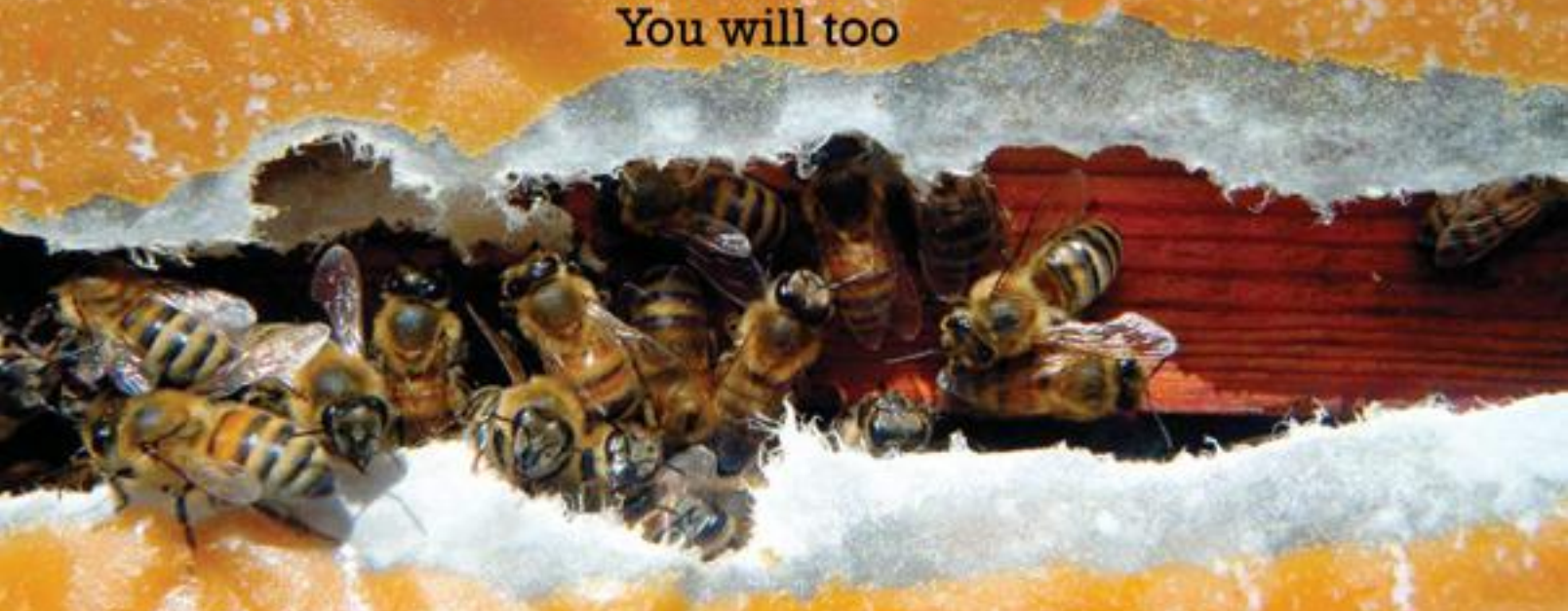

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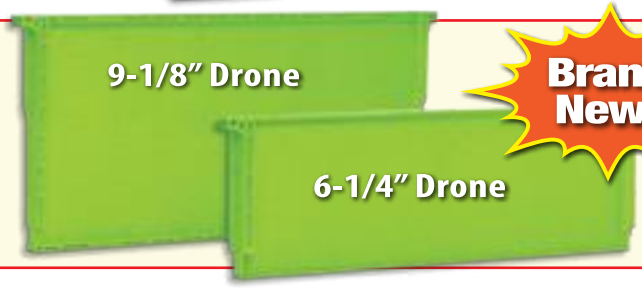

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A Healthy Colony Checklist, Part 2

Validating and Using the HCC for Hive Inspections

Introduction

Last month (July 2018) we wrote an article in *Bee Culture* titled "The Healthy Colony Checklist Part I: A Framework for Aggregating Hive Inspection Data". In this month's article we review a few key points from that article and continue the thread with a discussion of some of the ways we are testing and validating the framework followed by a discussion of where and how beekeepers can access and use this framework for their hive inspections and conclude with a discussion of how we see it evolving in the future.

Key Point Review

Why We Need a Framework

A framework is a lens to look at a problem in a certain way that can help focus the mind on the most important items.

By thinking through in advance what really matters, followed by testing and validation, we can make sure our inspections are done efficiently, consistently and with the right focus. With improved methods, hive inspections can be done more frequently for the same time investment, giving you a better view of activities in the hive and more consistent and timely data to help find and manage problems sooner, resulting in better hive outcomes.

A key benefit of using a common framework is the ability to pool or aggregate our hive inspection data. If you can learn useful information from inspecting your own hives, imagine what you can learn from everyone's hive inspections. If everyone used a common hive inspection method and consistently recorded that data in a way that could be shared (even anonymously), we would have "Big Data". This data could then be analyzed for key principles that work in very different situations to personalize hive management based on a variety of management actions. This *Apiary Management System* would lead to better beekeeping for all.

For more discussion about why this data collection is so important, please see the article "*Peering Into the Future: The Path to the Genius Hive"* in the April 2018 issue of *Bee Culture.*

What the Healthy Colony Checklist Is

Note that the *Healthy Colony Checklist* is both a framework to think about the key factors that define a healthy hive as well as a practical checklist you can use during your bee inspections. The Healthy Colony Checklist is also an inspection form you can use for measuring the health of your hive. It was developed by Dick Rogers, who has over 45 years of beekeeping experience and is currently the Manager or Bee Healthy and Integrated Apiculture Research. He has long defined a healthy hive as:

> *A healthy honey bee colony has below threshold levels of parasites, pathogens, and predators; no deficiency of, or out of balance, beneficial microbes; and strength and health*

Joseph Cazier is the Chief Analytics Officer for HiveTracks and the Director of the Center for Analytics Research and Education at Appalachian State University. He spends his days thinking about ways to use analytics for good and then finding ways to do them. You can reach him at ***joseph@hivetracks.com***

Richard (Dick) Rogers is the manager of bee health research at the Bayer Bee Care Center

Ed Hassler is an Assistant Professor in Information Systems and Associate Director of CARE for Technology at Appalachian State University.

James Wilkes is the Founder and CEO of Hivetracks. and a Computer Science Professor at Appalachian State University. His lifelong passion for bees keeps fueling the development and mission of HiveTracks software. You can reach him at ***james@hivetracks.com.***

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is sustainable with a reasonable amount of management by the beekeeper to provide food, shelter, and safety as needed, as for any livestock operation.

This definition has been tested and refined over the years into a practical and useful way to inspect colonies using six key concepts to guide the hive inspections. This system has also been released to the public in an open source format for anyone to use. The key concepts are as follows:

- **Brood** – All stages of brood and instars present in appropriate amounts
- **Adults** – Sufficient adult bees and age structure to care for brood and perform all tasks of the colony
- **Queen** – A young, productive, laying queen present
- **Nourishment** – Sufficient nutritious water, forage, and food stores available
- **Stressors** – No apparent stressors present that would lead to reduced colony survival and/or growth potential
- **Space** – Suitable space for current & near-term expected colony size that is sanitary, defendable, and room for egg laying

By focusing on these few key items, we can quickly assess the health of a hive. If each of these six areas is satisfactory, the hive is generally considered healthy. If one or more areas are struggling you can start a deeper inspection to try to assess likely sub-conditions that are causing the problem and record those as well. In this way, you can do a quick assessment and focus your attention on those hives that need help.

Testing and Validating the Healthy Colony Checklist

Fully testing and validating this framework will take effort from many parties over several years. However, early indications show that this framework is a good starting point. We will summarize the current work being done below.

Beekeeper Survey

With the help of *Bee Culture* we conducted a survey of beekeepers asking if this framework encapsulates the key information they need to know during hive inspections. Results indicated over 85% support for each of the six key elements of the Healthy Colony Checklist from ~ 700 respondents. Most beekeepers indicated that it was intuitive, easy to use and useful during a hive inspection.

Inspection Form Analysis

In the same survey mentioned above we asked beekeepers to share their inspection forms with us. Most (75%+) indicated they don't use an inspection form. However, many of those that do use one shared it with us. Additionally, we searched the web for as many forms as we could find from different groups and sent requests to state apiary inspectors across the country for copies of their forms. Many of these were copies of popular forms such as the USDA inspection form; others were unique.

We were able to easily take items from each of the inspection forms and put them into the categories of this framework, listing each item on a form by frequency (percentage) of occurrence to get a sense for what information beekeepers that use inspection forms today are collecting. Figure 2 shows an example of how this was done. Should there be any problems with the brood or other categories, the sub-conditions would help identify the issue and allow you to dig deeper into the problem area. This was done for each of the six macro conditions listed above.

Category	% Reported
Egg Sighted	64.15%
Capped Brood	39.62%
Uncapped Brood	32.08%
Larvae	30.19%
Youngest Brood Observed	1.89%

Figure 2: Sample of Hive Inspection Form Analysis for Brood Category Showing Percent of Analyzed Forms that Each Listed Feature

Cognitive Feedback

We are currently offering a version of this inspection framework on our website at HiveTracks.com for our users to test and adopt. Over time we will be able to assess the inspection frequency and quality to see if users find it cognitively easier and more effective to use, especially as we compare outcomes over time. We are hoping to see increased inspection frequency, consistency and usefulness as more beekeepers adopt this approach on the **HiveTracks.com** platform.

Systematic Literature Review

We are also looking into the science surrounding honey bees and beekeeping. We are currently in the process of mapping and reviewing the extensive body of scientific research to see how the framework is supported from a theoretical standpoint. This investigation may yield additional items that should be included in the framework, refinement of existing framework items, and scientifically tested explanations of how the framework components interact.

Where support for a portion of the framework appears to be lacking evidence, we can examine possible reasons for the discrepancy. Is it due to common misconceptions that simply do not stand up to testing? Perhaps researchers have not investigated that area. Figure 3 presents a graphic of this *Systematic Literature Review* process and how it leads to *Evidence Based Apiculture*.

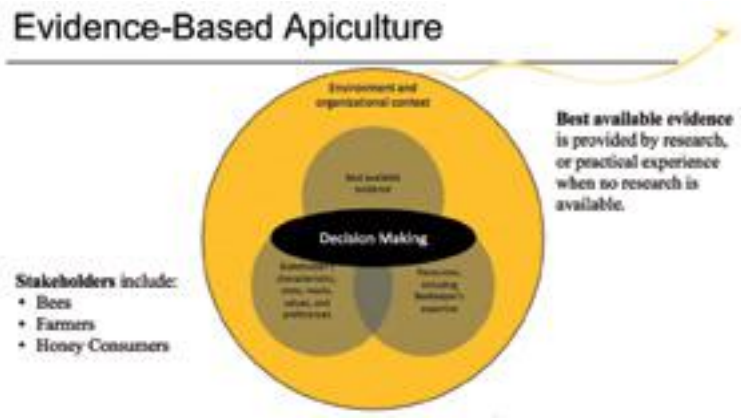

Figure 3. *Evidence Based Apiculture.*

Systematic reviews of this type benefit both beekeepers and researchers. For beekeepers, we can extract best practices that are theoretically and empirically supported. For researchers, such studies serve to summarize our knowledge of a topic, highlight areas that remain unresolved, and suggest new directions for research.

Evaluating and implementing the HCC at the Bayer Bee Care Center

At the Bayer Bee Care Center in Research Triangle Park, NC, the Healthy Colony Checklist was implemented as standard procedure along with near-weekly hive inspections in early 2016. The HCC has proven to decrease the time required for thorough colony assessments (HCC <15 min, standard colony condition assessment for research purposes 60-90 min., other methods 30-45 min). The HCC answers the key questions about colony health status, improves identification of corrective actions needed and task scheduling, provides an indispensable aid for training seasonal staff, standardizes the inspection and management of colonies, and provides adequate data for tracking issues and trends.

The goal is to satisfy each condition at least 80% of the time. Our results show that queen issues (failure of queens in their second year) and stressors (mainly *Varroa*) are the most common problems. Figure 4 presents this data visually.

How to Find and Use the HCC

As mentioned last month, any framework that is created and adopted will likely need to evolve over time and adapt to changing circumstances. As we acquire more data, we will be able to test the relative importance of various data elements to see what works well from a management standpoint. We are still in the early stages of testing. We are sure that this framework will continue to evolve, but preliminary tests indicate that it is comprehensive, useful and easy to use. Access to the Healthy Colony Checklist is provided on the Bayer's Bee Heath website and on **HiveTracks.com**.

Bayer's Bee Health website

The latest version of the HCC form can be downloaded from **beehealth.bayer.us**. The site includes a short article, a news post, and a **video** about the checklist as well. To request a spreadsheet template for summarizing the HCC forms, and/or to express an interest in accessing the pre-publication version of the airtable HCC database, please contact **dick.rogers@bayer.com**. Constructive feedback would also be appreciated.

HiveTracks.com

We have built the Healthy Colony Checklist into the **HiveTracks.com** Hobbyist platform and made it available for use with our system and all of your other bee data at **HiveTracks.com**. It is an easy to use digital implementation that can be done on the website or a mobile device within our app.

During a hive inspection you can look at the six key factors in the framework and simply mark if they are satisfactory, not satisfactory, or you are unsure. You can also take and upload a picture for future reference and comparisons. In this way, the information is recorded automatically and seamlessly with all of your other data. Figure 5 represents the form on the **HiveTracks.com** webpage.

The Future of the Healthy Colony Checklist

From our experience of testing and using the *Healthy Colony Checklist* we anticipate a bright future for it. It has shown itself to be easy to use, focused and useful.

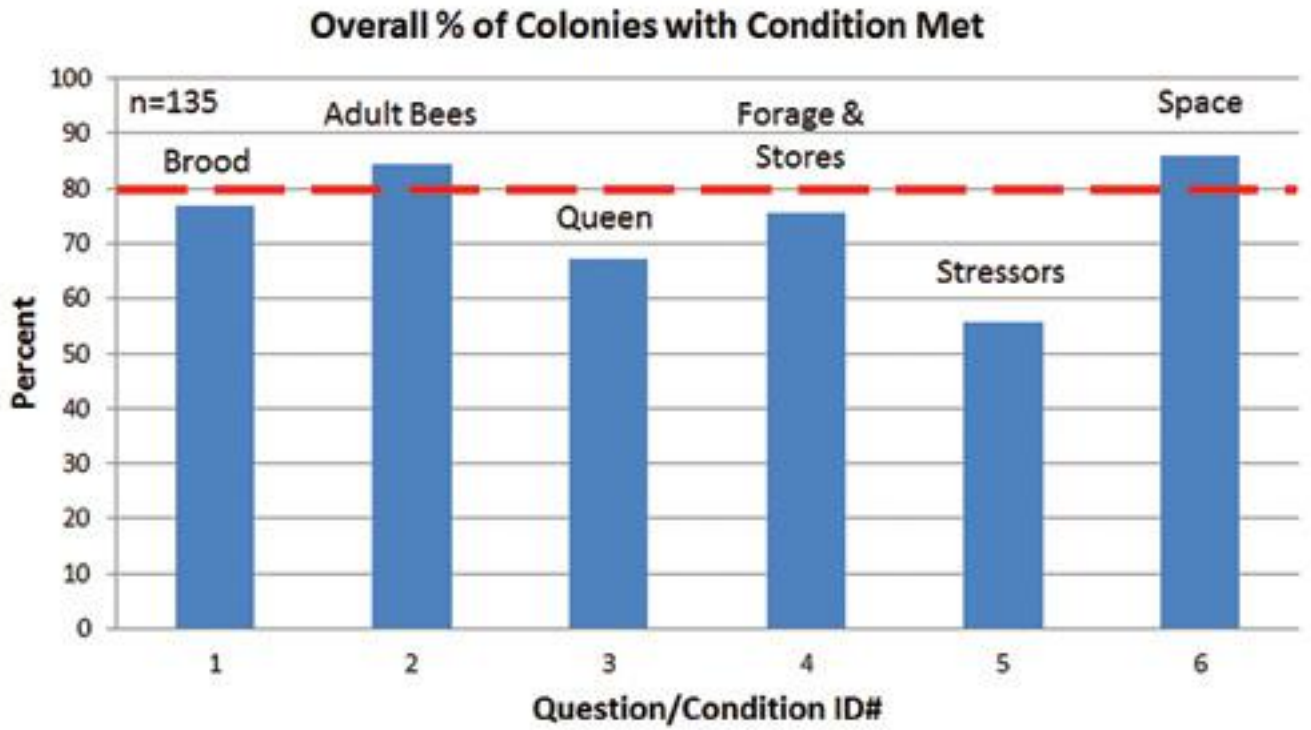

Figure 4. *Percentage of times each condition of the HCC was met for all inspections of the Bayer Bee Care Center research apiary hives in 2016. The goal is to achieve healthy conditions at least 80% of the time.*

Additionally it provides a way to aggregate data across different inspectors, different locations and over time. Even by itself, the HCC is a good tool for people to use in evaluating their own hives. However, when this data is collected electronically and combined with other data, it has the potential to take us one step closer to building the **Genius Hive** as outlined in our first article in the April issue of *Bee Culture*. As described below, we are taking several steps to make the HCC more accessible and useful for the average beekeeper.

From Paper to Processor

Moving the Healthy Colony Checklist from paper to an electronic format (see **HiveTracks.com** for an electronic form) means beekeepers won't need to carry around a pen to mark their Xs and checkmarks, and they won't need to transfer data into a summary spreadsheet if they want to do further analyses.

Most importantly, the open source checklist could become a standard for beekeepers around the world. Beekeepers could then discuss the health of their colonies relative to a common set of conditions as opposed to random observations stemming from various levels of knowledge and methods.

Training Program

Some beekeepers may discover that they are uncomfortable with, or don't know, how to assess some of the conditions on the Checklist. If you don't know how to assess a condition, you have a knowledge gap which you need to fill. The ability to identify and fill knowledge gaps is another advantage of the Healthy Colony Checklist. Once knowledge gaps are identified, beekeepers can focus self-learning on these areas, or instructors can target the real needs of students.

We hope to develop a training program to help people learn to use and assess their hives with the HCC, perhaps with video and quality checking or mentoring attached. As discussed earlier, the more consistent the inspection, the more valuable the collected data will be.

Sub-Conditions

In addition to the six key conditions of a healthy colony, sub-conditions and fatal conditions for each item have been identified. All these conditions have been used to develop a relational database that will soon be available in AirTable Universe (free airtable.com account required), an online platform where AirTable database templates can be published so anyone, especially beekeepers, can access and use the more comprehensive version of the HCC. In addition, Healthy Colony Checklist implementations and training are in the works for other platforms, such as **HiveTracks.com**. There is also a Healthy Colony Checklist for bumblebees under development by Dick and his colleagues.

Updates

We plan to update and modify the framework as we learn more from the data. The current framework is a good starting point, but unless we all use it, we won't know what to update.

We need a common framework to improve our inspections so we can learn more from the universally collected data. Currently few beekeepers pool their data with other beekeepers for analysis or for learning from each other. This framework can help start that process in a systematic way. Please consider adopting it for your operation, not just for yourself, but for all the other beekeepers that could benefit from your wisdom and experience.

Finally, special thanks to *Project Apis m.* for supporting a portion of this work with a Healthy Hives 2020 grant and to *Bee Culture* for providing a venue for sharing these ideas with an interested audience. BC

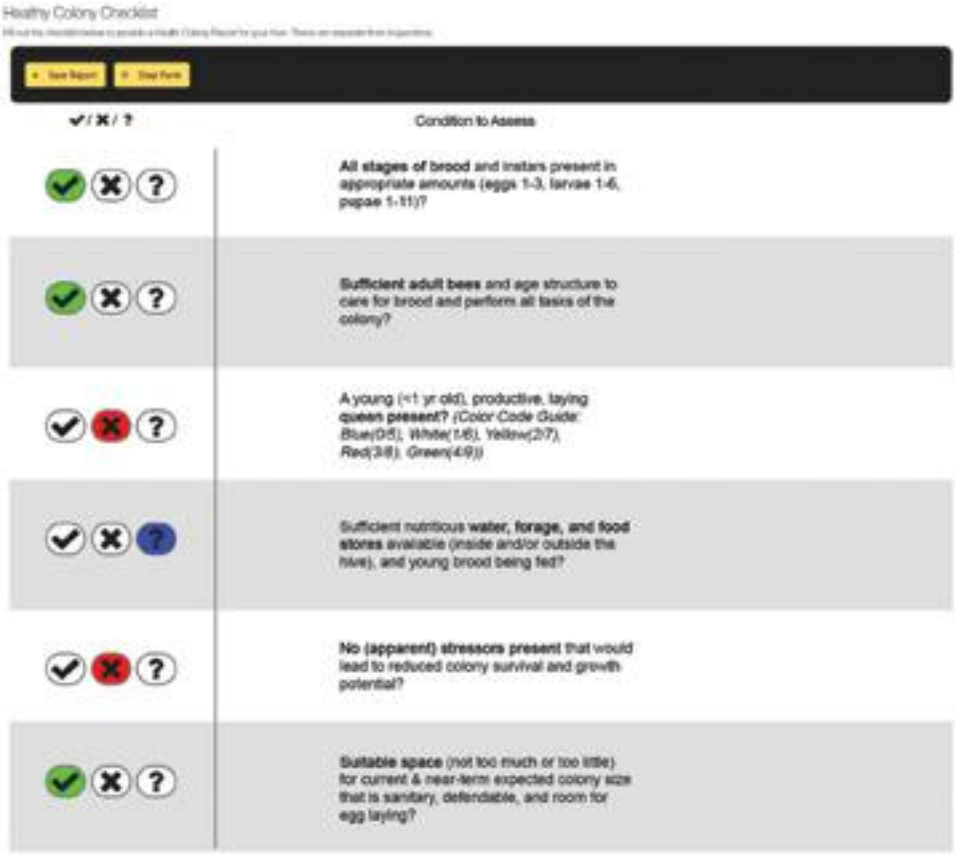

Figure 5**. The Healthy Colony Checklist at **HiveTracks.com.

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Clarence **Collison**

It can be pretty noisy in a beehive. Just listen carefully.

Acoustical signals have been found to be used for communication among honey bees in a number of behavioral contexts (Kirchner 1993). Bees coordinate their social behavior through an impressive array of specialized signals (piping, tooting and quacking) many of which incorporate air- or substrate-borne vibrations generated by the wing muscles (Pratt et al. 1996).

Queen piping are acoustic signals emitted by young queens during the process of swarming. The piping emitted by emerged virgin queens is called "tooting." The tooting signal starts with one or two pulses of about one second duration with an initial rise in both amplitude and frequency. These first long pulses are followed by a variable number of short pulses of about 0.25 second duration (Michelsen et al. 1986; Kirchner 1993). The fundamental frequency rises from around 400 Hz on the day of emergence to more than 500 Hz two to four days after emergence, whereas the number of pulses decreases from about 17 to about seven pulses per performance during the same period of time.

Following the issuance of the primary swarm, a surplus of queens are raised by the workers, the queen that first emerges from her cell announces her presence by tooting and also by release of pheromones (Winston 1987). Mature queens still confined within their queen cells answer the tooting with a distinct piping sound, the so-called "quacking." When several confined queens are present in the nest, a chorus of synchronized quacking follows each tooting (Wenner 1962; Michelsen et al. 1986). The structure of the quacking has been described as a sequence of short pulses typically less than 0.2 seconds long (Kirchner 1993). The fundamental frequency of quacking is approximately 350 Hz and thus lower than that of the tooting. Queen piping (tooting and quacking) is broadcast in the bee nest as vibrations of the combs (Michelsen et al. 1986).

Queens breathed continuously while they were piping, and were able to pipe with all spiracles except one blocked, so the sound could not have been produced by air entering or leaving the spiracles. It is produced by operating the flight motor without spreading the wings, and is radiated partly by the substratum, to which the vibrations are communicated by pressing the thorax against it (Simpson 1964).

Toots and quacks last several seconds and are broken up into syllables (Michelsen et al. 1986) whereas worker pipes last no more than one second and consist of a single pulse of sound. Queens pipe only in the context of colony reproduction, while workers pipe in a variety of circumstances, including foraging and colony defense in both queenless and queenright colonies (Pratt et al. 1996).

In honey bees the simultaneous presence of several emerged virgin queens in the period preceding afterswarming, is prevented by a delay of emergence of all queens but one. It this way fighting between queens is avoided. Grooters (1987) studied the processes responsible for this delay. The significance of the tooting sounds produced by the emerged virgin queen was examined. Queens ready to emerged cut the cap of their cells. In isolated queens this activity was interrupted by replay of recorded tooting. Consequently their emergence was delayed for several hours. If, however, queen cells in observation hives were exposed to tooting, the emergence of queens was much more delayed, because in this situation worker bees confine the queens in their cells.

The confining effect of vibratory dances, a worker behavior often observed on cells with queens ready to

emerge, was explored, but could not be demonstrated. An important element of worker behavior effectuating confinement appeared to be the sealing of cuts made by the enclosed queens in their cell caps. Incisions in queen cells were closed at the same rate before and after a 24 hour period of transmission of tooting, so sealing is not influenced by the presence of tooting. It is argued that separately tooting and sealing by workers cannot cause a long term delay of emergence of queens. Their combined presence is essential: tooting inhibits the activity of queens sufficiently to enable the workers to obstruct their emergence for days (Grooters 1987).

Cells containing developing honey bee queens, were subjected to two types of substrate vibration about one day before the queens were to emerge. A continuous vibration of 600 Hz caused a delay in emergence, but the vibration from queen-bee piping did not. The mortality of the developing queens exposed to either type of vibration appeared to be greater than normal (Spangler 1971).

Queen piping vibrations are transmitted through the comb and perceived by vibration detectors in the workers' tarsi. An emerged queen announces her presence by pheromones and piping- a series of pulsed, high-pitched sounds produced by a queen pressing her thorax and operating her wing-beating mechanism without spreading her wings (Simpson and Cherry 1969). Prior to going on a mating flight, a queen pipes frequently, perhaps to protect herself from the workers rough handling, since the workers near the queen freeze while she is piping (Winston 1987). Mated queens sometimes pipe before swarming (Allen 1956), but the frequency of piping is greatest between the time the first virgin queen emerges and the end of afterswarming, when the remaining queens fight.

The behavior of young honey bee queens and of worker bees was studied in an observation hive. Tooting and quacking signals emitted by the queens were recorded as airborne sound and as substrate vibrations of the combs by means of a microphone and a laser vibrometer, respectively. The fundamental frequency component is larger than the harmonics when the signals are measured as vibration velocity, and it is argued that the signals are carried mainly by the frequency component. The frequencies emitted depend on the queen's age and the tooting syllables contain a frequency sweep. These observations may explain some of the very diverse frequency values reported in the literature. The fundamental carrier frequencies of the toots and quacks overlap, but the tooting syllables have longer rise times than the quacking syllables. Recordings of the vibration of cells in which queens were confined allowed them to measure the threshold for the release of quacking in the confined queens by artificial toots and by natural toots from emerged queens. Artificial toots with long syllable rise time are more efficient in releasing quacking responses than are toots with short syllable rise time. This observation may suggest that the bees recognize these signals mainly by their temporal structure. A comparison of the threshold, emission level, and attenuation with distance, suggests that these and other vibration signals are used by honey bees only for local communication within a restricted area of comb (Michelson et al. 1986).

Experiments were carried out to examine the role of chemical and acoustical stimuli in the detection of fully matured queens just prior to emergence by virgin honey bee queens (Harano and Obara 2004). When the empty queen cells, which had previously housed either nine-day-old broods or adult queens just before emergence, were presented in pairs to virgin queens in the experimental cages, the virgin queens preferentially destroyed the queen cells that had housed emerging queens. They also found that virgin queens tended to destroy queen cells housing emerging queens that were allowed to move freely inside the cells much earlier than queen cells with movement-restricted emerging queens. These results suggest that both olfactory stimuli derived from the queen broods and acoustical stimuli caused by the movement of emerging queens are factors that virgin queens use to distinguish queen cells containing fully matured queens from those with younger ones.

Worker piping, previously reported only in association with colony disturbance or queenlessness, was seen in undisturbed, queenright colonies. Workers piped by pressing the thorax to the comb, spreading the wings slightly and lifting the abdomen towards the wings, which vibrated noticeably as the bee emitted an audible wail. Pipers wandered throughout the hive for up to 2.5 hours, stopping every few seconds to emit a pipe, which lasted about one second. The sound showed little frequency modulation, and a fundamental frequency of 330-430 Hz. It appeared to be produced by wing muscle vibrations and to be loaded into the comb by pressing down the thorax. Of three workers whose experiences prior to piping were known, two had been foraging and one had been unloading water collectors. Piping in this context may serve as a foraging-related signal, although its receivers and the information it transmits remain unknown (Pratt et al. 1996).

Worker piping, previously reported only in hives, was observed in swarms as they prepared to liftoff to fly to a new home. Pipers are excited bees which scramble through the swarm cluster, pausing every second or so to emit a pipe. Each pipe consists of a sound pulse

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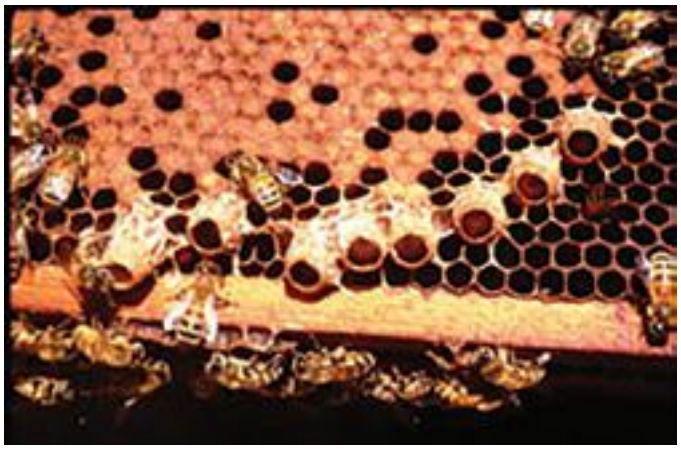

which lasts 0.82±0.43 seconds and rises in fundamental frequency from 100–200 Hz to 200–250 Hz. Many, if not all, of the pipers are nest-site scouts. The scouts pipe when it is time to stimulate the non-scouts to warm themselves to a flight-ready temperature (35°C) in preparation for liftoff. The time-course of worker piping matches that of swarm warming; both start at a low level, about an hour before liftoff, and both build to a climax at liftoff. When they excluded pipers from bees hanging in the cool, outermost layer of a swarm cluster, they found that these bees did not warm up. The form of worker piping that we have studied in swarms differs from the form of worker piping that others have studied in hives. We call the two forms "wings-together piping" (in swarms) and "wings-apart piping" (in hives) (Seeley and Tautz 2001).

Worker honey bees recovering from CO_2 narcotization emitted a distinctive 'quacking' sound consisting of a series of short notes, each possessing multiple harmonics and a fundamental frequency around 400 Hz. Quacking was usually accompanied by a distinctive 'shoving' behavior. Paired bees 'quacked' more frequently than single bees (Schneider and Gary 1984).

Of the many signals used by honey bees during the process of swarming, two of them – the stop signal and the worker piping signal – are not easily distinguished for both are mechano-acoustic signals produced by scout bees who press their bodies against other bees while vibrating their wing muscles. To clarify the acoustic differences between these two signals, Schlegel et al. (2012) recorded both signals from the same swarm and at the same time, and compared them in terms of signal duration, fundamental frequency, and frequency modulation. Stop signals and worker piping signals

differ in all three variables: duration, 174 ± 64 versus 602 ± 377 ms; fundamental frequency, 407 versus 451 Hz; and frequency modulation, absent versus present. While it remains unclear which differences the bees use to distinguish the two signals, it is clear that they do so for the signals have opposite effects. Stop signals cause inhibition of actively dancing scout bees whereas piping signals cause excitation of quietly resting non-scout bees.

Thom et al. (2003) investigated the brief piping signals ("stop signals") of honey bee workers by exploring the context in which worker piping occurs and the identity and behavior of piping workers. Piping was stimulated reliably by promoting a colony's nectar foraging activity, demonstrating a causal connection between worker piping and nectar foraging. Piping was stimulated reliably by promoting a colony's nectar foraging activity, demonstrating a causal connection between worker piping and nectar foraging. Comparison of the behavior of piping versus non-piping nectar foragers revealed many differences., e.g., piping nectar foragers spent more time in the hive, started to dance earlier, spent more time dancing, and spent less time on the dance floor. Most piping signals (approximately 99%) were produced by tremble dancers, yet not all (approximately 48%) tremble dancers piped, suggesting that the short piping signal and the tremble dance have related, but not identical, functions in the nectar foraging communication system. Their observations of the location and behavior of piping tremble dancers suggest that the brief piping signal may (1) retard recruitment to a low-quality food source, and (2) help to enhance the recruitment success of the tremble dance.

Wenner (1962) discovered that dancing bees produce sound in waggle dances. Kirchner et al. (1988) found that dance sounds are also made in round dances. The dance sound signals are emitted as airborne sound by dorsoventral vibrations of the wings (Michelsen et al. 1987). BC

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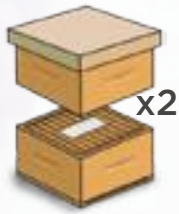

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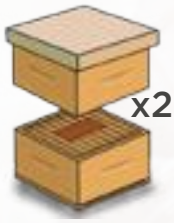

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FINDING DCA's

Where Do We Go?

Aude **Sorel,** Georges **Martin,** Emile **Houle,** Pierre **Giovenazzo**

The CRSAD(Animal Science Research Center) is a non-profit corporation in Deschambault, Quebec that carries out and supports research and development in animal sciences according to a collective strategy, to enrich the expertise of various livestock industries. It operates on over 150 hectares of land and in a context of consultation and partnership. The CRSAD has research projects in seven agricultural sectors: apiculture, dairy and beef cattle, pigs, dairy goats, and hen and broiler chickens.

At the CRSAD, we have had a honey bee breeding program running since 2010. We had isolated mating apiaries during the first years of the program, but had low mating success with them which I suspect was due to bird predation since they were in a forested area. We relocated the breeding apiary to an area near the research center, where we have had much improved mating success (85%). We produce a few artificially inseminated queens, but most of our queens are naturally mated.

To control the origin of the drones mating with our queens, we flood the area with drones from selected breeding colonies. We select our breeders for honey production, hygienic behavior, brood production and winter food consumption; we run 100 colonies and select the 20 best ones to graft and raise drones with. With the selected colonies, we create 120 nucs for the following year's selection.

For drone production, we put a drone comb frame in the middle of the brood chamber in eight to 10 of the selected colonies. This ensures the production of 20,000 to 30,000 drones every 24 days. Since we can't be 100% sure that our queens really mate with those drones, we wanted to better understand the reproduction dynamics occurring with our mating apiary. The first step of this process was to find the drone congregation area (DCA) of our breeding apiary.

A DCA is the area where sexually mature drones congregate and wait for virgin queens. This area is located at the same place year after year and the presence of a queen is not a necessity for its formation. DCAs are formed in areas protected from winds where flight is unimpeded. There are no obstacles within the DCA, but there should be some surrounding it for wind protection and to help the bees with orientation. In optimal weather conditions, drones in a DCA patrol a zone 100 - 200m wide at an altitude of five - 40m, and this area gets smaller in less favorable weather conditions. When a queen enters a DCA, a swarm of pursuing drones rapidly forms behind the queen in a comet shaped formation. The borders of the DCA are well defined, and when a queen leaves it, the drones rapidly cease pursuit.

Most of the drones in a DCA come from nearby apiaries. More than 96% come from apiaries located at an average of 900 m from the DCA. They transit between their apiary and the DCA via migration pathways that can form in areas protected from winds by the landscape or by buildings. Only 0.5% of these drones successfully mate with a queen. From a biological point of view, the closer the DCA is from the apiary, the higher the chances are for a drone to successfully mate. Since drones wait for queens and can't fly indefinitely, a short transit distance will increase the time they can spend in a DCA.

Drones have two types of flight: short orientation flights of one to six minutes and long mating flights of 32 ± 22 minutes. Flight duration is limited by the honey they can stock in their crop and between two mating flights, they spend an average of 17 minutes feeding inside the hive. Drones don't necessarily come back to their native colony, and can choose to stop in a colony closer to the DCA they are visiting. Weather greatly influences the flight activity of drones. Favorable weather includes a sunny or partly clouded sky, temperature in the 19-38°C range and wind under 22 km/h. Normally, peak mating flight activity occurs between 2pm and 5pm.

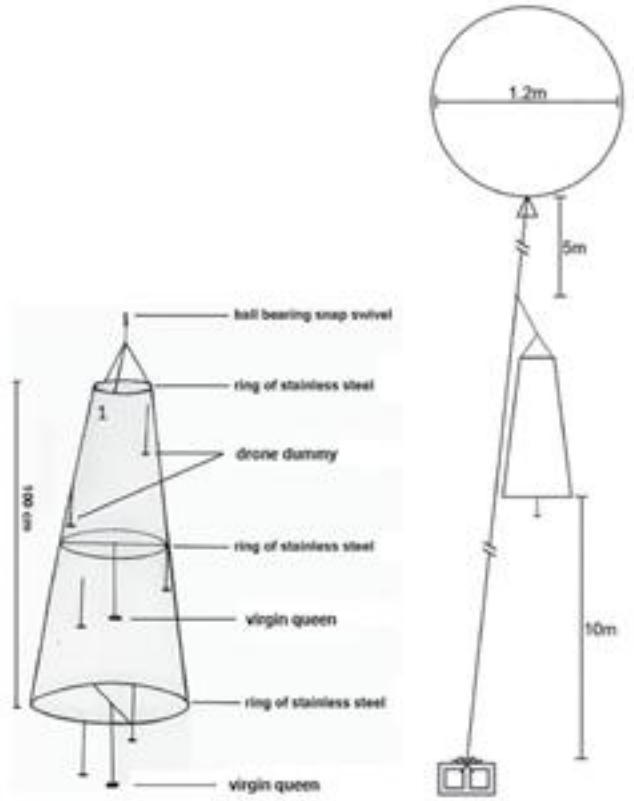

Figure 1. *Schema of the drone trap model on the left (adapted from William, 1987) and on the right (Mortensen and Ellis, 2014).*

Figure 2. *Virgin queen tied with sewing thread.*

Figure 3. *Drone trap in action.*

DCA localization techniques can be complicated and strenuous: listening for the buzzing of drones, queen observations, radar surveillance or landscape analysis. In 2014, Mortensen and Ellis developed a simple method that can be executed by a single person. This method consists of positioning drone traps in potential DCA areas that were identified beforehand via satellite imagery. This was the method that we adapted to locate our DCA.

The first step was to use Google Earth software to locate potential DCA areas within a 1 km radius from our breeder's apiary (areas in open fields with protection from wind). We identified 13 such areas that were further subdivided up to six subplots (figure 7).

Then we built drone traps (figure 1). For each trap, the following material was required:

- White nylon tulle fabric (5" x 63")
- Steel wire (.060"), used to form three rings of respectively 8.5", 14" and 20" of diameter
- Fishing nylon mono line
- 6 cigarette filters
- Black spray paint
- Hot glue
- 4 virgin queens
- 3 steel nuts (approximately ¾")
- 2 balloons (35")
- Kite line (150')
- Helium tank
- A 3-way ball bearing swivel
- A 2-way ball bearing swivel
- Sewing thread
- Kite reel

Figure 4. *Comet of drones pursuing a virgin queen.*

Figure 5. *Drone hunting with Émile Houle (left), Pierre Giovenazzo (middle) and Aude Sorel (right).*

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Figure 6. *The apiary in blue, the migratory pathway in white and the DCA in red.*

The three steel wire rings and the nylon tulle were sewn together to form a trap with a height of 40", in a cone shape. The 8.5" ring was at the top, the 14" in the middle and the 20" at the bottom. The top of the trap was closed with tulle, but the bottom remained open. The cigarette filters were painted in black and randomly attached inside the trap with fishing line (approximatively 6-9" of line). A drop of hot glue was used to secure the filters to the lines; these represent drone dummies. We don't know if the dummies are necessary, but since they were used in previous research and were cheap to produce, we put some in our traps.

A fishing line was fixed across the middle ring and a second one across the bottom ring. In the middle of each line, we fixed a fishing line 8" long, ended by a small hook (figure 1). This small hook serves to easily attach and remove queens from the trap. We used three short pieces of fishing line to bind the top ring of the trap to one end of the two-way ball bearing swivel. To the other end, we fixed a 35" kite line and the end of this kite line was bound to one end of the three-way ball bearing swivel. A 15' kite line was fixed to another end of the three-way swivel and served to tie the balloons. The remaining kite line (125') was tied to the last end of the three-way swivel.

To help us estimate the height of the trap, we put paint marks on the kite line every 15'. We also built a homemade reel with a wood plank, 12" nails and a plastic tube (google would help you with that). The steel nuts are fixed to the bottom ring to prevent the trap from being pushed horizontally by the wind; you can adjust the quantity to match your weather conditions.

We used two 36" party balloons, which are much cheaper than weather balloons, but also more fragile. The grass is as sharp as a needle for an inflated balloon! One balloon didn't have enough lift power and three balloons offered too much wind resistance, which tends to send the trap close to the ground, unable to gain height. We found that two of the balloons worked well. To be able to reuse the balloons on multiple days, we cut a 50 mL plastic test tube and secured it to the balloon with a rubber castrating ring. This allowed us to inflate and deflate the balloons at will.

We tied the virgin queens with a 4" sewing thread between the abdomen and the thorax (figure 2). You need to be careful to avoid tying the queen's legs or wings. The sewing thread with the bound virgin queen was fixed to the small hook of the free fishing line; one on the middle ring and one on the bottom ring of the trap. We replaced the queens after one hour to prevent them from dying of exhaustion. Since we needed to add weight with steel nuts to our traps, we believe that using plastic queen cages would be an interesting option instead of tying queens with thread, which is a difficult task to complete. We will try using plastic cages in future tests.

Next was the drone hunting part. During the afternoon on sunny days, we went onto a field identified with Google Earth as a DCA potential zone (figure 5). Since the DCA size is quite small, instead of fixing the traps on the ground, we patrolled the whole DCA potential zone. Two people patrolled the zone in an "S" pattern, maintaining the trap at an elevation close to 30'; when higher than 30', it is difficult to see the drones in the trap. When drones were seen entering the trap the evaluator stopped and waited 20 minutes. After the time was elapsed, the trap was lowered, and the drones were counted. If the count was below 50, the evaluator moved further away in the zone. If the count was over 50, a

second measurement over a 20 minute period was done to confirm the DCA (figure 3).

When you count 20-30 drones over a 20 min period, this is a possible indication of a migratory pathway, and you can try following it until you reach the DCA. You can also use visual and auditory cues to locate a DCA such as the direction drones are taking when leaving their hive, the buzzing of the drones in flight when you are close to the DCA or the formation of drone comet (figure 4).

We patrolled half of the potential DCA zones before finding a DCA which was only 60 yards away from the breeding apiary (figure 6). The drones were going through a small patch of trees to access an open field highly protected from winds by the trees and by a small hill. On days with weak winds, the DCA extended over the treeline bordering it (left side in figure 6). During our hunt, we had a windy period with winds of 15-20 mph/h but still got lots of drones in our traps at the DCA, so even if the weather conditions are not optimal, you can still find a DCA.

We tested half the potential DCA areas identified by with Google Earth, and only found one DCA. By the distance from the apiary and the number of drone comets we were observing, we are confident that most of our selected drones were going there. Still, we intend to test the other half of the identified areas as well as marking selected drones, and trying to capture them back at the DCA. These are future projects. Eventually, we also would like to find a way to track queens, and observe if they are going to other DCA areas that are further away. BC

I would like to thank Émile Houle (CRSAD) for the design and building of the drone traps as well as the field support. I also thank Pierre Giovenazzo (Université Laval) for traineeship supervision. Pictures in this article are from Aude Sorel and Mélissa Girard.

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Figure 7. *Identification of potential DCA areas with Google Earth.*

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MOTHER EARTH NEWS

FAIR

The Basics of Beekeeping

Seven Springs, Pa. | Sept. 14, 2018 | Seven Springs Mountain Resort

Ever thought about starting your own apiary but didn't know where to begin? Wonder no longer! Join Shane Gebauer of Brushy Mountain Bee Farm, Kim Flottum of Bee Culture magazine, and other special guests for an intensive one-day training course at Seven Springs Mountain Resort in advance of the 9th annual Mother Earth News Fair. From sourcing bees to extracting honey, you will learn everything you need to know about how to maintain a happy and healthy hive, straight from world-class instructors!

The Basics of Beekeeping is designed to "go deep" with a limited class size and personalized attention so that all attendees leave armed with the knowledge they need to start keeping bees. Presentations will be interspersed with hands-on workshops for setting up and maintaining your own hive.

The Basics of Beekeeping is limited in attendance. Reservations and tentative schedule will be available by July 1.

Sponsored by:

Brushy Mountain Bee Farm has been serving the beekeeping industry for more than 30 years and is the exclusive supply partner for this seminar. Find out more about their quality products, service and support online at www.BrushyMountainBeeFarm.com

Find out more and reserve your spot today:
www.MotherEarthNewsFair.com/Pennsylvania

Facebook Advertising

Jessica **Dally**

An Introduction –

Note: This article was written before full information was out about the Cambridge Analytica scandal . . . or at least before Cambridge Analytica closed shop. Ethical considerations of Facebook marketing and microtargeting, in particular, will be addressed in upcoming articles.

The Facebook Algorithm has changed again.

I've meant to write this article for about a year now, but school and work have delayed my progress. The thing is, I would have started this article the same back then. In all likelihood, I could delay writing another year, and it would still begin in the same fashion. "The Facebook algorithm has changed again."

Every month, the Facebook algorithm is one of the primary discussion topics for Facebook marketers. For the less experienced, the conversation goes "this is horrible, we shouldn't bother marketing on Facebook anymore." Savvy marketers see changes as merely a push to hone their craft and become better at what they do, as a requirement to up their game.

I'm going to suggest you see changes through that second lens. You may not see yourself as a savvy digital marketer, but you can be with a bit of practice. It is actually far easier than you think. And there is only one key.

Do social marketing the way you want social done to you.

I've said it before, and I'll repeat it, because it's the number one key to advertising, running a Facebook page, selling your product, doing outreach as an organization, and even communicating with your customers in person. Most of you know this inherently when you talk with people or run your business. And yet somehow we forget this when it comes to advertising. We think we need to be smarmy salespeople when we advertise. And yet we all hate that.

So how about we decide right here and right now to NOT be the thing we hate.

But how do you do that and still sell product, or advertise your organization?

It's a lot easier than you think. Better still, it is a lot CHEAPER than you think. When you do good work, when you aren't that high-pressure salesperson, selling becomes really inexpensive. Here's why: instead of trying to sell to every single person you come in contact with, you're going to try to reach the people who really, REALLY want to buy your product, or, for organizations, the people who really want to join or come to your meeting.

Most of us have been sold the line that if we don't push our products to everyone, we won't get enough buyers to sustain our businesses. Certainly, if you are selling something almost no one wants that may well be the case. But I'll suggest that your local honey, your beekeeping group, or your beekeeping supplies or products are not that. There are plenty of buyers out there.

Your problem isn't so much that you need to con people into buying your product, you need to find them. Let the people who love you tell their friends and sell your product. If you find your evangelists they will sell your product to those who need a push.

So why advertise on Facebook? One reason really – it's cheap. Facebook allows you to target your market very carefully, and in doing so, you can get to the specific people you want to reach.

To do this, you're going to have to go against some of your natural instincts. More is not better. Less is better.

So, let's stop talking about why and let's get to the nuts and bolts of how. This is the special sauce folks. And yes, you're going to have to experiment to get to know your audience. But you're going to be doing it with $10, or even $5.

There are several key components of ads. Each one needs to work for your ad to work. Let's talk about them.

Picture – We have talked before about the tools you can use for social media, and this is where you're going to use these. Pull up Canva (the online tool) because you're going to need it. Facebook prefers ads without a lot of writing in the picture. NO writing is best. That means your image needs to "speak" for you. It needs to tell the story. Are you selling honey? Are you selling your organization? Are you selling supplies? Make the picture show some drama, make it beautiful, and make it pull someone in. Remember, this is the first thing a potential "buyer" is going to see. It needs to attract someone.

Headlines – like the title of an article or your email subject, if this doesn't make people want to open your ad, everything else you write is useless. Are you having a sale? Say it. Do you want to play on the loss of bees around the world and people's interest in learning more? Your headline should draw on that interest. Should people buy local honey to save the bees? Tell that story. You have precious few words to get someone to click. Use them wisely.

The body of the ad- well if people get here you're doing great. They obviously clicked on your ad. So like a fish, you need to reel them in. Why should they actually buy from you? Does your sale end soon? What do they need to know? When is that meeting? Where can they find your local honey? What makes you different?

Remember, you're not trying to push to someone who doesn't want to love you. You're selling to people who are excited to learn more, to purchase. They've been waiting to hear more from you. Help them find out what they need to know.

So now you've created what we'd call the "creative."

All of this is extremely important. But what is next is what sets you apart from the pack.

Targeting

Targeting is how you decide who gets to see your ad. Many of you will be thinking EVERYONE!

No. Just no. For many reasons no.

Here's why not:

Targeting a lot of people costs a LOT of money. Sure, big brands do it. Big brands have a lot more money than you do. Microtargeting will get you to your audience for minimal amounts of money. Targeting a large audience will cost you thousands, tens of thousands, hundreds of thousands. You didn't think Facebook was growing into some massive entity with tiny, inexpensive ads did you? HUGE spends from big advertisers are what pays their bills. You can do that if you want. But I'm guessing you don't have that kind of cash. If you do, you've likely already hired an advertising firm, and you probably don't need to be reading this article!

Another reason not to do it, Facebook doesn't like it. When you target everyone, you get a lot of people who really DO NOT want to see your product. Think about a teen rock star. Some of you reading this article may want to hear about their newest release, but I'm guessing a lot of you do not want to hear about it. Targeting everyone on facebook means you would ALL see ads for it. Annoying right?

Facebook tracks how many people like your ad. It uses complex analytics to determine the quality of your ad- what those analytics are exactly, we don't know. But if a lot of people don't like your ad, don't click on it, or worse yet report they don't like it, Facebook determines that your ad has a low-quality score. And guess what happens then? One of two things.

First, the cost to deliver your ad to people goes up. In other words how much it costs to get your ad to each person on Facebook is higher if your ad doesn't appeal to people. Second, if people REALLY hate it, they will simply stop delivering it to people period. If no one wants to see your ad and Facebook determines this, they will actually stop showing your stuff.

Now granted, if you have enough money to spend per person, getting to them not showing your ad will take a LOT longer. If you were willing to spend $1000 per person to get your ad out, I'm guessing they'd show your ad a lot longer than if your budget for advertising were considerably smaller. But nonetheless, if almost everyone genuinely hates your ad, they will essentially show it to no one.

Let's get sidetracked a bit and answer why Facebook wouldn't show an ad. That seems crazy, right? Unless you look at the bigger picture. And we've talked about this before. Facebook doesn't exist for businesses to advertise to people. It exists to keep people connected to other people. In theory, if it could not have any advertising at all, it would likely do that. The people who signed up would be happy not to get any ads, and they wouldn't have people complaining to them about ads.

But that isn't how anything works. They need to make money, and yes, want to make money. So ads support the massive number of computers that run Facebook, and the large numbers of employees that keep Facebook running, and everything else that goes on behind the scenes.

So it's a tricky balance between keeping the people who sign up for facebook happy, and the businesses who pay their bills happy. If they show too many really horrible ads to people, eventually those people may leave and go to another platform. That is, rather obviously, against Facebook's best interests.

So Facebook has to balance the need for money and support with the need to keep people engaged on the platform by doing what it can to force

people to create better ads and target their ads to people who want to see them. They don't always do a perfect job, mainly because they can't hold the hand of every advertiser.

However one could argue that targeted advertising is better than what we used to have – the indiscriminate advertising of everything to everyone. As a side note, google ads work in very similar ways. They, too, charge based on how well your audience likes your ad. If you're spamming people, they make you pay more.

OK, back to why you shouldn't target everyone . . .

Targeting everyone is rude. EVERYONE doesn't care about your product, class, or even bees. Yeah, maybe they should. But you advertising to them isn't going to make that happen. You can't force someone to like something. I'm guessing most of you don't like being constantly advertised to on the internet.

So think about that for a second. It's far less annoying when you get an ad for something you truly want. Even less annoying when you get an ad for something you REALLY want, like a sale on a product that you are in the market to purchase, or an advertisement for an event you want to attend. So don't be the advertiser who spams everyone. Be the advertiser who only advertises to people who want to see their product.

OK, but how do you get to the people who want to see your ads?

That's what we're going to talk about next time. I know, it's like a horrible sequel on TV. The good news is I've already written that article so you won't have to wait too long. But the reality is that I'm going to dig into specifics, and I don't want to gloss over the hard information you need to know to do this well.

In the meantime, start looking at the ads you see on Facebook. Pretend you're an ad connoisseur. Did they target you well, or is the ad in question way off the mark? I recently received an ad aimed at personal trainers to get more personal training business clients – no, I'm not a personal trainer! WHY did I see this ad?!? Because I have friends who are personal trainers? That's some BAD targeting! What about the image for the ad? Is the image good? Does it pull you in? What about the wording in the heading?

You can learn a lot by watching others, both their failures and their successes. For the next month, watch ads to see what you can learn. Pay particular attention to your friends to see if they ever share an ad. Eventually, that's what you want to do with your ads. You want people to share them for free! BC

Jessica Dally is a freelance (for now) social media advertising expert, living in Washington State.

Beeyard Thoughts, Observations, and Updates

Beekeeping's electronic evolution – That's a good thing

Odds and Ends

The Queen's Nasonov Glad

Beekeeping's next evolutionary phase is well underway – Internet Technology

I probably just lost a bunch of readers

Quite a number of present-day beekeepers don't have a lot of interest in things electronic. Consequently, in our current beekeeping world, we are dividing into two worlds (at least two).

One world is the world of my beekeeping youth – woodenware that I can build, cheap queens, low-hanging swarms, bee removal projects, book reading, and educational meetings. It is the beekeeping world that has persisted for many, many years. True. That staid world is now forced to adjust by having to deal with more pests and much more plastic; but at the end of the hypothetical day, it was the same industry – just seriously tweaked.

That long-lived, traditional world is (apparently) speedily evolving into a craft or industry that would have been inconceivable and nearly unrecognizable just a few decades ago. The digital bee world is truly a change – not an adjustment.

It's ironic. Killer bees and predaceous mites nearly brought the traditional bee industry to its knees. Everywhere, beekeeping meeting attendance dropped. Membership waned. Since no one else would do the job, association officers were essentially elected for life or until they burned-out. During the darkest years of the killer bee/mite attacks, I now sense that I was present at the very lowest point that the Ohio State Beekeepers Association ever experienced. (I write that because I don't see how morale could have gotten lower.)

In the mid-1980s, while standing before a small crowd at the OSBA state meeting, the beleaguered and discouraged president said, *"Just look at us – just look at us. All our history, all our devotion to beekeeping through the association's years, and this is what we have come to. This . . . (as he waved his hands over the meager crowd). A meeting so small that we cannot even pay the room rental using the proceeds from this meeting. What is going to happen to us? What's going to happen to us"?*

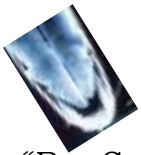
Well . . . just shoot me now. At the time, I was teaching small beekeeping classes and had committed to an academic life in beekeeping. Was there clear writing on the wall of my life? I remember thinking, *"Good heavens, we are the ones who are here – are we stupid?"*

A bit like our human ancestors, who very nearly became extinct many thousands of years ago, our hardy group of tenacious beekeepers hung on. After a few years, the craft slowly began to recover. It wasn't a quick rebound by any imagination, and it was no single thing that quickly initiated beekeeping's recovery. It took time and it was accomplished by a reduced population of beekeepers who didn't give in to beekeeping despair. They kept the fire going. They kept on keeping bees – no matter what. Don't forget, it was lean times for the manufacturing industry, too. Without them, recovery would have been seriously doubtful.

On no particular day, the dark cloud that hung over beekeepers for 10-15 years began to recede. Increasingly, the Africanized bee seemed to lose its threat of killing the masses. By then *Varroa* mites, along with industry and environmental changes, had taken out much of our bee herd. Finally, the public noticed. Finally. I began to get the question, *"Where are all the bees?"*

That's when the second new bee world was born. New people began to come to beekeeping. The national and local media picked up on the issue. The *"where's the bees?"* fire storm began to feed on itself. More media coverage. ***No bees – no pollination – no food***. New people continued to come. New organizations were formed that intended to save everything bee related. Even more people came. Classes and meetings began to fill and grew to attendance levels that were – and still are – historically unprecedented.

But increasingly, the older traditional beekeeper realized that this large new beekeeping generation was not exactly like the old one. True, basic bee biology is exactly the same. No changes there. But the reason



Stinging Realization

"Bee Space is not a rigid measurement. Over time, a hive box filled with bees will become tighter and more attached. So, bee space in a new colony is far from the established bee space in an older colony. Otherwise, we would not need hive tools."

these new people kept bees was different. Some were keen on pollination, or maybe they just wanted to help the bees. Their reasons were their own. Their attitudes were different. They formed opinions that were new to beekeeping. They are still passionate about their aspect of beekeeping.

While most of these new people did not actually develop the bee related components of the Internet, they are certainly users of web-based information and technology. I don't know. Maybe things would have changed even if new keepers had not shown up, but for sure, IT concepts changed more quickly because of their participation. There is clear justification for this new medium. At that time, within beekeeping, very few electronic tools existed. It was a verdant area for development. Outside beekeeping, fundamental changes were also happening. While other companies grew into spectacular enterprises -- and are still growing, big names (i.e. Kodak, Sears) slowly seemed to miss the boat.

The old technology

Old technology, in perfect working order, was literally discarded. It worked perfectly, but it was tossed. I still have my Nikon F2 film camera, a completely manual camera that I used to photograph the Africanized bee frenzy. It still works as well as it ever did. Slide projectors, slides, film – all suddenly became antiqued technology. I still have a slide projector and thousands of slides. As I look back, the old order technology crashed quickly.

My first digital camera was a Sony Mavaca. It still works perfectly – if you want to take a single photo and store in on a 3.5 floppy disk. Even digital equipment can become antiques.

I don't remember the last presentation I made using *only* photographic slides. Neither do I remember the first talk I gave using *only* digital equipment. I would have thought those two events would have meant more to me. The changes happened so fast.

Where do I stop this thread? Everything that is new will one day be old. That includes me. Everything, every device, every procedure that I once used to develop and deliver beekeeping information has radically changed. The extension programs at universities for which I have worked are rapidly dropping paper pamphlet factsheets and booklets and are moving to web-based delivery systems. There's no inventory, no storage and no space needed for this generation of booklets.

For the Alabama Cooperative Extension System, years ago, I was asked to update the state beekeeping pamphlet. The new 46-page, color booklet replaced the older 28 page, two-color publication. The new color booklet was initially sold to beekeepers, but it is now posted online at: **http://www.aces.edu/pubs/docs/A/ANR-0135/ANR-0135.pdf**

A Quick Read code is posted below for this URL. The book is no longer available in hardcopy but is currently being converted into an iBook that will offer even more information and instruction and will be posted online. I use this as an example of how a publication's cost is significantly reduced, but the circulation and availability is greatly increased by improving the text and posting it online. Certainly I will alert you when the new version is posted.

Many years ago, after desktop computers were birthed and growing, a university professor had a new one that was high end for the time. At a local meeting, a beekeeper made the comment that the professor no longer worked bees – he only worked his computer. Part of that comment was true.

Electronic tools should not overrun the subject (bees) for which the tool was purchased. But, expertise and competence with the tool (the computer and related systems) only comes after much time has been devoted to learning its function and operation. Of course, this learning and absorbing process is a never-ending procedure. I try not to become attached to any procedure. Surely everything will continue to change.

I'm being tender when I say that those beekeepers who have said to me that they came to this meeting to learn about bees and not about computers have missed the point. Smokers, hive tools, queen cages, web pages, computer training programs, streamed video programs, Podcasts, webinars and field days, are now all examples of beekeeping tools and learning systems. Beekeeping being separated from *"computers"* is a defunct concept.

But all these electronic gizmos are tools

All of these gadgets and devices are simply tools. At

This was the technology ofmy young career. I don't want it back. I really like digital photography. (But I will never abandon my film-based, mechanical Nikon.)

The progression of a booklet from simple color to color to IBook.

One of the "tools" that many of us now use to help keep bees.

the end of the day, the beekeeper will still have to search for a queen. *(Maybe a future WiFi based queen marking dot will be developed.)* Once found, the queen and her brood pattern will need to be evaluated. *(Maybe a chemical-sensing device can be developed that will send information to the smart phone that continuously estimates queen health and her function. Maybe this device could also sniff for mites and other diseases of the colony.)* Initial advances that use internet technology have already been made in areas like hive security. No doubt, more such security features will come along. Steal hives at your own risk. What do you think? Will *GoPro* or some activity camera be able to build a miniature camera so small that will fit on the thorax of a bee?

I did not mean for this piece to become the end all answer source for beekeeping apps and WiFi programs. So when I mention *Hive Tracks* and *Broodminder* – two well established web-based programs, I don't mean to offend others who also have beekeeping apps. I have not used *Hive Tracks* but at first glance, it appears to be a comprehensive program for all aspects of recordkeeping and calendar management. Have a look yourself at: **https://hivetracks.com/index.php** to see if you're interested.

I am tinkering with Broodminder (**https:/broodminder.com**). I have it working, but I am sorting out WiFi issues that I have in my home apiary. My beeyard is just a bit out of the range of my home WiFi system. When I was producing live video with Kim Flottum for his *Bee Culture* presentations, *Kim and Jim,* I had other connectivity problems. This electronic hurdle is not a surprise, and I will solve it.

Universities are now offering online beekeeping classes. The enrolled students can literally be anywhere in the world. Systems like GoToMeeting and Zoom allow for live lectures. All of this technology demands that the presenters change their presentation style. It is surprisingly difficult for me to eagerly and forcefully lecture to the wall in my shop. In most instances, the presenter can't see the audience clearly. The speaker wonders: *"How is this going over? Are they getting the bit of humor I just presented? Are they even awake?"*

With no audience involvement, the discussion period moves faster – but not fast enough. Ten to 15 minutes is all one can generally stand before eyes glaze over and attention wanders. But know this – these same restrictions apply to live speakers in front of an audience. It's a new way of talking about bees – from a great distance.

I suspect that the common wooden beehive is in the twilight of its life. I don't know how it will change, but it will be more wired, more online, more iCloud based. It will be an online hive. Will it have some kind of temperature control – central heating and cooling – as it were? Many of you beekeepers have already designed heated bottom boards.

Yet, throughout the whole process, bees will be bees. They will probably still be good at dying for a multitude of reasons. I am not a futurist. I have no idea what is on the way, but current events really point to a changed beehive to pair with a changed industry. That's a very good thing. Beekeeping is adapting to survive. Every day, something changes. My 12-year old grandson asked why I was using PowerPoint and not Google Slides. I didn't know Google Slides existed. I'm running the electronic race, but I will ultimately have to drop out. On that bright note, another topic.

Odds and Ends

I had never thought or heard anything about the queen using her Nasanov gland within the colony inside the hive. Hundreds of times, I have discussed or heard discussions on queen pheromones and "queen substance." As information has been accumulated, it has been shown that there are several pheromones that are produced by the queen and serve different functions within the hive. As such, there are probably several queen substances.

I had – apparently – incorrectly thought that *9-oxo-dec-2-enoic acid* was the secret sauce that queens used when swarming to settle the swarm around her. Maybe that is correct. I also thought that 9-oxodec *(as it sometimes abbreviated in both speech and writing)* was the location component that workers would use to find the queen in the colony. Honestly – I don't know how the queen uses this gland inside (or outside) the colony.

When I perform a rudimentary web search, the only hits I have gotten pertain to the well-known subject of worker Nasanov glands. At this moment, I do not have the time to pursue the bee literature to determine what is known. My observation may have already been elucidated in scientific reviews.

The Carniolan queen came with a package a few weeks ago. While producing a short video, I marked the queen. After allowing the paint spot to dry, I released this queen on the comb. She was skittish and ran on the comb. Near the top bar of the comb frame, she became nearly buried by her entourage. Only her abdomen was showing and her gland is clearly visible. She was using her gland just as a worker uses hers. Just for grins, I plan to look for this behavior in future queens. BC

The queen's exposed Nasanov Gland.

Dr. James E. Tew, State Specialist, Beekeeping, The Alabama Cooperative Extension System, Auburn University, Emeritus Faculty, Entomology, The Ohio State University; ***Tewbee2@gmail.com; http://www.onetew.com; One Tew Bee*** *RSS Feed (****www.onetew.com/feed/****);* ***http://www.facebook.com/tewbee2;*** *@onetewbee*

All The Buzzz in...

Hello Friends,

It's my birthday month! I will send a special gift to everyone who sends me a poem or a picture.

Bee B.Queen

Bee B. Queen Challenge

Send me your favorite honey recipe.

Pollinators Picnic

We can thank the honey bees for about a third of the food we eat. Whether it is the pollination of almonds or the seed reproduction for plants like alfalfa and clover which provide food for livestock, we can thank the pollinators for their tireless contributions to the world's food production. Even cotton plants produce a higher yield and better quality cotton when pollinated. Why not invite your friends over to celebrate our pollinators by serving foods honey bees helped to produce?

First, send your friends an invitation to the Pollinators Picnic. If you are feeling especially daring, encourage your guests to come dressed in bee-centric costumes: yellow and black striped shirts or socks, chenille stick antennae, or compound eyes sunglasses. Bee bold! Cover the ground or table with a cotton cloth. Make a Pollination Power Salad by combining the bee pollinated ingredients in the recipe. Cheese is on the list because dairy cows eat alfalfa which is pollinated by bees. Make the Bee Sweet Pollination Treat for dessert. Raise a glass of peppermint tea and make a toast to the honey bee, one of the best pollinators in the world!

Pollination Power Salad

- ½ cup raw sunflower seeds
- 2 cup broccoli, chopped
- 1 cup carrots, diced
- ½ cup yellow squash, diced
- ½ cup zucchini, diced
- ½ cup alfalfa sprouts
- 2 apples, diced
- ½ cup raisins
- ½ cup almonds, chopped
- 1 cup mozzarella cheese, diced
- ¼ cup Parmesan cheese, grated

Pollination Power Dressing

- 1 T. apple cider vinegar
- 3 T. canola oil (made from rapeseed)
- 1 T. honey
- 1 T. prepared mustard

Bee Sweet Pollination Treat

All the ingredients, including everything in the dressing, are honey bee pollinated.

1. Combine any of these fruits to make about 4 cups of salad: blackberries, blueberries, raspberries, and kiwi

2. Make a honey dressing by blending the following ingredients.

- 1 T. fresh mint, chopped
- 2 T. honey
- 1 tsp. orange zest
- 1 tsp. lime zest
- 2 T. orange juice
- 1/2 T. lime juice

... Bee kid's corner

Produced by Kim Lehman -www.kim.lehman.com
www.beeculture.com
August 2018

Pollination Relay Race

Preparation:

1. Cut yellow, orange, or red construction paper circles to represent nectar and pollen. Write a "P" (pollen) on half of the circles and an "N" (nectar) on the other half. If playing the game with younger children, make the paper circles two different colors.
2. Place the same amount of both nectar and pollen circles in four different containers to represent flowers.
3. You will need two bees. They can be puppets, stuffed yellow socks, or photos of a bee attached to a paint stirrer.

Directions:

1. Divide into two even teams.
2. Have two designated areas next to each other to be the beehives.
3. Place a "flower" with the nectar and pollen circles about 10 feet from each "hive".
4. Place the other "flower" another 10 feet further from the first "flower".
5. The first person in each team carries the bee to the first "flower", grabs a nectar and pollen circle.
6. Then they run to the second "flower", drop off the pollen circle, pick up another nectar circle and a new pollen circle and run back to the beehive.
7. The bee is passed to the next "worker bee" in line to run the relay. The first team to finish is the winner.

Carys Jones, 6, NC

Riddle

Why did the bee get married?

Bee-cause he found his honey.

Mary Beth Byler, OH

World Honey Bee Day

Saturday, August 18, 2018

Some ideas for ways you can celebrate honey bees:

- Organize a honey tasting party
- Publish a little paper with poems, facts and photos about bees to give away to you friends and neighbors.

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: beebuddiesclub@gmail.com or mail to the above address.

A watermelon blossom needs about eight bee visits to produce a large, well-shaped fruit.

Remembering Doolittle

Peter **Sieling**

On June 3rd, 1918, 100 years ago, Gilbert M. Doolittle died at age 72. Today he is remembered as the father of commercial queen-rearing. His book, *Scientific Queen Rearing* remains a classic work in apicultural literature. That book is just a small part of the enormous contribution Doolittle made to bee culture.

Doolittle was one of the most prolific apicultural writers of all time. He wrote thousands of articles for seven periodicals over a forty-eight year span. He read all the beekeeping papers of the time and tried out the recommendations of other authors. Woe to the person who made claims based on theory rather than experience! Some of his most entertaining articles consisted of verbal sword fights with other beekeepers.

Doolittle's advice was practically the final word on any discussion related to beekeeping. People traveled from all over the United States to visit him, by train, steamer, and bicycle. His techniques and inventions weren't original. He took other peoples' ideas and improved them. Artificial queen cell cups, the solar wax melter, and the division board feeder are some inventions he improved. Many of today's management techniques were perfected by Doolittle.

Doolittle wrote very little about his personal life, except as it related to beekeeping. Most biographical information comes from people who visited him and from stories published from his talks at beekeeper conventions.

Gilbert M. Doolittle was born near the small village of Borodino, in the Finger Lakes region of Central New York State in 1846. His father was a farmer, "poorly supplied with this world's goods". He kept Gilbert at work on the farm, so he received only a limited education. Doolittle once recalled sitting in the classroom the day the school commissioner came to examine the school. The teacher pointed out Gilbert as the "biggest ignoramus in the school."

When Gilbert was 10 years old, his father bought a colony of bees. Four years later, the Doolittle apiary had grown to 15 or 20 colonies, all in box hives. His father gave him a small swarm of his own. He left it some distance from the house and on coming home from school one morning found that someone had killed the bees and stolen the honey. Shortly after, his father's colonies succumbed to American foulbrood and had to be burned.

Ten years later, at age 24, Doolittle caught what they used to call "bee fever". He acquired two hives and began reading all the books he could find on beekeeping and subscribed to several beekeeping papers.

Doolittle's father was not pleased with his son's interest in beekeeping. Gilbert was neglecting his farm work. One day while Gilbert was upstairs in the house he heard his father talking to a neighbor, "I have always wanted and expected that Gilbert would be a farmer. I have hoped and prayed that he would make a failure of beekeeping, but it looks now as though he were going to succeed in spite of my hopes and my prayers." A year later, Gilbert left the farm and made beekeeping his specialty.

Doolittle corresponded with Elisha Gallup, a prolific beekeeping writer of the day. Gallup patiently answered all Doolittle's questions. The stack of letters, according to Doolittle was three or four inches high. In gratitude for Gallup's help, Doolittle continued the favor, answering all questions sent to him by other beekeepers.

He describes the next 30 years "as little less than one round of endless pleasure." He wrote, "I dreamed of bees nights, and thought of them during my waking hours to an almost absorbing extent." Doolittle's "endless pleasure" included doing everything himself. Besides managing two beeyards, he made equipment in his workshop powered by a steam engine. He answered all his voluminous correspondence, wrote articles for the various magazines, handled all his queen shipping (local people said Doolittle's queen business constituted half of the local post office's volume). In addition he kept up a garden, took care of the horse and was an active member of his church and town.

Doolittle met and fell in love with Frances Rosetta Clark. She has been described as an "invalid" and "lame." Friends tried to dissuade him from marrying her. His response to them was, "I like her even better for her

misfortune." They never had children.

Doolittle began writing in 1870, publishing his first article in the *Apiculturist and Home Circle*. His first letter in *Gleanings* appeared in its first year of publication in 1873:

"I have got off 1600 lbs. box honey, which I have sold for 25 cts. per pound. Extracted sold for 14c. I have also worked another small apiary for half of the honey, from which I have taken 900 lbs. I have also worked a 150 acre farm with the help of one man, and to tell the truth I am nearly worked out."

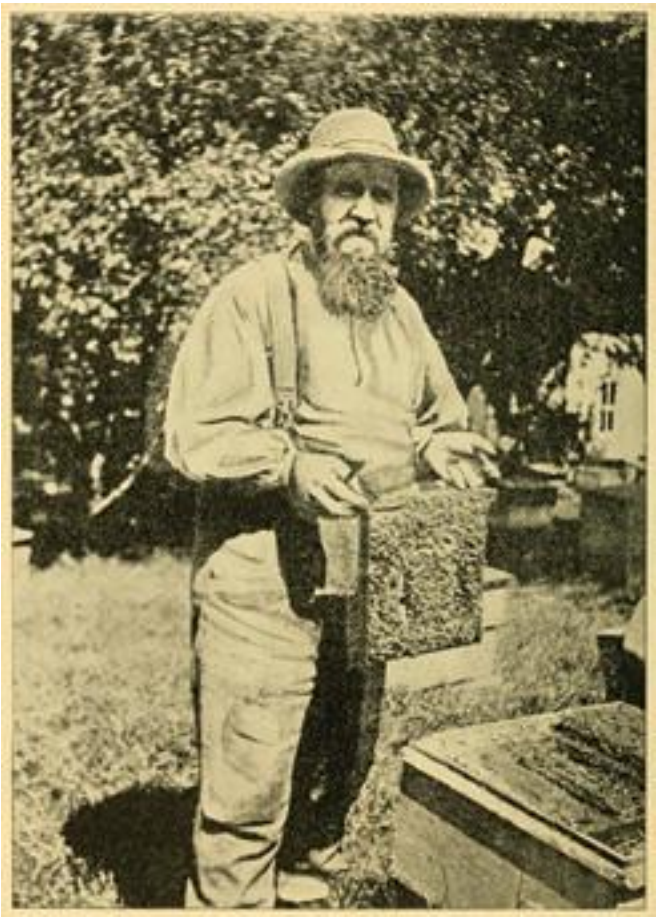
He eventually sold the farm, keeping twenty acres for his honey and queen business.

In 1880, Doolittle's father suffered an unspecified illness and needed care. Doolittle reduced his colonies from 250 to about 100. After his father's death, Doolittle supported his mother and sister. By 1907, ill health forced him to take on P.G. Clark as an assistant. Little is recorded about Clark, except that he lived in nearby Marietta and spoke at a couple bee conferences. He may have been a relation of Doolittle's wife, Frances Clark.

In 1913, Doolittle's wife suffered a stroke and he took over full care of her. He kept five colonies for relaxation, and continued to write.

One hundred years ago Doolittle died of "heat prostration complicated by having contracted a severe cold." It would be interesting to know what that would be called now. He had written his columns for the whole year during the winter months, so like a ghost he kept reappearing through the December issue of *Gleanings*, when the editor wrote,

"…the pen has now dropped from the lifeless hand, and he will appear no more in these pages, save as a quoted authority and memory."



Literary contribution to Beekeeping

Doolittle's book *Scientific Queen Rearing* introduces the artificial queen-cell cup as well as the production of queens above a regular hive with just a queen excluder between the two compartments. The book received a dubious review in *Gleanings* when it was first published. Over time it became the standard practice among queen breeders.

Doolittle also wrote two pamphlets. *The Hive I Use* describes his version of Elisha Gallup's hive with frames approximately 12 inches square. Doolittle stubbornly stuck to his Gallup hives for his queen-rearing, but used Langstroth hives in his out yard. *Rearing Queens* is a pamphlet based on articles he had published in magazines.

His last book, *A Year's Work in an Out-Apiary* first appeared in serial form in *Gleanings in Bee Culture* in 1906. It describes how he managed to harvest a maximum quantity of comb or section honey with only 12 visits to the bee yard. Most importantly, he claimed to have conquered the problem of swarming in an unsupervised bee yard. Doolittle never wrote a comprehensive, how-to-keep-bees textbook, stating that there were so many good books already, plus he already covered it all in his articles in the bee papers.

The bee papers of a century ago were like a slow version of the internet today. There was a great deal of discussion among writers, readers, and editors. Doolittle frequently ruffled feathers by challenging other beekeepers' pet theories. Some of his liveliest writing occurred when he disagreed with other beekeepers. "Truth and facts are such keen weapons that theory and error cannot stand against them."

His column in *Gleanings in Bee Culture* started out as *Seasonable Questions*. Later it was changed to *Conversations with Doolittle*. With his declining health and his wife's illness, and the fact that there is only so much you can write about bees over 48 years in seven papers without repeating yourself, his writing lost some its sparkle in the later years.

Doolittle quotes:

1907 p.392

…our time for study and preparation all along the line of bee work is during the winter months; and he who takes time by the forelock is the one the most likely to succeed."

1907 p. 623

…each season adds new thoughts, new complications, new zest, new energies, new determinations, etc., till the one great whole gives an indescribable pleasure to beekeeping not found in any other pursuit. And this pleasure can be grasped only by the one who is not turned aside by trifles. Over the door of apiculture stands written in letters of fire, "lazy and shiftless persons need not apply…"

Doolittle on Stinging – 1915

Do bees dislike black? In my younger years I accepted the idea as the truth. One day, four of us met at one of the apiaries, I wearing a black felt hat, the other three wearing straw hats. It was not long before Doolittle was the target for apparently all of the cross bees in the apiary, the bees getting on that black hat and stinging very much as they will in one's hair. Of course the trouble was in the color.

A few weeks later we met in another apiary, I wearing a white felt hat, and the others had hats of various shades, but none black. To my surprise, I was again the target for the cross bees. They stung away at that hat the same as they had done when I wore the black one. Again we met at my own apiary; and as this was a very warm day we all wore straw hats of about the same color. To my surprise, I was again the target for nearly all the cross bees we happened to stir up – not that the bees attacked my hat more, but they seemed to want to sting Doolittle more than any of the other three.

Then I concluded that their dislike was for my person. And I have found this to be so in the majority of cases wherever I have visited with beekeepers at different apiaries. I have often felt almost ashamed of myself when being obliged to hide my head in a bush or call for a veil when others had no trouble. But of this I am certain: Bees have a great antipathy toward any clothing that is fuzzy or of a hairy nature, and such should be avoided in the apiary.

Doolittle's activities regularly appeared in the local papers:

Cazenovia Republican, Sept. 30 1875

Mr. G. M. Doolittle, of Borodino, brought to this city Friday, four wagon loads of pure and beautiful honey, which he sold for twenty-five cents per pound. The combined weight of the packages was 7,000 pounds, amounting in money to $1,750 (the equivalent of approximately $38,000 in 2018).

Sometimes the papers get their facts wrong. Even Doolittle wouldn't get this sort of yield:

The Cortland Standard, August 30, 1877

G. M. Doolittle, of Borodino, Onondaga County, had sixty-seven swarms of bees at the opening of the season. He has taken four tons of box and 750 pounds of extracted honey from a single swarm. He has 157 colonies now.

NY Evening Post Aug 8, 1884

G. M. Doolittle, of Borodino, NY, has kept for the last eight or nine years an average of fifty hives in connection with the fruit business, and although taking but a small part of his time, he has averaged over $1,000 a year from the sales of his honey. Last year he took 4,000 pounds of linden honey, all of which his bees gathered from a linden forest six miles distant.

Excerpt from *The Otsego Farmer* August 15, 1890

"One lesson every successful beekeeper has to learn sooner or later…that is to keep his colonies of bees strong… look after the health and comfort of the bees rather than after honey. If they are kept healthy and strong, the honey will flow freely as a consequence…It is with bees as with birds and beasts—the better they are cared for the more valuable and profitable they become. The principles of life are about the same in all animated things."

The Skaneateles Press, August 25, 1893

G. M. Doolittle, the Borodino apiarist; has received an order for $100 worth of Italian queen bees for shipment to Australia, via the Pacific coast.

The Evening Herald Nov. 27, 1896

Natural Gas Discovered and Doolittle has a Close Shave

A group of men, including G. M. Doolittle, investigated a crevice from which issued a stream of natural gas. Fitting a blowpipe over the crevice, they boiled water, burned twigs and melted lead. Mr. Doolittle also quite unexpectedly found that gas would shave a man in less than a second.

Doolittle quotes:

"The idea that bees "work for nothing and board themselves" must be banished from our thoughts.... Successful bee-keeping means work, and lots of it, for a man with brains enough to know that he must leave no stone unturned that tends toward success."

"We are here for the good we can do, and if we know something that will be useful to our fellow-men, we should impart that knowledge to them as long as health and strength will permit."

Doolittle at the Theatre – 1898

Take a spool of white basting cotton. Drop it into your inside coat pocket, and, threading a needle with it, pass it up through the shoulder of your coat. Leave the end an inch or so long on the outside of your coat, and take off the needle. Four persons out of five will try to pick that thread off your shoulder as soon as they see it, and will pull on the spool until it actually does seem as though they are unraveling not only your clothes, but yourself.

Fixed as above, I was at a theater in Boston on one occasion. It was in the most interesting and pathetic portion of the play, when suddenly I felt something tugging at the basting cotton that I myself had clean forgotten. Half glancing around, I saw a woman – a total stranger – yanking at the thread. Her face was scarlet. She had pulled out about 10 yards, and was now hauling in hand over hand. Rip! rip! went the thread. Hand over hand she yanked it in. The aisle was full of it. "For Heaven's sake! Will it never end?" said she above her breath. I sat perfectly still while she pulled.

The whole section of the house soon got on to it. They didn't know whether to laugh at me or her, but sat and looked on amazed at the spectacle. At last as the cotton got twisted around her watch chain, over her eyeglasses, in her hair, and filled her lap, I turned around and, producing the spool from my pocket, said, 'I am sorry I misled you. You see I have about 124 yards left, but I presume that you don't care for any more tonight. The woman was a modest sort of lady in appearance. Her face was as red as fire, even to her ears. She looked at me and then at the spool. She changed color once or twice, and when the crowd caught on, the laughter was so uproarious that I almost repented me that I had done the thing, because it placed both of us in a rather ludicrous light. BC

BIGGER PICTURE

Jessica **Louque**

Red Tape Everywhere

If you've ever thought about starting your own agricultural business, from selling bee products to farmer's markets, I would definitely recommend reading some of Joel Salatin's books. He is definitely experienced in running a business with family and dealing with government bureaucracy and has a lot of advice for other people in similar predicaments. One of my favorites is *Everything I want to do is Illegal* because I feel the frustration that Salatin describes in that book. We have had so much frustration in starting up our company that I just honestly cannot fathom how any entrepreneur is able to build a successful business.

We started hitting roadblocks almost immediately. We wanted to build what would essentially be an ag building that also had some space for a kitchen, some offices, a conference room, and a couple bathrooms that also had a shower. The work we do is not the type where we have a lot of visitors, and normally we even discourage that because of confidentiality agreements during studies. Explaining what we do to the county did not go so well, and they decided we were an agrobusiness and gave us the same requirements for zoning and building as would be expected of a standard consumer business, like a Dollar General. We would have to build as commercial zoning with customer access that met all the regulations of a place that is typically frequented by the general public. There was no talking them out of this box we were now in, and we ended up not being able to move forward with this plan.

Our Plan B was renting office space and trying to renovate or secure one of the old buildings at my mom's for storage. The closest town to where we were trying to work had exactly zero rentals that were close to anything we would need. Finally, a family friend happened to realize we were looking for a place and had an office suite available. We thought we were at least on the right path. We bought most of our furniture and lab supplies and started getting set up, only to start hitting the next series of problems.

We thought we wouldn't have a lot of issues getting a business loan, but that was another entry into the "you are wrong" list. A large part of our issue is trying to explain what we do to people who have no idea people like us even exist. SO, try to imagine walking into a bank asking for an exorbitant amount of money, telling them that you have to buy thousands of dollars of equipment up front, but you will probably get enough work to pay for your loan within the year. Then you tell them that no, you don't really have but one guaranteed contract, but you can't get more work until you buy all of these things. Follow that up with trying to explain the science behind honey bee research and the cyclical nature because bees aren't particularly happy about the wintertime. Explaining that to a bank is like telling them you need a loan to go to clown college but you don't expect to pay them back at all. After about eight weeks of waiting for a response, they told us we were a giant pile of liability and they didn't understand our business plan enough to take a risk on an idea they weren't familiar with. There went a large majority of our expected starting capital. We tried a different bank after that and were able to get a credit card and a loan for a truck, but we couldn't get an extended line of credit on our account because we didn't fit a standard business model.

Our Plan C option was starting to kick into effect, which was more of a last resort, but in stages. It started by cashing out part of our retirement savings. I cannot possibly describe to you in a way that you could imagine the amount of cursing that is involved with how much of your money goes to the government. I am quite aware that there are penalties for taking out retirement early, but it does feel like everyone is trying to stop you when you can't get a loan and you are penalized for using your own money. We were fortunate to have it there to use at all. If you are wondering, your retirement accounts DO NOT seem to matter when you are applying for a loan because they consider it untouchable.

We're also running into other problems at this point because we have to move, put our kids in a new school district, and get our house on the market. Guess what we found

Family time in the bees.

Henry and George with the new four-wheeler for checking bees and moving equipment.

out! If you start a new business, you pretty much can't get a loan of ANY KIND because you don't have two years of tax returns. Continuing on the trend of Plan C, we had to continue on the retirement cash-out train to be able to have a place to live. Now, I know we could have in theory done that a lot cheaper and just rented a place to live, but in reality, it was just not an option to give up all the turkeys, chickens, ducks, guineas, and quail, plus try to fit all of us and the indoor pets into a rental home. We looked for months to find a place that was even close to suitable, but there just wasn't a lot on the market, or it would need more work than the asking price to be able to move in. In the end, we decided to build a house on land we already had. That's a hassle in its own right, but hopefully the house will be done by the time the kids need to start school. It does seem to help when you're paying with cash. As I mentioned before, we are both fortunate that we were able to save money in a retirement account to even have it for use or we would be in a terrible situation. I mean, our tax situation of paying out 40% or more of the original amount.

Now, everything is more or less running in some direction, and it looks like we can't have too many more upsets – right? Wrong. Being a new company, we have to be put in the system as a vendor for every sponsor that gives us work. We have to have a facility audit by their inspectors to prove that we meet the criteria for conducting studies and are actually capable of producing a successful study. There's also a quote acceptance and invoicing process that has to be followed. For one of our clients, being accepted as a new vendor took about two months longer than expected. We were a good few weeks behind in getting paid for a substantial amount of money (half the cost of the study to get it up and running) and had spent about a third of the money for the house on getting the study started and buying supplies. This was not the fault of the sponsor, but just another roll of red tape to wade through. We understood that and so did they, and our contact did their best to speed up the process. We were informed that if we could take a credit card, they could pay us almost immediately. I wasn't sure how that worked, so I called up the bank. Four people and a waste of time in my life later, and I had the answers to questions I didn't know I had. It turns out that the bank not only charges a more than 3% fee on any credit card transactions, including extremely large ones, but you have to have a business for over two years to be able to qualify to take credit cards as a form of payment. Let me reword that for those of you that didn't quite catch the incredulity of that statement: We had to have two years of operations before we were allowed to receive money for our work by that payment type. Now, in what way would two years make a difference in somebody trying to give us money? I don't care what's happening, if somebody wants to pay my bills or give me money, the bank should welcome them with open arms. I promise, you have my permission! Long story slightly longer, we had to go back to the sponsor and tell them we couldn't accept credit cards unless we used the Square app, which would still charge a 2.7% or higher fee on the transaction and may have a cap on the amount that they could receive. Hopefully, it comes through soon, but right now we're still waiting on a payment because we had to revert back to the check form of payment.

We have been really fortunate to be able to have funds to fall back on, family and friends to support us, and some clients that have stuck with us over the years to give us work. Overall though, starting a business has been somewhat of a nightmare and there are obstacles at every turn. It is absolutely baffling to me how the average person could ever have a dream and grow it to anything more than that with the restrictions on business and the sheer amount of money it takes to get started and roll through the appropriate paperwork and deal with taxes and money owed to the government at which times. Obviously we're happy to be in business and working on our own, but anybody who tells you it's easy to work for yourself is lying through their teeth and their pants are on fire like a flaming inferno. BC

The new truck for work.

Jessica Louque and her husband, Bobby run Louque Agricultural Enterprises, a contract research business specializing in apicultural studies.

Harvest Time

Means Removing Honey From Hives

Ross **Conrad**

Harvest Time Means Removing Honey From Hives

You have worked hard all year making sure the bees are healthy and have plenty of room to store their nectar while converting it into honey. If the season has been good (not too wet, not too dry), and you managed the colonies well by adding additional space for honey storage when needed, there should be a surplus of honey on the hive. Now is the time to realize the full benefits of your beekeeping efforts and harvest the excess honey that the bees won't need to survive the coming dearth. The first step in this process is to remove the bees from the honey supers.

Separating Bees from their honey

Unless you are using a flow hive, you will need to separate the bees from their honey. There are several options available for you to choose from when deciding how to best go about this task. The one that is best for you will depend on how many colonies you have, how much time and money you want to spend removing bees from honey supers, and how quickly you want to harvest the honey.

Shaking

Physically removing the bees from frames of honey is the simplest method of separating bees from their honey. The simplest form of physical removal is shaking the bees off the honey combs. No special equipment is required so there is no additional cost associated with this facet of the honey harvest.

Simply remove the frame to be harvested and shake the bees off the frame. This is perhaps best done with short quick jerky movements that cause the bees to lose their grip on the frame and fall off. Shake the bees off by the hive entrance so they can easily crawl back in, or shake them directly into the hive if it is open. For bees whose grip is extra strong, a strong blast of air exhaled through the mouth (such as when blowing out a candle) can blow the occasional stubborn bee off the frame.

Be sure to have an empty super or container on hand to place the bee-free comb into and quickly close the container up to discourage the bees from regaining access to the comb and trying to take back their honey.

Brushing

The next step up from shaking (and puffing) is to gently brush the bees off the combs. A bee brush can be procured for between $5-$15. Rather than shake the bees, simply brush the bees off by the hive entrance, or back into the hive. Try experimenting with different brushing techniques. While counterintuitive, brushing the bees in an upward motion may remove them more easily without injuring them better then brushing in a downward motion.

While brushing and shaking bees off individual honey combs is the lowest cost option for removing bees from their honey, it can be time consuming especially if you have more than just a few supers to harvest. Do *not* try to speed up the process by using smoke to drive bees off the combs. Doing so may impart a smoky flavor to the honey, ruining its delicate floral flavor.

Many backyard beekeepers find that a combination of shaking and brushing can be very effective for removing bees from individual frames of comb relatively easily. Once you get the rhythm down, the process can even go fairly quickly.

Fume boards

Commercial beekeepers have many colonies and pay a lot for labor, so they need to remove bees from honey supers quickly. The fastest way to clear supers of bees with the least amount of work, is to use a fume board and as a result, the fume board tends to be the bee removal process of choice for the commercial apiarist.

A fume board looks like an outer cover with cloth or felt pad attached on the inside underneath. The outer cover is typically made of metal although some of the new models use a semi-opaque plastic above the cloth. The fume board is typically four to five inches high but slightly smaller than an outer cover so that it is the same dimensions as a honey super. The typical fume board will run somewhere from $12 to $25 each.

The beekeeper soaks the cloth with a liquid chemical repellant and the fume board is placed on top of the honey super to be harvested after removing the inner cover and outer cover from the hive. As the sun warms up the metal cover of the fume board, or shines through the plastic, the liquid in the cloth evaporates creating fumes that are heavier than air. The bees don't like the smell and within a few minutes, all the bees are driven out of the honey super down into the super below. At that point, the beekeeper simply removes the super of honey and places the fume board above the next honey super to be harvested.

The fume board was invented by Charles Mraz of Middlebury, Vermont who originally used carbolic acid as the chemical repellant. A mild acid, carbolic acid (aka phenol) was the first antiseptic widely used in

surgery. In the years since, a number of chemical repellants have come on the market that are safer to use than carbolic acid.

Popular brands of repellent material are Bee Quick, Bee Go, Honey Robber, and Honey-B-Gone. Some brands give off a more pleasant odor than others, while other brands are designed to work even on cloudy days. Some of the chemicals also come with serious warnings about the damage it can do on human skin, as well as respiratory risks. For large operations that need to remove a lot of supers quickly, the efficiency of a fume board more than makes up for the cost of the boards and the repellant. For small backyard operations with a desire to reduce the use of chemicals, this option is probably not a good fit.

Blowers

Another method of physically removing bees from honey combs that is faster than shaking and brushing individual frames or combs is to blow the bees out of the supers. Bee blowers are sold by some bee supply companies. Alternatively, some beekeepers will use a leaf blower, a shop-vac that runs in reverse or even an air compressor on a low volume setting. If you don't already own a blower or shop-vac that can run in reverse, using a blower is the most expensive option for separating bees from their honey.

To blow bees out of honey supers, simply remove the honey super filled with bees from the hive and place it up on its end on a bench, table, or back of a truck. By directing air from the blower between the frames, the bees are blown out of the super. It is easiest to remove bees by blowing air between the top bars toward the bottom bars, since the bottom bars are not as wide as the top bars and this provides more space for the bees to be ejected from the super of honey. This method of separating bees from their honey is not gentle and gets the bees riled up so be sure your veil is on tight. It is also important to know where your queen is so that you don't inadvertently blow her out of the hive. Blowing bees out of honey supers should only be done during warm weather so that the bees can fly back to their colony after being ejected from their honey supers.

The metal covered fume board on the left has seen over 40 seasons of use while the newer fume board on the right, with the plastic top showing under the detaching cloth, has been used for less than 20 seasons. Clearly things are no longer made as well as they used to be.

Bee Escapes

While there were numerous attempts to invent contraptions that remove bees from honey combs, the original bee escape knows as the Porter bee escape, was perfected in the U.S. in 1891 by E.C. Porter of Lewistown, Illinois. It basically acts as a one way door allowing bees to move down through the escape, by preventing them from going back through the other way. The Porter escape is inserted into the oval hole in the inner cover. The inner cover is placed underneath the super that will be harvested 24-48 hours before you expect to remove the super. Bees will move into the brood box below the honey super and not be able to re-enter the honey super, especially if evening temperatures are cool enough to trigger clustering in the brood nest. The Bee Escape Board, or clearer board as it is sometimes called, is a larger more complex system of the same kind of one way trip out of the super. While numerous modern designs utilize square, star, vortex and other shapes, the traditional triangle design is probably the most commonly used bee escape. The escape board, or clearer board, works faster than the Porter Bee Escape, though there are reports of beekeepers increasing the speed of the Porter Bee Escape by customizing an inner cover to hold a half dozen Porter Bee Escapes at once. Bee escapes will set you back anywhere from $3 for a single Porter Bee Escape up to around $30 for an Escape or Clearer Board.

While use of the bee escape requires minimal labor, is calm and quiet working and does not rile up the bees, it does take considerable planning and attention to detail to use successfully. All bee escapes require two trips to the apiary: One to put the bee escape in place below the honey super(s); and a second, about two days later to remove the bee-free honey supers. This requires that the beekeeper account for the timing and weather conditions not only on the day you install the bee escape, but

The bee escape board (or clearer board) pictured here has openings in the corner of the triangles that are just big enough for a bee to squeeze through. Since the bees six legs prevent them from being able to pivot well, when walking along the outside edge of the triangle they have a hard time finding the opening due to the extremely sharp angle it would require them to navigate. Bees are able to travel down through the large round hole on one side easily, but are not able to move back through the other way.

on the day you remove and harvest the honey too.

It is critical that all entrances above the bee escape be closed and no cracks or other openings exist above the bee escape or bees will simply enter the empty honey super through the entrance and rob out the honey before you have a chance to harvest it yourself. This includes making sure that the outer cover is replace absolutely flat on top of the honey super and does not catch on the lip of the super inadvertently creating an opening for robbers to enter. When using the Porter Bee Escape in an inner cover with an upper entrance notched into the rim of the cover, flip the inner cover over so the notch in the rim in the inner cover is facing down and positioned below the bee escape.

It is important that no brood is in the honey supers being harvested or the nurse bees that refuse to abandon the brood will be left behind in the supers and have to be removed by blowing, brushing or shaking. I also find that there is a limit of about two shallow/medium honey supers (or one deep) that can be successfully cleared of bees within a 48 hour period. Try to remove bees from more than a couple mediums and you may find additional time is needed for all the bees leave the honey combs.

Timing

The amount of time you provide for the bee escapes to work is important especially in areas where honey combs are vulnerable to pests. Just as important though is that you plan the removal of honey from hives to coincide with a period when you will have time to extract the combs relatively soon after removal. Otherwise all your hard work may be destroyed by small hive beetles, Australian sap beetles, or wax moths.

Stragglers

No matter how you separate bee from their honey, a few bees will inevitably hitch a ride on the harvested honey combs and find their way into the honey house. These stragglers will tend to congregate in the upper corner of a window overnight. Thankfully such clusters of bees can easily be scooped into a container and thrown outside in the morning. It is a good practice to keep a hive or nucleus colony nearby during extracting time so stragglers have a place to go after being unceremoniously ejected from the honey house. Whatever you do, don't make the mistake of leaving a door or window open so the bees can find their way out on their own as the evening progresses, or you will wake up the next day to what seems like a room filled with every bee in the neighborhood all looking to take back their honey.

The honey harvest can be one of the most fun and rewarding times of the beekeeper's year, but it all starts with how well the bees are separated from their honey. BC

Ross Conrad is the author of Natural Beekeeping: Revised and Expanded Edition.

TV Proposal

Stephen **Bishop**

For those who have Netflix, I recommend for consumption: *Detectorists*. This show has nothing to do with beekeeping other than the fact that it has everything to do with beekeeping. What I mean is that detectorists and beekeepers are kindred souls. The show depicts a group of people on the outskirts who have selected a strange and often misunderstood hobby, metal detecting, and are obsessed by said hobby. If beekeepers wanted to plan an uprising against the trendy people who terrorized our youth, we would choose people who metal detect as our closest allies, followed closely by mushroom foragers.

Detectorists is a subdued, but smart comedy produced by the BBC (disclaimer: it contains much understated British swearing) with excellent acting and character development, which shouldn't be confused with *Diggers*, the contrived National Geographic "reality" show. *Detectorists* captures reality more accurately. It's depiction of the Danebury Metal Detecting Club rings true for anyone who has listened intently to hour-long discussions of such subjects as the best paint for bee boxes and the proper form for lifting hives or anyone who has participated in adult show-and-tells of hive tools and smoker fuels.

Full disclosure here, I have a soft spot for metal detecting. As a youngster, long before I compulsively lurked on Beesource (and the mysterious Bee-L), I had discovered the glory of Treasurenet, an internet forum in which people post pictures of their latest metal detecting finds. On many days, I was my dad's sidekick digger, hoping to unearth something worthy of Treasurenet. In *A Sand County Almanac*, Aldo Leopold wrote, "You do not annex a hobby, a hobby annexes you. To prescribe a hobby, would be dangerously akin to prescribing a wife – with the same probability of a happy outcome." Metal detecting chose him; beekeeping chose me.

Yet, all this attention on metal detecting has me wondering why no comedy or reality show exists about the antics of beekeepers. I suspect we beekeepers have been typecast as too serious. Certainly beekeeping has enjoyed its fair share of serious documentaries recently. In fact, I'm not sure if I can watch another end-of-the-world-as-we-know-it documentary on what ails bees. What ails bees is beekeepers like me who accidentally set hives afire with an oxalic acid wand.

Therefore, I propose we raise funds to send a beekeeper to Alaska. If Alaskan Crabbers, Alaskan State Troopers, Alaskan Truckers, Alaskan Gold Hunters, Alaskan Homesteaders, and Alaskan Bush Clan can ink a TV deal, surely Hollywood would bite if we sent Randy Oliver or Kim Flottum to the Great White North in veiled parkas. Furthermore, I can already provide free of charge a working script for the reality show:

Episode One: Hundreds of hives, a Hummerbee forklift, a pallet of beekeeping gadgets (each will only be used once), and a beekeeper arrive at the most isolated beeyard in America via parachuted air drops with the beekeeper scrambling to detangle and retrieve hives hanging from trees, all while being chased by a grizzly.

Episode Two: Beekeeper must now mill his own wood to replace the 97 hives busted and smashed in the air drop – all by nightfall, all while being chased by a grizzly.

Episode Three: Beekeeper meets skunk.

Episode Four: Beekeeper encounters rival beekeeper over the hill who has also been air lifted (coincidentally of course) in with hundreds of hives. The two beekeepers compete for territory.

Episode Five: Big game hunters confuse hives for targets and shoot hives, killing many queens and putting the whole season in jeopardy. Under cover of nightfall, the rival beekeepers unite to build a catapult. They hurl their meanest hives into the big game hunters' campsite and drive their common foe from the land.

Episode Six: Beekeeper realizes he is allergic to bees and goes into anaphylactic shock. He must be airlifted to hospital, again putting the season in jeopardy, only to learn the allergy was to peanut butter, after which he is parachuted back in and the season is saved.

Episode Seven: Revenge of the grizzly.

Episode Eight: An Eskimo municipality worries about the Zika virus and sprays for mosquitos, unknowingly raining down catastrophe on the beeyard.

Episode Nine: Beekeeper rushes to harvest honey before a once-in-a-thousand-years August snowfall.

Episode Ten: Beekeeper sells honey, loses a bunch of money, worries about paying bills – all while committing to come back next year after emerging from bankruptcy.

Discovery Channel, you can thank me later. BC

Eye Of The Bee-Holder

The Continued Buzz of Bee Movie

Ryan **McDearmont**

In our culture of information, nothing truly stays buried. Yesteryear's productions find new purchase as inspiration for the creations of today: the Netflix series *Stranger Things* and the recent film *Ready Player One* stand as sterling examples. The ideas, concepts, and images cast behind in the never-ending march of content consumption aren't forgotten or erased, but rather stored away in some distant corner of collective memory, laying dormant for another chance at relevance. When these works recycle into conscious perception, the resurfacing can be explicit and bombastic (think *Mad Max: Fury Road*), or deceptively simple. A coworker asks if you remember, say, *Gremlins 2*. Suddenly, thoughts of the movie occupy your conscious mind - thus, *Gremlins 2* is relevant again, even if only on a personal level.

Thanks to the archival nature of the internet, these pockets of pop-culture interest and relevance have grown more frequent and more unique. Whole articles and pages of the web are devoted to books, films, television shows, and other pieces of media which might have otherwise faded into obscurity without our current ease of information. Forgotten media finds new audiences as it propagates across the digital frontier through discussion, archival sites, and memes, and the ease of digital accessibility places works from the 1950s on the same playing field as works from the 2010s. A film which might not have found an audience upon its initial release goes viral, and meets a larger network of fandom which might have been too young, too uninformed, or too busy to see the movie in its first run. Sometimes, for whatever reason, this new "audience of the internet" falls far beyond the intended group for which the film was made. Such is the case with 2007's *Bee Movie*, a movie which has remained bafflingly relevant some 10 years after release.

But to state that the new, second-wave audience of *Bee Movie* exists outside the film's "intended" viewers would imply that *Bee Movie* offered the smallest shred of cohesive thought to who might be watching it. Ostensibly a children's film also meant to please adults, *Bee Movie* ping-pongs so haplessly between tone and subject matter that the resulting experience is nothing short of whiplash. Supposedly, kids enjoy *Bee Movie* for the trite, bright aesthetic and endless B-list bee puns, whereas adults should enjoy *Bee Movie* for the outdated pop culture references, adultery subplot, and – suicide jokes? By allegedly attempting to appeal to everyone, *Bee Movie* instead appeals to no-one. It's this unintentionally hilarious and extremely baffling mash of subject matter which ultimately propelled *Bee Movie* from B-movie (or even C-movie), to internet stardom.

For this, we can thank Jerry Seinfeld. Once the most well-known comedian in America, Seinfeld rightly enjoyed a wave of success thanks to *Seinfeld,* the now-iconic "show about nothing." The style of *Seinfeld* is immediately recognizable: everyday people, caught in a series of social faux pas and self-imposed blunders, try their best to hold together in ultimately inconsequential situations which are blown up to titanic events. The writing is casual, relatable, and occasionally referential, but also complex and adult, largely thanks to reliance on audience experience. How much would a kid appreciate the hilarity of being lost in a parking garage?

This manner of comedy works well in the context of *Seinfeld*. With a tight half-hour (23 minutes with commercials) to deliver the goods, the interwoven plotlines and comedic bits don't get time to languish around and eventually lose their luster, and the interactions themselves are buoyed by the incredible talent and chemistry of the main cast. *Seinfeld's* style is the purest distillation of Jerry Seinfeld's comedy, which has largely remained the same over the years. While his type of humor works well in bite-sized sitcom format, supported by other equally talented members of the production, the jokes don't fly so well when bloated to 91 minutes and dragged down by a cast which wholly lacks confidence in the material. Thus, we return to *Bee Movie*.

It's difficult to discern what Jerry Seinfeld was

thinking when he created *Bee Movie*. You can't blame him for trying. The Disney-subverting *Shrek* franchise had made it big with *Shrek 2* a few years earlier, so it's likely Dreamworks was on the prowl for more films which could satisfy kids while simultaneously entertaining adults. According to Seinfeld, the initial idea for *Bee Movie* "was a joke," but at some point the wires crossed and Dreamworks signed off on Seinfeld's apicultural apocalypse. So, the film about a bee who falls in love with a florist and sues the entire human race went into production, and was unleashed on unsuspecting audiences the 10th of November, 2007.

If you went to see *Bee Movie* opening day, you'd be forgiven for assuming the movie would be, well, good. The first trailer features a live action Jerry Seinfeld and crew attempting to film a scene of bugs on a car windshield wiper, with Chris Rock and Seinfeld himself dressed in absurd, cheap costumes of their respective insects. They exchange dry greetings and casual talk which contrasts their ridiculous situation, with Rock in particular none too happy about his role. Then, the director calls action, and suddenly the actors tumble across the giant windshield set, screaming and desperately attempting to escape the huge wipers and sprays of water. It's a *Seinfeld*-esque situation that quickly devolves into an even more nonsensical farce, and all things considered, it's pretty funny for a two-minute trailer.

Unfortunately, it also reveals the problems which would ultimately plague *Bee Movie*. While Seinfeld's comedic style comes through strong in the dialogue and set-up, it's promising something which doesn't exist. A movie about the making of a ridiculous insect-based film would be a much more entertaining premise than the insect film itself, and there's a certain tongue-in-cheek nature to the trailer that's completely devoid from *Bee Movie's* final product. In addition, there's not much to appeal to kids in this trailer. Children are smart, yes. However, so much of the humor relies on appreciating the absurdity of the situation, and familiarity with *Seinfeld*, that most kids in 2007 probably didn't get it. What else is there to laugh at? Sure, there's the slapstick element, but it can only go so far. The trailer spends a lot of time playing to adults at the expense of appealing to kids, and its this unbalanced exchange which mars *Bee Movie* as whole.

The opening segments of *Bee Movie* are abysmal, but so are the middle segments and the concluding segments. Our protagonist, Barry B. Benson (Jerry Seinfeld), graduates from college and then undergoes orientation at Honex Industries, where he learns he must pick a single job which he will work for the rest of his life. This sets him down the path to an existential crisis, where he decides he'll leave the hive instead of working as a drone until the end of his days. His internal conflict provides a springboard for the rest of the film, in which he begins a relationship with human florist Vanessa (Renée Zellweger), discovers the "theft" of honey by humans, wins a lawsuit against the human race, accidentally destabilizes the earth's ecosystem, and eventually realizes that bees and humans must work together to maintain the environment. Roll credits.

The ending message is a good one. However, after 91 minutes of infuriating bee puns, weird intimations of Barry and Vanessa's "relations," and no end of other jokes too adult for children but too strange for adults, it's a mercy that *Bee Movie* ends at all. I saw the film on its release at age 12, and I remember thinking it was okay. Not great, but certainly not horrible. Returning to it ten years later, I can barely finish it. *Bee Movie* is too unbalanced, too referential, and just too bizarre to be enjoyed. The twin spectres of disbelief and bafflement hang heavy: why did Ray Liotta need to be in the movie as himself? Was it necessary to have Barry's parents move to a hive ruled over by a "drag queen?" Why on earth does a character refer to Barry as Vanessa's "bed bug?" It's clear Seinfeld didn't adjust his tone to fit the script of a children's film. As a result, *Bee Movie* can never truly engage viewers. The wild oscillations of tone and content don't provide an easy entry into the film's world, and as such, it's never easy to sit comfortably with *Bee Movie.*

It's these alien moments which define Bee Movie. The jarring jokes become the norm, and create a hybrid,

lackluster experience which is neither a half-baked children's film, nor a mediocre adult comedy. Instead, it's a puzzle: who attempted to fit the square peg of Seinfeld's unmistakable humor into the round hole of a kid's movie about bees? Perhaps, amongst other factors, this essential enigma at the heart of *Bee Movie* is why the film has remained relevant through 2018, resurfacing into our cultural memory long after its mercifully brief moment in the spotlight.

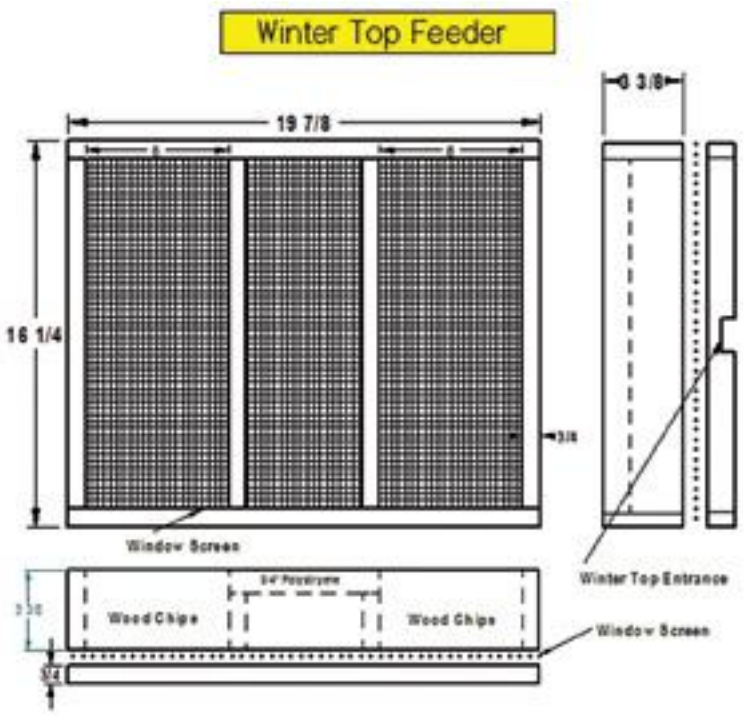
Through 2016 and 2017, *Bee Movie* found itself catapulted into relevancy once again, not as a film, but as an internet meme. Endless edits of the film surfaced, such as "The bee movie but every time they say bee it gets faster," which condenses the entire movie to a much more tolerable seven minutes. Social media users began to dissect the film, incredulously noting many of the same oddities I've detailed here. Barry B. Benson's face was plastered across platforms Twitter and Tumblr for several months, and T-shirts were made with the entire script of the film condensed to a single block of tiny text. As with most memes, it's difficult to state where exactly *Bee Movie* found its resurrection, but it's likely thanks to those who saw the film as children growing up, looking back, and saying, huh, wasn't that weird?

They're right, of course. *Bee Movie* is a truly weird film, much stranger than one might assume. It's an absolute misfire of a children's movie, and truly insufferable in its adult appeal. However, *Bee Movie* remains terrifyingly relevant. It's likely the first title someone will recall when you mention the concept of "bee films," and its propagation as a meme means that more people have likely been opposed to *Bee Movie* than *The Spirit of the Beehive* (1973), or *The Swarm* (1978), or even legitimate documentaries such as *Vanishing of the Bees* (2009). For better or worse, the world of bees in film is defined by the existence of *Bee Movie*. More so than any other work, *Bee Movie* has left an indelible mark of pop culture's perception of bees. As *Bee Movie* itself might put it, it's the bee-all and end-all. It's appropriate, in a sense. With a title as ubiquitous as *Bee Movie*, it couldn't be anything less than the reigning king of bee movies.

From *The Deadly Bees* in 1966, it took 41 years to reach *Bee Movie*, which may have once again killed the concept of bee-based films the way *The Swarm* did back in 1978. Perhaps it's for the best. With the hurried honeymakers once again having been phased out of fictional films thanks to a movie mishap, bees are free to inhabit the realms of documentaries and fact-based framing, which will likely do them far more good. It's true that *Bee Movie* ultimately posits a positive future for humans and bees alike, but the road it takes to get there is one which remains nigh unwatchable. The film's opening states, "according to all known laws of aviation, there is no way a bee should be able to fly." This is true for *Bee Movie* itself, which, despite all odds, has remained in flight across 10 long years. Let's hope it lands before too long. BC

BUILD A WINTER FEEDER

Ed **Simon**



Although not a standard section of a hive, Winter feeders can be a significant boon to your hive. By creating a box that will be insulated, have a moisture absorber and contain a top entrance, it is a one stop addition for the wintering of hives in a northern climate. Tom Bramble has been using this style Winter feeder for many of his 30+ years of beekeeping. Tom is a lifetime member and past chairman of the Southeastern Minnesota Beekeepers Association who swears on a stack of supers that this top is the best and many of his mentored beekeepers agree with him.

Some of the problems that this wintering top help solve are:

- It provides an entrance for the cleansing flights when the snow covers the bottom entrance.
- It provides a collection spot for the frost and provides ventilation for the hive when the moisture builds up.
- It provides a feeding area when you need to feed the bees, but you don't want to unwrap the hive.
- It provides an inspection area with minimal disruption of the bees.

Parts (Thickness x Width x Length)

1) ¾" x 19⅞" x 3⅛" – Sides (2)
2) ¾" x 14¾" x 3⅛" – Ends (2)
3) ¾" x 2⅜ x 14¾" – Section dividers (2) – Note: the height of this piece should be the height of the box minus 1". This allows for the polystyrene insulation cover.
4) ¾" x ¾" x 16¼" – Bottom end rims (2)
5) ¾" x ¾" x 19⅞" – Bottom side rims (2)
6) 16¼" x 19⅞" Aluminum window screen
7) ⅛" x ¾" x 16¼ – lathe (2)
8) ¾" polystyrene insulation board

Construction

We will start with a 1" x 8" x 6' or 8' pine board. Remove a ¾" strip from one side of the board and then cut the remaining board lengthwise into two equal strips. These strips provide the front, back and sides for two Winter tops. After a box is made, a window screen bottom is added and ¾" x ¾" rim pieces are added to hold the screen in place and allow for the top entrance.

Step 1: Rip cut a ¾" strip from one side of the original 7¼" wide board. This strip will provide material for the rims (parts 1 and 2) of one top.

Step 2: Using the remaining board, rip cut it into two equal strips. This should result in two lengths of board about 3⅛" wide. These strips provide the front, back and sides for two tops.

Step 3: Take one of the strips cut in step #2 and cut the two sides (parts 1) and the two ends (parts 2) from it.

Note: If you Started with an eight-foot board you should be able

to cut some the pieces described in steps #4 and #5 from the scrap lumber.

Step 4: Cut the two section dividers (parts 3).

Step 5: We can now assemble the top. Build the outside walls from the two sides (parts 1) and the two ends (parts 2). Use a good grade of exterior glue and nails or staples. Make sure the resulting box is square.

Note: If you are making a volume of hive bodies or winter tops you should consider making a "Super Jig" described in the book "Bee Equipment Essentials". It provides for the easy assembling of hive bodies and ensures the squareness of the resulting product.

Step 6: Add the two internal section dividers to the box built in step #5. One edge of the dividers needs to be even with the bottom edge of the box.

Step 7: Using a stapler, attach the window screen to the bottom of the box. The window screen can then be cut to size using a utility knife.

Note: Don't cut the window screen to size until you tack it to the box. It can stretch in an unpredictable manner.

Step 8: Using the ¾" x ¾" strip of wood cut in step #1, **c**ut to length the side and end rims (parts 3 and 4) to size.

Step 9: Cut a ⅜" deep by a ½" wide entrance notch in the center of one of the end rim parts. This will be the top exit.

Step 10: Nail or staple and glue the rim pieces to the bottom of the box. This will hold the screen in place and cover the ragged screen edges.

Note: Use a bead of glue that covers the screen. This helps holds the screen and rim in position.

Step 11: Cut two thin ⅛" thick pieces of lathe (parts #7). These will be used to cover the screen and the edges of the section dividers.

Step 12: Nail and glue pieces of lathe to the bottom of the separator boards. These cover the screen and hold it in place. The ⅛" thickness allows enough room between the tops of the frames and the top's bottom screen for bees to move to the winter exit.

Step 13: Cut a piece of polystyrene to cover the center section.

Step 14: Using your recycled paint, paint the box to your liking.

Usage

A Winter feeder is added to your hive as the top box, immediately above the bee boxes and under another moisture absorber and/or the top cover. The outside sections of the Winter top are then filled with dry wood chips or any other absorbent material to absorb the moisture in the air or as it drips from the top.

It's is horrifying that we have to fight our own government to save the environment.

Ansel Adams

KIM FLOTTUM

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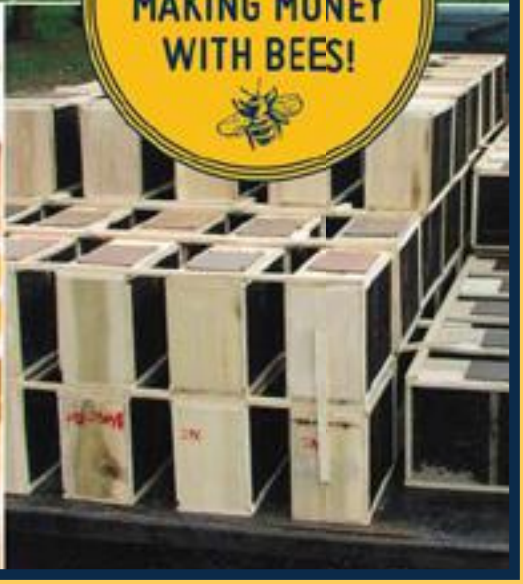

The open area in the center can be used to contain any food supplement or crystalized honey. Without breaking apart the hive, you see if the bees have eaten their way up the hive and are directly under the Winter top. At this point you know that they need to be fed. Crystalized honey, pollen patties and sugar patties can be placed directly on top of the screen, so the bees can access it.

Hint: Remember to replace the polystyrene cover over the center section to help keep the hive warm.

Alternative Construction

Unused supers or brood boxes can be cut down to a 3½" or 4" height and then modified with a screen and a rim to provide the same capabilities as the previous construction. Please be careful when sawing old hive bodies. The nails, screws or staples can dull a saw blade very quickly.

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 **SimonEdwin41@gmail.com**.

Note: The height of the Winter top can be varied depending on the width of the original material. BC

DOWNTOWN

The Good Of The Hive, The Good Of The Bees, And The Good Of Us All

"The Good of the Hive" is a quest by urban artist Matthew Willey to paint 50,000 honey bees in murals across America, and it has already connected North Dakota with New York, Florida with New Hampshire, and the wife of the Vice President, Mrs. Pence, with a third grader in Washington. Where the bees are painted, people come together to learn about and advocate for pollinators (he includes the odd butterfly, too!) and to find connection with each other through concern for the magnificent world of bees and people.

Ten years ago, as a successful muralist, Willey was struck with wonder by an incident that would have caused most beekeepers a bit of worry. While working in his Manhattan studio, he saw that a worker bee had landed, and was resting nearly motionless on his floor.

New to the beauty of bees, Matthew crept down and took a closer look. To his surprise, felt a connection (like so many of us do) and was visited by an inspiration that has since taken him around the United States as an artistic advocate for bees and the ties that bind all of us.

Willey's bee died, as most beekeepers would have predicted. Instead of shrugging, he got curious about why, and how. Two major lessons struck him deeply. In those days, Colony Collapse Disorder (CCD) was very much on everyone's mind, a kind of mysterious plague like those that sweep across history. As beekeepers know, CCD was an incredible turning point in peoples' concern about bees, and willingness to welcome them into their lives (even in odd places, like cities!)

The second surprise was that he learned of the role of "altruistic suicide" in the life of a honey bee. As beekeepers know, the bees do not permit anything dead, dirty, or diseased inside the walls of their hive, and their very life cycle – from house bee to guard to forager – causes the majority of them to die away from home, and without causing a burden or risk to her sisters who maintain the colony.

The name of Matthew's project, "The Good of the Hive," came from that lesson. He learned that a honey bee's immune system is collective: the status of the health and body of any individual bee's body is not separate from the rest, but her strength is nonetheless a critical contribution to the life of the hive.

It occurred to Willey that, as a human, that was true for him, too. All of the work in "The Good of the Hive" is linked to that idea. In 2015, he got a chance to put that vision into action.

One of Matthew's friends, knowing of his interest, sent him a video of a large blank wall on a family-owned honey company in LaBelle, Florida, and suggested that he ask whether they might want a mural of honey bees. At this time, as a full-time muralist and with a growing fascination with honey bees and their behaviors, Matthew had not yet painted a honey bee mural.

The first steps were not without complications. The honey company said that they would be delighted to have a mural, but murals were illegal in the town. They also had no money to pay for it. Willey replied that, if they got the law changed, he would come and do the mural anyway.

Several weeks later, to Matthew's surprise, the town agreed to change the law, and he raised the tiny sum of $500 from friends and went to LaBelle. The project would take 10 weeks and what happened would change the direction of Matthew's path as an artist forever.

When he got to the town, a family put him up in their RV 10 weeks for free. The coffee shop in town gave him free coffee and breakfast every single day. Restaurants gave him free food and people in the town started donating small amounts here and there. Soon, other honey companies in the U.S. donated to the mural!

In the end, the artwork was fully funded, and Matthew realized that there was a lot more going on than simply raising awareness about the importance of bees. This mural had illuminated issues surrounding honey bees way beyond the world of beekeepers and honey, but in doing so it shined a light on the beauty of the human spirit.

A remarkable conversation on site led continuing the mission. Someone asked Willey, "How many

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Clarence H. Collison

bees are in a healthy honey bee colony, 30,000 to 60,000?" They followed with, "Do you think you could paint 50,000 bees?" (There were only 17 honey bees in the first mural!)

The artist thought about it for a few seconds and replied, "I don't know. Let's see!" and "The Good of the Hive" initiative began. It would take nearly eight months to find another mural site, and at least as long to find steady financial support. Matthew ran an online crowdfunding campaign that failed, and struggled with whether it was going to be financially possible to shift the focus of his work as a muralist to his mission for bees and other pollinators.

Our community came to the rescue, too. Phyllis Stiles (Bee City USA founder) connected him with members of that great program, and it was a turning point. He was overwhelmed with inquiries about the initiative from all over the country, but North Carolina's Carrboro and Chapel Hill far exceeded the number of emails received from any other town or city. Since they were based near his part time home in Asheville, they were also close enough to hop in the car and meet them, and to perhaps have simple and economic enough logistics.

After one town council meeting where he shared his story with the Carrboro aldermen, they immediately (and unanimously) agreed to host and fund a mural in their town. Dan Schnitzer of Carrboro saw the education possibilities, and a second mural was planned for an elementary school. With those, the first two murals as a fully formed initiative were in place.

These milestones connected "The Good of the Hive" with Burt's Bees for their Culture Day in 2016, where he painted a mural at their headquarters.

Here in Washington, DC, another special project took place at the invitation of a second-grade girl. Sanah Hutchins wrote a letter to Willey after seeing a video of his work as part of the garden and honey bee education that is part of the curriculum at Janney Elementary School. When Matthew posted her letter on Instagram, the response was amazing. When Sanah's mother, Nabeeha Kazi, agreed to lead, the deal was done.

Just a few months later, when the project was done, city council members and Mrs. Karen Pence, wife of the Vice President, were there for the unveiling. The Pences have hosted beehives both at the Governor's Mansion in Indiana, and now at Observatory House in DC. The bees bring together people across our communities and our country.

And even those who came to the project only at the end were entranced. "What blows me away more than the questions is the curiosity," Willey told the crowd at the ribbon-cutting. "The idea of making all these paintings, and painting all these bees, is really to spark that curiosity to keep people interested. It's the essence of why I started doing this in the first place."

Since the success of its DC project, The Good of the Hive has done spectacular installations at Dag Hammarskjold Plaza in New York, and will soon paint a crowdfunded mural in Peterborough, NH. Willey has also painted a beautiful bee on the hearing aid of a little boy who asked for one. He has received inquiries from Maryland and back here in DC, and we cross our fingers that his message of hope and curiosity and bees comes back our way soon.

Even more exciting, The Good of the Hive has been documenting its work and the people it has reached, and it is developing a documentary about the project for which it has produced a trailer. This is an important first step it seeks the same connections and infrastructure the mural projects have found. Stay tuned about where you can see it, and maybe how you can help!

Matthew Willey lives part time in Asheville, NC when he isn't traveling the world painting murals. Visit thegoodofthehive.com to see more of Matt's incredible work, or to donate to the project. You can contact Matt directly at **matt@thegoodofthehive.com.** BC

Photos by Matthew Wiley.

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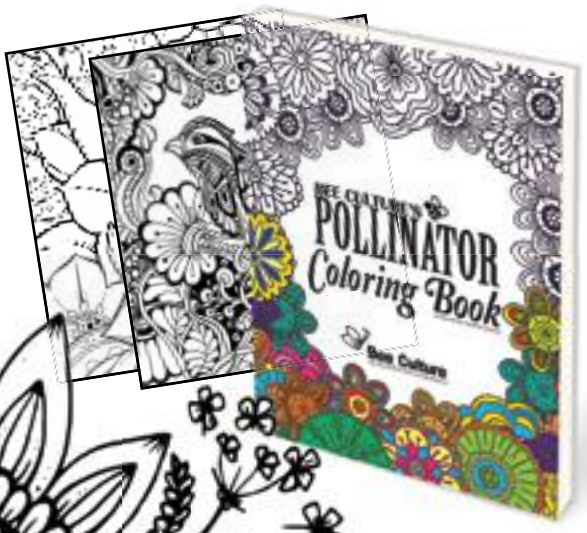

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Bee Culture

The Magazine Of American Beekeeping

Busy Days At The Farmers' Market

You have been participating in your local farmers' market for several months now. You have your table with your jars of local honey ready for sale. How are sales going now? Still the same as when the market opened for the season? Or have the number of customers declined over the last month or so? The market is definitely busy with people filling boxes and bags with beautiful tomatoes, ears of corn, lots of different summer squashes, big and little carrots and fruits. Although many of the market customers are those who have come each year for several years, new people do appear.

The woman who bought her regular yearly purchase of a squeeze bear of honey is seen every week. She told you how delicious your honey is. But she seems to only put it in her morning cup of tea. How many teaspoons in a 12-ounce bear? A 12-ounce bear contains eight fluid ounces or 48 teaspoons. Well, if a squeeze bear lasts her a year, she is not using very much in her tea. However she comes every week and buys fruits and vegetables. She certainly could use honey in recipes with those.

When the farmers' market opened for the season people did stop by your table and buy a jar or a bear. But that purchase seemed to satisfy their needs. Right now the bounty of vegetables and fruits seems to be taking their attention. Although you do have a few regular customers they still only buy a jar now and then. If the weather turns chilly in Autumn, sales might increase. But it would be nice if more of the market shoppers came to buy. There are many ways to attract customers. Now is the time to do something!

First of all you need to know the rules and regulations for your particular farmers' market. Are you allowed to give taste samples? If so then you need a way to give a small sample. A very small plastic spoon and a squeeze bear may be permitted. You do the "serving" of the taste sample to keep it under control. Now you need a trash can for the spoons and a container of water and a cloth for any drips. Unfortunately insects such as flies and yellowjackets, and even local honey bees, may be attracted. In that case, do not give taste samples this way.

If the small spoons and squeeze bear are not permitted or practical another way to provide samples would be to sell two-ounce bears. These have a small flat panel for a label. The label is necessary. It has your contact information on it. If you

Ann **Harman**

are able to collect varietal honeys, rows of bears with different colors of honey would make an attractive display for your table. The cap is flat so it can have a small label with the variety name. You might discover new customers. Many people, especially those used to "supermarket" honey, are quite surprised to learn honey naturally comes in different colors and flavors.

Here is another question to ask the market manager. Can you sell flavored honey sticks (straws) at the market? It's not your honey, of course, but they sell very well. Parents bring children to the market and the kids love the honey sticks. You may need to try several assortments of stick flavors to find which ones are popular and which ones are not. You can then just offer the popular ones. While the children (and parents, too) are selecting their sticks, the parents can be introduced to your honey varieties.

One question you may be asked by a potential customer is: "Is your honey organic?" You need to give an honest answer to that. The answer is No. You can explain that there are no standards for USDA certified organic honey produced in the USA**.** They do not exist. The official organic standards state that if you are not certified, you must not make any organic claim on the principal display panel or use the USDA organic seal anywhere on the package. A customer may comment that they saw (and maybe even bought) organic honey, labeled as such, in a store. You should then explain that the honey was imported from a country that has had its honey certified. Just remind them that your honey is local.

But don't worry. The word "local" on a product is enthusiastically accepted today. You can point out your address on your honey label. Most of those who come to the market are familiar with the town name. You can say that your hives are located near that town and that the bees forage on blossoms in that area. You can buy small labels that simply say "local honey" and put them on your containers.

Another health question can be asked. Many people have heard that eating local honey can "cure" or "prevent" hay fever, an allergic reaction to plant pollen. It is very important to make no health claims! You are not a health professional nor a doctor. You can simply say they can certainly try some honey. And add that it tastes good and can be used in many recipes. You may have a potential customer that says "I am diabetic so I think I can eat honey." Tell this person firmly, but gently, that only their doctor can say whether honey can be eaten or not. Diabetes is not just one condition. People with diabetes must follow the recommendations of their doctor.

By the way, are your jars sticky? One way to make certain is care when filling your containers. If any honey is on the threads it will slowly gather moisture from the air and slowly seep that wet honey down from the cap onto the jar. Wiping the threads with a cloth probably means that the cloth itself is depositing honey on the threads. You might not be aware of it. However shoppers really do not want to handle a slightly sticky jar. The threads of the jar must be clean, dry and free of honey before the cap is put on.

What about the containers you are using? Yes, they are one of your expenses but offering different containers may actually increase sales. Bears are generally popular and are an easy way to deliver liquid honey, especially for children. The inverted plastic jar is becoming more popular because it is not messy. You may wish to offer different sizes, such as two-pound or even five-pound jars. They are useful for those who cook with honey. The hex jars and the Muth jars make excellent containers for customers to give as gifts. The wooden honey dippers could be sold. Try different sizes and types of jars to make your honey display interesting. If your farmers' market is open into the late autumn you can promote giving honey in a fancy container as Christmas gifts. If your honey crystallizes rather quickly then selling it too far in advance for gift giving may not be a good idea.

If you usually only have liquid honey for sale you might wish to introduce customers to other forms – creamed, cut-comb, round sections and chunk honey. Creamed honey can have great appeal because it is not as messy as liquid. Honey in its comb is appreciated by a number of people but many have never tried it and thus have no idea what to do with it. It is possible to have small bite-sized pieces cut from cut-comb for customers to try. But it might be more practical to find some small plastic containers to hold a small piece cut from preparing cut-comb. They could be sold for a low price to those who wish a sample.

If you are not familiar with the National Honey Board, now is the time to get acquainted with it. It is one of the USDA marketing boards who purpose is to increase the consumption, and therefore the sales, of an agricultural product. You need to go onto the website **www.honey.com**. When the site opens scroll all the way down and look for

their e-catalog. Here you will find marketing items that can help your honey sales.

You will see two different hang tags. These have recipes using honey and can be put on all your containers, including the two-ounce bear. Then you will see various other promotional materials and the quantity you can receive free. One of the informational brochures is for kids. Then click on e-newsletter and sign up for free information and recipes throughout the year. Explore the entire NHB site so that you are familiar with it. Go back and click on Recipes and become familiar with that part of the site. New recipes are added all the time, especially seasonal ones. You can print out the recipes and make use of them.

You can select one recipe and print out a number of copies and call it your "Recipe of the Week." Make a little poster that says Recipe of the Week for your table. If someone buys honey give them a copy of the recipe and tell them there will be a different one next week. Even if they do not buy honey each week you are giving them a way to use honey. Print up some of the recipes for kids and give those away. The children might actually eat the vegetables their parents are buying. Have a collection of different recipes set aside. If someone stops at your table and you notice they bought several cucumbers (or carrots or other vegetable or fruit) offer them a recipe for the vegetable or fruit.

You will find other sources for recipes using honey, such as on the internet. In addition some of the bee equipment suppliers sell honey cookbooks. You can have an endless supply of recipes for your Recipe of the Week.

Another addition to your sales table can be the Honey Flower of the Month. Just pick some nectar-producing flower that bees visit, wrap the stem with some wet newspaper or paper towels and display it in a container on your sales table. Label the flower with its name and tell customers that bees visit these for nectar and/or pollen. The plant may start questions about the problems bees are having with forage or pesticides. Be sure you are up to date on efforts to help bees, and other pollinators, in your area. You can refer really interested people to websites such as the Xerces Society

(**www.xerces.org**) and Pollinator Partnership (**www.pollinator.org**) .

Don't be afraid to do something silly. August is the beginning of the bee's year. So find a little stuffed toy bee and put a little sign by it saying "Wish A Happy New Year to The Bees." Somebody is sure to stop, even if busy shopping, and ask about the bee's New Year. You do not have to go into great detail about the life of bees but tell them something and give them one of your Recipe of the Week handouts and hope they are interested in buying your honey.

Other honey bee products – candles, soaps, lotions, lip balms – sell very well. If you do not make any of these yourself, there is a beekeeper near you who does. That beekeeper may or may not be able to join you at the farmers' market. If not, then you can make arrangements to sell these items. If you have not used these products yourself, then try each one that you plan to sell so that you will be able to answer any questions from customers.

Just remember that when you are at the farmers' market you become an ambassador for honey bees. At the end of a day you have answered questions and listened to bee stories. As you are packing up at the end of the day, keep thinking of ways to promote honey in the kitchen. It's the magic ingredient! BC

Ann Harman lives and keeps her bees in Flint Hill, Virginia. Look for her at EAS 2018.

Honey Comb Commentary

Honey Plants, Honey, And A Bit About Using Nucs

Ray **Nabors**

The privilege of writing for the readers of *Bee Culture* has recently been granted to this writer. I have written for *Bee Culture* in the past but that was many years ago. It seems to me writing is best started at the beginning and we shall start way back. A friend of mine, an entomologist of note, was once asked, "when did you become interested in the study of insects"? His reply "at about age six." You might be amazed at how many people with doctoral degrees showed interest in their chosen subject early in life.

At the age of six, I resided out in the county. A land owner had sold a small parcel of property to a developer. Modest houses were lined up and down a few streets. In the one where I resided there was a large *Hibiscus syricus* (popularly called Rose of Sharon) in the side yard property line. I was fascinated with the honey bees gathering nectar and pollen from that profusely flowering shrub. I learned how to catch a bee in the flower, grab her by the wings at her back, let her sting my leather belt and then I could play with the bee for a long time. Unfortunately, I realized the bee always died within an hour after her stinger was removed. So, my tactics changed.

I began to use a mason jar with lid to capture the bees, flower and all. It was possible to watch the bees and they did not die so quickly. When I let them go, they all flew in the same direction. Soon I realized if they all went in the same direction they must be going somewhere, which might be their home. Then I learned to turn loose one at a time and follow that bee as far as possible then let loose another (Dr. Seeley explains this very well). Many of the largest trees had been left from the old farmstead. They were used to shade the houses. Within the next block of houses a short distance one such tree had a colony of bees near the middle in the hollow void left by heart-rot. I could climb the tree, set on a large lower limb and watch the bees coming and going. That activity provided summer time entertainment for several years.

Eventually my bee studies come to end. As I went through the early change of life, my biological interest turned to the females of my own species. Later, when my time came, I went into military service.

When I left the service, it was back to college. By that time, I had a wife and children. I studied Agricultural Biology in graduate school and did some research with honey bees. My graduate research in honey bees fueled my interest with several of my own beehives as well as the University's beehives. I have been looking into bees for a long time now.

Many beekeepers today are aging. Some have trouble handling the weight of a fully loaded standard super. Eight frame equipment has become more popular recently. A friend and fellow beekeeper, Steve Cooper, moved to the Missouri Ozarks from California. He is one of many Californians that have found the Ozark plateau both beautiful and economical. He worked for many years with Steve Taber. They raised queens for sale in nucleus colonies. He makes nucleus colonies for sale now in Missouri. He keeps all his bees in Nucleus size hives. I am fascinated with the technique. So, I must find out if this is a good way to make comb honey.

This is not the only hive style I wish to experiment with, but the other long hive idea has been put on hold until the nucleus hive is tested for honey production. The basic idea is to keep a productive colony in a nucleus hive three stories high. That is a total of 15 frames. It is enough for a hive of bees. It is also more like a hive in a hollow tree where bees rarely build more than five adjacent combs for their residence. It is, more natural for the bees and the boxes are light enough for anyone. More women and younger people are becoming interested in bees now. It is not only older beekeepers that can use these hives but probably most beekeepers that are not migratory will appreciate the convenience.

There is one thing that has not been tested with a nucleus hive. Can they be used for making honey? If bees can be increased and sold, then I suspect honey can be made. However, will these colonies make comb honey? That is the question we will attempt to answer

this season. Comb honey is a specialty product. It sells for special prices. The honey in this area is some of the best in our nation. Most of my comb honey is made from Hibiscus (*Gossypium hirsutum*) and legume (*Glycine max*). Everyone that is familiar with floral sources knows that enough hibiscus makes a fine yellow honey.

Everyone does not know that cotton is a hibiscus with large white flowers and a red center to attract honey bees. The plant also has extrafloral nectaries on the petioles and green stems. Legume honey is prized every where in the world. Legumes include clovers, vetch, alfalfa, all types of beans and many trees are legumes. We have a million acres or more of soybeans here. Apiaries here are about a mile to a mile and a half apart. We have several commercial beekeepers. This is the Delta of the largest river in North America. My honey is made where the states of Kentucky, Missouri and Tennessee come together. Kansas is always accused of being flat. This is the northern apex of the Mississippi River Delta. Our elevation is about 250 feet above sea level. It is 500 miles to the Gulf of Mexico. The River and Delta drops six inches per mile. That is flat.

The comb honey from this area comes out a light-yellow color. Pure legume honey tends toward water white. It is the cotton that gives the color. The honey flow here is primarily made on these two plants. The weeds here are so numerous in variety that we have one or more species of every weed family in North America growing in the ditches built to drain this swamp.

Most of the nucleus boxes for sale today were never intended to become hives for bees. Steve Cooper makes his own out of stock lumber. Making bee equipment out of stock lumber is usually wasteful. You cannot buy a 1" x 10" board and make a bee hive. The board is about 9.3 inches wide. A standard frame will not fit that depth, it is too tall. A 1" X 12" board must be ripped down to make the sides. My solution is different than Steve's. He makes his boxes from scratch. If you shop, you can find economy or commercial standard hive body boxes for about a dollar more than the 1" X 12" lumber will cost at the lumber shed.

My solution is to buy the standard hive bodies, cut a 1" X 12" board to a length of 19-7/8" and use that for one side of the hive box. The standard hive body box is cut in two pieces to make the other three sides. It already has frame rests on the end. This is how we can make five-frame equipment using standard stock bee equipment. It is faster than building them from scratch. It is surprising to me that beekeeping supply houses do not make a five-frame hive body. Plastic and paper nucleus boxes are not adequate for long term outdoor use.

Cotton.

The tops and bottoms for five-frame equipment is easily constructed from 1" X 10" stock lumber. A standard 1" x 10" board 8' long can be cut into four pieces 2' long making four tops or four bottoms as needed. Whenever I cut or rip a board, there is a technique I use to reduce warping. Even with bee equipment ordered from suppliers, I also use this technique. All you need is a high-grade water proof glue. Spread this glue on all the rough-cut edges. Water absorption will be restricted, and warping will be reduced. Using standard 1" x 2" stock for framing the bottom boards works fine. This lumber is ¾" thick and 1.5" wide. If you wish to make it more precise, simply rip it down so the thickness is reduced to ½". That will be about perfect for lifting the hive body off the bottom board. When you rip down 1" x 12" boards. the left-over pieces can be used to make cleats (or handles) for the ends of your new five-frame boxes. Cutting 1' x 2' boards down to 19¾" also leaves behind pieces that make good cleats. The routed hand hold in standard boxes are not present on all sides of a home fashioned five-frame hive body or super. Attaching cleats with glue and deck screws is the answer.

Shallow supers can always be fashioned in the same way as the standard hive bodies. A standard 1' x 12" board can be ripped into equal halves and will make two shallow super sides without much waste. Some shallow super boxes are a bit taller than others by an eighth inch. I center these so there is 1/16" off top and bottom. The bees will fix that little gap in no time. It will also provide ventilation. Currently, we (my bees and I) are in the process of changing from 10-frame equipment to five frames. Dr. Jim Tew, in a recent article gave some information about advantages of five-frame equipment. The interest is growing. We may see five-frame equipment available commercially soon.

Bee Good, **raymond.a.nabors@gmail.com**. BC

Soybean field.

CALENDAR

♦INTERNATIONAL♦

Propolis In Human & Bee Health will be held September 28-29 at the Park-Hotel, Moskva, Sofia, Bulgaria.

For more details, registration and abstract submission visit **www.propolisconference2018. cim.bg**.

Cuba Beekeepers Tour 2018 will be November 10-18.

Featured will be visits to apiaries, queen rearing, processing plants, research centers and more.

For more information please contact Benita Lubic CTC, President, Transeair Travel LLC, 2813 McKinley Place NW, Washington, DC 20015; 202-362-6100, 202-362-7411 Fax; **blubic@aol.com**

♦ALABAMA♦

Alabama Beekeepers Association Annual Fall Conference will be held September 21-22 at the Clanton Conference & Performing Arts Center, 1850 Lay Dam Road, Clanton.

Speakers include Jim Tew, Steve Payne, Lance Wilson and Brutz English.

For more information visit **www.alabamabeekeepers.com** or contact Bonnie at 205.559.2451.

♦CONNECTICUT♦

Back Yard Beekeepers – each month hands on inspection workshops, bee school, mentor program and more.

Speakers include September 25, Richard Coles; October 30, Dewey Caron; November 27, Bill Hesbach.

For information **visit www.backyardbeekeepers.com**.

♦GEORGIA♦

Georgia Beekeepers Association Meeting will be September 27-29 at the Forsyth Conference Center in Cumming.

Keynote speakers include Maryann Frazier, Jerry Hayes, Izzy Hill, and Julianna Rangel. In additional there will be a catered dinner with guest lecturer, 12 breakout sessions covering a wide variety of topics. We will have our annual honey show and a large grop of beekeeper suppliers.

For information visit **www.gabeekeeping.com**.

♦MASSACHUSETTS♦

Mass Bee Fall Meeting ill be November 17 in Bristol County.

Speakers are Jamie Ellis and Sam Ramsey.

For information visit **www.massbee.com**.

♦NEW YORK♦

Community Celebration of National Honey Month September 8 at Adams Fairacre Farms, 160 Old Post Road, Wappingers Falls, 9:00 a.m. to 4:00 p.m.

Lectures/vendors/displays/discussions/crating/bee kool bee school for kids.

For more information visit **www.adamsfarms.com or all 8453554.4306.**

♦OHIO♦

Lorain County Beekeepers, How To Collect, Process, Clean and Store Propolis, November 9, presented by Jeannie Saum, at Life Church, Graftong. Meeting starts at 7:00 p.m.

For information visit **www.loraincountybeekeepers.org.**

2019 Bee Culture Calendar Contest

Don't forget the 2019 *Bee Culture* Calendar contest! The topic is All Things Royal – Queens! Retinues, laying eggs, emerging from cells, being fed, Mating – that would be a sure one, as would a drone comet with a queen in front, queens fighting, anything and everything queens, queen banks, queen cells, grafting queens, caging queens, holding a queen in your hand, marking queens. If you got a queen you got a picture. All Things Royal. Don't forget! Send your photos as JPG attachments in an email, only 1 per email, to **Kim@BeeCulture.com**. If your photo is too large it won't come through. We will respond if we get your photo. If you do not hear back from us we did not get it. Reduce the size/resolution and send again. **With every photo you send include name, address, phone, or we can't use your photo.**

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I was a little surprised when the quote for "beekeeper" insurance for the Colorado Beekeepers came in at $1,450 for a three-day meeting and "bee college" in June.

We planned to look at some bees at our get-together. The first time I brought up "bee sting," the agent launched into a spirited description of how a good lawyer could muddy the water sufficiently so that there would be no way an injured party could prove that the offending bee was indeed your bee.

I said go ahead and give me your quote. He asked me a million questions and then took four days to get back to me. At this point we were within 24 hours of our beekeeper rendezvous.

When the policy description arrived, sticker shock set in, and I pretty much decided on the spot that CSBA would not pay $1,450 for insurance for a three-day weekend. But as a matter of due diligence I looked over the policy. I immediately noticed that there was an exclusion for injury caused by animals. My satellite phone service was giving me fits, so I emailed the agent asking if the insurance compay considered bees to be "animals," which they are. What good is "beekeeper insurance" that excludes coverage for stings?

He didn't write back. He called instead. He gave me the same pitch he did the time before, but in more detail. He explained that the CSBA policy would provide legal defense for a "stinging incident," up to $25,000. There was no way a bee-stung plaintiff would get past their battery of attorneys. I said, "OK, but what if the plaintiff did in fact convince a jury that the offending bee was a CSBA bee? Would you cover us?" That would be a "gray area," he opined.

I didn't even blow my stack. I'm getting better at that. Instead I told him I had other options for a weekend of insurance. This outfit specializes in "event" insurance. They didn't offer bee sting insurance, but their policy satisfied the CSBA's concerns in every other regard, and it was only $150. And hey, we're all beekeepers, right? We're not going to rush to hire ia lawyer if we get stung, are we?

We held the bee college pretty much in our front yard, so naturally I got to do all the planning. I got a little agitated at times. Finally the gal Marilyn said, "Look, this is just like finals. You study, you do your best, and then one day you wake up, and it's finals day, and you either pass or you don't. You'll do fine."

Friday was the kickoff barbecue at the farm, and Marilyn had to drive her school bus on this, the last day of the school year. Flyin' Barb drove up Thursday night from Colorado Springs to pitch in. Bright and early Friday we picked up tables and chairs from Nanci and Paul's place. Then Barb commenced to scrub and clean. She never made any wisecracks about the general disarray of Colby Farm, or the fly-by-the-seat-of-our-pants way Marilyn and I operate. You never met a kinder, more giving person than Flyin' Barb.

Speaking of flying, as our beekeeper commercial pilot reached for a refill of her wine glass, I remarked, "Guys, watch out if you have to get on a plane this weekend."

"The rule is 'Eight hours from bottle to throttle'" Jewels shot back.

I had to find a sub to fill in for a bee researcher rock star who had to cancel at the 11th hour. On Saturday, Utah state bee inspector Stephen Stanko gave solid nuts and bolts presentations on *Varroa* mites and American foulbrood. Derrick was so impressed, he said, "I'm glad that other guy canceled. Stephen was really good!" And Derrick knows bees. Any time Derrick offers an opinion on bees or beekeeping, you'd better listen.

We had a beekeeper roundtable featuring two commercial beekeepers Paul Limbach and Derrick, and sideliner John Hartley. I got the roundtable idea from the American Beekeeping Federation roundtables at their annual meetings. People get to ask whatever's on their mind, and I wish I'd budgeted more time for this.

At the field session at Paul's place, we looked at diseased bee frames, lit smokers, and alcohol washed and sugar-shook for mites.

Then, a banquet! Our caterer Cori can cook! Every course with a honey theme. Mead pairings with just enough honey wine to enjoy, but not enough for the ditch.

I tried to get a good night sleep Saturday night, but it wasn't over yet! Sunday morning early we cooked breakfast for the Colby Farm yard campers and lit out for the Flat Tops.

Paul provided a list of high altitude flowers that honey bees like and that you maybe never heard of. We found lupine, wild geranium, snowberry and dwarf waterleaf, the bundle of tiny purple florets from which honey bees make water-white honey. At Derrick's Clark Ridge apiary at 9,500 feet, we tasted that pale, delicate honey.

Paul does not seek attention. Rather, beekeepers are drawn to him. His encyclopedic knowledge of bees, his easygoing manner, and his never-failing inclination to share with others make him easily the most popular member of the Colorado State Beekeepers Association.

So we pulled off the bee college, OK? It ended yesterday, and it took time away from my bees. This evening I did mite tests. Five hives tested zero, zero, one, 10, and finally 30 mites in 300-bee sugar-shake samples. Thirty mites on June 11? Oh, boy! Here we go!

Ed **Colby**

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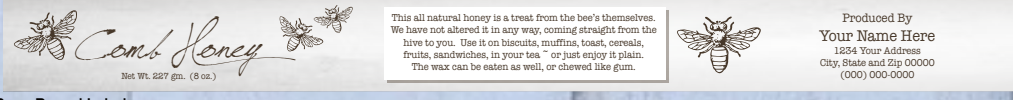

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12 oz Panel Bears $114.95/400 ct. Case No Caps
16 oz Panel Bears $94.69/240 ct. Case No Caps
24 oz Panel Bears $89.50/195 ct. Case No Caps

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*Each HopGuard II kit contains 24 ready-to-use strips. **HopGuard II is approved for use during the honey flow**. Simply add HopGuard II to hives at the rate of two strips per 10 frames of bees. Hang strips between brood frames. Refer to the package for further instructions.*

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