Jan 2011

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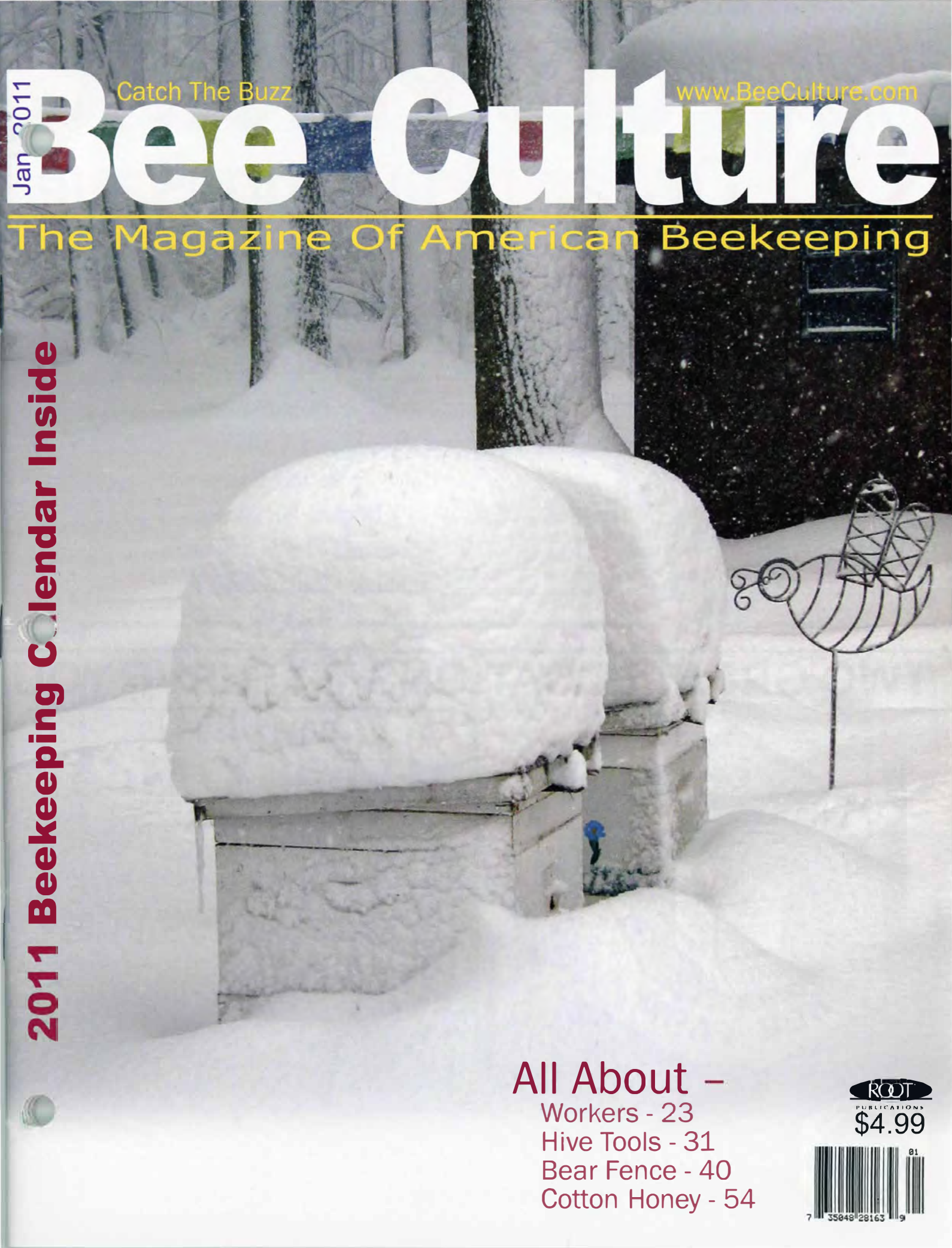
Bee Culture

The Magazine Of American Beekeeping



2011 Beekeeping Calendar Inside

All About –

ROOT PUBLICATIONS
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Winter time bees need enough food in the right place to last until Spring nectar and pollen flows begin. If you're not sure if your bees have enough, check as soon as you can. If not – feed with honey or fondant so they don't starve just a week away from Spring.

This Winter Wonderland photo is by Jeff Bryer, and was a runner up in our Calendar photo contest.

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Bee Culture

FEATURES . . .

DEPARTMENTS & COLUMNS

SHB Traps

Here are a few of my SHB experiences this Summer. The first trap I tried was the Freeman trap. It has a nice white tray, which should be black, on the bottom board but no way to keep my friendly Possum from dragging it out and licking it clean as a whistle. He showed up nicely on my game camera. Now I know the reason I cannot use bottom board feeders. Always torn out.

I next tried the West beetle trap. It sits on the bottom board too, but is black. It is slanted in the front so I guess ole possum couldn't get a hold on it. Anyway, putting two eye bolts on the bottom board with a bolt through them keeps the animals out. I could tell I was getting a few beetles in the West trap.

My best deal seems to be the inner trap. I have not had much luck with Dr. Hood's trap. I am getting too old to do much hive lifting so putting them in a bottom super is usually not good. Putting it in the top super is okay but you lose a frame space and I run nine frames. The Beetle Blaster and AJ's traps seem the most productive. Some problems exist. The SHB's are smart. They hide under the lip of the Beetle Blaster on top of the top of the frame rail. I get five to 10 under the lip every time I remove the inner cover. AJ's trap seems to catch a few internally as does the Blaster but for old guys like me, the dexterity of the arthritic hands is challenging. I am not putting a bit of pollen patty in the bottom of this trap since I know SHBs love it. I'll do some more work on this next Summer, if me and the bees are still around.

Dick Largen
Bethalto, IL

Bees In Town

We all know that when we live in urban settings, we need to locate our hives in spots that do not interfere with regular folks.

Some city laws are pro bee and some are not. Most that are, demand registration, a setback from neighbors, a solid enclosure, and a water source provided close by. These are all good ideas anyway, since officials tend to favor the opinion of the general public and just see bees as stinging insects.

For the hobby beekeeper, these rules are just fine if we can have the pleasure of a hive in the backyard. I found that when I moved to town, an out yard several miles away was not convenient or as fun. I find it a pleasure to be able to pull up a chair and watch them when taking a break.

My hive location at our present home is next to the alley, by my shop. A six-foot enclosure with gate to match the fence looked good, but I was concerned about the trash guy getting offended, so I extended it another four foot with 2 x 4s and screen.

I used plastic on the fence behind them to make it so they would not leak through to the alley, but I plan to change it to screen for better ventilation.

The end result is a 10 foot high flight path that will not bother anyone. I plan to grow vines on the outside next to the alley to make them less obvious next year.

Don't forget to give honey to each of your neighbors.

Frank Grover
Boise, ID

Bee Trucks

I am one of the sissy-boys from the city (born in the Bronx) Neil Shelton writes about in his primer on bee trucks. Upon moving to the country, my first truck was a second-hand Datsun, an otherwise decent truck except for the fact it rusted out faster than a swarm gets away. My first full-size pick-up was a used Jeep J-10 (I think they wrote the Lemon Law modeled on this truck). Everything went wrong. The engine caught fire one time hauling firewood in the dead of Winter; thank goodness I was able to extinquish it in a panic by throwing armloads of snow on the engine.

But I really learned about beekeeping and bee trucks while serving in the Peace Corps in Central America (did you know that trucks exported to the tropics have no heaters?). The project I was working on – a C.A.R.E.-sponsored Beekeeping Extension and Research Project (B.E.R.P.) – demanded transportation and I was loaned a government-abused Ford F-100 which had rarely been maintained but turned out to be the best truck I never owned. I drove through water so deep there was six inches on the floorboards (inside the cab!) and it never stalled out. I nicked a tree with my rear bumper which permanently changed the aspect of the vehicle going down the road - the rear wheels were not in line with the front wheels - it was like I was going down the road cockeyed. People would wave at me frantically and yell, "Centerbolt!" (whatever that means) and I'd give them a big smile, shrug my shoulders and keep on truckin'.

I think the point Neil wants to make is that your truck should

serve your purpose. I know beekeepers who haul trailers of colonies for pollination. I know beekeepers who drive south every spring to pick up packages and nucs. I know one beekeeper who never harvests a drop of honey, who only raises bees to sell for apitherapy. And I once helped a hobby beekeeper load two colonies into the trunk of a Lincoln Continental (with a Grateful Dead bumper sticker!). These days I have an 18-year-old F-150, four-wheel drive, six-cylinder engine, with a five-speed manual transmission and 225,000 miles. For a sideliner, it's a good truck for moving bees and hauling supers. It carries 10 hives with stands or 30 full supers (loaded!). But much of my time is spent driving around to bee yards and 14 miles per gallon just doesn't cut it. So last Summer I found a Toyota Tacoma, 4WD, four-cylinder, five-speed transmission with 86,000 miles. It gets 23 miles per gallon and serves the purpose. Yeah, I know, I now have TWO trucks - that's a danger Neil neglected to mention. If you're going to keep bees in several locations, you need to consider the price of gas.

Finally, be mentally prepared to let your truck be a work truck. Honey, wax and propolis will cover not only the bed but door handles, steering wheel, gear shift and seat covers. Bee poop will stain the finish. The cab will be littered with bee gear, double that if you have an extended cab. The truck will perpetually be muddy, duct tape will be your best friend. Just check out the parking lot at your next bee meeting (state meetings especially instructive) and you will get a good idea what you're in for. But remember, trucks are just hive tools with wheels; beekeepers may love their trucks, but the bees come first.

David Papke
Stewartstown, PA

INNER COVER

Welcome to a new decade, and will it be Two Thousand Eleven, or Twenty Eleven? It's shorter by a third to say twenty eleven... Does it make much difference? Maybe.

This is leading somewhere. Most of the magazines I read are news related – mostly because I enjoy reading news a lot more than listening to people tell me about it. I don't read many magazines that aren't news. Well, this one. And the *Bee Journal*. The rest of the Ag magazines I read are really news magazines about different ag industries . . . fruits and nuts, vegetables, food safety, water use, land use, the politics of government money, congress watchdog stuff, . . . there's not much how-to in most of them . . .

Time, Newsweek, U. S. News, and *The Economist* lead the way for me. They are weeklies, and like many of you I know what day they should arrive and I'm a bit peeved when they don't. It better be here tomorrow is always the first thought . . . and then a silent curse towards the delivery gods.

Every year about this time they all sum up some of the things that happened this past year. The summing up is usually interesting, mostly as I get to recall the less than earth shaking events that went by the way side as the A+ events pushed them off the front page. Obituaries are like that. What notable people aren't here anymore that I used to watch, read or listen to that I grew up with . . . geeze, some of them have been a part of my whole life, and some haven't been here as long as I have . . . it's always a bit unsettling.

This year they made comments about the coming year . . . remember going from 1999 to 2000 and Y2K? This year isn't nearly as notable as a special year . . . going from the decade of 2001 to 2010 to the next 10 starting with 2011 . . . no big deal, really. But one of the writers in *The Economist* did make a point about 2011 . . . the Elevens, as he put it. There will be an 11:11:11 in November . . . Armistice Day will be special, certainly. And I'm old enough to remember 6:6:66, all the way to, now, 11:11:11. And there's a lot of palindromes associated with it . . . palindromes . . . words, or numbers that read the same forward or backward.

For instance, 11 x 11 is 121, and 111 x 111 is 12,321, and 11,111 x 11,111 is 123,454,321, and so on.

When it comes to making predictions they talk about how to fix the economy, politics and politicians, elections and those running and not running, global climate change effects, internet advances, security issues, who has the bomb and what they might do with it now, new diseases and pests for people and everything else, agriculture and food security, banks and finance, what science will provide and not provide this year, how we are affected by and how we affect other countries about all the things just mentioned. And finally, the brave ones will predict what won't be here (or will be rapidly on the way out) at the end of the year. The winner of that somewhat somber prize is the incandescent light bulb. Who would have thought that?

If you save these from year to year, and I do most years, you can check to see how well the predictors did. That some things will happen is a given . . . and some never get close. If you are a gambler – betting money that congress will or won't do something that affects your business for instance – winning this game can be important. For most of us it's entertainment.

So with that spirit in mind, here's a few of my predictions for the beekeeping industry, based on conversations with folks close to certain situations, how other closely related agriculture groups are doing, recent political events – local, national and international, and things I think will happen . . . just because. I've heard this called a WAG . . . a Wild A**ed Guess, and that's not too far from the truth.

So here goes. The quality of queens won't improve much this year. There's too much going against queen producers for them to be able to do a good job, but a good-weather Spring will help. Since beekeepers won't pay what a good queen's worth . . . you'll often get what you pay for – a bug not worth the time it takes to install. This is one of those things that's a given by the way. Get a clue . . . buy a queen that's worth the money, if you can find one.

Early queens will be harder to get. Hawaii is sinking under the weight of all the small hive beetles they have munching on beehives and rotten fruit, and they're not going to get any better any time soon. They are worse there than anything you can imagine. And Australia is . . . for the moment, off the map as a supplier. *Cerena* is a curse and we don't want it here. So where will those new queens come from in March and April? You need to raise your own this year. Start now.

Scientists tell us, now, that breeding bees resistant to varroa is nearly impossible because of how the genetics of bees work...just can't be done they say . . . too many recessive genes, too many variables, too much work to keep it working. With the genome already solved, and the advances out of Montana and the U.S. Army, Minnesota and Baton Rouge, I think it can be done, and I think it will be done . . . this year. It won't be available for a bit . . . and then, once turned over to the queen producing industry it will disappear. Mostly. Too bad. But the little guys will succeed though, like the Russian program. Get to know one of them.

Where does your honey come from? This year you'll know, for sure. All those tests that can be done, and the gang of four (or is it more now?) that want to make sure honey from Hong Kong was really produced in Hong Kong is getting feisty. It'll make life interesting for the importers, and difficult for the cheaters and the crooks.

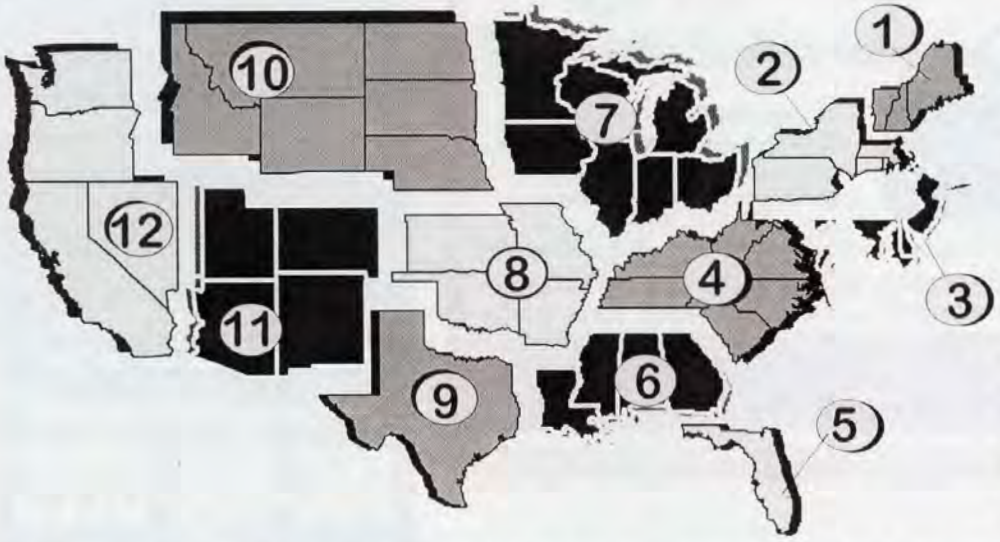
There's a group out there that want to make the honey bee a national resource . . . like water, soil and air. They'll get their wish this year because somewhere there's going to be a major crop failure because there weren't enough honey bees to pollinate the crop. Maybe almonds, maybe watermelon, maybe apples in New York . . . somewhere some bunch of growers are going to be seriously hurt because of the effects of climate change and lack of pollinators. It hasn't really happened yet, but this year the government will finally have to listen.

Even more stubborn cities will

Continued on Page 62

Twenty Eleven.
Happy
New Year.

JANUARY – REGIONAL HONEY PRICE REPORT



The Way It Was, And Will Be in 2011

We surveyed our reporters this month with two sets of questions. The first was a quick review of how this past season went.

The first question asked how things were, generally, now. 66% are pleased with their respective situations, or at least feel that they are about right, all things considered…weather, production and the rest. Fully two thirds…that's impressive we think.

Then we asked about prices. Fully 83% think prices are right about where they should be, considering their costs and the amount of work involved. So inspite of what some think (well, 17% think prices are too low), it seems that honey isn't doing too bad.

We also asked about the condition of the colonies going into winter. 44% are pleased with the condition of their bees this fall…better than in the past several years. 45% think they look about the same as most years…some great, most average, a few bad. Only 11% are worried because they don't look good – it was a hard fall, not much honey stored, very little pollen…

Finally, we asked about plans for next year. Fully 41% plan on expanding next year. That is a very promising figure from where we sit. 51% plan to keep the status quo and not move up or down, and that's good news too. And, of course, 9% plan to downsize…mostly because they are phasing out of the business due to health or other reasonable reasons.

Then, if given the chance, what one piece of advice would they offer to other beekeepers. I wish we could list them all because they are all great, but here are the most, and the best…

Hang in there, it's getting better; Pray; keep your day job; get rid of the gloves; harvest early and light; buy local queens; don't over medicate; be on time, but better be early; the most offered advice – Pay attention to your bees. Test, and then treat for *Varroa* if needed; expect losses; expect to have fun; spend more time with fewer bees; know your costs and sell at a profit; be frugal; many said to learn all you can; make splits because prices are increasing; expand gradually and enjoy the trip; all beekeeping is local; be patient; keep your colonies strong; plan ahead; use a single brood box, not two; feed heavy when feeding is necessary; many suggested to treat if needed, on time; make summer splits; leave lots of honey on in the fall for winter use, and finally, stay away from places that use pesticides.

All good advice…do all of these, and I guarantee you, you'll be in better shape next year than in many years…

Happy New Year!

	REPORTING REGIONS												SUMMARY		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Year
EXTRACTED HONEY PRICES SOLD BULK TO PACKERS OR PROCESSORS																
55 Gal. Drum, Light	1.67	1.85	1.67	1.53	1.55	1.65	1.68	1.65	1.67	1.58	1.55	1.58	1.53-1.85	1.63	1.65	1.55
55 Gal. Drum, Ambr	1.66	1.75	1.50	1.51	1.45	1.51	1.83	1.65	1.40	1.66	1.49	1.55	1.40-1.83	1.58	1.59	1.45
60# Light (retail)	130.00	160.00	125.00	135.60	120.00	142.50	131.50	145.00	135.00	112.95	144.80	170.00	112.95-170.00	137.70	137.68	131.96
60# Amber (retail)	130.00	150.00	115.00	133.60	120.00	150.50	119.50	146.67	100.00	139.36	137.33	163.15	100.00-163.15	133.76	137.06	122.70
WHOLESALE PRICES SOLD TO STORES OR DISTRIBUTORS IN CASE LOTS																
1/2# 24/case	55.20	67.65	59.40	53.90	69.77	53.75	50.00	69.77	69.77	64.00	52.65	83.40	50.00-83.40	62.44	60.29	63.13
1# 24/case	85.56	107.68	76.20	69.45	98.00	83.78	75.20	90.42	72.00	99.84	73.11	102.43	69.45-107.68	86.14	85.18	78.32
2# 12/case	73.80	81.85	68.85	62.33	94.50	75.05	66.20	93.00	68.50	81.00	65.00	83.68	62.33-94.50	76.15	74.50	66.87
12.oz. Plas. 24/cs	68.16	94.78	66.50	64.00	60.00	75.72	60.40	79.20	66.00	60.60	70.36	74.65	60.00-94.78	70.03	68.06	62.33
5# 6/case	99.81	95.98	78.90	72.38	84.00	78.62	75.47	81.00	72.00	75.60	73.05	96.00	72.00-99.81	81.90	84.71	77.64
Quarts 12/case	109.64	136.50	112.20	98.90	96.00	91.74	90.00	101.25	126.00	120.06	93.96	122.00	90.00-136.50	108.19	106.82	103.71
Pints 12/case	73.19	76.98	66.00	62.25	68.00	64.17	76.80	62.85	96.00	70.20	64.50	72.00	62.25-96.00	71.08	68.83	59.19
RETAIL SHELF PRICES																
1/2#	3.00	4.08	2.94	3.26	3.39	1.90	3.29	1.79	3.19	3.15	3.02	5.16	1.79-5.16	3.18	3.37	3.36
12 oz. Plastic	3.50	4.74	2.96	3.65	4.55	4.37	4.05	4.03	3.65	3.75	4.04	4.66	2.96-4.74	4.00	3.93	3.74
1# Glass/Plastic	4.38	5.59	5.02	4.64	5.96	5.00	4.88	5.12	4.24	5.63	5.22	6.45	4.24-6.45	5.18	5.21	4.83
2# Glass/Plastic	7.50	7.99	9.22	7.71	9.05	7.65	7.76	8.85	7.26	9.40	8.52	10.75	7.26-10.75	8.47	8.48	7.98
Pint	7.93	8.48	6.50	6.49	6.60	7.09	6.77	6.84	9.00	7.50	7.43	9.12	6.49-9.12	7.48	7.57	7.36
Quart	11.75	13.65	11.00	10.30	12.00	10.63	9.35	10.95	12.00	13.43	10.28	15.87	9.35-15.87	11.77	12.50	11.65
5# Glass/Plastic	18.50	16.93	19.53	15.93	21.00	14.86	15.43	19.66	18.00	16.95	19.24	19.00	14.86-21.00	17.92	19.46	17.97
1# Cream	6.49	6.86	6.50	5.99	6.49	5.17	5.78	5.19	6.49	5.33	6.29	7.75	5.17-7.75	6.19	5.85	5.75
1# Cut Comb	6.50	5.98	6.50	5.46	7.02	5.83	6.44	6.50	7.02	6.00	7.12	8.62	5.46-8.62	6.58	7.40	6.71
Ross Round	6.20	5.23	6.50	5.33	6.20	6.50	5.33	6.00	6.20	6.20	6.33	8.62	5.23-8.62	6.22	6.50	7.02
Wholesale Wax (Lt)	2.25	3.85	2.75	2.96	2.15	3.30	3.19	3.94	5.50	4.00	3.34	4.00	2.15-5.50	3.44	3.93	4.03
Wholesale Wax (Dk)	2.25	3.15	2.75	2.80	2.00	3.48	3.37	3.50	4.50	3.64	3.00	3.38	2.00-4.50	3.15	3.51	3.11
Pollination Fee/Col.	90.00	105.00	70.00	42.00	125.00	62.50	53.00	75.00	88.85	88.85	69.00	107.50	42.00-125.00	81.39	82.06	72.48

A Closer Look

THERMOREGULATION

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

It pays to stay warm.

The internal temperature of a honey bee colony ranges from 31°C (87.8°F) in the peripheral areas to 36°C (96.8°F) in the brood nest, regardless of ambient environmental conditions. The process by which worker bees maintain a near-constant hive temperature is called 'thermoregulation', and it is crucial to the proper development of larvae to adults. Capped pupae are especially sensitive to drastic changes in temperature. If the brood area remains below 32°C (89.6°F) for too long, there is a high incidence of deformed wings, legs and abdomens, and emerged adults may exhibit neurological and behavioral abnormalities; eggs and larvae in open cells are less sensitive to prolonged drops in temperature. Brood nest temperatures above 36°C for any prolonged period are equally detrimental to brood (Yang et al. 2010). Thus, thermoregulation is a high priority in colonies rearing brood, but more variable in the absence of brood (Stabentheiner et al. 2010).

Summertime thermoregulation is achieved through evaporative cooling. Workers collect water and deposit it in empty cells within the brood chamber, then fan the water vigorously. Water collection is a specialized task, like pollen or nectar foraging, and bees assigned to this task appear to perform only duties related to hive cooling. Kühnholz and Seeley (1997) studied the behavior of water-collectors in honey bee colonies, and reported an increase in the number of water collectors during a heat-stress event. Heat lamps were used to bring brood nest temperatures up to approximately 42.5°C (108.5°F), and the number of water collectors rose slowly but steadily until well after the peak temperature was reached. However, when heat lamps were turned off, water collection dropped abruptly. Water-collecting bees passed their loads off to water-receiving bees at the hive entrance, rather than taking it inside themselves. Water receivers tended to deposit their water loads in empty cells in the brood nest, smearing it on the cell sides and ceilings. They also occasionally ventilated the hive by fanning.

To the observer, the act of hive cooling is demonstrated by a line of bees stretched across the hive entrance fanning their wings furiously. Within the brood nest, fanning workers form chains facing the same direction to move air over their developing young. The direction in which worker bees circulate air from the hive entrance differs among species of honey bees: *Apis cerana* orients itself head-in-tail-out at the hive entrance and fans cool ambient air into the hive; *Apis mellifera* faces the opposite direction and fans hot air out of the hive. Yang et al. (2010) attempted to elucidate this difference in interspecific hive cooling by studying the effects of combining the two species into a single colony and comparing their behavior with two pure colonies. Their research looked at the following behaviors in hybrid colonies: 1) whether workers of both species ventilated at the hive entrance; 2) if they fanned with their natural body posture, or adopted the posture of the other species; and 3) whether their ventilation efficiency improved or worsened compared to a single-species colony. Experimental colonies were established with either an *A. cerana* queen or an *A. mellifera* queen, and both *A. mellifera* and *A.*

"To the observer, the act of hive cooling is demonstrated by a line of bees stretched across the hive entrance fanning their wings furiously."

cerana workers. Pure colonies of each species served as controls. Test hives were fitted with small heaters and brought to an internal temperature of 38°C (100.4°F). At this point the heaters were removed and cooling behavior of the bees was recorded until temperatures returned to normal. In all mixed colonies, each species retained their natural cooling posture at the hive entrance: *A. mellifera*, head out; *A. cerana*, head in. Interestingly, there were significantly more *A. cerana* than *A. mellifera* fanning at the entrance in both types of mixed colonies, regardless of the queen species. A comparison of control colonies showed that pure *A. cerana* colonies solicited a significantly greater number of entrance fanners and were more sensitive than *A. mellifera* to temperature changes in the hive, which was exhibited in the early-onset of fanning when the hive was heated. However, *A. mellifera* were able to cool their hives faster on average (55 minutes, versus 67 minutes for A. cerana) and with fewer workers fanning, indicating that drawing hot air out of the hive is more efficient than forcing cool air in. Results of the study showed a decrease in cooling economy in mixed-species compared to pure *A. mellifera* colonies, but similar cooling efficacy in mixed and pure *A. cerana* colonies.

Thermoregulation behaviors can also vary within a single species of honey bee. Genetic variation among patrilines (lines of bees derived from genetically different drones) was shown to have a significant effect on the ability of workers to keep brood temperatures stable. Jones et al. (2004) compared the thermoregulation efficiencies of colonies with a single patriline to those having multiple patrilines. Colonies were assessed for their ability to achieve and maintain a proper temperature in the brood nest (approx 35°C) when the ambient temperature was raised to 40°C. Uniform patriline colonies had a significantly higher variance than non-uniform colonies with respect to the mean temperature. In addition, two colonies of five-patrilines each were observed for differences in fanning-onset thresholds as temperatures increased. In both colonies tested, fanning workers were collected from the hive entrance as hive temperatures were increased, and their paternity was determined using genetic markers. Some patrilines produced more fanning workers than other patrilines for many or all of the experimental temperatures (25°C to 40°C, in 1°C steps), suggesting that these patrilines had a lower than average threshold for fanning. The responses of different patrilines to changes in ambient temperature illustrate two important phenomena. First, patrilines undoubtedly vary in their responses to changing temperature; and second, the proportion of fanning workers from different patrilines changes with temperature.

"Thermoregulation behaviors can also vary within a single species of honey bee."

Fanning is not the only technique honey bees employ to regulate brood nest temperatures during the Summer months. Starks and Gilley (1999) showed that worker bees shield brood against external heat by creating a physical barrier with their bodies, and absorbing the excess heat. Workers can withstand temperatures up to 50°C (122°F), while brood have a threshold of approximately 36°C. By placing heating pads on the outside of small observation hives, they were able to simulate heat stress to the brood chamber of a hive, while observing worker behavior through the glass pane. Worker bees were attracted to the heated glass and clustered more densely over the brood comb than the honey comb. There was no apparent buzzing of wings, and drones and queens were excluded from the "shields." Starks and Gilley (1999) proposed that in a natural environment, heat shielding may act as mobile insulation for nest cavity walls that are particularly thin and exposed to sunlight.

Hive warming is achieved in a much more visually subtle way than hive cooling. In the Winter, when hive temperatures drop from 28°C (82.4°F,day) to 17°C (62.6°F, night), the metabolic rate of a honey bee colony rises tremendously from seven to 19 watts/kg of body mass (Wineman et al. 2003). The honey bee's hair also helps to insulate the cluster: it has a plumose structure, much like goose down, and when bees are tightly packed together it traps warm air within the mass of bodies (Mangum 2001). But heat must be generated continually to maintain a constant cluster temperature, especially during cold nights.

The center of honey bee heat production is the thorax. This is also where the flight muscles are located. Honey bees produce heat by contracting their flight muscles very rapidly, a behavior referred to as "shivering." This activ-

ity is not detectable to the human eye, and heat-producing bees may appear to be at rest. The most intense heating is concentrated in the brood area; as mentioned earlier, the pupae are the most susceptible to fluctuations in temperature. Brood-heating bees are positioned one of two ways in the brood nest to transfer heat directly to their young sisters: 1) headfirst in adjacent empty cells to warm brood from the side or, 2) pressing heated thoraces onto capped cells (Basile et al. 2008). Cell heating can occur in intervals of 30 continuous minutes, which leaves heater bees quite depleted of energy stores. The brood nest is usually surrounded by pollen cells and the stored honey is located beyond these. This would present a refueling problem for heater bees if they were expected to feed themselves. Fortunately, heater bees are regularly attended by food donors, who supply them with high-powered honey fuel. Basile et al. (2008) observed the trophallactic dynamic of donor and recipient bees in the brood nest and found that donor bees are a separate task specialization from nurse bees, as the donors attend only brood warming bees, and not larvae.

Heater bees continue to render their services even after the brood has completed their development. From a physiological standpoint, bees are not adults as soon as they emerge from the brood nest. They are not capable of proper activation of their flight muscles for either flight or endothermic heat production until they are several days old. It is not until eight or nine days of age that bees are morphologically and physiologically fully-developed. Therefore, for the first week post-emergence, bees are poikilothermic and stay close to the brood nest where the temperature is high and stable, until they are able to generate their own heat (Stabentheiner et al. 2010).

Hive thermoregulation plays an important role in queen rearing as well as brood production. DeGrandi-Hoffman et al. (1993) studied the effects of temperature and position in the brood box on the development rate of queen bees. Three studies of colony thermoregulation were conducted to determine if: 1) temperatures around queen cells differ depending on their location in the brood nest, and if queen cell location influences queen survival rates and emergence time; 2) the location of queen cells differs throughout the year, and whether queen development times are affected by ambient temperatures; and 3) temperatures in the central brood nest differ from those around queen cells.

Results of the first study showed that queen cells located in or adjacent to the brood nest were held at higher temperatures and had a greater chance of emergence. In the second study, the position of queen cells migrated from the central brood nest to the frame periphery from Winter to Summer. However, queens took significantly more time to complete development in Winter, Spring and early Summer. Results of the third study showed significantly higher temperatures in the central brood nest than the environment immediately surrounding queen cells; the temperature gradient was also much smaller in the brood area. Due to the variability in emergence from queens of different patrilines, DeGrandi-Hoffman et al. (1993) also proposed that queens from different patrilines could have different degree-day requirements for development. This would genetically predispose certain lineages to emerge first and become reigning matriarchs.

Although managed honey bees are capable of handling most temperature extremes that affect their hives, beekeepers may want to enhance the bee's natural thermoregulation with hive modifications, especially during cold Winters. Applying an exterior treatment to a hive during cold months can have a notable effect on colony thermoregulation. Wineman et al. (2003) showed that wrapping hives in infra-red polyethylene sheets during a subtropical Winter increased hive temperature, colony population and Spring honey production. Furthermore, when compared with non-covered hives, polyethylene-covered hives showed an increase in brood area of 59%; non-covered hives actually had an 8.4% reduction in brood area. Adult bee populations were increased by 37.5% in covered hives and 11.8% in non-covered hives, and Spring honey production was doubled in hives wrapped in polyethylene. This research supports the use of artificial hive insulation to increase colony viability during the Winter and following Spring. BC

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The Warre Hive

The "People's Hive" was developed by Abbe Emile Warre who lived in northern France from 1867 to 1951.

Ernie **Schmidt**

Though commonly referred to as the Warre Hive, its real name is the "People's Hive" It was developed by Abbe Emile Warre who lived in northern France from 1867 to 1951. Warre experimented with over 350 designs before perfecting his Warre Hive in response to the decline in beekeeping in France. Emile wrote a very detailed book *"Bee Keeping for All"*[1] on the construction and management of his hive. Clearly Emile developed his hive to be the best of two worlds, it is healthy for the bees and easy for the keeper. For the keeper, the hive is easy and inexpensive to build – mine are about $25.00 each. They require a minimal amount of labor for the keeper; the bees do most of the work doing what they do naturally. There is an emerging group of beekeepers embracing both this method and philosophy of keeping bees. It appears that David and Pat Heaf's translation of Emile's book, *"Bee Keeping for All"* in 2007 from French to English was the catalyst for this movement. Emile's book is a must read for everyone interested in beekeeping.[2]

There are those that have put forth the theory that one hope for the beekeeping industry lays with the hundreds of thousands of backyard keepers and small operators around the world. This is because they are breeding localized strains of bees suited for their local environments. One key to raising strong natural bees is to house them in a hive that closely replicates the natural condition bees have survived in for millions of years. This same hive would allow the keepers to easily extract the products that he keeps bees for and manage the hive without inducing excessive stresses on the colony. The Warre is such a hive. It is designed to replicate a hollow tree cavity. The Warre hive and management methods were specifically developed not only for the greatest benefit for the bees but for the ease of the keeper to keep the bees under these conditions. The hive is inexpensive and easy to build, simple to manage, requires little invasion to harvest. Emile Warre wrote in his book that the *exact* purpose for the hive was to make it ideal for the hundreds of thousands of individual keepers around the world.

I could never do justice to Emile's book and the excellent internet sites about building Warres and managing them. I will only briefly describe and summarize the hive characteristics and management here and provide a list of some of these websites at the end of this article.

The Warre has been referred to as a Vertical Top Bar Hive. But it is similar to the Topbar hive only in that the Warre also uses bars without foundation, instead of frames. The management and care of bees in the Warre differs from that of the Top bar, however. The phrase, "Let Bees Be Bees" describes Warre management style very well. There is very little intrusion or opening of the hive. Emile was adamant about retention of the hive interior atmosphere. The bees can create and control the temperature, humidity, even the oxygen/carbon dioxide level of the hive. Studies have discovered that this bee-created atmosphere appears to have some control of the *Varroa* mite.[4]

The main hive consists of equally sized boxes. Using one or two boxes to start the bees in the Spring, the hive is only opened from the top after that in the Fall to harvest the super(s) of honey. New boxes during the Summer are always added from the bottom. The boxes containing bees are lifted from the bottom board, a new empty box is placed on the bottom board then the boxes

of bees are placed on top of the new empty box. The oldest boxes are the upper most in the stack. All boxes have top bars. The bees build downward in a Warre as they do in a hollow tree cavity.

The goal is for the bees to fill at least three boxes by Fall, the upper most box of three is usually full of honey, and the top cover and quilt are removed and the top box is harvested. The quilt and cover are placed back over the two remaining boxes of stores and bees for wintering the hive.

The quilt, or condensation box, is a very important component of this hive. It is a shallow box with a starched burlap bottom, filled with wood shavings or equally absorbent material. It is placed above the top box. The sides extend to cover an inch or two of the top box. The purpose of the quilt is to absorb excess humidity and moisture from the hive year round.

The volume of a Warre system is very close to the volume preference of the honey bee. Given the choice swarms exhibit a preference for cavities about of 40 liters in volume.[5] Two boxes, which is roughly close to 40 liters or about 1.5 cubic feet, is how a package or swarm is started. Adding new boxes beneath original boxes as the bees fill the boxes, emulates the natural downward movement of the colony in a cavity. Adding new boxes provides empty space below the existing combs, thus discouraging swarming and encouraging honey production in the upper most boxes.

For those who want to try keeping bees in a Warre, I would recommend building your first one exactly as Emile outlines building it in his book. For your first year, manage the hive as he outlines. He spent a life time doing the experimenting for the final hive concept construction and management. Inevitably, as you keep bees in the Warre, you may start seeing ways of modifying parts of it to improve it. I must confess I am guilty of that. I have modified several things myself:;

1. I built screen bottom boards for my Warres. It is your "window" to the hive. I have sliding boards under my screens that I leave in unless I am inspecting the hive. Periodically I place a sheet of sticky paper to monitor for mites. I also use a mirror and flashlight to look up into the hive through the screen to determine when to add another box.

2. I put mosquito screen on the bottom of the condensation box/quilt instead of starched burlap. It's just easier and works just as good for me.

3. I don't nail my top bars in permanently anymore. I notched both ends of the bars and pounded small finishing nails along both bar shelves in the box, correlating with the correct location for the bars.

4. I will be putting an observation window with a cover on the back of boxes I build from now on. Not all of the boxes, it's more of a luxury for me personally. I like to see what the bees are doing. I didn't think of this idea but when I saw it, I built one and I really like it.[6] The window hive is clearly the favorite of visitors and guests on the farm. It is also easy to look through the window to time adding new boxes.

5. My stands are also both modified and copied from another Warre keeper.[6] Emile's design had the hives pretty close to the ground. Here in the Pacific Northwest I have a great deal of rain and an assortment of ground crawling pests. BC

References

There are excellent websites about the Warre method on the internet, in my opinion these are the best two. Emile's book, *"Bee Keeping for All"* can be obtained from these sites. Plans and directions for building hives and links to sites of Warre keepers and more can also be found on these sites.

[1] **http://warre.biobees.com/index.html#1**

[2] **http://warre.biobees.com/bfa.htm**

[3] To access Commercial Warre Keeper Gilles Denis's website- Google search **www.ruche-warre.com** The Google search engine has a translation icon and will translate Denis's French site into English.

[4] Tucson AHB/mites Conference RIFA Control **http://entomology.ucdavis.edu/faculty/mussen/3-4-00.pdf**

[5] The Bee Nest (Basic Bee Biology for Beekeepers) **http://www.extension.org/pages/The_Bee_Nest**_(Basic_Bee_Biology_for_Beekeepers)

[6] Sustainable Beekeeping with Warre Hives- David Heaf's Warre Project **http://www.dheaf.plus.com/warrebeekeeping**

WORKERS

LIFE IN THE HIVE

Know What To Expect, When To Manage Them Best

Larry **Connor**

Worker honey bees are pretty amazing insects. This has the fortunate result that many scientists use them as their 'lab rats' to decode the complex relationships they have with each other and with the queen and drones. They do all the work in the hive, except for egg laying. They control the queen's behavior and replacement as well as the number and age distribution of the drone population of a hive.

As a product of evolution, worker bees are the result of an amazing selection process that resulted in many chemical and nutritional control mechanisms used to suppress worker ovary development so they do not lay eggs unless there is no queen and no brood in the hive. A worker bee is a female bee that cannot mate, so the eggs of a worker are not fertilized, and thus haploid, having just one set of chromosomes. In Hymenoptera, these develop into males. Worker produced drones may or may not be significant in terms of passing on genetic information – depending on which scientist you speak to. I suspect that it is an indirect benefit of the haploid-diploid sex determination system. That a worker bee can produce sons to pass on a portion of the colony's genetic composition is undoubtedly important in the grand scheme of things in bee-dom.

Worker Development

We should all know by heart the intervals of metamorphic honey bee worker development: three days as an egg, six days as a larva and 12 days in the sealed cell. Remember 3+6+12 equals 21 days. Like many things in the hive, these are average figures – variations are common.

The egg – The queen deposits each worker egg in the cell after first inserting her head into that cell and determining the cell size. The late British bee researcher Dr. John Free fastened tiny cylinders of tape on the front legs of test queens and found that when a queen could not detect the size of a cell, she was no longer accurate in the release of sperm to accomplish fertilization of the egg – these queens mixed the frame with both fertilized and unfertilized eggs, both workers and drones in worker cells. Thus all worker eggs are fertilized, and a good queen will produce a pattern of 95% or more worker cells and a few missed cells and diploid drone eggs that will be removed soon after hatching.

The egg stage functions as the time period for the union of the sperm and egg with the resulting embryo feeding on the yolk in the egg – resulting in rapid growth of the embryonic bee during this short three-day period. Eggs are held upright by a small amount of cement at the bottom of the egg. At the end of three days the outer egg shell, the chorion, softens as it is reabsorbed into the body and the egg lies on the bottom of the cell and becomes the larva. Initially the larva is without food.

The larva – This is the period of continuous feeding and growth of the bee. In just six days the bee grows from a tiny egg to a large larva. Nurse bees feed the larva many times per hour and provide a surplus of royal jelly at the bottom of the cell for the first 48-50 hours. This is the same food as fed to a queen bee throughout her lifetime. After this initial feeding, the diet of the larva changes to a more complex diet that inhibits the formation of queen characteristics and promotes the formation of worker features. The special diet, or worker jelly, is loaded with additional carbohydrates and lipid molecules that turn on characteristics of worker development and turn off characteristics of the queen caste. Other triggers are also involved in this caste manipulation.

Larvae form a shape of a letter 'C' a few hours after feeding, and 12 hours after hatching the larva is floating in a pool of royal jelly. When raising queen bees, this is the start of the ideal time for removal to a queen cup. The larva floats on the bed of royal jelly and molts at least four times before the final molt to become the pupa. The molting skin is extremely thin and hard to detect. During the sixth day the bees place a beeswax 'cap' on the cell, even though the larva inside has not completed her larval phase. Then the larval body changes into an intermediate prepupal form, which is intermediate between the larva and the pupal stage.

The queen on a frame of brood toward the end of the brood season. Worker bees continuosly obtain samples of her queen pheromone, modify it and return it to her as a means of brood area regulation. There are cells of pollen in the brood area. This is generally considered a good behavior of bees. House bees pack the pollen into the cells, add honey containing microbes, and preserve the pollen. This pollen is likely to be used quickly as the nurse bees remove and digest it for royal jelly production.

Nurse and House bees work with the foragers to regulate brood production in the hive. Here we see a condition typical of a poor season. This was taken in the Fall of 2009, when the colonies were ending a poor year. There is brood on the right and stored honey (or sugar syrup) on the left. In between we normally expect eggs and larvae, and stored pollen. The absence of the pollen undoubtedly is the reason there is an absence of open brood.

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The pupa – The larva spins a thin brown silk cocoon with special glands in the head. Then she molts the final time to become the pupa, with characteristics in the form of the bee, but without wing development and integument pigmentation. The first parts of the bee's external body to change color are the two compound eyes, first to pink and then purple. Internally the body is becoming more differentiated, with the formation of adult bee organs, like the honey stomach, developing out of the simpler larval digestive tract. Just how many changes take place during the 'quiet or resting' phase of development is not known, but it is both large and essential to the adult bee's many roles in the hive.

The emerging individual – Twenty-one days after the queen deposited a tiny egg in the cell the worker bee emerges, soft of body, unable to sting, and covered with body hairs that have not yet dried in the atmosphere of the hive. Some refer to emergence as hatching, but we restrict the term hatching to refer to the egg to larval transformation, and emergence for the worker bees cutting the protective capping off her cell and walking out of the cell, ready to begin her initial duties. These callow bees are responsive to the queen bee, and quickly learn her odors. This helps them at various parts of their adult life.

The Nurse Bee (in the brood nest)

These young bees quickly assume duties. No other bee provides instruction or hints at the job ahead.

Cell cleaning – Newly emerged bees will clean the cells of newly emerged cells; the remaining royal jelly traces, larval fecal materials and trim the cappings of the cell. I suspect they either remove any objectionable odor that might repel the queen, or they coat the empty cell with a special odor or pheromone that stimulates the queen bee to deposit a new egg into the cell, thus starting the brood production cycle all over again.

Feeding brood – Newly emerged bees quickly feed themselves pollen and nectar, and are fed by other worker bees as part of the 'community stomach' of the hive. This includes food and chemical components collected from the queen, and the microorganisms necessary for digestion. The feeding process stimulates the digestive tract of the bee to process the food and convert the proteins and carbohydrates into royal jelly for the feeding of bees in the larval stages.

Royal jelly production – Each worker bee undergoes a period of abundant royal jelly production when the season and food supply allows. Most of the year this feeding is almost immediate after food intake. But in the Fall and early Winter the royal jelly production is delayed as the colony takes a break in brood rearing. The appearance of the first larvae in January (northern hemisphere) stimulates royal jelly secretion by select nurse bees.

Brood regulators – It appears that these young bees determine the amount of royal jelly to produce, and thus the amount of brood to rear, based on stimulation by the increasing day length as well as the food budget of the hive. Here the 'community stomach' controls population growth. Bees with proper nutrients in their cells and their digestive tract will produce more royal jelly only when there is an abundance of food stored in the combs and coming into the hive as foragers find early season food. Food reserves in the cells of over-wintering nurse bees is essential for the care and feeding of a healthy brood cycle early in the season. If the prior season had poor food reserves, or if the colony was exposed to parasitic mites and diseases, or the colony was undergoing any other stress, then the nurse bees are likely to be less fit for brood rearing.

It is not the temperature outside the hive that determines the amount of brood that a colony produces, but

eveals the large worker larva inside. The bees will and the larva will then spin a silk cocoon and have becoming more adult bee like in appearance.

A nurse bee feeding open brood in the brood nest. Notice the middle-sized larvae and the newly sealed brood cells. Once the cells are sealed the workers will have about 12 days in the cells, where they complete development into adult bees.

the bee population and nutritional status of the nurse bees, these young bees that are so critical to starting the new season properly.

Queen attendants – Nurse bees also feed and care for the queen. They regulate the amount of food she receives as they themselves are subject to complex factors that include the food reserves, the nutritional composition of the 'community stomach' and population of young bees inside the hive. Part of this network is the feedback the nurse bees provide to the queen by returning modified queen substnce to the queen – she then responds to her own chemical signals (pheromones and hormones).

House Bees (In the hive but outside the brood area)

As bees mature they move away from the brood area to the areas immediately beside the brood. This includes the areas where pollen and nectar are being processed, as well as the area where honey is being converted from the raw ingredient brought from the field, the nectar. It is useful to call these older bees House Bees, since they are leaving Nurse bee duties, but are not yet leaving the hive to collect pollen, nectar, propolis and water.

Pollen and Nectar Processing – It seem logical that bees transition to food processing after being the primary consumers of the products. Pollen forgers enter the hive with two pollen pellets on their corbiculae, and go to the comb near (and sometimes in) the brood area. There they reverse the packing direction and kick off the pollen loads, directly into the cells. These are in pairs. The house bees then add additional stomach contents (including nectar/honey containing microbes for conversion to bee bread) and push the pollen into the cells using their heads. This increases the efficiency of storage by two and half times. In the Fall the pollen may be coated with a thin layer of honey, but most of the year the house bees keep the pollen cells open and available for consumption.

We have discussed the process of converting nectar into honey in other articles. The house bees are the hive members that normally handle this duty. When the flow is heavy, many bees are required to ripen the nectar crop into honey.

Wax secretion – The house bees consume nectar and honey and digest the carbohydrates, stimulating the eight wax glands on the underside of the abdomen to secrete beeswax. House bees then manipulate the wax scales into the beautiful wax comb. Some of these bees are responsible for keeping the wax production area warm. They use their antennae to measure the comb temperature and heat the area by flexing their wing muscles without moving their wings.

Guard duty – The house bees are the bees that monitor the hive for invaders, including wax moths, small hive beetles and *Varroa* mites. A series of intricate behaviors are involved in grooming behavior used against *Varroa* parasites. Older nurse bees are at the hive entrances and may be the ones that greet you with hive defense in mind.

Other duties – There are other duties of house bees, including general house keeping, queen and drone cell construction and regulation, undertaking duties, wash-board activities at the entrance (removing bark from the non-existing bee tree) and much more. Undoubtedly there are duties we have yet to discover. BC

Exhausted after reading about all the work bees do? Then if you can take a break and participate in the Serious Sideliner Symposium in January, you will hear 24+ great speakers discussing the interests and focus of the small scale and semi-professional beekeeper. Or pull up a chair by the fire and read one of Dr. Connor's books. Check out ***www.wicwas.com*** *or your local bee supply dealer for copies.*

What's Worse – The Pest, Or The Cure?

When It Comes To Small Hive Beetles, There Are No Easy Choices

Jennifer **Berry**

The average consumer is pretty naïve about where food comes from. Generally, we have no clue about how it's planted, grown, harvested, processed, packaged, transported and finally displayed in the grocery store. (Not that there's anything wrong with that.) It's understandable that most people just have more pressing issues in their lives than to occupy themselves with the process of how food gets to the table. But if consumers did know more, we might see some serious changes in how we produce food in this country such as more humane, organic, and free range options, to name a few.

When you talk to the experts they say it is unrealistic to think we could possibly feed the world with organic meats and produce, unless the population was dramatically lowered; which is not a good solution. However, demand for changes in the whole food chain are occurring and growing in popularity. Organic food is the fastest growing sector in the American food marketplace and is becoming more commonplace in grocery stores. Biodynamic agriculture, farmers' markets, food co-ops, organic farms, and sustainable farming are all on the rise. Localvore (one who consumes locally grown food), CSA (community supported agriculture), and CNG (certified naturally grown) are the newest buzzwords. These are all efforts to protect soil, water and wildlife while recycling resources, promoting ecological balance, and conserving biodiversity. And as a result, these measures help ensure that our food and our world are a bit less toxic.

Let's narrow the focus just a bit. Before you became a beekeeper (or interested in bees) did you know what went into making a pound of honey? Well, I didn't know squat, except that those cute little smiling bees on retail packaging were responsible for filling honey bears and sweetening my life. That's about what the average honey consumer knows as well. Oh yes, we also know that bees sting, and that kids look absolutely adorable when dressed up in a fuzzy honey bee costume with that little stinger projecting out the back. "Isn't that just too cute, honey? Take a picture."

What was it about beekeeping that lured you in? Was it your love of honey that brought you into the fold, or do you just like wearing white? If it was the honey, do you remember tasting "real" honey for the first time? Not the junk they sell in stores that's been imported from wherever, filled with whatever, and processed however. I'm talking about the stuff you eat right off your finger, directly out of the comb while working bees, or right out of a jar from the local beekeeper at the farmers market?

Once exposed to the rich, full flavor of pure honey, your "palate," as they say, changes forever. I've seen it time and time again. Whether it's a friend, family member, next door neighbor or stranger, once someone tastes the real stuff . . . they're hooked! And they keep coming back for more.

Some returnees do so because they have certain health issues, allergies for instance. They've heard that eating local honey can help lessen the symptoms. And, here in the southeast many people are miserable with allergies, especially during the spring months. Folks also seek out pollen since it's been promoted as the "perfect food;" it's consumed by the tons for nutritional or health reasons. Finally, beeswax is used for candles and skin products. People searching out these products usually are more health conscious, for whatever reason, than the normal consumer. So how would their perception change if they realized there are numerous chemicals in these bee products?

The use of chemicals in honey bee colonies has been a source of concern for some time, not only for beekeepers, but for researchers as well. In recent years, due to adoption of IPM, chemical use by backyard beekeepers has dropped dramatically. But most of us realize that there is a time and a place for chemical use. Look at our own bodies, for instance. We don't think twice about taking a pill if we become ill. Off to the doctor we go to get a prescription, then to the drug store to fill it, and finally home to take it. But aren't these very medications we're slipping into our own bodies chemicals as well? What would bees infested with mites choose if they were able: a strip of coumaphos, a dose of apistan, a dollop of amitraz, a dribble of acid, a wafer of thymol, a spoonful of sugar, or nothing at all?

Beekeeping today is not like the good ole days when our grandfathers kept bees. Prior to the 80's few chemicals, if any, were needed to keep colonies alive. Unfortunately, with the weight of current stresses on bees, including mites, diseases, and more recently small hive beetles, this is not the case anymore.

"Can we reduce the use of these pest control chemicals in our beehives?"

With yet another exotic pest being introduced to the U.S., beekeepers have been desperate for a control against small hive beetles (SHBs), especially in southern regions. SHBs can pose a problem to bee colonies just about anywhere, but nothing as compared to the Deep South. In my neck of the woods, beetles usually make their devastating march only after a colony has been compromised by other issues, such as mites, disease, queenlessness, etc. However, further to the south, beetles don't need an invitation to take over, they just do. Hence, controlling populations has become a priority in some operations. With coumaphos (Checkmite+□) having been approved for use in hives to control mites, it was quickly approved for dual use to control SHBs. However, numerous other techniques and concoctions have been tried and are used today . . . some illicitly.

One popular product used by beekeepers, which kills SHBs, is Maxforce Roach Killer Bait Gels or Maxforce FC Magnum. The bait was developed to kill ants and roaches in and around areas inhabited by people, but without causing them harm. The active ingredient is fipronil, a broad-spectrum insecticide. If you have cats or dogs, then you may recognize the trade name Frontline, which is used to control fleas. Fipronil is also widely used in other applications from inside to out. Inside, it is used in commercial and residential food processing areas. The benefit with this particular insecticide is that there's no need to cover food prep stations during treatment. Outside, it is commonly used for managing termites and pests in turf grass. However, fipronil is **very toxic** to honey bees and has NOT been approved for the use in honey bee colonies.

Here's some interesting information that comes directly from a website which sells Maxforce: "The active ingredient in Maxforce FC Magnum, Fipronil, provides a unique mode of action that works through both ingestion and contact, knocking down roaches and ants that eat or simply touch the bait. Either way, one contaminated roach or ant kills many others where they live and breed. The Domino Effect® still achieves population control, but with faster visible results. Maxforce FC Magnum roach bait gel is the newest bait from Maxforce by Bayer. It has the same great active ingredient (Fipronil) as the other Maxforce products. Only this time, you get five times the active ingredient, plus a new technology called ContactX™ that kills roaches even when they just touch the bait. Other roaches touch or eat the dead roach and spread the bait again, controlling the entire colony, even the roaches you can't see." Controlling the entire colony . . . Hmmm?!?

Maxforce is applied to colonies in several different ways. One way is to inject the gel into corrugated plastic signage material. You know the ones. They pop up like mushrooms along roadsides and front lawns during campaigns suggesting that you elect this candidate or that one. Another way of introducing this product is to squirt it into the center of a CD or DVD case and the beetles will enter through the small holes on the side. The idea behind these semi-closed systems is to draw the beetles in to partake of the bait where they hopefully will croak immediately, that is to say without exiting and re-entering the hive contaminated. If the beetle does die inside the trap, the chemical would be contained, never exposing the bees, wax, pollen or honey to the toxin: at least this is the assumption made by those applying the product. They rely on the idea that the fipronil is "quarantined" inside the trap and not spread around the colony. However, it seems this may not be the case.

Fipronil is a slow acting poison. When it's used in a beehive, an exposed pest is able to amble around before dying, either returning to its hiding place or continuing to feed on pollen or brood and the residues are spread everywhere they go. In addition, once the insect does die, if it is eaten by other beetles or their larvae, there are sufficient residuals left to kill those beetles as well. And the contamination process goes on and on.

Recent analysis of hundreds of wax and pollen samples has revealed unprecedented levels of miticides and agricultural pesticides. While fipronil was not in the top 10 most detected pesticides, it was detected in both wax and pollen. Those consistently detected as the top three were fluvalinate (Apistan□), coumaphos (Checkmite+□), and chlorpyrifos (Mullin et. al. 2010). The first two are beekeeper applied miticides used for controlling *varroa*. Chlorpyrifos (an organophosphate) was at one time one of the most common and widely-used household pesticides. Trade names you probably recognize are Lorsban and Dursban. But because of undesirable children's health issues, it was banned from homeowner use and severely restricted for use on crops; however it is still very prominent in the environment.

But what's worse, the pest or the cure? Our world is so inundated with man-made chemicals we would be hard pressed to find any food item free of toxins, including honey. They're in the air, the water, the soil, inside our homes, and our bodies. They're passed through the food chain from one organism to the next. But as we become more educated about the food we eat, I imagine we'll become even more selective. By being more selective we can at least limit some of what goes into our system, can't we? And maybe by restricting or reducing the use of chemicals in our bee colonies we can ultimately reduce the amount released into the environment, chemicals that would otherwise eventually find their way back to us. Listen to what some of your fellow beekeepers are saying. "It's been years since I've treated with anything, and the bees are still alive." At least for now!

See Ya! BC

Jennifer Berry is the Research Coordinator at the University of GA Bee Lab. Contact her at Jennifer@BeeCulture.com.

Reference:

Mullin, C.A., M. Frazier, J.L. Frazier, S. Ashcraft, R. Simonds, D. vanEngelsdorp, J.S. Pettis 2010. *High levels of miticides and agrochemicals in North American apiaries: implications for honey bee health.* PLoS ONE 5(3): e9754. Doi:10.1371/journal.pone.0009754.

More Than You Ever Wanted To Know About
HIVE TOOLS

There's more to the lowly hive tool than you would imagine.

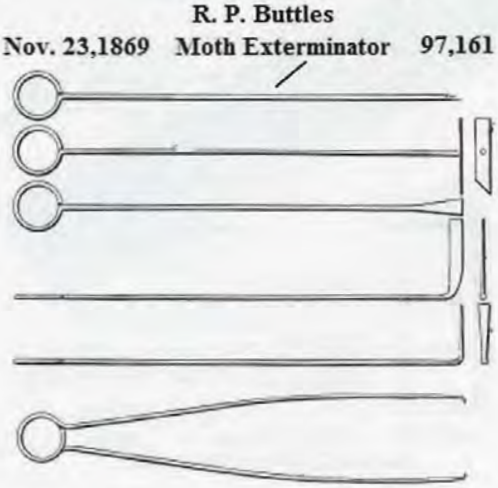
Jim **Thompson**

A recent letter to the editor of *Bee Culture* mentioned that the hive tool was developed from a paint scraper. This prompted me to search the patents on paint scrapers. The earliest paint scraper was patented in 1873. Sometimes they were called cabinet scrapers, painter tools, putty knives, and scrapers. Some incorporated a blade in with a paint brush. Many used razor blades which could be retracted or covered. One even had saw teeth on the side of the serpentine blade, while another had a rasp and spoon incorporated into its handle. The real complicated models had twirling blades or wire brushes. Then there were ones that used heat that could jeopardize one's house or life.

Only the "Painter's Implement" (429515) resembled the bee knife. The painter's Implement looks like a Swiss Army knife with three foldable appendages. One of the ends had a hook like the bee knife. Since the painter's implement was patented in June 1890 and the bee knife was patented September 3, 1907 one would think that the knife was influenced by the implement. However the "Red Devil's" paint scraper seems to be a spin off from the hive tool. The angle at which the Red Devil is bent is greater than the 90° hive tool, however the other brands of "paint scrapers" on the market currently are bent at the 90° angle. The problem is that these tools were not patented, so obtaining the production dates is difficult.

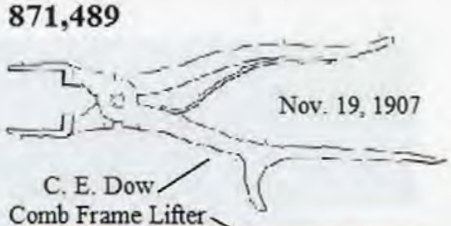
Many of us might be hard pressed to define what a hive tool looks like. Of the eight million plus patents that have been issued, you'll find only 11 that relate to hive tools. The hive tools may be known by another nomenclature such as hive opening tool, apparatus for separating hives, tool for apiarists, bee knife, and moth eliminator tools.

The very first hive tools were nothing more than rods with hooks and oversized tweezers. They were used to clean out the dead bees on the bottom boards in Winter or early Spring. The tweezers could grab moth larvae in between the combs. Thus the patent calls them moth instruments. The patent drawing included more tools, but I simplified the drawing due to space. Remember during this period of time most hives did not have moveable frames.

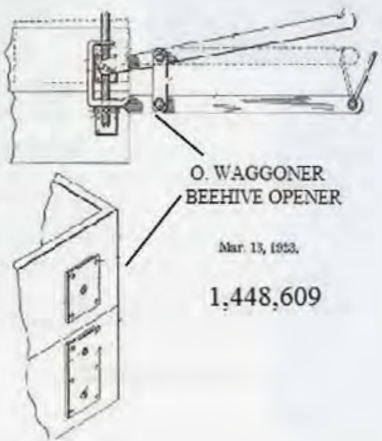


The I.F. Sawyer bee knife was used to cut beeswax out of unwanted areas. If the hive had frames the knife would be handy to clean them. The edge of the knife could be used to clean the sides of the frames as far as the beekeeper dared. The hook may have been influenced by the painter's implement of 1890 and would be helpful in cleaning debris in between combs.

The C.E. Dow Comb Frame Lifter as it was patented shows a frame grip, but the model that I have in my collection has a hive tool riveted to the long handle. There is also a bail used to keep the handles together.



The O. Waggoner Beehive Opener would appear to work rather well in breaking the supers apart. The invention requires metal plates to be fastened to all supers and probably near two different corners. The "hive tool" has a stud that fits into a hole in the top super and another that fits into a hole in the bottom super so that when the handles are squeezed the supers separate.



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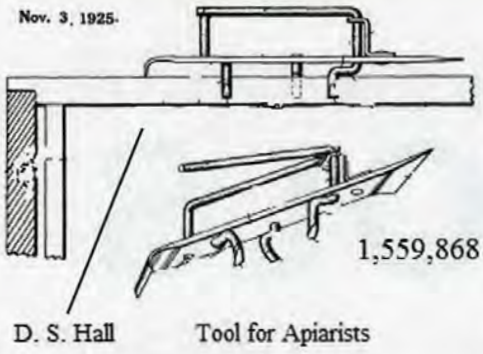
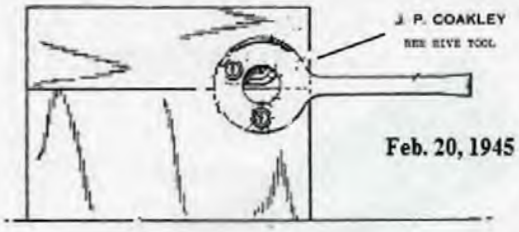
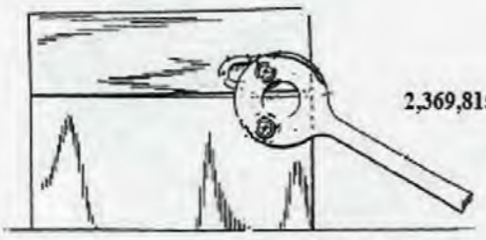
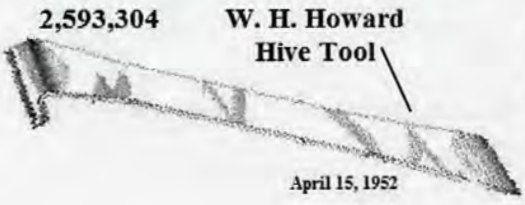
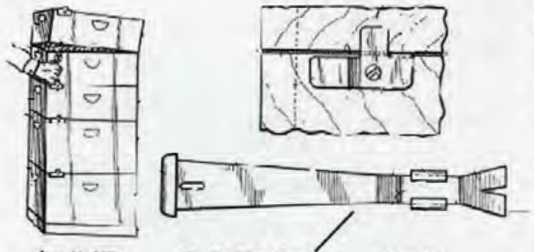










The D.S. Hall's Tool for Apiarists, patent 1,559,868 issued November 3, 1925 again appears to be a device that would separate two supers. Again the supers would have to be drilled so three rods could be inserted into the sides. By turning the two levers which are extensions of the bent rods the supers would separate. There would be an awkward moment where the beekeeper would have to remove the apparatus so the supers could be separated further.

February 20, 1945 J.P. Coakley received a patent for a beehive tool, Number 2,369,815. Again the supers needed to have holes drilled near the corners of the supers. It looks from the patent that he treated the supers as fine furniture as the holes were reinforced with metal grommets. The grommets would allow the hive tool (spanner wrench) to pivot and thus separate the supers. As with the previous inventions one would need to have holes in at least two locations and there would be an awkward period of time when one removes the spanner wrench and sticks their fingers in between the supers to separate them further. The idea about sticking frames still had not been addressed by the previous three ideas but I guess that the supers would be held apart long enough that a screwdriver, pry bar or conventional hive tool could be used.

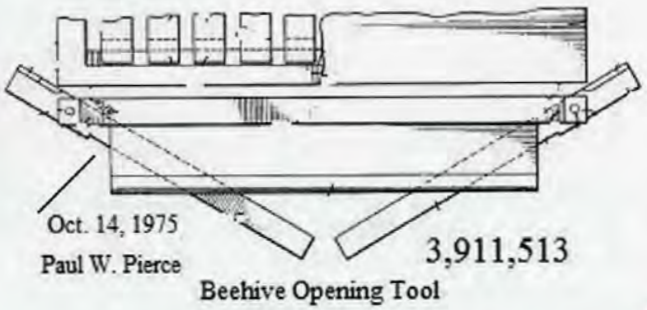
The W.H. Howard hive tool, patented April 15, 1952 looks similar to the hive tools that most of us use. However the bend is not quite the same as it shows a double bend. There were earlier hive tools than the Howard as I have an A.I. Root hive tool with the clover trademark embossed in it. That trademark was last used in 1921. This indicates that not all the hive tools were patented. The better hive tools usually are made by knife manufacturers as they use a high quality steel.

August 11, 1970, E.R. Homins was issued patent 3,523,314 for his beehive opening arrangement. It would appear that this system uses a modified hive tool and special clips screwed near each top corner of the super. The hive tool has an attachment that would slide onto the clip, becoming a lever and pivot the clip to separate the supers. This system would allow the beekeeper to have a useable hive tool in their hands. However there would be a large expense in preparing each super with four clips and making sure that you don't lose the "hive tool" (handle). It would be wise to have several hive tools.

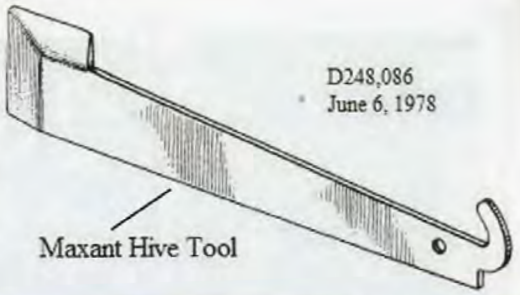
Back in the 70s Walt Crawford of Massillon, Ohio designed a hive tool that can destroy the upholstery of your truck or give you back pain in just a few seconds if carried in your back pocket. It has an arm or hooked finger protruding at 90° and a hook at the end of the hive tool that act as frame lifters. It lacks a place where you can safely apply a force to drive the blade in between the supers and is very sharp in three places.

October 14, 1975, Paul W. Pierce was issued patent Number 3,911,513 for a beehive opening tool. This is hard to visualize as one must get the two arms of the tool in between the supers. Once in place the arms would apply pressure on the bottom of the frames in the top super and with a scissor action apply pressure to the tops of the frames in the bottom super. Paul Pierce also patented a queen grafting needle, a wiring board and an electric uncapping knife.

Crawford Hive Tool



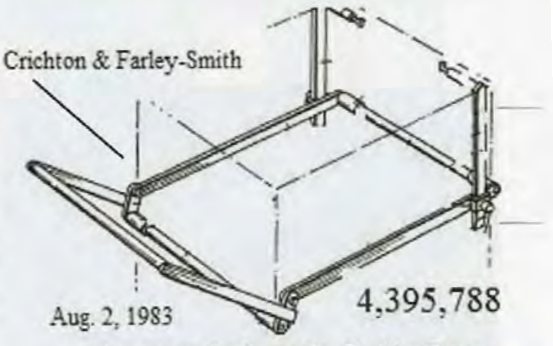
(Des 248,086) The 10½ Maxant hive tool patented June 6, 1978 solved the many bends a hive tool would have to achieve the frame lifting feature. It provides knife edges to clean the top and sides of the top bar while it is still in the super. In fact one could use it as a hatchet to cut weeds and small branches. There is a drawback of being unable to safely drive it in between two supers using the heel of your hand. It is made of chrome plated tough steel. It may leave indentations in frames when using the lifting hook. If you fail to assemble frames correctly the end bars could separate from the top bar.



About the time of the "J" hook hive tool, Maxant also developed a 7½" hive tool that had lugs on the sides of the blade. I find that these lugs aid in spacing the frames. The total length of this tool if the bend was straightened out is 8¼".

Maxant 7½" Hive Tool with Lugs

August 2, 1983 patent Number 4,395,788 was issued to Norman K. Crichton and Clive Farley Smith for inventing the apparatus for separating beehive boxes. This is a device intended to remove the top super from a hive. Using the idea of levers and pivots the super is slid and positioned over the apparatus so it can be removed and carried to the honey processing area.



The Handle was introduced around the year 2000. It was advertised as the strongest hive tool ever produced. The concept behind it was that you now had a better handle so you could get better leverage. It feels good in your hand and works well if you have been working your hives all along. However if you try to separate a hive that hasn't been worked in years the handle has been known to bend due to the temper being taken out of the steel in the welding process.

Another local beekeeper developed a hive tool similar to the handle only this tool had a solid rolled steel handle and a piece of steel from an automobile spring. This tool would fall into the category of being indestructible. However this hive tool weighs two and one half pounds making it very bulky to use or carry in your pocket.

Indestructible Hive Tool

Hive Inspection Tool developed by A.M. Southwick, March 3, 1959 is included in this article as it was listed as a tool. However it is a bracket to hold the hive or supers above a certain point up for the purpose of inspecting the hive. From my experience, the device would get in the way and not allow a frame to be removed. If one is going to tip a hive it usually takes two people. The upper supers are stepped in so they have 3/8"to ¾ "to pivot on. One person will steady the upper supers while the other removes a frame or frames for inspection. The angle of tipping sometimes can become is quite steep.

When I started beekeeping I had a mentor that had 50 years experience working bees. He taught me to keep the hive tool sharp so the frames and supers could be cleaned easily. The part of the hive tool that needed the most sharpening is the "hook" and when it was filed down to a small curve as in the photo, he would heat up the hive tool, straighten it out, and reform a new hook until it got to the nail hole. The large particles of wax and propolis are removed by the blade. The final cleaning is done with the hook or the blade held in a vertical position in a scraping motion.

The A.I. Root hive tool shown here is out of chorological order because three features need to be addressed. The tool is tapered at both ends so if one is into sharpening, heating and bending would allow you to switch ends after getting to the thicker part of the hive tool. Notice that this hive tool does not have a "nail puller" hole. The clover leaf logo is pressed into the middle of the tool. This logo was used by the Root Company from the 1890s to 1921. Due to overproduction some items were stock piled and sold well after the logo changed. In the 1935 Root catalog the advertisement shows a yellow hive tool with a clover leaf "decal" for sale. The 1935 hive tool also shows a nail pulling hole but is on the blade end. The price

A. I. Root Hive Tool

WRITE FOR PRICES ON QUANTITY LOTS

95% of Commercial Beekeepers Wire Horizontally

You Can Do It Easily

The straightest and strongest and most profitable combs are those reinforced by four horizontal non-stretching wires threaded through the end-bars of the frames. Study the illustrations of combs on page 25.

OUR INEXPENSIVE FRAME-WIRING OUTFIT ... 50 FRAMES AN HOUR ...

—Inexpensive frame-wiring outfit, not postpaid, mailing weight, 1 lb. 50c

Foundation Put in Frames Faster Than With Any Other Method

THE ROOT ELECTRIC WIRE-IMBEDDER ...

Imbedding Wires in Foundation.

OUR COMBINED FRAME-WIRER AND WIRE-IMBEDDER ...

RESISTANCE COIL (Works on Any Current)

SPUR WIRE-IMBEDDER

QUALITY FOR QUALITY WE MEET ANY PRICE

Root Steel Hive Tools—Do Not Bend or Break

HEAVY HIVE-SCRAPER FOR BUSY MEN

HANDY SECTION SCRAPER

SCRAPING KNIFE

BRISTLE BEE BRUSH—NEEDED BY EVERY BEEKEEPER

WHISK BEE BROOM

SUPER TONGS FOR LOOSENING SUPERS

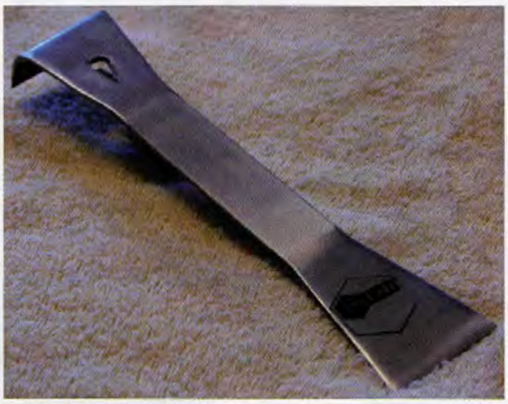
Root Steel Hive Tools---Do Not Bend or Break

This tool is indispensable in **scraping frames** and **prying them loose**, as well as for separating supers, raising covers, etc., when they have been glued down by the bees. The scraping end, being bent, fits the palm of the hand when the other end is used as a pry. The material is tempered steel of good quality, enameled yellow so as to be easily seen in the grass. Used for beekeeping work, the tool will neither bend nor break.

404—Hive-tool, 8-inch, shipping weight 4 oz. (Not Postpaid) $0.48
405—Hive-tool, 10-inch, shipping weight 6 oz. (Not Postpaid) .... .55

1935 Root Catalog

Clover Leaf Logo of A.I. Root on hive tool.



Thorne Hive Tool

for an eight inch hive tool was 48 cents while the 10 inch hive tool was 55 cents in 1935. Another interesting point from the 1936 Walter Kelley catalog reveals a hive tool similar to the 1920 Root hive tool with the double taper and no nail puller hole.

The Thorne hive tool is made in England. It is chrome plated and has a slightly different shape and 8¾" inches long horizontally or nine ¼" long if straightened out.

The Italian hive tool is the longest hive tool in my collection at 15-3/8". It features two hooks on the ends with notches. These hooks might be useful in retrieving items between frames. The blade is not particularly sharp.

The most common of all hive tools is the 10 inch. For some strange reason the shape seems to be the same whether it is made in the United States or abroad. The 10 inch hive tool is the length of the metal required to make the tool when straightened out. Without the bent part the tool measures 9-3/8" long. Most bee supply companies carry them, but they may have their own color scheme. I would suggest that you stay away from green (grass) or black (dirt) colors. If there is no other choice remember that the paint usually comes off when you clean it with steel wool and a cleanser. Some dealers even carry the 10 inch hive tool with a Teflon coating in which case a soft rag and liquid cleanser should be used. With a Teflon coated tool no sharpening should be attempted. You may find that the Teflon anti-stick feature is not always an accurate description or quality to have in a hive tool. BC

Jim Thompson is a bee equipment collector, honey show judge and beekeeping historian, who lives in Smithville, Ohio.

The Italian Hive Tool

New 10-inch Hive Tool

Winter – Increasingly An Uncertain Season In The Bee Colony

James E. **Tew**

It seems that present-day successful colony wintering is more a good guess than good science.

Presently, it is cold and quiet in my beeyard. It's that time of the year. Yesterday, on a walk to my kindling pile, I ambled by the quiet wintering colonies that I keep in my home yard. Two of the three colonies looked terrible. I felt disgusted. These two colonies were three- pound packages last spring. I gave them full deep frames of honey and they accepted the new queens. They built up strong and stored a honey crop. Now, here they were with signs of *Varroa* predation and signs of a skunk pawing at the entrance. There were scattered dead bees around the upper entrance. Overall, the colonies had a disheveled, desperate look about them and the worst of Winter is yet to come. I felt disgusted.

In past articles, during presentations, and during interviews, I may very well have acquired a cranky reputation that I'm not sure I want. I feel that I am not cranky but I am frustrated. U.S. beekeepers have been dealing with *Varroa* for 25 years. Yet, here these mites are still killing my colonies all these years later. True, the early *Varroa* hysteria has passed and modern beekeepers now accept these pests a normal way of beekeeping life. All those years ago, I was sure that after analytical people had a good, long chance to look at this *Varroa* thing, a commonly accepted protocol would evolve – a general recommendation. Instead, current recommendations are all over the page: use resistant queen stock, treat with hard chemicals, treat with organic chemicals (soft chemicals) or don't treat at all. So far, no single procedure has worked in all colonies for all beekeepers all the time. That's a frustrating bit of news for me to accept.

I speak for no one but myself. I have taken no surveys. I have no science. Even so, I have slowly and reluctantly grown to accept that my beehives will not soon look like the hives I managed 20 to 25 years ago. Generally, my present hives will have smaller populations, will not swarm as much, and will need much more assistance from me.

My Winter survivors

In years past, I hoped for strong colonies coming out of Winter. Now, I am content with the colonies simply being alive as they come out of Winter. Live bees give me something with which to work while dead bees just give me more work. I don't know why the bees don't seem to like Winter as well as they did two decades ago. Even if I did know, would it really matter in the short term? Already, I am trying to control *Varroa* within my colonies. I can't really do anything about virus infections other than to know what they are. I've always known that Nosema infections should be treated, yet I rarely apply the medication. American foulbrood is still an occasional problem that I try to eliminate when I find it. So, I don't know why my bees don't Winter as well, but even if I did know the reason, I suspect my bees would still be wintering poorly. I can reduce this complicated scenario to the simple statement – *"I just hope they are alive in the Spring."*

Spring/summer management directly affects Winter management.

General Suggestion – feed heavily during late Winter/early Spring Supplemental feed – carbohydrates and protein

During the past couple of years, I have presented conflicting advice and opinions on supplemental feeding. I have frequently recommended leaving the beehives undisturbed as much as possible and I still recommend that procedure. If you are not there to help when weakened colonies come out of Winter, recovery will take much longer.

In years past, there were two kinds of spring supplemental feeding procedures - stimulative feeding and survival feeding. Stimulative feeding involved giving the bees thin, watery sugar syrup to "stimulate" them to wake from their Winter dormancy so they could get on with the procedure of foraging. This no longer seems important to me and probably never was a very important management procedure. If you are going to feed your bees, feed them copious, thick syrup and feed it to them long-term. Feed them something on which they can survive.

Which type of feeder

There are several designs of feeders. I have described them in previous articles. I feel a need to be blunt. Use hive top feeders. You can get more feed in place quicker with the least amount of disruption to the recovering colony. I have several hundred internal division-board feeders but I plan to leave them in storage. They require opening the colony, sloshing syrup around while I try to pour it into the narrow feeder. Entrance feeders are nearly useless for serious feeding – too small and too far from the wintering cluster. Open feeding in transitional weather is "iffy" and depends on the bees having good foraging conditions. Additionally, open feeding stimulates robbing and fighting amongst the bees. While this technique is labor-efficient, it is not particularly efficient for weak colonies. I say again, use hive top feeders.

What carbohydrate to feed?

If possible, feed traditional sugar syrup mixed from granulated sugar. I presently have several drums of corn syrup that I will probably use later in the year, but during late Winter/early Spring, I want to go with something that I know works. Syrup made from clean granulated sugar works. Corn syrup is probably fine as a Winter feed, but nagging questions keep arising about the use of corn syrup as a bee feed. If you have your personal reasons for wanting to use corn syrup, I don't object but feed something and feed plenty of it.

Small wintering colonies should be housed in small hives – even nucs.

Protein supplements

Throughout the passing years, research interest has waxed and waned on the subject of pollen substitutes. Each time I comment about pollen substitutes, I get correspondence from those who manufacture it. I am in a position of information weakness here. While I have not objectively compared the various protein diets that are available, I have used all the common diets. During some years, some colonies take some of the diets. I assume it helps meet my colonies' nutritional needs. I don't know how much. That's not much of a recommendation.

So why recommend these products at all? Assuming we agree that our bees are generally more challenged than they were a few decades ago and assuming we agree that the precise reasons for this decline are unknown, I want to eliminate as many variables as possible. I plan to feed pollen substitute in late Spring this year.

General Suggestion – weak colonies

In a publication I have written, I stated, "*In most cases, it is poor management to overwinter a small or weak colony because in most locations the weak colony will not have time to increase to its peak population for the Spring nectar flow*[1]". Why my change? It used to be that weak colonies were the minority category. Now, for many of us, weakened colonies coming out of Winter are all too common. In early Spring, I would commonly combine weak colonies into stronger units, being hopeful that they would build up, and then I would divide them later in the Spring back into two units. I am not totally comfortable with that procedure now – especially for colonies that have a chance of surviving even if they are weak. Why? For two reasons:

Intensive colony manipulation

Combining colonies is a simple process on paper. In the beeyard it's disruptive and chaotic. Drifting bees may be lost. Occasionally, colonies being combined are trapped between newspaper-divided units and it's extra work for me. If I combine two weak units, I now have a colony that is not as weak as it was – but still weak. Counting my labor and counting the extra stress I put on the combining

[1]Backyard Beekeeping, James E. Tew **http://www.aces.edu/counties/Montgomery/documents/BackyardBeekeepingANR-0135.pdf**

colonies, I say again, I am not totally comfortable with this recommendation now.

Queen loss

When I combine weak colonies, I lose queens. They were not good queens or the colony would not have been weak, but they are a living queen in late Winter/early Spring. This is a time of the year when replacement queens are difficult to get. My present attitude is that I would rather have a poor queen rather than no queen at all. I refer you to one of my opening comments above – *"I simply want them to be alive."*

Let me be clear. If the colonies are profoundly weak, combine them if you wish. If the weak colonies have a chance of making it to Spring, let it have a shot at it. A stronger colony is not made that much stronger by adding a weak colony to it. During this time, when U.S. colony numbers are declining, I am inclined to keep smaller colonies until they become really small before combining.

General Suggestion – stores reallocation

This really is not a change so much as it is just more important. True, supplemental feeding seems to be increasingly important, but nothing beats honey in the comb as food stuff for wintering beehives. Last spring (I wrote about it), I supered with many more deep supers than I would have in past seasons. Last November, I left more honey on the bees that I used to. In fact, most of my colonies are tall for wintering colonies.

As has always been the norm, some of my colonies stored more honey than others. As Winter progressed, those that tended to be lightweight were given capped honey – in deep frames – from those colonies that had more stores than they could use. This was a significant change in my Winter management scheme. I intentionally reduced my overall extracted honey crop in order to have honey in deep frame reserves. I still have had colonies die with honey stores on the hive. I have moved some of that unused honey to colonies that seemed to be light. But, my point is that I ***had*** some honey to give back to them. I can't lie to you. It was hard to keep that extra honey from going under the uncapping knife. I'm glad I resisted.

Traditional Winter management procedures

The established wintering hive management scheme is not totally dysfunctional – far from it. In all my rants, I have never meant to suggest that all we have ever done in wintering hive management is now wrong. What I have been saying is that we should modify some of the ways we manage or bees in the light of our present bee colony shortage. For those of you needing to read a general discussion of traditional hive Winter management, look at nearly any current bee book. Several times, I have referred to management information in *Backyard Beekeeping* at: **http://www.aces.edu/counties/Montgomery/documents/BackyardBeekeepingANR-0135.pdf**

Honestly

The best current wintering recommendation is to send your colonies into Winter with a strong population of workers, headed by a young queen, having abundant food stores, and with a reduced pest population – especially *Varroa* populations. That would be the perfect bee world. If you have to feed your colonies, as I described above, something went wrong last Fall. If your colonies are small and possibly will have to be combined, something went wrong last season. If your colonies need extra frames of honey added during the Winter, something went wrong last year. Clearly our goal is to send our bees into Winter in strong shape. If that doesn't happen, we must do whatever we can to put on management *Band Aids* during the Winter. Do whatever it takes to keep your bees alive. BC

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CHAIN LINK

The Non-Electrical Option For Caging Colonies From Brutal Bears

Melanie **Kirby**

Walkway between rows gives access to the back of each hive for revision. Hives on pallets are tipped slightly forward to aid in water runoff.

They're waiting for when you drive away- with forks, knives and napkins. You pull away from your beeyard with the intention of going back in a couple of weeks. You return to mayhem and destruction . . . no one warned you that Pooh was a messy Marvin with no manners and a voracious appetite for brood! And Pooh will come back . . . as long as the buffet is available and access is feasible.

When investigating what style of bear proof-fencing to install, don't forget to consider chain link. It requires neither electricity nor imported tiger scat. Your apiary can be well contained and "constructive." Designing a cage that allows for multiple hives and placement while allowing access by beekeeper and beekeeper tools requires only two things: a shovel and elbow grease.

My partner has a couple of apiaries in northern Michigan that are very susceptible to bear damage. One apiary came with an electric fence from a prior garden. The fence kept shorting out as wild berries grew up around the enclosure. He even placed pieces of insulation to space the wires out from the plants. But wouldn't you know, those darn ants would move blades of grass and short the system.

Electric fences require regular maintenance and checking. Despite having this apiary on a friend's property who resided a mere 30 yards away, the system wasn't secure. And there was a bill for the electricity – a plug in with a meter.

He chose to build his first apiary with chain link. He found used chain link through a local fencing company for a discount. Theory and Reality have it that as the bear tries to grab, pull and climb the fence, their claws are pinched and voila- they cease attempting to enter. When we teamed up six years ago, I helped him build the second chain-link right next door to the first one.

We used 4 x 4 x 8 foot cedar posts. He used regular gardening timbers on his first one over ten years ago, which are still intact and secure in the moist woods off of Lake Superior. The enclosure is rectangular- 8 foot x 8 foot x 16 feet long. Posts placed eight feet apart (one on each end and one in the middle) on both sides. Fencing secured to posts with 1½ inch staple nails.

We placed ceiling posts/rafters approximately every 2½ feet. Additional fencing was secured over the top. This allowed us to put pallets on top of the fencing and more hives: a double-decker chain link bear-proof apiary. We even ran some mating nucs up on top one season with good take. We didn't have to travel with cells as the cell builders and breeders were inside the cage.

Each enclosure holds 12 hives – six down each side with entrances facing outwards with a walkway running down the middle for access and a gap for standing on the side between each set of two. Revisions performed from backside of each hive. All hives were on half size pallets up off the ground.

Forefront view of staple nails on end post. Excess chain link thrown over top to serve as roof for double-decker use.

The high-rise hierarchies are reminiscent of art deco. There's the superintendent checking the weight.

Vehicle can be backed up to gate for unloading and loading of bees and boxes.

Pallets on top can hold more hives. Gate swings down from ceiling and padlocks to an eyebolt.

Caged colonies cannot be contained when the flow is on!

Forefront view of cage made with garden posts. Background view of newer cage made with cedar posts.

Pushing hives back to back on pallets and cutting insulation to fit sides prepares these girls for overwintering for almsot nine months.

Snuggle bunnies waiting for Winter.

To overwinter in northern Michigan, we push four hives flush back to back, side to side and wrap them in two inch thick insulation or as dollars may dictate black roofing paper. One large piece of insulation covers all four colonies as a group. We make sure to cut entrance holes in the insulation and to leave a small crack in upper cover for ventilation. They do get buried in snow but with screened bottoms on top of pallets – they are insulated from the gales of November, December, January, February, March, April . . .

I joke that the Upper Peninsula of Michigan experiences nine months of Winter and only three months of warm – Spring in June, Summer in July and Autumn in August. It's not far from the truth most seasons! With the intense but short bloom, it is no wonder that the bears look to fatten up on brood before the extended cold season. Any hive or boxes we left out of the chain link cage was munched the first night. BC

Melanie Kirby keeps bees and raises queens in Michigan and Arizona.

It's Winter

Here's Eight Ways To Warm Up With Honey

Ann **Harman**

Oh it's cold! No matter where you live – north or south – January is Winter at its best. Even states that enjoy being a haven of warmth during January experience cold temperatures at times. We pull on sweaters, build a fire in the fireplace, throw another log into the wood stove and sneak the thermostat up a degree or two. However, there's nothing like a good hot drink that warms us from the inside. Just holding the warm mug or cup is comforting.

So this month we'll have some recipes – with honey, of course – to help us through the chilly days and evenings. If you have a favorite recipe to make you warm, take a look at it. If it calls for sugar, don't do that. Just substitute your honey. Usually you can do a one-to-one substitution, honey for sugar, in beverages. But the additional flavor of your honey may indicate that slightly less honey than sugar produces a fine drink.

Let's start our warm-up with some hot drinks. These are much better than some prepared hot cocoa mix that you've been using. After all, these recipes do use your good honey.

HOLIDAY COCOA

1 tablespoon cocoa
1 tablespoon honey
1/3 cup whipping cream
1 cup hot milk
2 tablespoons apple liqueur

Heat together the cocoa, honey and whipping cream until well mixed. Stir in milk. Pour into two small mugs. Stir one tablespoon apple liqueur into each. Serves two.

A Honey Of A Cookbook
Alberta Beekeepers Association

Here is a nice coffee recipe for those wintry days when you don't want to go out to your favorite coffee ship.

SPANISH COFFEE

coffee
honey
cinnamon sticks
lemons and oranges
brandy
whipping cream, whipped with honey

Make strong coffee, using a medium-dark roast. Warm honey. For each serving, place a cinnamon stick in each mug. Add a slice of lemon and slice of orange. Add one to two teaspoons of warm honey and of brandy. Fill with hot coffee. Top with cream whipped with honey. Decorate with orange slice.

A Honey Of A Cookbook
Alberta Beekeepers Association

This next recipe is for the peanut butter lovers. It's really delicious!

P-NUTTY WARM-UP

1/2 cup honey
1/3 cup smooth peanut butter
4 cups milk
nutmeg

In a saucepan, combine honey and peanut butter. Gradually stir in milk. Cook over medium heat, stirring constantly until mixture is hot. Pour into mugs and sprinkle with nutmeg, if desired. Makes five cups.

Ontario Honey Recipe Book
Ontario Beekeepers Association

Here is a nice hot drink recipe to accompany an afternoon of sports on TV while the snow and sleet are blowing around outside.

HONEY GROG

4 cups apple cider or apple juice
juice of 1 orange
1/4 cup honey
2 tablespoons butter or margarine
1 cinnamon stick, 3 inches long
1 teaspoon grated orange peel
1/4 teaspoon ground nutmeg
1/2 to 3/4 cup light rum (optional)

Combine all ingredients except rum in medium saucepan and bring to a simmer, stirring occasionally. Simmer five minutes. Stir in rum just before serving, if desired. Makes eight servings.

Sweetened With Honey
National Honey Board

Now we'll have a couple of hot drinks for the end of the day.

HONEY TODDY

1-1/4 cups milk
1 teaspoon honey
1 tablespoon whisky

Bring the milk almost to the boil. Stir in honey and whisky. Drink just before going to bed.

The Honey Cookbook
Charlotte Popescu

HARD DAY HOT LEMON

1 cup hot water
1 teaspoon honey (light and mild is best)
1 teaspoon lemon juice (fresh squeezed is best, but if using bottled concentrate, use only ½ teaspoon)
3 cloves

Heat water and pour over lemon juice, honey and cloves. Steep for several minutes. Remove the cloves, stir and enjoy, slowly. Single serving.

A Honey Cook Book
A. I. Root Co.

The days of chilled desserts and mounds of ice cream will return in a few months. In the meantime we can enjoy some warm desserts.

A warm fruit soup is really a dessert even though it can be eaten for breakfast or also served chilled.

SWEDISH FRUIT SOUP

1/2 cup dried apricots
3/4 cup dried prunes
6 cups cold water
1 cinnamon stick
2 lemon slices
1 cup honey
1 tart cooking apple
2 tablespoons raisins
2 tablespoons currants

Soak apricots and prunes 30 minutes in the cold water. Add cinnamon stick and lemon slices. Bring to a boil. Cover and simmer 10 minutes, stirring occasionally. Peel and core apple and cut into 1/2 –inch thick slices. Add applies, raisins and currants and simmer for three minutes. Cool slightly. Add honey, stirring until blended. Remove cinnamon stick. Serve hot or cold. Makes six servings.

Honeylicious Recipes
Tidewater Beekeepers Association

Fresh pears are available during the winter. Honey, brandy and pears make a delicious combination in this cake.

BRANDY PEAR CAKE

Batter:
3 large pears, peeled, cored and sliced
1/2 cup honey
1 tablespoon butter, softened
1/2 cup brandy
juice and grated rind of 1 lemon
1 teaspoon salt
1/2 teaspoon allspice
1/2 teaspoon mace
1 teaspoon baking soda
3 cups whole wheat pastry flour

Topping
1 large pear, peeled, cored
2 tablespoons butter
1/4 cup honey
1/4 cup brandy
1/4 teaspoon allspice

Mix until smooth 1½ cups of the pears and the honey, butter, brandy, lemon juice and rind. Add salt, spices, soda and flour. Mix well and pour into an 8X8-inch buttered and floured pan. Decorate the top with the remaining pear slices. Bake at 350° about 40 to 45 minutes.

Combine all ingredients for the topping in a small saucepan and cook until thickened. Makes about 1/2 cup. Spread evenly over the top of the warm cake. Serve warm.

Honey & Spice
Lorena Laforest Bass

Have you warmed up yet? BC

Ann Harman is keeping warm, and drinking a Toddy at home in Flint Hill, Virginia.

PEACE
On Earth & In The Beeyard

Ross **Conrad**

When we manage our bees in a way that allows them to co-exist with mites, beetles, and diseases without using toxic chemicals and antibiotics, we are participating in the broadest peace movement of our time.

"Peace on Earth and Goodwill toward Men." These beautiful words and wonderful sentiments from the bible, were generously shared and abundantly circulated this past holiday season. Such ideals underlie and support the Christmas tradition enjoyed by people all over the world. Not being a big fan of war, I greatly appreciate the spirit of peace that is so abundant at this time of year. However, once the season has passed the concepts of peace on earth and good will toward men (and women) seems to take a back seat to other ideals that do not share the same spirit.

When we mention war today Afghanistan or Iraq typically come to mind. We may even think of the unofficial wars the U.S. is waging in Pakistan and more recently, Yemen where special forces are deployed and unmanned drones regularly fly bombing missions. However, aside from these more obvious regressions from peace, the war mentality and language of the military has become so intertwined with our modern culture we hardly recognize its continuous presence.

For example, in the all-American game of football bombs are thrown, quarterbacks are sacked, and like an air force jet, touchdowns occur. We have "wars" on drugs, crime, poverty and so on. It is in our thoughts where wars begin and violent thoughts lead to violent actions. The military forces of each nation are among the most environmentally destructive organizations in the world. The United States which spends more money on military expenditures than every other country in the world combined, has the dubious distinction of hosting the most environmentally destructive organization on the planet: the Pentagon. Similar to the military, our system of industrial agriculture and food production which wages war upon nature and the earth, makes conspicuous use of the military mindset, language of war, and violent action.

Corporations that manufactured poisons and explosives to kill people during wartime, have been transformed into businesses that, following war, produce agri-chemicals. Coumophos, the active ingredient in the *Varroa* strip Checkmite+, is just one member of the organophosphate family of pesticides that is derived from nerve gas poisons developed during World War II. Weeds and pests have become "the enemy" to be killed. Thus herbicides with names like - "Round-Up," "Machete," "Pentagon," "Blade," "Firstshot," "Marksman," and "Squadron" permeate the marketplace.

History has shown that the use of toxic chemicals pollute the earth creating a poisonous environment for life, and leads to the development of chemical tolerance in weeds and pests. (I was originally going to use the word "resistance" rather than "tolerance" in the last sentence but caught myself when I realized that resistance brings up images of the "French Resistance" and other military related groups.) Increased tolerance then requires that

poisons be applied in greater and greater concentrations, or in more lethal formulations. This warlike approach ultimately fails to control pests for long and clearly cannot be carried on and sustained indefinitely. A smarter and more sensible approach would be to base ones activities on peace with the earth.

Beekeepers have inherently known this all along since we are in the business of trying to keep these insects alive. Honey bees are sensitive to the weapons of military/industrial agriculture. Large scale pesticide kills in bee yards became so problematic that laws have been passed that require special labeling instructions with the aim of protecting bees from chemical applications.

The beekeeping community once firmly in the military industrial agriculture camp, initially turned to toxic chemistry in order to address *Varroa* infestations. In recent years however, there has been a shift toward a more peaceful and earth friendly form of beekeeping. Rather than introducing poisons into beehives, drenching the ground in apiaries with toxic chemicals, or drugging colonies with antibiotics, beekeepers are exploring creative and less violent alternatives for controlling *Varroa* mites, small hive beetles, wax moths, foul brood, and nosema. While the publication of the book *Natural Beekeeping* helped to provide some initial momentum for this movement, additional organizations (such as the Organic Beekeeping Association) and new publications (e.g. *Wisdom of the Bees* by Erik Berrevoets, and *The Bee-friendly* Beekeeper by Dr. David Heaf) are helping to further propel this movement toward a more peaceful approach to beekeeping.

This shift toward a gentler approach to beekeeping, and thus a more responsible form of stewardship for the earth is also evident in other areas of food production. For over a decade now, organic farming has been steadily growing and organic food has been the fastest growing sector of the food industry and the only sector that has shown significant and consistent growth for well over a decade. There is growing recognition that our continuing violence to our soils, to the water, to the atmosphere, and to farms and farmers is producing a warlike food system that is proving itself unable to feed everybody. One billion people today go hungry every night. Two billion of us suffer food-related diseases such as heart disease, obesity, diabetes, and cancer. Millions more of us suffer "collateral damage" as exposure to agricultural poisons leads to diseases, birth defects, and even death. A growing number of people are fed up by this state of affairs and are demanding better solutions. Good planets are hard to find so it's time we stopped systematically poisoning and killing the one we are on.

If we are to have a future that consists of peaceful, smarter development, there are three primary cycles of violence that we will have to break. The first is violence against the earth which evidence suggests is the underlying reason for our current ecological crisis. Then there is the violence of poverty, destitution, discrimination, and displacement that targets people. Finally, we will have to learn to break the cycle of violence of conflict and war which becomes necessary when people live beyond the ability of their land base to provide for their necessities. When cities and nation states are unable to provide for their own needs they are forced to trade with their neighbors for the necessities of life. If the neighboring communities, states, or nations refuse to trade then the resources they hold are taken through force and violence.

Apologists for corporate and government entities point to the economic benefits that are produced from our military mindset. These days however, only a small percentage of the population is benefiting from the "war economy."

People's requirements for quality food and water can be met only as long as we protect nature's capacity to produce clean food and water. Dead soils and polluted rivers, plants coated with poison, or frames of comb contaminated with the residues of toxic chemicals will not provide high quality food for humans or other life forms (with the possible exception of certain obscure species of bacteria).

The concept of peace on earth gets dusted off and trotted out each December as if we are saying "look, we know what is right and good." Yet there is a amnesia that grasps our collective consciousness with the advent of new year. In a kind of Jekyll and Hyde schizophrenia we forget the kindness, tolerance, and peaceful approach that pervades during the final month of each year and allow ourselves, mostly through our media and political discourse, to be dragged back into a mindset that is diametrically opposed to peace. One of the most important new year's resolutions we can make may be to simply commit to carrying the holiday spirit of peace on earth with us throughout the rest of the year.

Waging peace has always had moral, ethical, ecological implications. Today, we are starting to recognize that it is important for the survival of species, both our own and the billions of others who share the planet with us. The work of peace takes on many forms and includes respecting human rights and standing up for social justice. To paraphrase the nuclear physicist and environmental activist Vandana Shiva, defending the rights of the Earth is the most important of all human rights and social justice struggles. As beekeepers when we do our part to end war against the earth and the environment by managing our bees in a way that allows them to co-exist with mites, beetles, and diseases without the use of toxic chemicals and antibiotics, we are participating in the broadest peace movement of our time. BC

Ross Conrad is the author of Natural Beekeeping. *You can reach him at* ***dancingbeegardens@hotmail.com***.

IBRA

INTERNATIONAL BEE RESEARCH ASSOCIATION

What's New?

Norman **Carreck**

The International Bee Research Association (IBRA) has now been providing the bee community with information services for more than 60 years, and has had to adapt and change to reflect the changing nature of both beekeeping and bee science, and in particular to embrace modern information technology. There have recently been a number of exciting developments that reflect its evolving role.

Firstly, and perhaps most obviously, has been a change of leadership. The role of Director of IBRA embraces many functions, and after much discussion following the retirement of Richard Jones, Director since 1996, in October 2009, the post was split into two roles. Sarah Jones now has the role of Executive Director, responsible for the day to day running of the organization, and Norman Carreck is now Scientific Director, responsible for scientific and technical aspects. Tony Gruba remains as Finance Manager, and Jane Jones remains as Bookshop Manager. IBRA is a Registered Educational Charity (No: 209222) and also a non-profit Company (No: 463819), governed by a Council of members worldwide. The new Chairman of the IBRA Council is Hans Kjaersgaard (UK) whose introduction to IBRA was through international honey trading for many years.

Publishing journals remains one of IBRA's core functions. The *Journal of Apicultural Research* (JAR), which will reach its 50th volume in 2011, publishes peer-reviewed papers including original research articles, original theoretical papers, notes, comments and authoritative reviews on scientific aspects of the biology, ecology, natural history and culture of all types of bees including honey bees, bumble bees, stingless bees and solitary bees. The Senior Editor is Norman Carreck (UK), assisted by Dr. Adriana Alippi (Argentina), Dr. Jay Evans (USA), Dr. Fani Hatjina (Greece) and Sarah Jones (UK). From 2010 it became a solely online journal reflecting the changing nature of scientific publishing. Subscribers have access to all articles as they are published, and the extensive and valuable back catalogue is gradually being scanned and becoming available online. Individual articles can also be purchased from the website.

From time to time, special issues of JAR are entirely devoted to particular topics of importance for beekeeping worldwide. For example, in 2008, Issue 47(3), edited by Dr. Peter Neumann (Switzerland) and Dr. Jamie Ellis (USA) covered the small hive beetle[10]. Earlier this year Issue 49(1), edited by Dr Peter Neumann (Switzerland) and Norman Carreck (UK) was devoted to the problem of worldwide honey bee colony losses[11]. This special issue is also available as a limited edition hard copy.

In 2009, JAR was joined by a sister journal. For a number of years, the editors of JAR had been receiving papers which dealt with aspects of hive products without actual reference to bees themselves, and these, no matter how good, were considered to fall outside the scope of the journal. In recent years, however, medical problems such as pathogen resistance to antibiotics have caused a renewed interest in the medicinal use of the products of the bee hive, long used in folklore and traditional medicine, allowing them to take their place among the modern armory of drugs. While many scientific studies have shown efficacy and safety, many other claims that have been made lack scientific credibility. As with any drug of biological origin, a thorough understanding of the mode of action, and the standardization of concentration of the active ingredients, together with standardization of testing methods, are essential. The fact that reports of the efficacy of hive products are often anecdotal, and have hitherto been published in a wide array of journals, books and ephemeral literature, has arguably slowed the acceptance of the use of hive products in "conventional" medicine.

IBRA's new online journal, the *Journal of ApiProduct and Apimedical Science* thus provides a single forum for peer-reviewed reports of research on the six main hive products of both *Apis* and non *Apis* bees: honey, pollen, propolis, wax, royal jelly, and bee venom. Authoritative review papers can also draw together the results of many studies, and provide a platform for the adoption of standardized tech-

niques[6]. It is edited by Prof. Rose Cooper (UK), assisted by Sarah Jones (UK), and with an Editorial Board in seven other countries.

These two scientific journals are mainly intended to serve the international academic community, but IBRA's third journal *Bee World* (BW), founded in 1919, and relaunched in 2010[13], is principally intended to serve the beekeeper worldwide. Edited by Richard Jones (UK), BW is free to IBRA members. BW provides easily accessible articles by authors around the world on all aspects of bees, beekeeping and bee science. Future articles planned include a regular series on plants for bees, and popular articles summarizing scientific papers published in IBRA's other two journals.

From its early beginnings, IBRA has published books, ranging from small booklets, to major works which have stood the test of time. Three of these are Dorothy Hodges's *"The pollen loads of the honey bee"*[11], Ronald Ribbands's *"The behavior and social life of honey bees"*[12], and Lesley Goodman's *"Form and Function in the honey bee"*[3]. Two best selling IBRA books recently republished include William Kirk's *"A color guide to pollen loads of the honey bee"*[7] and H.A. Dade's *"Anatomy and dissection of the honey bee"*[2]. The IBRA Bookshop sells a large range of books on bees, beekeeping and bee science, as well as IBRA's own publications. The Bookshop is well represented at UK functions such as the British Beekeepers Association Spring Convention at Stoneleigh and the National Honey Show in London, and also travels abroad to conferences such as Apimondia and EurBee. All items can also be purchased from the website.

One of the reasons for the foundation of IBRA, back in 1949, was the realization by its founding Director, Dr. Eva Crane, that bee scientists in many parts of the world, especially in developing countries and the then Eastern Bloc did not have access to papers and articles published elsewhere. This quickly led to the foundation of a library. It grew rapidly, eventually comprising many thousands of items including books, journals, pamphlets and scientific reprints. This needed full time library staff, who were constantly providing copies for other libraries and researchers worldwide. The introduction of the internet has, however, fundamentally changed the nature of information dissemination, causing much consternation among traditional libraries as to how to physically house paper collections, which few people now consult personally. In the case of IBRA, an offer from the National Library of Wales at Aberystwyth to house the collection was gratefully accepted, and the Eva Crane/IBRA Library is now housed in purpose built, controlled environment facilities. The full catalogue will soon be available online. In the meantime, individual researchers can consult the actual volumes in Aberystwyth, whilst IBRA's own journals and a few others such as a complete run of the *British Bee Journal*, can be consulted at IBRA's headquarters in Cardiff, Wales.

Sarah Jones

As well as paper items, IBRA has also amassed many other museum artifacts. Many of these were collected by Dr. Crane on her worldwide travels and were used as material for her many books. These include examples of ancient and modern bee hives of many kinds, beekeeping clothing, extraction equipment, coins, stamps and medals featuring bees, and many thousands of photographs ranging from Victorian glass "Magic Lantern" slides to modern digital images. Storage and curation of such items has always posed problems. Despite many attempts, there remains no museum devoted to beekeeping in Britain, although for many years a number of IBRA items were on display at the Museum of Rural Life at the University of Reading, England. Sadly, the collection currently remains in store, although it has now been fully photographed and catalogued, and a growing number of CDs and books of photographs have been published[5].

Historical research has revealed many archaeological remains relating to bees, including bee shelters and bee boles, which survive throughout Britain and elsewhere. These were collated and published in Eva Crane's 1983 book[1], but records have continued to be added, and the IBRA Bee Bole Register is now fully available on the website.

As mentioned above, IBRA has been at the forefront of efforts to understand honey bee colony losses and the various explanations that have been proposed. It is an inescapable truth, however, that the parasitic mite *Varroa destructor* is present in all regions of the world where recent colony losses have occurred, and the mite is known to interact with other pests and diseases, principally viruses. *Varroa* is, however, not a new problem. It was first identified as a serious pest more than half a century ago, and chemical and other control methods have been available for decades. Why therefore is it still a problem?

IBRA now proposes to address the continuing problem of *Varroa* through an integrated project. This will consist of a major conference, to be held at the Univer-

sity of Worcester, UK, on 29th January 2011. This will be aimed at beekeepers and scientists, and the speakers will be international authorities, who will outline our current knowledge about the biology of the mite and its interaction with other diseases, discuss the problems of chemical resistance, and suggest control methods, whether chemical, biological, biotechnical or by bee breeding, and suggest practical solutions for the practical beekeeper to enable us to live with the mite in the 21st century. Full details of the conference and online booking facilities are on the website.

The conference speakers will each contribute a chapter to a book, which will complement the earlier well received IBRA publications "Living with *Varroa*"[8], and "*Varroa* – fight the mite"[9]. It is planned that the new book will be launched in April 2011, and in order to supply the needs of its international audience, many of whom are not English speakers, a Spanish edition will also be produced, to tie in with IBRA's participation in the International Apicultural Congress (Apimondia), to be held in Beunos Aires, Argentina, in September 2011.

In its seventh decade, IBRA has thus adapted to a changing information world, and has many exciting future plans, but as a small independent charity and publisher, to continue its valuable work, it needs the continuing support of beekeepers worldwide. Membership of IBRA currently costs just GB£30 ($18.00) per annum. For more information visit **www.ibra.org.uk**. BC

Norman Carreck is the Scientific Director of IBRA.

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We've All Been Here Before

Tom **Rearick**

European grapes and European bees - something in common

This is a tough time for honey bees and beekeepers. Colony Collapse Disorder, *Varroa*, Small Hive Beetle, Africanized Honey Bees, Tracheal mites, and invisible pathogens are wreaking havoc on apiaries. Will more than 30% annual hive losses cripple the pollination industry and discourage hobby and sideline beekeepers? It would be nice if we could look into a crystal ball and see what the future holds. We can't. But we might gain insight by studying a remarkably similar historical event: the near total extinction of the European wine grape.

Like honey, wine's history is inseparable from the history of agriculture, food, medicine, literature and religion. Archeological evidence suggests that wine production existed in Iran from 6000 to 5000 BC. Likewise, caving paintings in eastern Spain, dated to 6000 BC, show early Spaniards hunting and harvesting honey. But until the 17th century, wine was not simply something drunk at celebrations, it was the only safe drink (in moderation) in a world where water in cities and villages was usually unsafe to drink.[1] Wine was typically stored in barrels and served in goblets from leather or stoneware jugs. It was not a drink that was savored as it is today. It was a healthful drink – and 'healthy' rarely tastes great.

The role of wine in Europe changed in the 17th century when cities began to pipe clean water like the Romans had done centuries before. Beside clean water, wine also had to compete with beer made stable by the addition of hops, chocolate from Central America, coffee from Arabia, and tea from China. However, this was not to be the end of wine-making. In the same way that the Langstroth hive would later revolutionize beekeeping, 17th century technology transformed the packaging of wine.

Developments in glass-making technology in the 17th century made bottles stronger (to avoid breakage from inconsistent fermentation) and cheaper. Someone combined glass bottles with a cork and a corkscrew and they had a system for keeping wine far longer, more reliably, and in smaller, more affordable amounts than previously possible with wooden kegs. Add a growing middle class in the industrialized European countries, and you had a burgeoning wine trade. By the 1880s, wine was so popular that 80% of the population of Italy worked in one way or another in support of the wine making industry.

About this time, when the wine grape was king of the agricultural world, a tiny aphid arrived in Europe that utterly devastated Europe's vineyards in less than 20 years.

In the middle of the 19th century, the *Phylloxera louse*, an insect that lived on the roots of grape vines in eastern North America, found its way to Britain and France. "It is argued by some that the introduction of such pests as *Phylloxera* was only a problem after the invention of steamships, which allowed a faster journey across the ocean, and consequently allowed durable pests, such as the *Phylloxera*, to survive." [see Wikipedia: 'Great French Wine Blight']

Since *Phylloxera* is native to America, the native American bunch or Fox Grape (*Vitis labrusca*) had become tolerant to the pest. The best known cultivar of this North American native is the Concord grape. However, the European wine grape (*Vitus vinifera*) was not tolerant. An epidemic wiped out vineyards in Britain then did the same in Europe. Some estimate that 90% of all European vineyards were destroyed by the end of the 19th century to the American louse.

Does any of this sound familiar?

What is killing our bees? How about *Varroa* mites from Southeast Asia, Tracheal mites from Britain, and Small Hive Beetle from Africa. Bee colonies in Florida are being invaded by Africanized honey bees (AHB). But unlike the AHB that migrated into Texas from South America over the Central American land bridge, the Florida AHB gained entry through the shipping ports on container 'steamships'. Our bees, like wine grapes before them, are victims of the globalization of disease.

There was a frenzy of activity in France and elsewhere to save the European wine grape. Some attempts helped, such as planting *Vitis vinifera* in sandy or volcanic soils in which *Phylloxera* had difficulty thriving. Some attempts did not help, such as blessing the seeds or planting live toads under wine grape vines. If you believe some people today, we can save the bees by tearing down our cell phone towers!

Ultimately, there emerged three partisan camps that battled each other over how to best deploy French gov-

[1]Since the 17th century, the problem of safe drinking water has only grown to be a larger problem. Today, over one billion people are estimated to lack access to safe drinking water.

ernment resources:

- Many of the grape growers as yet unaffected by *Phylloxera* lived in denial that they would ever be affected
- Chemistry advocates injected highly inflammable and expensive insecticides, such as Carbon Bi-sulphide, into the soil to kill the root-bound louse.
- The very unpopular *américainistes* were scientists and growers that preferred grafting *Vitus Vinifera* onto hybridized *Phylloxera*-resistant root stock derived from the American fox grape. This was an unpopular approach because the French feared that American root stocks would tarnish their reputation for superior wines.

As a parallel, I believe we have three partisan camps today with respect to beekeeping:

- Colony Collapse Disorder (CCD) deniers
- Advocates of pesticides and chemical controls
- Advocates of non-chemical controls such as Integrated Pest Management (IPM) and genetic engineering.

One elusive goal of researchers in the 19th century was to find a natural *Phylloxera* killer or parasite. They were unsuccessful but the same goal exists today for bee pathogens. I douse the ground under my hives with water containing beneficial nematodes that wait for Small Hive Beetle (SHB) larvae. When the SHB larvae crawls into the ground in order to grow into a beetle, the nematodes crawl into the larva, injects them with a lethal infection, and abruptly ends the Small Hive Beetle's life cycle. Fungi and bacteria have been explored.

The wine grape was finally saved by grafting it onto *Phylloxera*-tolerant hybridized American root stock. Nearly all grape vines today in Europe and around the world grow on root stocks that originate from North America... including even the French varietal wine grapes growing in California. The battle against *Phylloxera* has not been won but it is held in an economically-viable stalemate.

Likewise, the effort to save the European honey bee may require hybridization with a grumpy, foreign bee that is has a natural resistance to *Varroa* – the African-ized Honey Bee. And like the battle against *Phylloxera* and other pathogens, the battle with the honey bee's enemies may never be won but will – hopefully - become an economically-viable stalemate.

The Future of Beekeeping

Perhaps the most intriguing thing about the The Great Wine Blight is how it transformed the wine industry and its culture. The craft of wine making had not changed much from the time of the ancient Romans to the French vignerons[2] of 1850. It was a trade handed down by father to son without written instruction or formal instruction. So far as anybody knew, wine was created by 'spontaneous generation.' It was not until the middle 19th century that French chemist Louis Pasteur discovered not only how yeast turned sugar into alcohol to make beer and wine but how the wrong bacteria could ruin good wine. This marked the beginning of a change in wine making from an inconsistent cottage craft into a technology that enabled consistency in product and production. The Montpellier School of Agriculture in France and the University of California at Davis each grew in reputation, funding, and in the numbers of technologically trained graduates. These graduates and their science-based processes have transformed the wine making industry. I believe that we have yet to see a comparable transformation in beekeeping.

I have crafted good wine and a lot of bad wine. I am currently crafting bees. I use the term 'crafting' because I don't really know what is going on in each colony. I was told at my beekeeping club that understanding comes with experience. I can imagine a wine making craftsman from the 17th century telling his son the same thing. I read magazines full of tips and advice but very little is verified through controlled and repeatable experiment. Beekeeping has not changed much in 100 years but unless we gain scientific understanding to some serious problems, there may not be many bees left to keep. That is why I am encouraged when I see talented students majoring in entomology, beekeepers participating in national surveys and experiments, and new demographic groups discovering the joys of beekeeping.

I can imagine a day when my iPod notifies me that

- hive #3 has a 8% economic-threshold Varroa population or
- hive #6 will swarm tomorrow with a 70% probability or
- hives #3 through #6 detected that a neighbor just sprayed the dandelions in his yard with Spectracide, not fully understanding the distinction between an insecticide and a herbicide.

That will be the day when the process of beekeeping is consistent, measured, and well understood. Will I miss the 'good old days' when beekeeping was a craft where hives regularly starved or absconded or collapsed? Hardly. BC

Tom Rearick is a beekeeper in Roswell, Georgia and the creator of ***BeeHacker.Com****, a website that explores the cross-pollination of beekeeping and technology.*

[2]From Wikipedia: Winemaker - "A vigneron is someone who cultivates a vineyard for winemaking. The word connotes or emphasizes the critical role that vineyard placement and maintenance has in the production of high-quality wine."

Cotton — An Excellent Bee Plant

Connie **Krochmal**

Gossypium

Cotton is an excellent crop for bees. Providing both nectar and pollen, this is a member of the Mallow family, which also includes hibiscus and hollyhock. Originally found in the tropical regions, these species are native to Africa, Australia, the New World, and Asia. There are 16 or so species of wild cotton around the world.

Though eight species have been grown over the years, about four or so are now widely cultivated. In addition to these species, there are also natural hybrids and cultivated varieties. Though cotton has naturalized and spread to waste ground in some areas of the eastern U.S., it is generally short lived. However, I've seen cotton growing wild in Puerto Rico and elsewhere in the Caribbean.

The plants are drought tolerant, and are found in the wild in a variety of habitats from rocky hillsides and along dry river beds to the edges of deserts.

When grown in temperate zones, various cotton species are stiff, herbaceous plants and have rather large, lobed leaves. Blossoms are shaped much like those of hollyhocks.

Once the seed capsule ripens, it splits to reveal the cotton boll. The cotton fibers surround the seeds. The number of seeds per boll, up to 50 or so, can vary from one species to another.

The American cotton harvest is expected to be around 18½ million bales in 2010. Seventy-five per cent of that is for export.

Cotton History

The oldest known cotton cloth was excavated in Pakistan, and dated to around 3000 BC. Cotton was introduced from India into China. The cultivation of cotton reached Egypt around 600 AD. Arabs introduced the crop to Africa, though there could have been native cottons already growing there.

Prehistoric remains of cotton from Mexico date to 1700 BC, while ones from Peru are somewhat older, to 2000 BC. In addition, prehistoric fragments of cotton have been found in the American Southwest as well.

The history, origins, and domestication of cotton are muddled. According to experts, the seeds could have floated across the Atlantic from Africa to South America, or even from the Americas to the South Pacific. Experts agree that different species were domesticated in the New World, Africa, and Asia.

European colonists in America began cultivating cotton as early as 1621. Some of the earliest European settlers in the South grew cotton. With the invention of the cotton gin by Eli Whitney in 1793 and the widespread institution of slavery in the South, cotton became a major crop for the area and continued until the Civil War. Cotton cultivation also spread as the nation expanded westward into new territory.

Climate and Growing Conditions

Cotton prefers a sunny, warm, humid climate with uniform temperatures throughout the growing season. Prolonged cloudy weather is bad for the crop. The season needs to be frost-free for six to seven months.

The advantage to growing under irrigation is that the moisture can be provided on an as-needed basis. Cotton plants require adequate moisture during the early stages of growth. For the flowering season, dry weather is favorable. Little rainfall is needed once the crop starts to ripen.

Excessive rainfall prior to the cotton harvest can damage and discolor the cotton bolls. When the ripe bolls become rain-soaked, the seeds can begin to sprout, which can also damage the bolls.

Cotton Pests and Problems

Various pests and major diseases can pose problems for this crop. Disease resistant varieties are now available. Originally, the crop was particularly susceptible to root rot and wilt.

A number of insects can attack cotton plants. Despite eradication efforts, the boll weevil remains one of the major cotton pests. It spread from Mexico into the U.S. in the late 1890's, and moved eastward. This was especially bad during the 1920's. Boll weevil damage is also related to

certain weather conditions. Hot dry weather is least favorable.

There can be seven or more generations of weevils per year. They spread via the seed. They can also fly around six miles per day. The adult weevils feed on the foliage and lay eggs in the young flower buds, which destroys or discolors the bolls. Farmers use cultural controls as well as pesticides to minimize weevil damage. With the adults overwintering among plant debris in the fields, very low winter temperatures can curb populations, lessening weevil damage the following year.

Cotton blossom

Growing Cotton

In the U.S., cotton is grown exclusively from seeds. Because cotton roots are near the surface, deep plowing is unnecessary. Depending on the region, the seeds are usually planted in very large acreages any time between March 1 and June 1. The early crop will begin blooming in May. The active growth generally occurs from early June into mid-August.

In the U.S., this is grown in the Cotton Belt, which extends from the Atlantic Seaboard to the northwest corner of Texas. Cotton is also cultivated in the Southwest and California under irrigation.

Cultivated Cotton Species

In America, the cultivation of certain species is sometimes limited to a specific region of the country.

Levant cotton
(Gossypium herbaceum)

There is disagreement as to the likely origins of this species. Some say it originated in Africa. Others believe it was originally native to Asia and possibly Saudi Arabia. In any case, it is now widespread in Asia. Levant cotton could have been one of the first domesticated species. This is grown mostly outside the U.S., particularly in Asia.

This slightly hairy, shrubby plant reaches five feet in height. Generally behaving as an annual, it contains a small number of branches. The leathery foliage has up to seven lobes, which can have toothed edges. The medium sized blossoms are yellow with purple in the center.

Sea Island cotton
(Gossypium barbadense)

Still found in the wild, this domesticated species is native to tropical South America. It was introduced to the West Indies, and from there into the American South.

A shrubby, hairy, branched plant, it reaches ten feet in height. Occurring both as annuals and perennials, this can become woody. The dark stems are angled. The leaves have three to five lobes.

The bright yellow blossoms often feature purple tinges. The five sepals form a cup or calyx. There are leafy bracts at the base of the flowers. The bolls are fairly large, up to 2½ inches long.

The two main varieties of this species are Sea Island cotton and Egyptian cotton. The main differences between the two are in the texture, length, and color of the fibers.

The Sea Island cotton variety is considered the finest of all. Its fiber is two inches long. This is generally grown on the coastal mainland and islands off the coast of Georgia, the Carolinas, and Florida. It is also cultivated in the Caribbean islands. Sea Island cotton is particularly prone to the boll weevil.

Egyptian cotton is grown in the southern U.S. as well as in the Southwest and California. This variety was introduced to America around 1900. There are a number of well-known types of Egyptian cotton, such as Pima and Yuma. When compared to Sea Island cotton, the Egyptian feels less luxurious.

Tree cotton *(Gossypium arboreum)*

Though this is indigenous to India, it might have been originally introduced to Asia from Africa. Tree cotton was likely the first cotton woven in India. This is now widely grown, particularly in India, but elsewhere in Asia as well as Africa.

The growth habit can vary considerably. It can be a shrub, tree, or shrubby perennial reaching 10 feet or so in height. This can also occur as an annual. Tree cotton has few branches. The young growth is often hairy.

The foliage has up to seven lobes, which can also have their own lobes. Tree cotton blossoms can occur either singly or in long bunches from the leaf axils and terminally. Often, the yellow flowers have colorful purple or reddish-purple centers.

Upland cotton
(Gossypium hirsutum)

Apparently native to tropical America, upland cotton still exists in the wild. This was domesticated in the New World. It is the major type grown in the U.S., particularly in the Cotton Belt. This is also cultivated elsewhere around the world.

This slightly hairy, bushy plant can be a small shrub, tree, or annual. A much-branched species, upland cotton is generally three to ten feet in height. It often features reddish-green hairs. With palmate ribs, the large leaves are up to six inches wide. They're alternate, and heart-shaped with three to five lobes.

The large, showy, terminal flowers are three inches long. Initially white or pale yellow, the blooms become pink, red, or purple the following day, and cease producing nectar.

The large, rounded bolls are green.

There are two major types of this species in cultivation. These are the long staple and short staple cottons. The two are grown in different areas of the country.

Cotton as a Bee Plant

If left to grow naturally, cotton will continually bloom and fruit throughout the Summer and Fall until a killing freeze. The long season makes this an ideal plant for bees. Cotton is capable of yielding enough nectar for two generous honey crops per year. On the whole, this is a very reliable honey plant. Under good growing conditions, this can result in 100 pounds of honey per colony.

The extrafloral nectaries also make this a particularly good bee plant. These are present on the floral bracts and on the undersides of the leaves. In fact, the extrafloral nectaries often yield more nectar than the blossoms. Often present before the blossoms open, the extrafloral nectaries yield so much nectar that it is visible on the foliage. This nectar source is often present before the blossoms open. In many cases, the bees prefer the extrafloral nectaries to the flowers.

Many factors can affect the nectar flow of cotton plants. These include the type of cotton being grown and the plant vigor as well as the soil type, soil fertility, rainfall amounts, and climate. The honey yield for Sea Island and Egyptian cotton is generally higher than that for upland cotton. In addition, healthy plants produce more nectar. High humidity and warm, damp conditions are favorable for nectar production. The nectar flow can be quite heavy when the crop is irrigated.

Rich, black soils, such as those found in parts of Texas, are ideal. These provide much better honey yields than cotton crops growing on sandy soils.

In earlier times, the plants would have ripe bolls and blossoms at the same time so that the harvest lasted for several months. Certain modern farming methods have impacted the extended season for nectar production. Chemicals are often used to encourage uniform flowering and ripening so the entire crop can be harvested mechanically at one time. In addition, defoliants are sometimes applied prior to harvest. These eliminate the leaves with their extrafloral nectaries.

On the whole when compared to many other crops, cotton plants are often treated with a larger number of chemicals. Unfortunately, some of these are known to be toxic to honey bees. The organic cotton fields are much safer places for honey bees.

Cotton Honey

When the cotton honey is ripening, the apiary can have a characteristic odor. Although the honey is generally light colored and almost clear, it can be extra light amber. This generally has a thin body. Once the weather turns cold, it can become thick and difficult to extract. When it granulates, cotton honey is fine grained and pure white.

For the most part, cotton honey is noted for its excellent flavor. This mellows after it is initially harvested. It is considered high quality and equal to basswood honey.

Under certain growing conditions, some reports indicate that the honey can be lower in quality. When cotton is grown on less favorable soil types, particularly sandy ones, the honey can taste somewhat stronger. In addition, honeydew can affect the flavor with one source describing the honey as tasting 'oily'. In the past, reports indicated that cotton honey in the Southeast fermented and exploded. However, this appears to be a rather uncommon occurrence. BC

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

The combs were filled with honey bright.
And New Year's Eve was filled with light.
But what was this, a most unusual sight,
The bees were zinging in crazy flight.
Buzzing here and buzzing there,
In frosty, freezing, snow-filled air.
I stared in awe, I couldn't belive,
Their finest honey had turned into mead!
Don't drink and fly!
Happy New Year!
Michael Salnicky

New Electronic Book –

The systemic insecticides: a disaster in the making by Dr. Henk Tennekes. Produced by Weevers Walburg Comminicatie, Zuthen, the Netherlands. An Ebook PDF is available at www.disasterinthemaking.com for $16.95 Euro. 72 pages. Excellent illustrations by Ami-Bernard Zillweger.

It is notable that this book and information on the scandal at EPA regarding registration of Bayer's clothianidin become available at about the same time. EPA, brought on the carpet for grossly mishandling the registration due process of this chemical in part because of information first published in Bee Culture by Tom Theobald in July, certainly has some 'splainin to do on their process, and the bureaucratic rug they swept their mess under when they allowed Bayer free rein with this deadly cocktail.

And Bayer, too, has some 'splainin to do on their gross negligence on performing even the minimum testing for honey bee safety before they even got a conditional registration from EPA seven years ago. It was, as Tom says, research fraud at its best.

There are some beekeepers in this country that are convinced that this chemical, and others like it are closely associated with CCD. There's evidence to support that. Dr. Tennekes would probably agree.

His slim book catalogs a tragedy of monumental proportions regarding the loss of the insect-feeding (invertebrate-dependent) bird populations in all environments in the Netherlands. And he ties the disappearance to agriculture generally, and the neonicotinoid insecticide imidacloprid in particular. Clothianidin is no different, he says.

He brings together the disasters of surface water contamination and the decline of nearly all life forms associated with that resource, but then he also includes the decline of insect feeding woodland birds in Britain, the Low Countries, Germany, Switzerland, and France. It is a telling, and gruesome story. The insects are gone. And now, so are the birds. The question is . . . what, or maybe who, is next?

Kim Flottum

GLEANINGS

JANUARY, 2011 • ALL THE NEWS THAT FITS

AUSTRALIAN BEES BANNED

With little public fanfare, the United States has banned the importation of honey bee queens and package bees from Australia.

Minister Counselor (Ag) Simon Smalley at the Australian Embassy in Washington and a spokesman for the U.S.Department of Agriculture'S Animal AND Plant Health Inspection Service (ASPHIS) both confirm the move made towards the end of last month.

Both say there is a "temporary suspension" of the imports, but the APHIS website has a one sentence reference that reads:

"Importation of honey bee queens and package bees from Australia is prohibited."

But the halt is not because of the Asian bee incursion in northern Queensland as many expected but because of something called slow paralysis virus.

In a letter sent to AHIS official Wayne. F. Wehling and seen by Bee Culture, Australian world bee authority Dennis Anderson of the Commonwealth Scientific and Industrial Research Organization questions the decision, saying the virus has never been found in Australia.

"I wish to inform you that Slow Paralysis Virus has not been detected in or reported from Australia," Anderson says. "This is despite a number of surveys for it."

Anderson says this is borne out by the following:

"In the latest publication on SPV by Miranda et al 2010 – it states on page 2525 that quote 'SBPV appears to be extremely rare, having been identified positively only in Britain, Fiji and Western Samoa (Allen & Ball, 1996; Anderson, 1990; Carreck et al., 2010; Martin et al., 1998), despite being included in surveys of Australia (Hornitzky, 1987), New Zealand (Todd et al., 2007), Scandinavia (Nordstrom et al., 1999) and Poland (Topolska et al., 1995). Only in Britain has it ever been associated with colony mortality (Carreck et al., 2010)'."

Anderson, principal research scientist at the CSIRO, says he is confident Australia knows what viruses are present in its honey bees.

"This is also born out be the fact that since imports of Australian bees into the U.S. started in 2005 (?), no viruses have been detected in Australian bees in the U.S. that Australia didn't already know about and publish," the letter says.

He says the only exception is Israeli Acute Paralysis Virus (IAPV). However, Anderson says, prior to this virus being named IAPV by a researcher in Israel, that virus had been regarded in Australia as a strain of Kashmir Bee Virus.

"If SPV was the primary reason for APHIS suspending imports of Australian honey bees into the U.S. (this is the reason given in the official response), then the process that led to the decision to suspend has been a travesty and should be reconsidered," Anderson's letter states.

In another letter, also seen by *Bee Culture*, Tim Ryan of Biosecurity Australia tells Daniel Weaver, president of the American Beekeeping Federation, hisorganization was in the process to writing to APHIS to start to detail the lack of evidence for SPV being in Australia.

"Your request for a copy of the letter from APHIS has come back to Biosecurity Australia, but the decision is that we cannot release government to government correspondence without the permission of the originating party," Ryan states.

"However, I can tell you that the letter states that suspension is 'primarily due to slow paralysis virus' but then goes on to mention other viruses- TSBV and BVX.

"It quotes the findings of the APHIS Pest Risk Assessment from earlier in the year as support for the suspension 'until Australia can control or eradicate the Asian honey bee and provide data about the distribution of bee viruses and pests, particularly SPV.'

"To me this leaves them a pretty wide operating scope outside SPV. In my interpretation the letter also precludes an increase in the export exclusion zone around the Asian bee area again quoting the 'unknown' distribution of SPV."

Australian bee exporter Warren Taylor, one of the pioneers of the U.S. trade through his Australian Queen Bee Exporters Pty. Ltd. company, says SRV does not exist in Australia.

"Somehow, somewhere it was reported that we had Slow Paralysis Virus which was incorrect," he says in an email to Bee Culture. "I guess the ban is all political so USDA is now trying to find something else to hang their hat on.

"Our bees have been tested so frequently as they entered U.S. I am sure that they would have found something if it actually existed.

"I guess U.S. beekeepers will be very short of queens January to March as I visited Hawaii in June and saw problems they are having with *Varroa* and SHB."

Alan Harman

EPA'S OOPS

Beekeepers and environmentalists in December called on EPA to remove a pesticide linked to Colony Collapse Disorder (CCD), citing a leaked EPA memo that discloses a critically flawed scientific support study. The November 2nd memo identifies a core study underpinning the registration of the insecticide clothianidin as unsound after EPA quietly re-evaluated the pesticide just as it was getting ready to allow a further expansion of its use.

Clothianidin (product name "Poncho") has been widely used as a seed treatment on many of the country's major crops for eight growing seasons under a "conditional registration" granted while EPA waited for Bayer Crop Science, the pesticide's maker, to conduct a field study assessing the insecticide's threat to bee colony health. Bayer's field study was the contingency on which clothianidin's conditional registration was granted in 2003. As such, the groups are calling for an immediate stop-use order on the pesticide while the science is redone, and redesigned in partnership with practicing beekeepers. They claim that the initial field study guidelines, which the Bayer study failed to satisfy, were insufficiently rigorous to test whether or not clothianidin contributes to CCD in a real-world scenario: the field test evaluated the wrong crop, over an insufficient time period and with inadequate controls.

Citing the imminent economic and environmental hazards posed by the continued use of clothianidin, the National Honey Bee Advisory Board, Beekeeping Federation, Beyond Pesticides, Pesticide Action Network, North America and Center for Biological Diversity are asking EPA administrator Lisa Jackson to exercise EPA's emergency powers to take the pesticide off the market.

"The environment has become the experiment and all of us – not just bees and beekeepers – have become the experimental subjects," said Tom Theobald, a 35-year beekeeper, in a July 2010 *Bee Culture* article that started this up. "In an apparent rush to get products to the market, chemicals have been routinely granted "conditional" registrations. Of 94 pesticide active ingredients released since 1997, 70% have been given conditional registrations, with unanswered questions of unknown magnitude. In the case of clothianidin those questions were huge. The EPA's basic charge is "the prevention of unreasonable risk to man and the environment" and these practices hardly satisfy that obligation. We must do better, there is too much at stake."

Inner ... Cont. From Page 10

open their doors to the keepers of bees and chickens and rabbits and goats and partridge and backyard gardens and city gardens and farmer's markets and CSAs and street markets and more. Knowing where your food comes from is becoming more and more important. Wake up America!

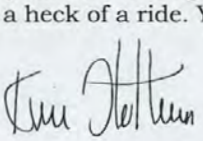
The Farmer's Almanac and the wooly bear caterpillar are at odds on how bad the Winter will really be. I side with the caterpillar and it's going to be wet and cold and miserable (they've already closed schools here, and it's not even winter yet). And bees are going to suffer everywhere because we just don't Winter bees as well as we did 75 years ago. Plan on the 30+% loss, again, this year, just because it was too cold for too long and for reasons known and unknown, and some foreseen and some never thought of. Maybe next year we'll take better care of them.

There will be patches of green in the California landscape this year where green has never been. A few wise growers are taking care of the bees they use before they need them and after they are done. Growers need bees and bees need to eat . . . who, do you think, is going to provide all the right food? HFCS and protein supplement . . . not on your life, not any more.

By the end of the year . . . After nearly a dozen years the next edition of *The Beekeeper's Handbook* is due out. I've heard that maybe the next edition of *The Hive and The Honey Bee* will be out. And *Better Beekeeping* will be out. The last is the next in line from the *Backyard Beekeeper* and *The Honey Hand Book*. Look for all three this year.

It'll rain too much is some places and not enough in other places and it will be too hot there, and not warm enough here and floods will be a problem and there'll be late freezes and early freezes that'll wreck havoc on honey crops and honey bees, and tornadoes and hurricanes will too. This is the easy part . . . No matter what is predicted . . . it's true . . . someplace.

Good luck this season. Remember to keep your smoker lit, your hive tool handy and your veil tied tight . . . it's gonna be a heck of a ride. You just wait.



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Lucky Us

Ed **Colby**

Whenever I fill a grocery shopping cart with bee sugar, someone inevitably says, "My goodness! What are you going to do with all that sugar!?"

To which I reply, "I'm going to try my hand at baking some cookies!"

Thankfully the bee feeding is over. Now there's nothing but to wait, and wonder how many hives will succumb to our always unpredictable Colorado Winter. Here, a January thaw is a consummation devoutly to be wished, but last year we didn't get one. Without an opportunity for cleansing flights, the bees took sick with *nosema apis*, and I took losses.

It's always something in this business.

I could have piggybacked my bees onto one of Paul's semi loads to California, and I probably should have, but I hate to let the little darlings out of my sight.

I don't like the idea of the almond production monoculture. You've seen the photos – blooming almonds as far as the eye can see, and nothing else. Lots of people who are not beekeepers know about almonds and bees, and if someone asks me if I ship my bees to the Golden State, I'll say, "Almond pollen for bees is maybe like spinach for you. It's good for you. But if it were all you ever ate, you might take on a greenish pallor. You might not feel so good."

Plus all those bees situated so closely together creates a perfect opportunity to spread diseases and parasites. It's like sleeping around. It might seem like a good idea at the time, but sooner or later you're going to come down with something.

Of course my bees get parasites and diseases anyway, so probably all I'm really doing is making a bad business decision by keeping my bees home all Winter. At $150 a hive – or whatever the going rate is – I'm leaving some money on the table. But I hate to let the little darlings out of my sight.

I do want to be smart about money. At 63, I finally have a retirement plan: work until I drop. Before the recession, and the divorce, I anticipated that Social Security and savings might provide a modest stipend through my Golden Years. Now all bets are off.

It impresses me that so many people act nonplussed when I say this. No retirement?! These days, people get it. We boomers are not all going to drive our motor homes off into the sunset. But I'm not so bad off. At least I have a job.

And I do enjoy my work on the Aspen Mountain ski patrol. Don't get me wrong: I'm not the patrol director, or even a supervisor. I don't have the talent, or the inclination. I'm down in the ranks.

Patrolling on Aspen Mountain is really a young person's job, and it's either keeping me young or killing me not-so-softly. I suspect the latter. This is a steep little hill, and I sometimes wish there were an easy trail to the bottom.

I signed on a lifetime ago for the thrills – not the money – but they do pay every two weeks, and the checks never bounce. The bees help with the bills. Every day at work somebody hands me money for honey. My workplace social interaction complements my retail honey sales. Honey flies out of my hands.

I guess my dad steered me into both ski patrolling and beekeeping. He worked for the State Department in Washington, later in the Foreign Service, and following that he taught college Spanish. When he worked for the government, he abhorred the red tape and his diplomatic social obligations. At the university, he never fit in politically. He never found a job he loved to wake up to. When I was a boy, he warned me, "Money doesn't matter. Follow your heart. That's the only way you'll be happy in life."

I took that advice, and I never made my fortune. But I find satisfaction in my work. The bees are part of that.

We beekeepers are so fortunate, mites and colony collapse disorder notwithstanding. We get to pursue an ancient and honorable craft. Who else can say that?

A respected Big Operator spoke at the Colorado Beekeepers' meeting a few summers ago. He said he sometimes wondered why he did it, when life might be so much more satisfying on a 40-hour work schedule.

I thought, "He doesn't get it! He doesn't understand time clocks and work rules and promotions and backstabbing and worrying about whether your tie's on straight." I wondered if he'd ever worked for a company with a human resources department, or received an employee evaluation.

If your back doesn't hurt, if your rig's not broke down, if nobody's yelling at you, if your bees are on a honey flow, if your partner's word is gold, if you're driving down the road in your bee truck, free as a bird, who should you envy? You're living the dream, and maybe your bees help to make the world a better place.

Uncle Helmer said, "One minute you're 19, and your whole life is in front of you. Then you wake up one morning, and you're 80 years old." He snapped his fingers. "It goes just like that!"

Our time on this good Earth is brief. Be at peace with that. But we beekeepers made the right choice. Somehow we understood what truly matters. We took the road less traveled. Lucky us.