

Bee Culture

JAN 1997



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by Richard Bonney



COVER

Making packages is a central theme this month. A medium-sized operation in Georgia and a large one in California share some of their secrets. But getting packages from producer to beekeeper can be a trial, too, and the role of the USPS is also examined.

Next month we'll look again at packages - more producers of different styles and sizes, and, most importantly, getting those packages into your equipment safely and efficiently.

This will be a banner year for the package business. Make sure you're ready.

photo by Kim Flottum

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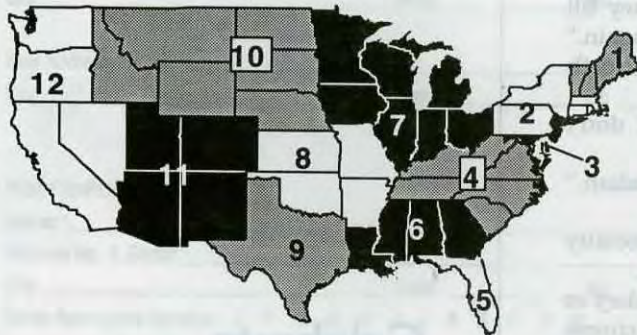
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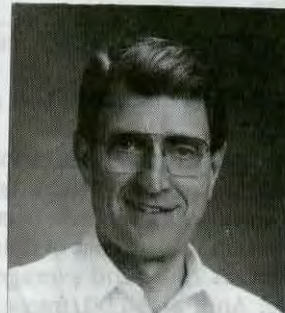
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The things that are important in life are worth mentioning, and worth pursuing.

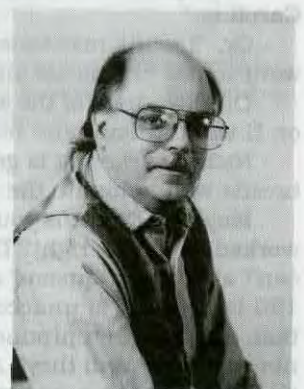
by Richard Taylor



*Check out our new Honey Report,
Page 12*



JOHN ROOT
Publisher



KIM FLOTTUM
Editor

INNER COVER

In 1872, A.I. Root's Bee Supply Company was a booming business. And A.I., already a popular contributor to *The American Bee Journal* and other journals, writing under the name 'Novice,' was receiving literally thousands of letters each week regarding the science, the art and the business of beekeeping.

Root's early success had attracted much attention because he was using the 'new' moveable frame hives (and manufacturing them, too), and the productive Italian bees.

So, in 1872 A.I. began preparations for a regular and organized way to not only answer all the mail he was getting, but to steer customers his way from the following he had in the other journals.

The first "published" issue of *Gleanings In Bee Culture* didn't appear until January 1873, but the work began earlier. And much occurred during that preparatory year that didn't appear until later.

In honor of those journalists who spend their time in the trenches *before* you see their work, we begin our celebration of 125 years, *this* year. Not, as so many do, when the work is finished, but when it began. Nevertheless, 1997 marks the beginning of our 125th issue. Celebrate with us a century and a quarter of beekeeping history.

This is a wake up call. Actually it's an advanced notice to anyone and everyone who raises and sells queens.

Soon, very soon I predict, the typical and traditional 3-banded Italian just ain't gonna do it anymore. Nor will the 'best and biggest and brightest' from this year's colonies always make the best for next year's breeders.

Soon, very soon I again predict, your customers are going to become *very* specific about what they want in a queen.

"Winters well in New England, builds fast for northern pollination businesses and makes its honey in late Summer - early Fall, then shuts down fast after goldenrod. And, oh, yes, is resistant to mites and is so gentle I don't have to wear a veil, ever," is one request you're going to start hearing.

Or, "I need bees that make lots and lots and lots of bees all season long, starting early for queens and packages and nucs, then for pollination in the almonds, then apples, then make honey till frost in the Dakotas, then south to Mississippi to start all over again."

Or, "I just want something that does well in my part of North Carolina."

Or, "I want resistance to mites and foulbrood, 'cause I don't want to use chemicals anymore."

Or, "I want all of the above, but I want a black bee, not Italian," or, "I want Italian, and not black."

Niche marketing is gonna take over here. Real soon. Specialty breeds will dominate the market, the ads, and the business.

Maybe the queens you've been raising will work, because they've worked for years, right? Don't bet on it. The cost of doing business can't afford 'just queens' anymore. A 70-pound average, when over 150 is possible is unacceptable. And, at \$5.00/frame for pollination, a colony that produces 15 or 18 while yours still barely make nine won't do, will they? And is \$15 - \$18/colony medication/year acceptable when a partially resistant colony costs half as much? What about winter losses up north? Premite averages were 10-15%, post mite higher. Is even 10% acceptable at today's replacement

costs in cash and labor?

The precedent is already common practice in a host of other domestic annuals. Dairy farmers don't hope their cows produce profitable and productive offspring by mating with the bull they've had awhile. They hire professionals who have the best sires available - in test tubes, ready to deliver. Farmers can't afford to gamble on 'average' producers. The same goes for turkeys, sheep, goats, pigs . . .

And plant people aren't raising seeds from the tallest, or heaviest or whatever . . . they're using hybrid seed to get the best production in the area they're grown. Northern Ohio soybeans aren't the best for southern Missouri. And honey producing queens for South Dakota aren't the best for overwintering in New England. The future is in hybrids, and the future is now.

Another prediction. Somebody, somewhere is going to start a good, sophisticated breeder program and sell you 11 hybrid breeder queens on order for you to use. It'll happen, count on it. And that somebody, somewhere has already started. The New World Carniolan group is one. Small, limited in the variety produced, but exactly right-on in direction. Starline and Midnight lines are

Continued on Page 56

Celebrate,
Celebrate!

KEEP IN TOUCH

Write: Editor, 623 W. Liberty St.,
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MAILBOX

We Know These People

During the past 20 years I've had bees, I have profited from many sources, notably ABC & XYZ and your magazine and it's stable of excellent writers.

My wife encourages me in my beekeeping pursuits and enjoys accompanying me as I make my rounds through the countryside doing county inspections or giving honey bee demonstrations. But she, herself, prefers the Business Section of the newspaper to read.

So I was startled recently at the dinner table when she put her hands to her cheeks, opened her eyes wide and exclaimed, "I must be going crazy! I read your new *Bee Culture* before I picked up my *Business Week*."

"Why would you do that?" I asked.

"Because it had a picture of Jim Tew on the cover, and I thought to myself, I know this man. I've heard him talk up at Wooster, both he and Richard Taylor. I know these people in here."

Thanks for bringing "these people" and others like them into my home. Your subscription is definitely worth the price.

Kendal Smucker
Bellefontaine, OH

Swarming Cause?

The letter from Darrel W. Jones from Rainsville, AL, in the November, 1996 issue of *Bee Culture* is worthy of careful study indeed, of research on what triggers the impulse of bees to swarm. Too long have we depended upon the time worn observation that crowding in the brood nest is the main cause. My experience in central New York over the past three years leads me to this point of view. Rarely here would one expect to see late August and early September swarms. But coincidentally with arrival of mites in our neighborhood late season swarms seem to be becoming common. Three such swarms alit in my

equipment this year, one in an empty hive in my apiary, one in my garage in hold-over equipment and one on a branch on one of my cherry trees, all after mid August. Two years ago four swarms occupied my equipment in my garage and one huge swarm alit on one of my spruce trees, again well after mid August. One could logically speculate that such swarms develop as a result of impossible conditions in mite infested feral colonies or in those of beekeepers close by.

John J. McKelvey, Jr.
Richfield Springs, New York

Catching Swarms in MN

A while ago you had someone writing about catching swarms in his beehives and you asked if somebody had any luck doing that. I have tried years ago to get a swarm in a bait-hive by putting some frames with comb in an empty hive and sometimes sprinkling pheromone inside and had never any success. In the last years my luck has changed.

In 1992 I got five swarms to go into my hives and also five in 1993. A neighbor beekeeper and I both lost all our bees in Anoka to the mites in the Winter of 93-94. Mine were replaced with six packages from Drew Apiaries and I don't know how many the neighbor put out. Still, in 1994 two swarms went into two of my hives in Excelsior, also in Anoka two swarms had occupied two of my empty hives. A third was hanging on the front of a vacant hive, but they had not found the auger hole yet. I credit my swarm catching luck to the fact that I leave the hives from the colonies that died right on my locations after cleaning them up. There is usually lots of honey left in them and if the mites killed the bees, I assume, it is safe to let the bees clean them out. The frames

with lots of pollen, I try to take out as much as possible before the moths get in them.

In 1995 I got nine swarms. I had to retrieve two out of trees, but the rest went into my hives on their own. One came in the second half of September and had been hanging on the outside of the hive for a while, because there was wax on the outside of the super. In 1996 only two swarms observed. One went into one of my hives. The other came from our observation hive at the nature center. This was a clipped and marked queen, which I picked up off the ground and put in a hive. I then caught a few bees in an empty match box to put with the queen. The rest of the bees soon followed. Maybe the bees are getting smart in Minnesota.

That reminds me of the ducks we had in the Netherlands. We had duck nests (made out of straw or swamp grass) that one saw on garages, in trees and the canals. That's how we got our eggs. Sometimes we had two ducks laying in a nest at the same time. An old wagon wheel flat on a pole in a ditch about three feet above the water could hold two or three nests. We tried it here too, but did not have much success.

Enjoy your magazine.

Joe Wiersma
St. Louis Park, MN

Applying Grease Easily

Recently, I found a "food decorating tool" that works like a regular "caulk gun," made of stainless steel, is "heavy duty" and pushes out the vegetable shortening mix very well. I got a box (contains nine refillable plastic tubes) with it. Each tube will hold over 1/2 of a 3 lb. can of shortening. This way, I can load these tubes before I leave the house for my "out yards." This "tool" is easier to use than the messy brush method. It's expensive, about \$150. I use shortening on each hive in late winter and late July, so, I

Continued on Next Page
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MAILBOX

apply it on each hive two or more times a year. Except for labor, it's cost effective in my case.

I apply about 1/8 inch "rope" of the stuff onto the center of the top bars of each frame, in the bottom two supers (brood nest), also inside at the top of these supers, then top and bottom of inner cover and entrance way of the bottom board. When the weather is cool, it doesn't melt everywhere, but as it gets hotter it will melt all over, so, I have to be careful not to get it into the cells of the comb.

I located this "tool" in a local restaurant equipment store. They obtained it from Prince Castle, Carol Stream, IL. Phone number (708) 462-8800.

Voron Baughan
Chattanooga, TN 37421

Another Honey Heater & Wax Melter

I was prompted to write after I read the two articles in the November '96 issue. I too developed a simple and inexpensive method of heating my honey. I had to think of an alternative to the stainless steel tanks that cost hundreds of dollars and would be used only a few times during the year. Having just a few hives made them seem like an investment that would never pay for itself.

Instead, I use a 2.5 bushel plastic bucket with handles (about \$6 at Walmart), and a single pole 600W hot water heater heating element, with thermostat. I carefully drilled a hole in the bottom and screwed in the element. Some electricians tape to cover the contacts, and caulking to help with the seal, finished the heating unit. I duct-taped the thermostat about 6" up from the floor and set it at its lowest setting, 120°. I set it on a couple of 2 by 4s, put in a 60# bucket of crystallized honey, and filled up the rest of the tub with water. This system liquefies the honey in 12-18 hours, without burning it. The unit cost \$20-\$25 to build. Just make sure the water never gets below the top of the heating element or it will burn out,

and may short out. Just in case, use a ground-fault outlet!

I also use a very simple method of cleaning my wax. Having built a beautiful solar melter, complete with double-pane glass, insulation, etc. that never seemed to work in the cold autumns of Maine, where I used to raise bees, I came up with an easier way to melt and clean small quantities (5 to 20 #s) of wax. I use fine nylon (window curtain, or stockings) material cut to fit a glass bowl, and pile it high with all my old uncleaned comb, scraps, decappings, etc. I put it in the microwave on high for five minutes at a time. I check it and add more scraps as they melt. When melted, I take out the nylon and let the wax drip into the bowl for a minute. All the bee parts, grass, etc. stays behind in the nylon. Wait till this mess cools, and the ball of leftovers can be thrown out and the nylon used over. The wax can then be poured into Teflon bread pans and allowed to cool. I pop the bricks out, turn them over, and wash off the tiny amount of honey that also came along for the ride in hot water. These bricks are now pure, yellow bees wax. Simple!

Gert Walter
Boxborough, MA

Purple Martin Info

I have been a landlord for five years and have established a good strong martin colony. The first year I had a house was near my apiary and witnessed bees flying and attacking adult birds as they flew into the gourds (nests). Since that time I have moved this colony to the front of my property and have had no more problems. Martins are known to eat mostly drones because they fly the highest where martins like to feed. So you may wish to print this so that Mr. Woernle will know that it does happen. I am a member of PMCA and will let them know of this. They help to promote conservation and re-establishment of martin colonies all over the United States.

Thomas Sipprell
Orlando, FL

In regard to your article about

bees and purple Martins, here is my experience.

I had six swarms of bees and planted six acres of sweet clover 100 yards or more from the purple Martins. It was a rainy Summer and the sweet clover bloomed all Summer long. Those Martins lived out over the sweet clover all Summer long (eating bees I suppose). It was a large colony and had been there 10 years or more. They never came back! There never were anymore there later either.

Joe W. Anderson
Scottville, MI

Top Bar Dry Rot

My hive on Guam just taught me a lesson. A new frame I installed last Winter already has dry rot on the ends of the top bar. I think this tells me to put a coat of varnish on the ends of new frame end bars. Is this something which would be worthwhile to do all the time, not only on Guam?

Dan Hendricks
Mercer Island, WA

Another Dance?

In response to Adrian Wenner's letter in the October issue it may be useful to return to basic facts.

I became involved in the bee dance controversy by chance in 1977 when I read of a PhD thesis by Anita Janda in Linguistics at the City University of New York: *The linguistic analysis of the honey bee's dance language*. I mentioned this mathematical analysis, describing honey bee dance language as different in kind rather than degree from human language, on three occasions in 1990 (*American Bee Journal*) (12); *Bee Culture* (3, 7); *Interdisciplinary Science Review* (15(2); 187). The thesis (No. 7902547) is available from University Microfilms International, 300 N. Zeeb Road, Ann Arbor, MI 48103. I expected Adrian Wenner would publish a critical review since he has a B.S. in mathematics, as does Ms. Janda. He will discover this is not a popular or even semi-popular source.

I first heard of bee dances in 1945 at the University of Wisconsin when Arthur Hasler returned from a survey of bombing effects on

MAILBOX

German civilian morale. He took the opportunity to meet Karl von Frisch to discuss his work on the sense of smell in fish, and incidentally learned about bee communication. Hasler established that fish return to spawn in the river where they hatched by recognizing its unique chemical composition.

Von Frisch was an authority on sensory physiology in fish; thus, it was not surprising he investigated the importance of odor in bee communication, and devoted 72 of his 566 page book *The dance language and orientation of bees* (1967) to describe its role in orientation. Wenner believed that an "overlooked" 1937 von Frisch article is evidence he then thought bees use only odor for communication, but my typescript copy did not support this surprising conclusion. Bee World reprinted the article in 1993 (74(2): 90-98), and my list of pages in von Frisch's 1967 book that cover the material in the 1937 article on odor in 1995 (76(3): 162-164).

John E. Eckert would be surprised to learn his landmark studies may not be considered experiments. I used "finding" in referring to his work as a conclusion on data however derived rather than a narrow definition of experiment. The study of effects of prevailing wind on bee activity would be useful, but can/should be separated from the question of whether/how/when bees communicate nectar sources to nestmates? When I was explaining the bee dance controversy to some family members, 12-year-old Michael interrupted to suggest the basis for the disagreements may involve a difference in the definition of language? It was obvious to him that any hypothesis must first agree on such a definition.

Linguists describe what animals use as fixed stimulus-bound messages in contrast to the linguistic ability of humans, a distinction René Descartes pointed out over 300 years ago (V. Fromkin and R. Rodman, *An Introduction to Language*, 1978). Wenner and Wells do not believe animals are capable of communication: "Discovering" or "proving" the existence of a language in a nonhuman species does not hinge only on evidence. One first of all has to be able to "believe" that such a capability can be possible" (Anatomy p. 67). I am surrounded by chickens, tur-

keys, and dogs that obviously do communicate. A hen's call when a hawk soars overhead causes her chicks to scramble for cover. The difference is that animals do not debate whether they are, or are not, using "higher psychic powers."

In my correspondence with Wenner, I took the opportunity to use his admonition: "One can usually trust results but must always suspect interpretation." I suggested the results of the crucial two-hive experiment reported in *Anatomy* pp 136-138, Fig. 8.3 could be reinterpreted. Instead of "completely anomalous," I suggested this was an elegant demonstration of robbing. Santa Barbara was in its dry season. Did the liberal sprinkling of clove-scented sugar solution into Hive II change its guard behavior, permitting entry by robbers from Hive I? Wenner protested he knows robbing, but did not provide an alternate explanation for his report that the bees attacked the "intruders." Might other readers have a suggestion?


If honey bees did use odor only to find nectar sources, they would have problems Emperor Hui-tung attributed to butterflies in a poem written 1101-25:

"Dancing butterflies are confused by fragrant pathways;

Fluttering about, they chase the evening breeze."

Note: I intentionally avoid "religious-like beliefs" about anything. I even accept the speed of light tentatively, remembering it was recently changed; and will be again with better techniques of measurement. Wenner has documented he does discount evidence at odds with his beliefs (*Anatomy* p. 67).

Toge S.K. Johansson
East Berne, NY



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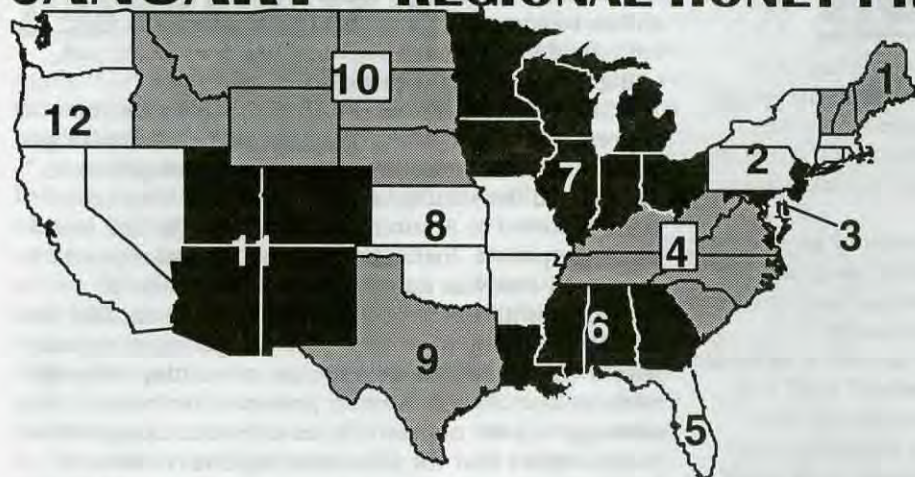
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JANUARY - REGIONAL HONEY PRICE REPORT



Region 1

Prices about average to just a bit lower with a few exceptions. Demand steady to increasing a little. One lb. and 12 oz. plastic (mostly bears) most popular sizes sold, with two lb. close behind. Clover, berry, looestrife and goldenrod most commonly produced.

Region 2

Prices average to a bit lower. Demand increasing with the season, heaviest around the holidays. One lb. jar most popular along with 12 oz. plastic. Looestrife and goldenrod most common, along with basswood & clover.

Region 3

Prices above average at wholesale bulk, below at retail. Retail demand strong, but heavy competition from large suppliers keeping prices low, apparently. Wildflower, locust, clover and tulip poplar commonly produced.

Region 4

Prices a bit low on bulk side, average on wholesale and retail sides. Quarts, pints and one lb. popular, along with gallon jugs. Tulip Poplar, Clover most commonly produced, along with Sourwood and Wildflower.

Region 5

Prices high on wholesale, average on large sized retail, but low in-between. Wholesale and specialty demand strong, especially citrus. Retail size 1 lb. and quart and pint popular. Orange, Palmetto, and Gallberry commonly produced, along with Pepper.

Region 6

Prices a bit lower than average pretty much across the board. Demand strong for specialty varieties and basic sizes in quarts, pints and gallons. Tulip poplar, clover, sourwood, wildflower, tallow and titi all popular.

Region 7

Prices a bit higher wholesale, but a bit lower retail than average. Demand strong for bulk honey. Most popular size one and two lb. (after drums, of course). Clover by far the biggest crop, but Locust and Wildflower, too.

Region 8

Strong wholesale prices and average retail prices throughout the region. Strong demand for wholesale light product. Quarts and one lb. popular. Soybean, Clover and Wildflower produced.

Region 9

Prices low on wholesale scale but high on retail when compared to average. Most popular size is quart and one lb., but 12 oz. also popular. Mixed Wildflower, including Cotton and Mesquite and Catsclaw all commonly produced.

Region 10

Prices strong across the board in the region, and lots of honey produced here. Wholesale demand very strong because of mostly light color and amount produced. Clover the obvious choice for crop produced, but other Wildflowers contribute, too, especially in western areas.

Region 11

The Southwest's prices are about average for most products, but demand at wholesale strong this year. Mesquite and Catsclaw, Wildflower, and some Clovers popular. Quarts, pints, and pails popular sizes, along with 1 lb. and smaller for tourists.

Region 12

Prices a bit lower than average overall, but some products, and places do just fine depending on location. Strong for wholesale, but retail demand does well in more urban areas. Makes sense, right? Clovers, Berries, Star Thistles, Fireweed and Sage all popular.

	Reporting Regions												Summary		History	
	1	2	3	4	5	6	7	8	9	10	11	12	Range	Avg.	Last Month	Last Yr.
Extracted honey sold bulk to Packers or Processors																
Wholesale Bulk																
60# Light	63.69	63.38	70.50	62.83	69.28	60.50	66.73	72.67	51.00	69.28	73.04	57.13	48.00-95.00	64.84	68.44	47.98
60# Amber	60.91	61.88	63.00	58.39	64.28	57.33	64.83	70.48	46.50	64.28	66.63	57.63	41.00-90.00	61.85	67.07	45.61
55 gal. Light	0.90	0.97	0.97	0.85	0.97	0.95	0.95	1.00	0.94	0.97	0.89	0.89	0.75-1.23	0.93	0.96	0.67
55 gal. Amber	0.84	0.96	0.85	0.84	0.87	0.87	0.90	0.90	0.80	0.87	0.81	0.85	0.65-1.08	0.87	0.91	0.62
Wholesale - Case Lots																
1/2# 24's	30.36	27.74	38.40	33.32	22.80	41.33	27.80	33.13	30.50	33.13	28.00	31.67	20.40-48.00	30.99	29.67	22.50
1# 24's	40.63	38.95	52.80	39.04	20.00	38.45	41.05	40.35	46.00	40.47	45.89	44.21	20.00-60.00	41.41	40.90	32.57
2# 12's	36.06	35.11	37.08	36.29	36.80	35.70	37.12	39.20	41.00	37.08	37.57	34.60	24.00-50.40	36.85	38.43	30.89
12 oz. Plas. 24's	34.17	35.30	43.20	36.28	32.84	32.70	34.62	33.17	38.50	32.84	40.37	26.11	15.60-48.00	34.93	35.64	29.02
5# 6's	39.90	39.91	43.29	41.34	43.29	36.20	40.93	40.00	41.55	43.29	37.80	37.23	31.50-57.60	40.77	40.50	31.78
Retail Honey Prices																
1/2#	1.86	1.75	2.16	2.17	1.10	1.61	1.89	1.73	3.05	2.16	2.30	1.61	1.10-3.50	1.88	1.79	1.52
12 oz. Plastic	2.05	2.12	2.50	2.00	2.00	1.76	2.13	2.00	2.93	2.09	2.36	1.98	1.25-2.95	2.08	2.19	1.74
1 lb. Glass	2.64	2.67	3.25	2.64	3.60	2.19	2.55	2.51	3.75	2.98	2.98	2.50	1.76-4.50	2.67	2.58	2.00
2 lb. Glass	4.27	4.35	6.00	4.34	4.28	4.00	4.46	4.55	4.38	3.50	3.93	4.58	2.49-6.00	4.36	4.38	3.43
3 lb. Glass	5.81	6.59	6.89	5.76	4.50	6.84	6.07	5.39	5.78	4.50	5.61	5.54	4.29-10.50	5.87	5.77	4.59
4 lb. Glass	6.78	6.75	6.71	6.70	6.71	6.28	8.50	6.70	7.25	6.71	6.39	6.71	4.00-8.99	7.14	7.28	5.62
5 lb. Glass	8.25	7.81	7.97	8.80	7.97	4.95	9.18	9.25	8.73	6.50	8.53	8.21	2.40-13.00	8.50	9.27	7.08
1# Cream	3.09	3.23	4.50	3.47	3.46	2.52	2.67	3.16	4.43	3.46	3.22	2.81	2.00-5.25	3.14	3.06	2.57
1# Comb	4.15	4.13	4.57	4.28	4.57	4.00	3.97	3.53	4.70	4.57	5.31	3.88	2.50-7.00	4.22	4.05	3.35
Round Plastic	3.65	3.29	2.00	3.25	4.24	3.00	3.28	3.77	5.80	4.24	5.25	3.67	2.00-7.00	3.71	3.82	3.05
Wax (Light)	2.51	2.81	2.50	1.89	2.25	2.62	2.61	2.69	3.50	2.85	2.15	2.59	1.00-5.00	2.55	2.86	1.88
Wax (Dark)	2.21	2.60	2.78	1.73	1.75	2.44	2.55	1.83	3.00	2.78	1.91	2.15	1.10-5.00	2.23	2.67	1.54
Poll. Fee/Col.	33.95	40.00	30.67	28.83	25.00	32.30	39.17	35.00	20.00	34.89	29.00	33.33	15.00-55.00	34.66	33.96	30.25

HONEY MARKET PRICE SURVEY RESULTS

Back in November, 1996, we put a Honey Market Price survey in the magazine, giving EVERY reader the opportunity to respond not only with the prices they were using, but also to several background questions as well. We anticipated a pretty good response because the Column is popular. We weren't disappointed, but the results were worth the effort. The prices are listed in the new report just to the left of where you are now. The results to the questions are below.

Before we look at individual regions, let's look at some bigger pictures. Thirty-five percent of the respondents operate 50 or more colonies, averaging 268, with a range of 61-2000. Median is 160 colonies. Of these, the average time keeping bees was 21 years. They averaged 125 lbs/colony last year. Both mites, combined, are the biggest problem, according to this group.

No expansion plans are being made by 25% of all of the respondents. These sit-tight operations average 60 colonies each, but nearly 60% of these have fewer than 20 colonies each. All together, they average about 21 years in the business, and, interestingly, produced an average of 160 lbs/colony last year.

Those that plan to expand this year are the interesting group though, so let's examine them a little closer. Overall, they comprised 75% of the respondents, which is promising in itself. As a group, they averaged 107 colonies, have been keeping bees 15 years, and produced 141 lbs. honey/colony.

Twenty-eight percent of those planning to expand have more than 50 colonies, averaging 325. They've been at it for about 19 years and produced a respectable 153 lbs/colony.

Two-thirds of the expanders run fewer than 50 colonies, averaging 20 each. They've been keeping bees an average of 15 years, and produced about 75 lbs/colony last year.

Here's a most interesting item.

Expanders with more than 10 years experience have an average of 94 colonies, but only produced, on average, 91 lbs/colony. They have about 23 years experience. Now, expanders with less than 10 years experience, averaging 5, actually, have an average of 129 colonies each, and produce a whopping 200 lbs/colony. I like the aggressiveness of this bunch - good size and growing, productive and still relative rookies.

Sixty-five percent of the respondents have been keeping bees for more than 10 years, with an average of 81 colonies each, producing an average of 182 lbs/colony last year. Fifty or fewer colonies are owned by 64% of these beekeepers, with an average of 26 colonies each.

Briefly, let's look at some other stats from this group as a whole. More than 50 colonies - 31%; fewer than 50 - 68%. Keeping bees more than 10 years - 65%; less than 10 - 35%. Here's a twist - the biggest problem keeping bees is both mites - three times as many people who had fewer than 50 colonies agreed than those with more than 50 colonies. However, across the board one, or both mites was considered the biggest obstacle to future growth. Mites are a serious problem, but more so, it seems, for small scale beekeepers.

Region 1. 4.5% of respondents. All sell honey, but few expansion plans, mites a problem for all. Average about 40 colonies.

Region 2. 15% of respondents. 90% sell honey, moderate expansion plans, average about 30 colonies, mites a problem all over.

Region 3. 4% of respondents. All sell honey and most plan to expand. Average about 120 colonies, and both mites still a problem.

Region 4. 14% respondents. All sell honey, and two-thirds plan to expand. Average 40 colonies, only 60 lbs/colony. Mites leading problem.

Region 5. 21% of respondents. Minimal expansion plans from local beekeepers, but migratory from north expanding. Average 20 colonies, or 220 (hobby vs. commercial). All sell honey, *Varroa* the biggest problem.

Region 6. 5% of respondents. All sell honey, and all plan to expand this year. Average about 80 colonies, at 100 lbs/colony. Mites a problem.

Region 7. 29% of respondents. All sell honey, but only two-thirds plan to expand. Average 75 colonies, but only 9 years keeping bees. Tracheal and *Varroa* mites troubling.

Region 8. 8% of the respondents. All sell honey, moderate expansion plans, but average 19 years experience, with about 75 colonies. Mites biggest problem.

Region 9. 3% of respondents. All sell honey and all plan to expand. Evenly divided between sideline and commercial. Average 8 years experience. Both mites causing problems.

Region 10. 1% of respondents. Lots of commercial operations. Moderate expansion plans. Mites, mites and high costs listed as problems.

Region 11. 4% of respondents. All sell, but only half plan to expand. Sideline and commercial operations primarily, averaging 20 years in the business. Pesticides and mites the biggest problems.

Region 12. 11% of respondents. Only half plan to expand, and those are the smaller operations. Commercial just catching up. About half sell honey. Mites the biggest problem.

If you've counted, the percentages don't quite add up due to rounding errors, but they're close. And, interestingly the respondents closely mirror beekeeper populations in the U.S. They are a bit light from the commercial standpoint however, especially in Regions 10, 11 and 12. And a bit heavy from smaller operations, especially from Region 7. But not a bad picture, overall.

"NOVICE'S"
Gleanings
IN
Bee Culture.
1873

Or how to Realize the Most Money with the Smallest Expenditure of Capital and Labor in the Care of Bees, Rationally Considered.

PUBLISHED QUARTERLY.

VOL. I.

MEDINA, O., JAN. 1, 1873.

No. 1.

This year marks the very beginning of this magazine. One hundred twenty five years ago, A.I. Root started his routine publication, that, in 1873, would become *Gleanings In Bee Culture*. We celebrate not the published dates, but rather the work behind . . . *Gleanings In Bee Culture*.

Only a handful of publications have been around this long. These include some literary and scientific journals and several agricultural publications. This speaks well of the traditions and foundation of this country. Those things of value persist, in spite of, or perhaps because of the changes that go on. But those that persist continue to meet the needs of their readers. In fact, they are the harbingers of change. They act rather than react, they are the guardians of what is, and the messengers of what will be.

Gleanings In Bee Culture came into being because A.I. Root could no longer keep up with the correspondence required by his customers. His writing in the *American Bee Journal* had developed a following, and his booming bee supply business brought hundreds of letters, many of them asking the same questions, wanting the same information.

To not only make his correspondence more efficient, but to disseminate new information as it became available (from whatever source) he decided to send out a 'quarterly' magazine to anyone willing to pay the very modest subscription price (25¢/subscription). The initial response was so overwhelming the next month the magazine became a monthly for the same price.

In each issue this year we will review portions of those 125 years. Sometimes a short, intense span, others will cover longer, more quiescent periods.

Enjoy - and learn from 125 years of American Beekeeping history.

This first installment covers only the first two years, 1873-1874, because so much happened during that initial time frame.

In response to the hundreds of "How do I get started?" letters, A.I. devoted a portion of each issue to "Starting An Apiary." Topics covered included design - hexagon,

with the honey house in the center, building a protection fence and starting those famous grape vines over each colony for shade.

He advised to start small and avoid debt, *not* to pay for patent rights when buying hives, to avoid robbing and that early Fall was the best time to introduce queens.

A popular notion at the time regarding honey extraction was that because nearly all colonies suffered from dysentery, *all* honey was extracted in the Fall, even from the brood nest. Then, colonies were fed sugar to replace stores. Moreover, it was suggested, if you were careful, you could extract brood comb honey and *not* spin out any larvae present, thus preserving it for future growth.

Colonies placed in full sun in the Winter did as well as wrapped colonies, at least in the Medina area. Indoor wintering was popular then, too, as long as bees were taken out for a 'fly.'

The second year the magazine moved from "how-to-start" to "how-to-conduct" an apiary, and the topics move just a little from how-to, to examining on-going problems.

Of note for the second year, A.I. changed from having the magazine printed at the Medina County Gazette to in-house. The press was new, and typesetting was still a skill A.I. was learning (though he learned fast). The press was powered by a windmill, which, when the wind was blowing hard kicked out paper faster than it could be loaded, and some copies came out with print askew.

They also started offering subscription deals to clubs that year, along with offering three or four other journals at reduced rates.

Both years featured several 'sections' worth note. Already mentioned was running an apiary. Closely tied to this was the question and answer section. Each month readers would ask questions, which were answered by A.I. So many questions were repeated that they were given their own number. Suppose someone asked about dysentery. After a very short answer, the reader was referred to "Question No. 13, Vol. 1, No. 4, for a more complete answer. The Q&A section took up much of each issue.

Another part was the "Heads of Grain From Different Fields" section, where readers sent in not questions,

but opinions, experiences, results of trials, comments on equipment tried (success and failures were noted) and more. Writers were from all over the U.S. so similar problems in different geographic areas were solved on a local basis, rather than a "one-size-fits-all" response. This section was very useful to readers, who wrote in to compliment or complain or comment on previously published data.

The Editor, A.I. Root, called himself the Novice (note the original title of the magazine), and, curiously, referred to himself in the third person. This took some of the direct onus away when explaining problems encountered with suggestions previously made, yet deflected direct credit when they did work. A curious position.

In this light, we noted a few of the more interesting comments made, and we quote . . .

On Moon's Journal (a beekeeping periodical at the time) "Candor compels us to say that the greatest fault we can find with this journal is that it seems to lack both substance and system." So much for constructive criticism.

Or how about the role of women in beekeeping? "If more of our American women were beekeepers they would know better what health and happiness is possible for them in this world of ours." Or, in the Spring, "The lady of the house should visit the hives daily to see if anything is amiss." Try either of those today.

Famous people, and events, were noted, too. "It is with great sadness we convey the passing of Mrs. L.L. Langstroth," in the February, 1873 edition.

Probably the most oft heard comment on beekeeping's inventors was made in the August, 1874 issue. "In making improvements on a hive, know just what has already been made," and, a bit further down the page, ". . . and it probably didn't work the first time, either." How often in the last 124 years have so many things been tried that were tried, and failed, before?

Another topic occasionally featured was "The Novice's" experience with some subject. For instance, his history with smokers went like this . . .

"We started by burning tobacco, which irritated the Novice as much as the bees," then to cotton rags, which did well but were in short supply. Rotten wood worked well, burning the end of a stick, but sparks from this started the sawdust on the path on fire and "a fine Italian hive was completely burned up." Then a small, flat pan with burning 'chips' was used but was too hot to handle, then a cooking pot with a handle was tried, and declared "as fine a way to use smoke" as was possible.

That is, until he tried Quinby's cold blast smoker. It was a wonder, "but would go out if placed on its side." Then, Quinby's first smokers were held together with metal solder, "that melted soon after lighting", and was useless. Quinby rectified the problem, and that smoker became the standard, at least for awhile.

Making your own equipment was also a standard, and articles the first two years explained how to make frames, a water jacket incubator, a foot power buzz saw, a honey extractor and a wax extractor, metal rabbets, a black lace veil, an all metal queen cage, quilts (used as an inner cover, made from woven straw [inexpensive], to regular 'quilts' made by the women in the family), an in-hive frame feeder (Simply a canvas 'sack' attached to a double top bar frame and filled with syrup. No, it didn't

leak, or leak fast enough.), winter passages in combs, and even a wintering cellar.

The how-to written that wasn't intended for beginners included a several part series on queen rearing, wintering, using long hives (yes, they go back this far, and didn't work then!), dealing with robbing, queen introduction, moving colonies, and feeding.

The business side of running a supply manufacturing company and a monthly periodical also was evident in the pages of *Gleanings*.

The size of boards available very quickly determined the size of hives manufactured, and, since available lumber came (or was made) in a 12" x 12" x 7/8" size, the choice was easy. This was before larger-scale manufacturing was in place.

Want to see what the Novice's much-publicized apiary looks like. For 30¢ you could buy a photo, complete with Novice, Mrs. Novice and son E.R. What a deal!

Raising your own queens? Start with 50, end up with 30 and spend as little time as possible, rather than spending lots and lots of time for fewer queens. Efficiency is important.

One section each month was devoted to "Humbugs and Swindles." That is, queen producers who took money, but didn't deliver; or "New" design equipment that wasn't new; or white wash sold as paint; or . . . well you get the picture. A comment made by A.I. in one column - The bigger the flyer (catalog), the greater the claims, the less likely you are to get what you paid for - still has a grain of truth today.

Advertising, too, was evident, though not overpowering. They listed queen suppliers and hive manufacturers and other rural oddments needed in life. It wasn't until March, 1874 the first beekeeping book ad appeared.

Also discussed were comparisons of equipment sold by the Root Co., and others, specifically in the area of cost. You could buy a standard hive including bottom board, door step, stand and blocks for \$2.00. Add 20 frames and a quilt, without hardware and all bundled for only \$3.25. A beginner's kit, consisting of a simplicity hive, an extra cover for the bottom(?), three coats of paint(!), a quilt, 10 combs, an Italian queen, four quarts of bees, and a two-year's subscription to *Gleanings* could be had for \$18.25.

A.I. also promoted products advertised in the journal. He liked Mr. Muth's jars, Mr. Quinby's smokers, a variety of queens and several books - all advertisers. Hmmm . . .

And, of course, other famous beemen were contributing - not articles or columns, yet, but letters and Heads of Grain - Doolittle, C.C. Miller, Muth, Grimm - among others.

Much happened during these two years in the industry - the dimensions of the hive were, more or less standardized, along with frame sizes, extractor sizes, patent rights and queen production. It was an exciting time.

Next month we'll look at a little longer, but no less interesting span of time.

Kim Flottum
Editor, Bee Culture Magazine

Roger Morse

Research Review



“Honey bee pollination of low bush blueberries produced berries more than twice the size of unpollinated fruit.”

Five hundred colonies of honey bees, with about 30,000 bees per colony, were placed on one end of a lowbush blueberry field that stretched in its longest direction for four miles. Observations were made on seed set, fruit set, berry weight, and maturity rate every three tenths of a mile from the bees. All four of the factors measured were improved close to the hives where the greatest number of bees foraged. For example, the berries that were well-pollinated near the bees were more than two times the weight of the berries that were found where there were few or no honey bees.

In the case of lowbush blueberries at least three properly pollinated, well-developed seeds per berry are needed for even minimum size berries. A greater number of seeds means larger fruits as well as a shorter development time. More than ten seeds per fruit is desired, which of course, means that at least ten pollen grains must be deposited on each blueberry flower stigma.

The number of bees foraging on blueberries showed a significant decrease after about 1.8 miles from the location of the colonies. The number of solitary ground and twig nesting bees, as well as bumble bees, was uniform throughout the experiment area. The researchers stated that “native pollinators had little influence on berry production” as they were not present in sufficient numbers.

These experiments were conducted in Notre-Dame-du-Rosaire in Quebec, Canada, which lies north of Quebec City. There were two severe frosts on consecutive nights that killed all of the open flowers. Only those berries already pollinated and

the flowers that opened after the frosts survived. The frosts had an adverse affect on fruit set but not the overall results of the experiment.

There has been a long-time argument on the part of some growers and researchers that honey bees are not efficient pollinators of blueberries because of the small flower size. The authors of this paper include mention of this thought in their introduction suggesting it is very much alive in some quarters. The experiment reported here, which is the largest and most detailed experiment on blueberry pollination that I have seen, should put that question to rest for all time.

Pollination Under Plastic Covers


Covering rows of squash and melons with clear plastic tunnels is increasingly popular. The plastic prevents many insect pests, and the viruses they spread, from attacking the plants. This means less insecticide is needed to grow these covered crops. However, the plastic also prevents pollinating insects from visiting the flowers. Traditionally, the covers have been used to protect the plants in their early growth stages but have been removed at about the time the flowers open. This, of course, exposes the plants to insect attack as well.

Tests were conducted in West Africa in which two different techniques were tested. In one, the tunnels were provided with multientranced hives, that is, the bees from the colony could fly into the tunnel or outdoors. In the second trial, one end of the tunnels was removed so that pollinating insects,

especially honey bees, could fly into them.

Both systems worked quite well with “54 percent as many bees foraging under the tunnels open at one end” as were seen on plants that were fully exposed to the pollinators.

We must be careful in thinking that these same techniques might work in this country but certainly they are worth trying. West African honey bees are very different from our own honey bees insofar as their flight behavior is concerned.

These techniques may have some application in home gardens. I have found that by using black plastic on which to grow melons in my own garden that I can grow varieties that would not otherwise mature in upstate New York because of the short frost free time available. The black plastic warms the ground, prevents weed growth, and retains soil moisture. I have watched others cover their melons with clear plastic tunnels in their early growth stages, in addition to using black plastic on the ground, and have been pleased to see how much more rapidly these melons mature. 

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Mark Winston



Government, Queens, & Brother Adam

“Perhaps it’s time to think again about stock maintenance in North America, and what we should do with the stock bred in the copious and diverse selection programs that have littered our beekeeping landscape in the last few years.”

I never met Brother Adam, corresponded with him, or even used his Buckfast queens. Yet, his death in September, 1996, touched me, partly because of his reputation, but also because of an image from a television show about him that was broadcast a few years ago.

If you’re not familiar with Brother Adam, he was a Benedictine monk and bee breeder from Buckfast Abbey in England who developed a line of bees called the Buckfast bee that has been used worldwide for beekeeping. He was a remarkable individual whose knowledge of breeding was intuitive rather than coming from scientific training, and the techniques he developed have become classic methods to select and maintain queen stock. The television image of Brother Adam that came to mind when I heard of his death was of him at the age of 90 being carried in a bamboo chair up Mount Kilimanjaro in Africa, still searching for new bee stock in spite of his advanced age. He explored the world’s remotest regions looking for qualities to mingle with his Buckfast stock, and even into his 90s he continued to try to improve his already stellar queens.

One of the things that impressed me about Brother Adam was that he worked for an “organization,” yet he was able to maintain and sell a line of bees for many decades. This is a singular achievement, because other organizations such as universities and government laboratories have not been successful at keeping and selling breeding stock for commercial beekeeping. Beekeeping is odd

in many ways as an agricultural profession, and one of the ways is the failure of public organizations to maintain selected and commercially viable breeding stock.

This is not to say that universities and government have not been involved in stock selection. On the contrary, there have been innumerable programs to select stock with various characteristics that could be useful to beekeepers. The problem, however, is that programs to select stock are run on government time, meaning that funding is provided for short-term (three to five years) selection but not for long-term maintenance.

A good example of this problem is the British Columbia bee. In the late 1970s and early 1980s, the B.C. Ministry of Agriculture decided to fund a program to select, test and breed queen stock that would have qualities successful under British Columbia conditions. This program was conceived and headed by John Corner, the Provincial Apiarist at the time, and after three years did produce an excellent bee. They followed the Page/Laidlaw closed mating system, a breeding pattern developed by Rob Page and Harry Laidlaw that allows open mating by a limited number of queen lines to be maintained almost indefinitely without inbreeding. It is a system used today by many commercial queen rearers, and if I remember correctly, the B.C. bee was the first demonstration that this system could be effective for stock selection and maintenance on a large-scale, commercial basis.

Colonies headed by the B.C.

queens had all the qualities you might want in a perfect colony. They were gentle, overwintered well, swarmed rarely, and produced buckets and buckets of honey. Queens from this line also laid the finest brood patterns I’ve ever seen, with hardly a cell missed. I would call the brood from these queens a work of art, a stunning array of cell after cell, frame after frame, filled with uniformly healthy and solid brood, a beekeeper’s dream.

Yet, when the project ended, the stock gradually disappeared. It was turned over to private commercial beekeepers by selling breeder queens, and gradually became absorbed into the general queen population. Remnants of this stock remain in British Columbia; the queens we use at Simon Fraser University are descended from the original B.C. bee. It would be a stretch, however, to say that anyone in British Columbia or elsewhere is still selling the pure B.C. bee.

I should emphasize that the gradual disappearance of the B.C. bee does not mean the program had no use. We now have a viable and growing queen rearing industry in British Columbia, whose history can be traced directly to the B.C. bee. The breeding program was only one component of a broader project to train beekeepers to select and rear queens. The individuals who worked for or took courses from this program formed an experienced nucleus of commercial queen rearers who have continued in the industry. Thus, although the B.C. bee is hard to find, the B.C. queen industry continues to

“Colonies headed by the B.C. queens had all the qualities you might want in a perfect colony. They were gentle, overwintered well, swarmed rarely, and produced buckets and buckets of honey. Queens from this line also laid the finest brood patterns I’ve ever seen, with hardly a cell missed.”

GOVERNMENT ... Cont. From Pg. 19

thrive and grow as a result of this program.

The history of our British Columbia bee is typical of stock selection programs. I have seen the same process repeated over and over. A scientist succeeds at convincing government funding agencies to provide three to five years of grants to select “improved” queen stock, but at the end of the program, no funds are provided to maintain the stock, and it slowly vanishes as an independent entity. I won’t embarrass anyone outside of my home province by listing programs that have ended this way, but the memory of selected and lost stock is strewn all over the North American landscape.

I perceived this problem during the B.C. bee episode, as a young and naive new faculty member here at S.F.U. I recall attending a meeting of our Canadian Association of Professional Apiculturists in the early 1980s and suggesting that we put a proposal together to develop a Canadian Queen Stock Center that would maintain selected stock for sale as breeder queens to commercial beekeepers. My more experienced colleagues sitting around the table were polite, and humored me by suggesting that it was, indeed, a good idea, and I should develop a preliminary proposal with a budget. My youthful enthusiasm carried me as far as the budget, which reached into the millions for initial start-up funds and continued on at hundreds of thousands of dollars each year for operating funds. Even my starry eyes clouded over when I saw the costs, and my proposal vanished into a well-deserved obscurity.

Except there’s Brother Adam. Here’s an individual who succeeded

in selecting and maintaining a particular stock for decades when other bee stocks have disappeared within a few short years. This achievement was not only notable but has turned out to be important for North American beekeeping, since the Buckfast stock has been incorporated into tracheal mite-resistant stock now being sold commercially in Canada and the United States. Why did Brother Adam succeed where so many other programs have failed?

One part of the answer is that he had the long-term financial support necessary to maintain stock. The Buckfast Abbey was incredibly supportive of Brother Adam, and funded his work on the long-term time scale necessary to maintain stock indefinitely. Granted, a government laboratory is not the same type of institution as a monastery, but nevertheless, the Buckfast example demonstrates that stock maintenance is possible if funding is committed to that objective.

Brother Adam also succeeded because he was a hard-nosed businessman. He sold his breeder queens at a good price, and developed licensing agreements worldwide so that he continued to receive royalties on queens derived from his stock. Thus, Buckfast Abbey tried to operate as a commercial rather than a public organization, and did not consider profit to be a dirty word.

A final aspect contributing to his success was the product itself, considered by many to be the most prolific, disease-resistant, and honey-producing queen ever bred. Whether the Buckfast queens are indeed the top of the line can be argued; I’m sure that there are other queens that do as well or better in particular parts of the world. Nevertheless, Brother

Adam’s queens certainly are among the best queens ever bred, reared and sold around the world, and their reputation contributed to the ability of Buckfast Abbey to maintain the stock.

Perhaps it’s time to think again about stock maintenance in North America, and what we should do with the stock bred in the copious and diverse selection programs that have littered our beekeeping landscape in the last few years. For example, it is hard to keep track of all the government-funded projects that have been conducted recently to develop mite-resistant stock, and I am concerned that whatever benefits might be derived from these queens will dissipate as the programs end.

Looking at the success of Brother Adam suggests to me that we could do as well, but only if a new model for stock maintenance is developed. Clearly, a stock center must be financially independent, meaning that proceeds from the sale of breeder stock would have to be sufficient to cover expenses. Since government has proven unsuccessful at long-term programming for the bee industry, I suggest that commercial beekeepers might set up a stock center themselves. If every queen breeder in North America raised the price of their queens by 10 cents each, and contributed that amount toward the establishment of a stock center, it would only take a year or two to raise enough start-up funds to get it going. Operating funds might be generated for a few years by a continued levy, but over time the levy should decrease and the center become self-sufficient.

I propose this concept with no expectation that it will happen. Beekeeping is a competitive commercial enterprise, and it seems unlikely that an industry composed of highly independent individualists would be able to cooperate to the extent necessary for a stock center to succeed. Reluctantly, I accept the fact that Brother Adam was unique, and the circumstances under which he worked unusual. I doubt we will see another enterprise like Buckfast Abbey and the Buckfast queens for a long time. I didn’t know Brother Adam, but I’m going to miss him. ☐

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? DO YOU KNOW ?

Early Spring Prep
Clarence Collison

With Spring approaching, beekeepers are anticipating a new season. The first step in early Spring management is to check colonies to determine if they have survived Winter. The arrangement of food stores and cluster location is normally determined as early as weather permits. Both pollen and honey are necessary for colony survival and development. Colony health is a second consideration that has become extremely important, especially since the introduction of the parasitic mites.

In the extreme south, anticipation of the orange honey flow, and preparation of colonies for shaking packages and raising queens are of major concern. In the west, preparations for almond pollination and having adequate supplies of bees available for this important task are also part of the preparations for Spring.

Please take a few minutes and answer the following questions to determine how well you understand these important topics.

The first nine questions are true or false. Place a T in front of the statement if entirely true and F if any part of the statement is incorrect. (Each question is worth 1 point).

1. ___ Almonds require cross-varietal pollination.
2. ___ High-fructose corn syrups or isomerized syrups are fed to colonies in the spring, rather than sugar, since they are more nutritious for the bees.
3. ___ Isomerized corn syrups, commonly called high fructose corn syrups, contain glucose and fructose.
4. ___ Terramycin is most effective as a preventative treatment for American foulbrood and European foulbrood when it is fed in sugar syrup.
5. ___ Colonies with young queens are least apt to swarm.
6. ___ In the spring, honey bees are typically clustered at the top of the upper-most hive body.
7. ___ Chalkbrood is normally most prevalent in the center of the broodnest.
8. ___ *Varroa* mites prefer worker brood over drone brood for reproduction.
9. ___ Male and female *Varroa* mites feed on larvae, pupae, and adult honey bees.

Multiple Choice Questions (1 point each).

10. ___ *Varroa* mites were first found associated with:
A. *Apis dorsata*
B. *Apis florea*
C. *Apis laboriosa*
D. *Apis mellifera*
E. *Apis cerana*
11. ___ All of the following products have been shown to be efficacious against *Varroa* mites except:
A. Tobacco Smoke
B. Fluvalinate
C. Menthol
D. Amitraz
E. Folbex Smoke Strips
12. ___ The bee louse (*Braula coeca*) is actually a:
A. Beetle
B. Parasitic Wasp

- C. Mite
- D. Fly
- E. Tick

13. ___ All of the following diseases and infestations are normally most prevalent in the spring except:
A. European Foulbrood
B. Sacbrood
C. Chalkbrood
D. Tracheal Mites
E. *Varroa* Mites
14. Name two situations in which a mated laying queen leaves a hive. (2 points).
15. List two reasons why the smoker is such a valuable tool for working honey bee colonies. (2 points)
16. Give two reasons why the use of a Boardman feeder is discouraged when a colony requires supplemental feeding. (2 points).

Please match the following isomerized corn syrup formulations with the correct statement. (4 points).

- A. Isomerose 100
- B. Isomerose 900
- C. Isomerose 550
17. ___ Slowest formulation to granulate.
18. ___ Least expensive formulation.
19. ___ Contains the highest concentration of fructose.
20. ___ 42% of the sugar is fructose.
21. Name two disadvantages of buying a nucleus colony over a package of bees. (2 points).

ANSWERS ON PAGE 56

Buddhism & Honey Bees

Michael Burgett & Pornthawee Riddhiputra

For thousands of years honey bees have been incorporated into the ideologies of all the world's major religions. Judaism, Christianity and Islam abound with references to honey bees. The attractiveness is due to the apparent orderliness of the honey bee's social life, which has been frequently cited as an example for the faithful to follow. Not only has the social order of the bee been held as an example for human society to imitate, but honey and beeswax themselves have held, and in several cases still hold, important places in the rituals of several religions. Little, however, has been written concerning the connections of Buddhism and honey bees, which is somewhat ironic considering that the geographical area of this largely Eastern religion is presently home to the world's richest diversity of honey bee species.

By virtue of its Asian origins, Buddhism is a religion little-known and poorly understood by most people in Western countries. Few know that it is an older religion than Christianity by some 483 years. While the Christian calendar is based on the year of Christ's birth, the Buddhist calendar begins from the death of the Buddha (483 AD). In the Buddhist

calendar it is now the year 2479. The Buddha was born in the year 563 AD into a royal family in what is now the Himalayan nation of Nepal. His name was Siddhartha Gautama, and for the first 29 years of life he enjoyed all the privileges of a royal household. By the age of 29 he had observed a world full of suffering, pain and hardship. In his royal and sequestered existence he felt he would never find a solution for ending universal suffering. It was at this time that he cast away all his royal entitlements and became a wandering monk. At the age of 35 he found enlightenment, which soon thereafter attracted others to his teachings, and from there a world religion was born.

There are numerous representations of the Buddha. One of the lesser-known and infrequently seen of these images portrays a sitting Buddha being served by an elephant and a monkey. The elephant is holding what appears to be a bamboo cylinder, and the monkey is holding out a branch on which is a honeycomb. The Buddhist literature that details this image is from the Dhammapada Commentary, which although the date is not exactly known, is presumed to be written sometime around 450 BC.

The Dhammapada Commentary, written in the form of illustrative stories, is a narration and expansion of the Dhammapada. The Dhammapada, also known as the "Way of Righteousness", is the name for one of the sacred books of Buddhist scripture. It consists of 423 stanzas which are supposedly the very words of the Buddha. Authorship of the Dhammapada Commentary has been frequently attributed to the fifth-century Buddhist scholar Buddhaghosa. However, many present-day students of Buddhist literature question this and conclude that the actual author of the Commentary is unknown (Burlingame 1921, p. 60). The Commentary is divided into 26 books, each recounting a number of legends and stories. The particular story which describes the image seen in the photo is from Book I, story 5 and is titled "The Buddha, the elephant and the monkey" (Burlingame 1921, pp. 179-183).

The story centers on a faithful elephant named Parileyyaka who abandons his elephant herd to live alone. The elephant enters the Protected Forest where he discovers the Buddha and decides that he will serve and protect him. The elephant's diligent efforts in serving the Buddha attract the attention of a forest monkey, who decides that he too will attend the Buddha (often referred to as the Teacher). What follows is taken directly from Burlingame's English translation of the original Pali text of the Dhammapada Commentary.

One day as (the monkey) was running about, he happened to see some stick honey free from flies. He broke the stick off, took the honeycomb, stick and all, broke off a plantain leaf, placed the honey on the leaf and offered it to the Teacher. The Teacher took it. The monkey watched to see whether or not he would eat it. He observed that the Teacher, after taking the honey, sat down without eating. "What can be the matter?" thought he. He took hold of the stick



by the tip, turned it over and over, carefully examining it as he did so, whereupon he discovered some insects' eggs. Having removed these gently, he again gave the honey to the Teacher. The Teacher ate it.

The monkey was so delighted that he leaped from one branch to another and danced about in great glee. But the branches he grasped and the branches he stepped on broke off. Down he fell onto a stump of a tree and was impaled. So he died. And solely because of his faith in the Teacher he was reborn in the World of Thirty-three in a golden mansion 30 leagues in measure, with a retinue of a thousand celestial nymphs. (Burlingame 1921, p. 180.)

For those closely involved with bees the story is fascinating. And while Burlingame was a renowned linguist, some further apicultural interpretations will enhance this marvelous tale. In all certainty the "stick honey" the monkey offered the Buddha was a complete nest of one of the two recognized species of dwarf honey bees. It would be either *Apis florea* or *Apis andreniformis*, two species that are very similar in nest form and general biology and are known inhabitants of Asian forests. Dwarf honey bees build a nest consisting of

a single comb that is usually attached to a small-diameter branch. Therefore Burlingame's use of the term "stick honey" is apt. Dwarf honey bee colonies are valuable resources for several large predators, man being the most important of these today. So the monkey's discovery and exploitation of a dwarf honey bee colony is biologically feasible.


In the translation, the nest was "... free from flies." We can assume that Burlingame, as a non-entomologist, should have used the word "bees." Why a dwarf honey bee nest should possess honey and brood but no adult bees is unknown. Dwarf honey bees are naturally migratory and are known to seasonally abscond, but to leave behind honey stores and living brood would be aberrant behavior, unless a major colony disturbance had taken place shortly prior to the monkey's discovery of the nest. In the story the monkey places the "honey stick" on a plantain leaf before offering it to the Buddha, and it is here where the image differs from the Commentary: The image depicts the monkey in a subservient posture holding the comb by the branch.

The story reinforces a major Buddhist conviction in the description of the Buddha's refusal to eat a "honey stick" that possesses living beings.

The monkey discovers this when he carefully reinspects the comb and finds eggs. We read that the monkey "... removed these gently" which presupposes a respect and reverence for life, a basic tenet of the Buddhist faith.

The monkey's fate for his service to the Teacher may at first seem unfair, but again by knowing Buddhism includes a belief in reincarnation, we see that the monkey's rebirth into a golden mansion, with a serving retinue of "a thousand celestial nymphs" just may well be an enviable destiny for those who willingly serve.

Acknowledgments:

We thank Dr. Phramaha Chanya Khongchinda of Wat Umong in Chiang Mai, Thailand, for his valuable assistance in locating the Burlingame reference. We also thank the Thailand National Museum at Chiang Saen for permission to photograph the Buddha image. 

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Michael Burgett is Extension Specialist, Entomology, Beekeeping for the State of Oregon. He travels, and consults extensively in Thailand on beekeeping problems.

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PRACTICAL BEEKEEPING

FROM THE NET

Ron Miksha

Last time, we introduced the World Wide Web to beekeepers and used it to travel around the globe. This time, we will stay a little closer to home by showing how the Internet can be used to bring practical beekeeping information to you. From your own home or office computer, you will be able to access millions of words and thousands of pictures that may help you find answers to your questions and help you solve your beekeeping problems.

Presently, the World Wide Web contains over 80 million different web sites and pages. Maybe more. A little over a year ago, there were about 35 million pages – the Internet is more than doubling in content every year. As the Internet expands and as web pages and locations come and go, it becomes more difficult to find materials you need. If all the Internet information were published in books, they would line a shelf 50,000 feet long, which would fill a typical shopping mall. Unfortunately, the books on beekeeping would be scattered on every floor, a few in each store. They would be mixed in among books on geophysics, works of Dante and the Croatian phrase books! There is an enormous volume of information contained in computers owned by other businesses, governments, clubs and universities around the world. Guidebooks and road maps are becoming essential. We will try to point you in a few of the right directions to find materials you can use.

The Internet has several parts to it – for example, the World Wide Web, News Groups, and Gopher. Before computers and networks could handle pictures, sounds and motion, the Internet was used to view and

send text. The system called **Gopher**, with roots at the University of Minnesota, has hundreds of millions of words on file in thousands of computers. This information includes many thousands of pages of practical beekeeping information. You can reach some of this information with your regular Internet software, by typing *gopher://* in the address space at the top of your web browser, followed by the appropriate computer's address. For example, type in *gopher://sunl.oardc.ohio-state.edu/11/bioag/bee-info* and you will have access to Ohio State's materials on basic beekeeping, Africanized bee stock and mites and diseases. Note when you type in these long and complicated addresses, you must get every letter and number exactly correct. For example, in the location just given, the address uses a numeral 1, not the letter l. Also, you must not use a capital letter where a small letter is required, or vice versa! Fortunately, once you have made a correct entry, you can save the location and never need to re-type it.

Another great source of information is the beekeeper's news group. If your Internet service allows you to send and receive e-mail, and if it allows access to the **News Group** on beekeeping, you can type *news:sci.agriculture.beekeeping*, and you will be in touch with nearly 6,000 other beekeepers who use this special news group to buy and sell equipment, ask for advice, complain, and make political statements. There are others as well.

Other Internet resources of practical interest to beekeepers are found on the World Wide Web. They often

include photographs, video, sounds and diagrams. Following, we have identified a small number of these sites to help you get started in your Internet search. Happy hunting!

APIS: Apiculture Information and Issues

<http://gnv.ifas.ufl.edu/~entweb/apis/apis.htm>

This web site, largely managed by a pioneer in the electronic media (Dr. Malcolm Sanford, entomologist at the University of Florida in Gainesville), is one of the finest Internet locations in the world. Dr. Sanford's newsletters are archived within an easily navigated web site where beekeepers can select from about 200 articles on pollination, honey quality, honey bee nutrition, economics of beekeeping, Africanized bees and practical and timely beekeeping advice.

Gears: Global Entomology/Agriculture Research Server

<http://gears.tucson.ars.ag.gov>

This award-winning web site is colorful, timely and informative. Operated by scientists working for the American government's beekeeping research department, this site contains recent investigations in entomology. The well-written articles include materials on pollination, AHB and mites. An entire section includes materials which help teachers (this includes beekeepers!) convey the importance of bees and pollination through a variety of interesting activities.

A.I. Root's Bee Culture Web Site

<http://www.airoot.com>

Our first two reviewed sites (APIS and GEARS) are operated by a university

Continued on Next Page

and a government agency, respectively. The A.I. Root site is an excellent example of a commercially operated web site with current, useful information. Companies such as Root's can effectively use the Web as a showcase for products by displaying examples of their wares and by offering non-obtrusive purchasing information. Root's *Bee Culture* site offers two or three articles appearing in the current month's issue and includes summaries of the rest of the magazine's contents. The pages are updated monthly, giving fresh and new content to the web site visitor. Past month's issues are archived and easily accessible.

They have announced, however, that significant improvements will take place shortly, including lots of new information and photos. They'll also have an internet directory, much like the Who's Who published in each April issue.

Practical Information from the University of North Carolina

http://www.ces.ncsu.edu/depts/ent/notes/Beekeeping/bee_contents.html

The focus at this university site is on aspects of beekeeping useful to North Carolina beekeepers (e.g., pollination and honey plants of NC), but these and other pages of information at this

site will be of interest to all beekeepers. General interest topics include landscape planting for bees, reducing bee stings during outdoor activities, and bee mite information.

Getting Started in Beekeeping

<http://ianrwww.unl.edu/ianr/pubs/extnpuhs/insects/g1104.htm>
The University of Nebraska offers information about beekeeping in Nebraska, but also has information useful to anyone getting started in bees, including notes on preparation of equipment and start-up costs.

Guildford's Hints & Tips for Beekeepers

<http://www.guildford.ac.uk/bee-hive/home.htm>

This outstanding web site is operated by a nonprofit organization - a British beekeeper's club. Included are topical and useful pages for intermediate and advanced beekeepers, one of which is the 'Hints and Tips' page. Included among the tips are advice on reducing robbing among the hives, requeening aggressive colonies, and looking for the queen bee.

Sunsite Public Beekeeping Files

<http://sunsite.unc.edu/pub/academic/agriculture/entomology/beekeeping>

This enormous site contains about half a million words of beekeeping related information. Much of this in-

formation is included in archives of the beekeeper's News Group messages. This collection contains exchanges of e-mail among many different researchers and beekeepers. It is difficult to search for specific information, but these files can be downloaded to your own computer, then opened in a word processor which can be used to search for the key topics of interest to you. Among the other files at this web site are articles on planting to attract bees, abstracts from research papers and information on pollination. The files at this location can be copied directly to your own computer, allowing you to exit from the Internet so you can read the materials at your leisure and without connection and access fees.

We hope this short list will get you on the Internet and help you explore this vast, public database. If we missed one of your favorite locations, drop a note to Ron Miksha at *Bee Culture*, or e-mail Beekeeping@aol.com. Next time, we will lighten up a bit with some fun web locations which you and the kids will find particularly amusing. ☺

Ron Miksha has kept bees for over 20 years, produced queens and honey in FL, pollinated apples in WV, and produced clover honey in WI. He lives on the edge of the Rocky Mountains in Calgary, Alberta, Canada, where today he keeps two kids and two hives of bees.

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SWORDS APIARIES

Making Packages in South Georgia

Dana Stahlman

Sonny Swords bubbles with enthusiasm for beekeeping. Along with his wife Cindy, Sonny operates 2,000 colonies and produces some 4,000 packages of bees annually. They are not the largest beekeeping operation in Colquitt County, Georgia which has five other commercial beekeepers with 2,000 hives or more. Fred Rossman, another nationally known package producer and equipment manufacturer lives here, too. I was told that Colquitt County has a beeyard for every square mile of the county. I don't doubt it.

Sonny keeps a close watch over his business. Both Cindy and Sonny have personal knowledge of day-to-day goings-on within their operation. They are members of the crew and do anything expected of other crew members. As Cindy indicated to me, "We don't ask our men to do anything we don't do." They don't sit in a big office or have a staff to handle orders. Sonny and Cindy do it all. As Granville Yeomans told me, "Sonny is the boss and anything he tells me to do is going to get done his way."

Granville is a most enjoyable person to be around. His constant chatter either drives all around him into stitches or causes them to seek solitude in some other location in the bee yard. I felt right at home when he told me that "he was goin' to get [my] Ohio behind stung all to pieces."

This is a family business. When I joined their crew for the first two weeks of April, 1996, I was immediately accepted and made to feel at home. Sonny is not a bit bashful about telling a person what he wants. I was impressed with his order to us to make sure the weight of each package of bees was at least a half-pound more than what was ordered. He wants no short package weights.

Another characteristic Sonny displayed was a genuine concern for his employees. I watched as he worked with two young men, Kenneth and Marcus Vinson, who had come looking for work during Spring break from school. Both were hard workers and wanted to do anything to earn some money. Working bees is not what most teen-agers would be doing during Spring break. Sonny had plenty of help, but he gave both jobs such as

putting queen cages together. Both said they were not afraid of being stung, but we thought it was just so many words. Possibly, after being stung, they would not show up for work. Sure enough, both were stung on the first day. The next morning they were back and wanting to go to the beeyards with the rest of the crew. Although they might be in the way, Sonny decided that it would be good experience for them to tag along.

One was used as a runner for this and that while the other nailed lids over the tops of the holes in the bee package cages. This was done on the truck, well away from the beehives. Kenneth, as runner, asked a lot of questions. He followed Sonny wherever Sonny went, and asked questions constantly. Both boys were very hard workers, and it was soon discovered that they were not afraid of bees or of being stung. It was a rare opportunity to teach beekeeping to these eager young men even if it took a little time.

It was a delight to watch Sonny explain this and that about what he was doing and add bits of beekeeping information such as, "This is a drone." Then he would take time to explain the facts about the kinds of bees in a hive and field the multitude of questions that followed. For his effort, these boys may become beekeepers in the



Sonny and Cindy Swords taking orders and working on the books at home after a hard day's work.

future. The potential is there.

Most Southern beekeepers, like the Swords, began preparing for package season last July, according to Ken Freeman, an employee for the past seven years. He began grafting on February 14 this year, but much went into getting ready for the package season. The package bee business is a mad dash that lasts maybe eight weeks during the months of March and April. By May, the season is over, and the honey flow in Georgia is well under way. The Swords also depend on pollination contracts to supplement their yearly income.

I arrived on March 31, just in time to see and photograph the most intense period of work. The only problem with this plan was the weather. An order for 600 packages was delayed by a customer due to unexpected low temperatures in the North for the month of April. However, work went on regardless. The temperatures in Moultrie, Georgia, hovered in the 50° range on April 1, and we ended up putting candy in queen cages and getting the cages ready for queens. The heat from the heater in the shop made a nice cozy atmosphere for the eight of us who were ready to go out and shake 600 packages of bees. We went through the April Fools' Day jokes, and by noon, things had warmed up enough to go out to catch queens.

I was eager to see the type of nucs Sonny used to raise queens. I also wanted to see his queen yard—the place where the mother queens were kept — as well as the starter/finisher hives. I was given access to it all.

The very best bee education is to work for a commercial beekeeper. They have developed methods of beekeeping to reduce labor cost. For instance, when I first saw the finisher hives, my attention was immediately attracted to PVC pipe sticking out from the sides of the hives like little smokestacks. I have not seen it, or the feeder the PVC goes into, used by anyone else. It looks much like the division feeders we are familiar with except that it is a full-depth frame with a half-depth feeder container. Drilled into the side of the hive is a hole into which is fit a 3/4-inch PVC pipe with an elbow and short extension down into the feeder. This feeder was devised to allow feeding without disturbing the cell building going on inside the hive. It is very simple and yet very effective.

I discovered that feeding bees is mandatory if you

Close up of a cell builder hive. Frames with cells are numbered so exact information can be kept on each graft.



want to raise brood and prevent your hive from starving to death, especially last year. Starvation of hives is a serious problem many years, and each and every hive had been fed twice before I arrived. And yet, I saw bees that had built up tremendous populations that were on the verge of starvation. I had the chance to go with a feeding crew, but more about that later.

The nucs used by Sonny consist mostly of standard-depth hives divided with a division board to give two nucs per stand. Each compartment of the nucs had a division board feeder as well as two or three frames of drawn comb. The bee population would adequately cover whatever brood was in the frames. He did set up some baby nucs (about 200), but clearly, Sonny and his crew do not like using them. He indicated that queens coming from nucs with full-sized frames of comb are larger and seem to produce a higher percentage of takes than the mini-nucs.

While Ken has the responsibility of grafting and producing the queen cells to go into the nucs, Cindy Swords has the major task of catching queens. She determines along with Sonny, which queens to keep and which ones to kill. Ugly queens get dispatched immediately. What is an ugly queen? It is a queen dark in color. Sonny and Cindy like yellow queens. Italian queens with just a touch of black on the last segment are also considered fine queens if the size is large. If the queen happens to be small, or dark, or misshaped, or disfigured, she is immediately pinched and dropped back into the nuc. This happens over and over during the catching of queens. Before a queen is removed from a nuc, she must be laying eggs. The schedule followed by Swords is to expect newly hatched queens to be mated within nine days of hatching. I found that the queens produced from a breeder queen can be very uniform from a graft. Daughter queens produced are large, beautiful, yellow queens with just a few being "tiger tails." Tiger tails are those with a black tip on the last segment of the abdomen.

Mother queens are usually two years old and are judged to a certain extent on the prodigy they produce. Sonny selects from his own hives, but like most breeders, he has introduced new genes from other stock into his breeding program.

Swords' breeding queens are kept in special hives.

Continued on Next Page

Kenny Freeman checking on his grafted cells. The cell builders are kept strong with bees and brood. The queen cell cups with larva are placed in the bottom brood chamber with plenty of capped brood and pollen.





Cindy and Sonny catching queens.



One method of shaking bees. The queens are located in the brood chamber and kept there. Frames to be shook are set outside the hive for the shakers. Usually four or five frames are shook to make up a three pound package.



Bees being shook into a package. The funnels are built by a local tinsmith.

They use eight-frame hives with the queen restricted to two frames by a vertical queen excluder. In this way, the frames contain eggs of a known age, and when they are three and a half days old, Ken begins his task of grafting the tiny larvae into cell cups. One interesting bit of information I learned from Ken about this process was that as soon as he has grafted from a frame of new larvae, he washes all the other larvae from the cells in the frame, and he then reintroduces the frame back into a breeder hive for the queen to lay in again. He does this by holding the frame just grafted up to a water hose, and this floats the larvae out quick as a wink. A quick shake gets the rest if any were missed. All hives used in the breeder yard, whether as a cell builder or breeder hive, had strips of Apistan. These are replaced with new strips in a timely manner; thus the job of fighting the introduction of mites into the yard is an ongoing process. This represents a major cost to the breeder, but as Sonny explained to me, "They are expensive, but anyone not using them is stupid."

I got the same message from Glen Barclaw, another old-time Georgia beekeeper with Ohio connections. Glen has been around for 80 years or so, and I took a liking to him immediately. In the bee business, old war-horses need to learn new tricks fast in order to survive. Glen is one of them.

While I am on this topic of Glen, I should point out to Northern beekeepers that the relationship of one package producer to another down here is close. We picked up feed for bees from the Barclaws, and I found out that Sonny also buys quite a bit from Fred Rossman as well. The cages used are also Rossman cages and purchased from Rossman's rather than built by Sonny's crew. The same goes for the syrup cans that go into the package.

Sonny's phone rang constantly. Either customers were wanting packages, or other Georgia commercial beekeepers were sharing concerns. The most serious concern while I visited was starvation. Again, weather patterns were responsible. The bees normally feed in the early Spring with honey flows and pollen available in early April. During my stay we had come upon a number of hives with large populations of bees on the verge of starvation, but we always hoped for the honey flow to pick up. Instead Georgia was facing temperatures down to lows in the 30s and rain.

With 4,000 pounds of syrup on the truck, we headed to the outyards. Feeding bees is fast business. The hives



The Swords crew, Ken, Sonny, Kenneth, and Grandville, shaking bees.

are all palletized, so it is impossible to pick up the back of a hive and get a fair idea of its weight like we do in the North. The pallet is the bottomboard and has room for four hives. The feeders in the hives are arranged to the inside of the upper chamber. In this way a crew of three can feed a yard of 40 hives in 15 minutes or less from the time they enter the yard to leaving it. One member of the crew does nothing except move top covers from over the feeders. Hive covers are flat, allowing them to be slid sideways. Our telescoping covers of the North would not allow this. The feeder is exposed. Following the person moving top covers are two crew members with syrup cans. As the syrup is drawn from the storage tank on the truck, it is put into the feeders. The first crew member then closes up the hive and makes sure the yard is checked so nothing is missed. The syrup cans are placed back on the truck, and the crew hits the road for the next beeyard.

Bees will use the syrup to feed both young larvae, and themselves. This extra cost cannot be avoided. It cuts into the profit margin when packages are sold. It is just one more problem Sonny and his crew must worry about when getting hives strong enough to shake bees.

Another problem is rain. I have picked up bees in the South for the last three years. Some commercial operations will not shake bees when the weather is bad. But Sonny tries to fill his orders when promised even if it means shaking bees in the rain. Shaking bees in the rain or even on days when bees are confined to the hives because of bad weather is not fun. An order for 400 packages required us to work in the rain. Everyone going to the beeyard knew that this was going to be an unpleasant experience.

One would think that the crew would wear gloves and be dressed up in armor, but that is not the case with Sonny's crew. However, bees were shaken and when the rain poured we sought shelter in the trucks. We spent half of a day sitting in trucks waiting for the breaks between showers. Not very productive but each package shaken represented another one that did not have to be shaken later.

I have seen bees shaken in several different ways. The usual way used by many producers is to send several crew members ahead of the shakers. These crew members locate queens and set frames with bees outside the hives to be shaken. The queens remain inside the hives where they will not be accidentally shaken into packages. Packages shaken out with this method include a number of drones.

Sonny's hives are double-deep high with a queen excluder between the upper and lower chambers. The queen is maintained in the lower chamber along with most of the drones. She is not disturbed in the shaking process because the brood nest is not disturbed unless she happens to find a hole in the queen excluder to get to the upper chamber. It doesn't happen often, but it does happen. This method also encourages swarms. However, packages are drone-free or nearly so.

Each member of the crew is assigned a specific job. For example, as soon as the truck with empty cages arrives at the yard, someone begins distributing one or two cages per hive. These are set several feet from the hives. While this is being done, the shakers are getting on their veils and filling smokers with fuel. The smoker fuel of choice here is pine needles, which are available in

most yards, but bags of needles are carried on the trucks just in case some cannot be found on the ground.

Sonny's crew at full strength will have five shakers and one person following behind checking the weight of the packages. Some hives give up enough bees to make up several packages at a time. However, the average is one package per hive on each visit. Hives are shaken every two weeks or so starting the first week of April. I should mention that some of these hives were shaken in late February and March to get bees for the queen nucs required to run an apilary operation such as this. Generally, the packages are left on the ground until the yard is done. Then the task is to load the packages onto the truck, secure the load, store smokers, and head for the next bee yard. Most of the shakers can expect 100 stings or more during the day. They wear no gloves, and some work in short-sleeve shirts even in the rain.

Getting stuck in the Georgia mud is another common occurrence when it rains. As an outside observer, I have learned quite a bit about Georgia swamps. One learns to stay on the road if there is one and not venture a foot or two off it. Almost every commercial beekeeper in Southern Georgia has to deal with this problem. Bee yards tend to be located in remote areas with little drainage. Even back country roads are often impassable after a heavy rain. One of my less memorable days was spent stuck in one of Sonny's queen yards.

The truck became stuck in a little water puddle on the path into the nuc yard. We grabbed our veils, smokers and queen cages and went into the yard to cage queens. The job had to be done - stuck or not!

The queen nucs were scattered along the narrow road, or path if that is what you want to call it. It had rained the previous several days, and the water had reached some of the nucs on lower ground. Lower ground was at most a foot below the higher ground. The terrain here was very flat with large pine trees scattered about. We went to work on the nucs. After several hours of kneeling down on the wet ground, finding queens and caging them, we were ready to go. The only problem was the truck was still stuck. Try as we might, the slick Georgia clay would not give up the truck.

We walked about a mile to find a tractor. Once we had it, I was sure we would be out in no time at all. I was given the job of driving the tractor, and my confidence was high. We got to the truck, attached our chain, and pulled the truck free. Or at least it was free for a short time. It became stuck a second time trying to turn around. No problem; I hooked onto the truck again, and once again it was moving on its own. On the third try, I drove the tractor off the road trying to get around the truck. A big mistake. The tractor disappeared in the swamp. The ground looked firm because it was covered with vegetation and trees.

Again back to the place where we borrowed the tractor to tell them what we had done and to use their phone. Half a day shot, and I was filled with remorse and embarrassment. Sonny took it all with calm ease. He has been through this many times. At least we caught the needed queens and would have plenty of help the next morning to get us out. New queen cells would have to be placed in the nucs anyway, so the trip back to get the truck and tractor would not be a total waste of time. It just damaged my ego.



A load of packages ready for the trip back to the shop. Cindy and Sonny checking the load.



Three pound packages getting ready for shipment

I spent two weeks with Sonny, Cindy and the crew, and I gained a deep respect for all of them. I have made friends that will last a lifetime, and I have learned that producing package bees is filled with all kinds of unknowns. If all hives produced maximum populations as a hive should, if the weather would be ideal, if bees could survive the mites without expensive chemical treatment, and if customers would let the producer know immediately if a problem existed with a package of bees on arrival at the destination, producing package bees would be profitable, fun and swamped with new people getting into the business.

But the real story is drastically different. Package bee producers like the Swords are faced with many challenges. They know how to produce bees. However, they have no control over the weather or the demands of customers for bees.

At the end of a hard day's work, the bees are stacked in the shop ready for pick-up. One knows that all is well as the bees give off a gentle hum. It is music to the ears. If the temperature is too hot, the hum changes to a roar with bees rushing about the cage in a frantic effort to get water or fresh air.

Sonny makes sure the bees are kept cool in a shaded shed which is lighted by a single bulb. Light comes in the open doors at the side and back of the shop, but no

light falls directly on the packages. If the bees are kept overnight, the cool morning air reflects the absence of sound as the bees cluster to keep warm. But as the temperature rises, the bees begin to become active, and the gentle hum of the bees reminds all of us that work needs to be done. Getting the bees in the cages is only half the job done. Panic sets in if the person who ordered the packages for pickup does not arrive as scheduled.

If you order your bees by mail, please understand that bees are not a commodity that can be taken off a shelf and shipped to you. They are highly perishable. The syrup *may* last the bees for a week or so, and the bees *may* live for 40 days or more, but young caged queens need to start laying eggs to replace the bees that die as early as possible. Therefore, the package producers do not go into the beeyards, shake bees and have a large inventory on hand in the warehouse ready to be shipped. They must schedule their orders and shake them just prior to shipment or pickup.

All package bees should be treated for *Varroa* and tracheal mites shortly after arrival. The Swords keep very clean hives, by the way. As a bee inspector, I talk to beekeepers who are shocked to find that a newly started hive from a package has mites. But mites are everywhere, even in the South, and some get transported North in packages. The cost of Apistan is small when compared to the cost of a package of bees and the transportation costs to get them to you. The best time to treat for tracheal mites is when the package arrives. Use Crisco patties and sugar for tracheal mites. For *Varroa* wait a week or so until the queen is laying a good pattern, then use Apistan strips.

If you assume that your package of bees is mite-free because a tag from a state department of agriculture claims the bees to be disease-free, be prepared to be disappointed. If a producer tells you that they do not have a mite problem, buy your bees from someone who is honest with you. Everyone has mite problems, and commercial beekeepers are doing everything within their power to fight against them. But the battle is tough, and even with an ever-present treatment program such as used by the Swords' Apiary, bees will still have a mite problem. The Swords spend a lot of money to fight the problem, and still Sonny will tell customers that he has found mites in some of his yards. I respect his honesty, and it may cost him customers.

At least one producer I bought packages from two years ago claims that inspection of his hives has produced no mites, and this producer presented me with a certificate to show that his yards are apparently disease-free. It is funny that a sample of these bees revealed both tracheal and *Varroa* mites. The bees must have picked them up in the two days they were hived before I collected my sample and sent it to the USDA Beltsville lab.

The package bee business is no picnic. Stress is a big factor during bee shaking time for both the package producer and the bees. When a load of bees goes out, we breathe a sigh of relief because getting up a load of fresh, healthy bees is no little task. I learned that many of Sonny's bees go out in big lots. It is not uncommon for Northern package sellers to come South with semi trucks designed for hauling bees. Some of these orders are so large that several package producers contribute pack-



Grandville Yeomans using the staple gun to staple wooden strips to the packages prior to taking them to the post office.



Packages placed on the scales at the post office for shipment to a customer. Average shipping weight for three pound packages was eight and a half pounds.

ages to the load. The bulk of Swords' bees are shipped in lots of 200 to 600 packages at a time with very few shipped by mail.

The number of packages being shipped is limited to the crew or crews available to shake bees and the condition of the colonies from which bees are taken. The use of double-deep hives with a queen excluder between the upper and lower chambers creates a major problem. When the weather is cool, bees tend to cluster in the bottom brood chamber with the queen early in the day. This means that fewer bees are available to shake from the upper chamber.

Package operators in general found fewer bees to shake last year. I heard over and over the same story from discussions with beekeepers: "The weather is not helping us." Some even worry about the other factors such as mites. As I have indicated, anyone producing bees must treat for mites. But what effect is this having on the bees? No one knows for sure, but it is evident that most beekeepers look back several years to the days when hives were busting with bees - days when each hive would give up several packages of bees in a single shaking.

My two-week stay was an eye opener. For the first time, I really understood why my package bees were a month late in 1993. At that time, I was very upset with the producer, who was from another Southern state. By

all standards, 1993 is a year most Southern package producers judge all other years by. Last year turned out to be difficult, but the beekeepers here had queens to put into packages even though the weather was colder than usual. The demand for bees just outstripped the supply of bees available. Look for price increases this year and do not be surprised if you do not get bees.

Reports are coming in from many states of big losses due to mites. The demand for bees certainly will cause many producers in the South to increase their numbers of hives to meet the demand for package bees; however, the price of honey is at an all-time high, and decisions must be made as to how many packages they want to produce at the expense of weakening their own bees for the honey flow that quickly follows the package bee season.

What should you do if you want package bees this year? Examine your bees early. Select a package bee producer and order immediately. If you wait until mid-February, you may find getting bees in April impossible. If you wait until late March, forget it. **BC**

Dana Stahlman is a sideline beekeeper and County Bee Inspector from Delaware, Ohio. He has contributed to Bee Culture on a variety of subjects, and is active in local and state bee associations.

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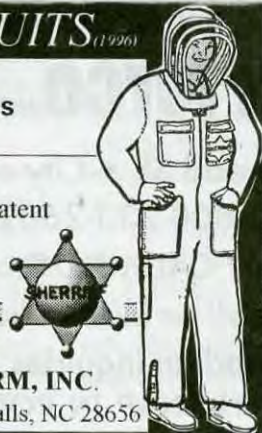
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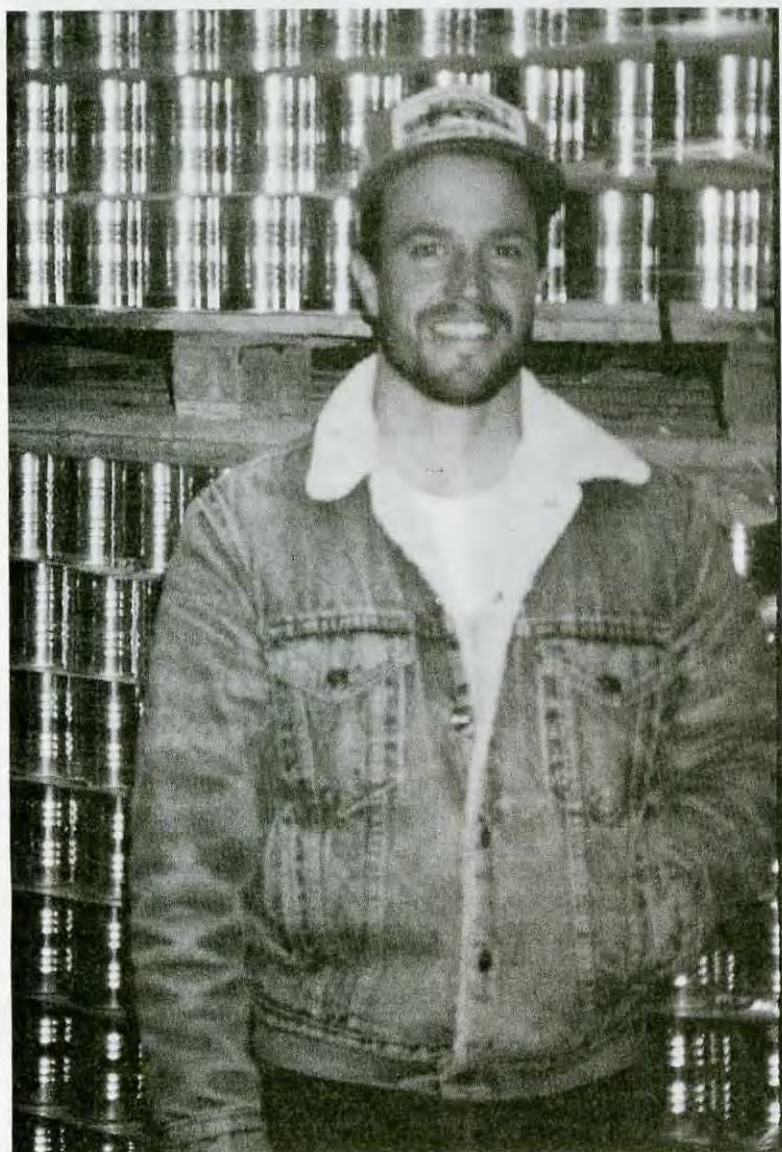


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Kamron Koehnen oversees the huge bee operation.

Almond and walnut orchards, multi-crop pollination contracts, package and queen production, equipment manufacturing and wholesale supplier – C.F. Koehnen and Sons is a California agribusiness personified.

Selling thousands of queens and packages each spring is only a part of C.F. Koehnen's business every year but it is an important part – and one not always so evident. For years Koehnen's, like many other California queen and package producers, exclusively supplied their products to Canadian beekeepers. They had no domestic market, nor needed one.

When the Canadian border

closed that changed, and they turned to the U.S. package and queen market, hoping to maintain their production. Though slow at first, they gradually gained market share with efficient production and competitive pricing. Sheer size allows for slimmer margins on queen and package pricing.

In November, 1996 Kamron Koehnen hosted *Bee Culture* readers to a guided tour of the Koehnen queen and package facility just outside Glenn, California, about an hour and a half north of Sacramento.

Koehnen's started in 1907 when Carl Fredrick (C.F.) Koehnen, then a commercial catfisherman along with

C.F. KOEHNEN & SONS

Packages, Queens & Pollination

A 90-Year Old California Agribusiness

————— Kim Flottum

his brother Albert, acquired their first colonies in Tracy, California. One thing led to another, and soon he left his brother, Albert, and moved to Glenn County and eventually to the present location just outside Glenn.

The area then was primarily undeveloped, and honey production was easy due to open land and the huge grain fields that turned yellow with star thistle.

Today, Robert and his brother Bill, and Robert's sons, Kamron and Kalin, and Bill's son, Mike, are partners in the business, each responsible for certain aspects of this sprawling business, but each crossing over when necessary. They have over 40 full time employees.

The family has a good mix of skills and interests. Robert has a knack for equipment design and shop work. But he also oversees the queen rearing operation. Bill, the President of the company oversees the nuc making process, shakes packages when needed and trucks almonds and walnuts in the Fall. Mike is the company's controller, keeping an eye on the financial side of the business, while Kalin deals primarily with orchard management. Kamron oversees the huge beekeeping operation.

At season maximum, the company has about 15,000 colonies, and

Continued on Next Page



Factory seconds – 1-gallon cans used for feeding bees. A standard practice in central California. Cans are purchased from a seconds broker. Lids have a hole large enough to accommodate the screw-on lid.

KOEHNEN ... Cont. From Pg. 35

all are kept within a 30-mile radius of the farm. They don't move bees to other states for honey production, and they don't even own an extractor. This operation is strictly feed-lot beekeeping.

The busy season starts in January when colonies are fed the California version of a pollen substitute to get things moving. To make these patties, 7 - 8 gallons high fructose corn syrup is mixed with 50 pounds brewer's yeast in a commercial-sized mixer. The blend is left overnight while it 'sets up' to a jello-like consistency in a specially made box. The next day this mix is 'sliced' and each patty is placed between the two supers of the brood nest. This much mix feeds roughly 90-100 colonies.

Towards the end of the month each colony is 'graded,' evened up, and about 12,500 are moved to almonds for pollination. From there about 5-7,000 are moved to prunes, then to clover, then to sunflowers and finally vine crops – all for pollination.

After almond and prune pollination the remaining colonies are returned to their permanent locations and used for package production. Since January they've been fed, and have gathered good supplies of pollen from almonds and nectar from prunes so these colonies are very populous and ready to be shaken.

Except they don't 'shake' packages. Rather, they use a 'smoke up' system that works like this.

The colony to be worked has its lid removed, and an excluder is placed on top. A deep super, equipped with vertical boards (placed at about normal frame location) and a screened top is placed above the excluder. Then, the crew of 3-5 people smoke each colony entrance four or five times at five or so minute intervals. This drives the bees up into the

special super, where they cluster on those vertical boards.

Then, each box is removed and slammed down on top of another screened box, and the package bees are collected. The first time a colony will yield about five pounds of bees, but six to seven isn't uncommon. When the screened box is full, 10-15 pounds, the bees are transferred into two or three pound packages and a queen and feeder can are added. A crew can produce 500 two-pound packages from 224 colonies (two yards) in an average day.

Colonies are "shaken" twice for packages and no more. Usually, a colony that has a good queen and is well supplied with food can produce 10 pounds of bees for the season with this method. The second round is all done by hand shaking. That enables them to requeen the entire outfit at this time, before being moved into Summer pollination.

They focus on larger deliveries, of course, and can and will ship truckloads of packages if arrangements are made. They will also put bees in a customer's equipment, saving costs all around.

These colonies are requeened with stock raised by Koehnen's, who produce, depending on the year, between 70-100,000 queens each season. Robert selects breeders from the many thousands of colonies they run during the previous season by the crews, who mark exceptional colonies. Breeders are selected that show good honey production, gentleness



One view of the queen yard, located just outside the grafting room. Feeder cans are in place atop the colonies.



The mating nuc used at Koehnens. In the back is the feeder, and three frames are in place. The lid is secured with a large rubber band.



In the warehouse Koehnens have thousands of feeder cans, cages and boxes to send queens. They're already made up to use, or to sell to other queen producers.

and superior brood production and good overwintering characteristics. Sixty to seventy breeders are chosen each year. They produce Italian Cordovans primarily, and some New World Carniolan stock.

Breeders are set up in the queen yard, and frames of eggs are grafted into wax cups on bars set on frames, and the frames are then placed in queenless cell building colonies to raise. Three frames, each with four

bars containing 15 cells each are placed in a colony, with about an 85% 'take.' The frames are rotated into and out of the colonies on a set schedule. They can produce about 2500 queen cells per day.

On the 10th day after grafting the cell bars, the finished queen cells are removed from the cell building colonies and placed in an incubator to even-out the process. An elaborate record keeping process is used, so if

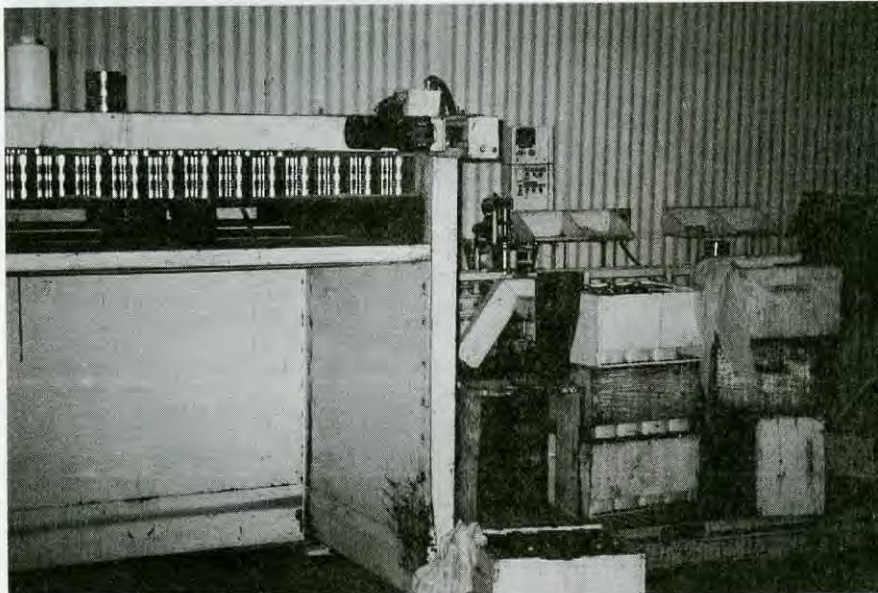
there is a problem with a queen, she can be traced to determine what the weather was like during all critical stages of development, most importantly mating.

Meanwhile, another crew is busy preparing the 50,000 or so mating nucs used. To get them ready an assembly line is set up. The mating nucs are essentially small colonies. To start, the nuc has two frames and a feeder inside. First, the internal feeder is filled with syrup, complete with Fumidil-B®. Then the nuc moves down the assembly line to a person who has a hot implement that softens a spot on the comb and a ready-to-emerge queen cell is pushed into the frame at the soft spot. Moving on, four ounces of bees are poured in (taken from package colonies) and left to settle in. As the nuc moves down the line another frame is added and the lid is put on and secured with a large rubber band.

The nuc is then left in the warehouse for a day and a half or so, to get things 'settled' inside and hatch the cell. Then they're moved to one of several mating yards and the nuc is opened. After about eight days the virgin queen is mated. Eighteen to 19 days later, during the early part of



The machine developed by Robert Koehnens that makes the mini-queen cage. It can produce 6,000/day.



The machine that fills feeder cans

KOEHNEN ... *Cont. From Pg. 37*

the season, the queen is caged. Later, only 16 day's wait is required. Koehnen's have queens ready about April first, so you can see that the process begins *at least* by the first of March.

To expedite this process – queen and package production – Koehnen's have capitalized on Robert's skills in equipment design. They have a queen cage making machine that can produce about 6,000 cages/day. The California mini queen cage has proven successful and is used by many breeders. It is sold in 1,250

count boxes.

They also have a machine for putting lids on package feeder cans, and a machine that fills the cans. They can produce these so efficiently that many package producers find it's easier, and less expensive to purchase the cans than to do it themselves.

They have devised a queen shipping box for sending bulk queen orders that comes in a variety of sizes, and are also used by many other queen shippers. The whole operation works out of several buildings, some

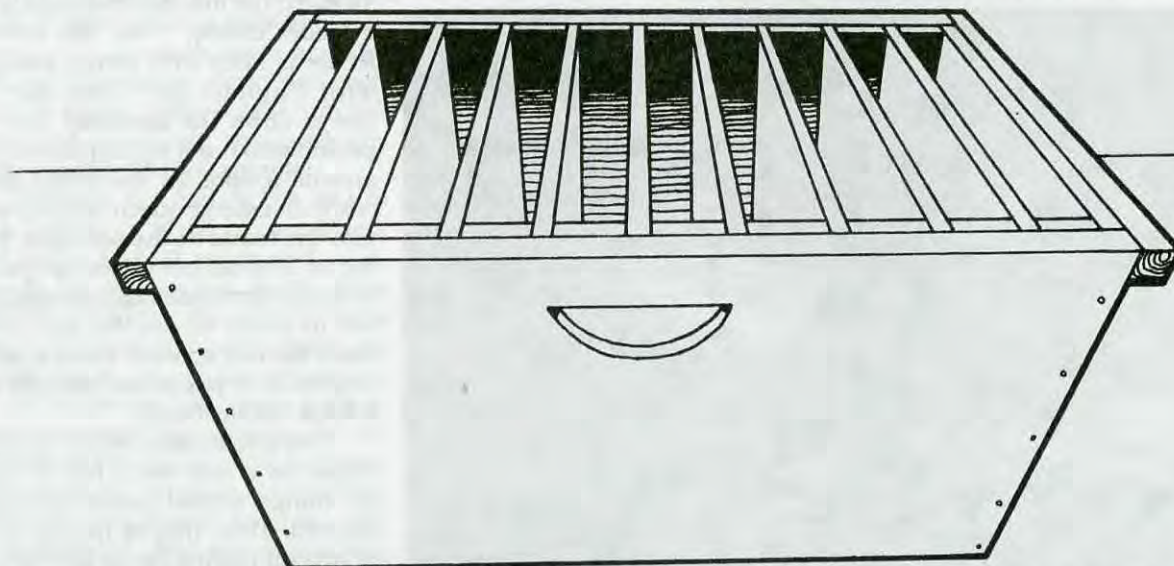
for work, some for storage.

Transportation and colony movement is handled by a fleet of 2-ton flatbed trucks and several homemade forklifts. The forklifts can carry 16 hives (four pallets) at a time, and the truck can haul 112 (7 groups of 16) hives per load. Speed and efficiency are important when moving colonies in and out of orchards and their equipment is first rate.

The forklifts were designed specifically with the pollination business in mind. 'Drops' in orchards are preset at 16, 32 or 48 colonies per site, depending on the grower and the crop. Of course the more colonies in one spot the better because crews spend less time moving them in and out. Also, those crews who check colonies after dropping spend less time driving between sites.

Efficient, aggressive and skilled, C.F. Koehnen and Sons carved out a market in the U.S. when the Canadian border closed, and today are a major player in the honey bee industry. But, when all is said and done, with the modern equipment, large scale size and lots of help, something Kamron said during our visit probably plays more of a role in their success than anything else. He said, while showing us the operation, "Everything we do, we work for the next time around." That philosophy will spell success in any beekeeping operation – no matter the size. **BC**

You can contact C.F. Koehnen & Sons at 3131 Hwy. 45, Glenn, CA 95943, (916) 891-5216.



A drawing of the 'smoke' box used when making packages. This is top view, (with the screen removed) showing the boards the bees cling to when they are driven up from the colony with smoke. This box has no bottom, and when full the bees are dropped into a screened box, then dumped into cages. An excluder is placed on top of the smoked colony so when bees go up, the queen and drones are kept behind.

SHIPPING PACKAGES

Richard Bonney

Getting bees from the producer's beeyard to your beeyard can be a *very* perilous journey.

Most of us have bought package bees at one time or another. Some of us have had them shipped via the U.S. Postal Service. Others got them from a dealer who had a truckload brought in. Some of us have tried both ways, and many of us have stories to tell. I know I do.

Most of my stories are about postal shipments. For instance, I once stopped at a small post office in a nearby town to pick up some stamps. It was around noon, and the day was hot. As I parked, I noticed several packages of bees in the blazing sun on the loading dock at the side of the building. The bees were obviously restive and uncomfortable. When I went into the post office, I mentioned that the bees out there were suffering a bit and really should be moved into the shade. The post office worker was sympathetic to the bees' plight but stated emphatically that she was not going to touch them. They were bees, and everyone knows that bees sting. I said I would move them, and she said that would be fine. So I did.

I asked about the packages and learned that they had arrived earlier that day, been unloaded from the truck by the driver and not touched since. The beekeeper they were addressed to had been called promptly, but he was at work and could not pick them up until the end of the day. That sun was hot. Perhaps I saved those bees' lives; perhaps they would have been all right. Bees are tough.

In another instance, I received a call from a nearby post office saying that they had a problem with some bees – could I come and help, quick. Since I was on my way out and would be passing near that office, I agreed

to stop. Again I found bees on the loading dock, but only one package this time. However, these bees were flying. As the package was being unloaded from the truck, someone had dropped or otherwise mishandled it and caused the screen to tear. Many bees were out, although the queen was still in place and the feeder can intact. No one had been stung, but as could reasonably be expected, the post office workers were upset. I explained that I had an appointment and could not stay to help, but if they would just leave the cage in a corner of the loading dock, the bees would eventually make their way back to it, and the beekeeper they were addressed to could come and take them away at the end of the day. I explained that the number of flying bees should diminish as they settled down, the bees were unlikely to bother anyone, and post office business could go on more or less as usual. Then I left.

I learned later that the postmaster was not willing to live and let live. He had someone spray the bees. When the beekeeper arrived to pick up his package, there was about a cupful of live bees left in the cage.

These are not unusual stories. Any group of beekeepers could probably relate at least one or two similar tales. Nor do these stories point out gross misconduct or totally unreasonable actions. They are human reactions to stinging insects, and thinking about such situations reminds us that bees are not accepted casually by most non-beekeepers. The activities and behavior of people expected to handle bees in the course of their work – postal workers and

the like – will not always be rational. Beyond human reaction, other factors influence all of this. Take this past season, for instance. Bee losses over the Winter were exceptionally high, and the demand for replacement packages was way beyond normal. Then, in the Spring, the weather through much of the package bee production area in the Southeast was abysmal – rain, cold, even frost. Package production was delayed, and many shipments were very late. The delay meant that many packages were being shipped in warmer than usual weather. The bees were additionally stressed.

When the situation is not normal, problems seem more prevalent. Perhaps they are, or perhaps it just seems that way because more is at stake. Last year we needed bees, we couldn't get bees as readily, and the perception of every problem was magnified. Then again, perhaps problems last year *were* greater. It is hard to tell. Producers are the best source of information, and their stories are mixed.

I talked with several producers across the country. Certain common threads ran through all of those conversations. First, it is obvious that the producers care. They are in business, and that business is putting live, healthy bees in our hands as expeditiously as possible. Second, this past season they were overwhelmed.

Probably about 40 percent to 50 percent of all package bees shipped are transported by the postal service. The remainder are trucked directly, in vehicles driven by beekeepers or by someone who has a self-interest in the well-being of the load. It is the bees moved by the postal service that are usually at the heart of the problem situations. Not always, but usually. I have already addressed a

couple of problems at the receiving end. What about problems at the source? The extent and degree vary. Some producers report no significant problems. Others have little if anything good to say about the postal service.

The producers actually face two kinds of problems. They must deal with the postal service, and they must also deal with their customers, the beekeepers. Most of the time everything goes smoothly. Orders are received, filled on schedule, bees are shipped, nothing is mishandled, and the customer receives a live, healthy package as ordered. Other times – disaster.

Usually, fault lies with the postal service, but the complaints and the blame go back to the producer. One producer told of a shipment of over 600 packages turned over to the postal service which met with disaster. At the post office, the packages were loaded into a closed, unventilated trailer and the load dispatched. Within 120 miles of the origin, the bees died of suffocation. Another producer had a similar story – bees confined, inadequately ventilated, and the truck left out in the sun while the driver had coffee. These bees also died. In other instances, the truck may be suitable and the driver conscientious, but the packages are placed in unsuitable containers. One shipper mentioned queens sealed in plastic, while another knew of packages loaded on end into mail bags. Stories such as the one I related earlier abound, where the bees arrive at way points or destinations and are left outside, exposed to the elements for varying periods.

In theory, the producers have protection if the bees die from such mishandling. They can be reimbursed by the postal service for these losses. In practice, it doesn't always happen. The postal service does not always accept the blame or may not reimburse in full, and they will not insure bees beyond the fourth shipping zone. What this means in practice is that bees shipped, for instance, from Southern Georgia to destinations in Delaware, New Jersey, Pennsylvania and points north will not be insured. Similar distances are in-

WHO TO BLAME?

Over the years producers have always been the recipients of a certain amount of abuse when packages arrived late or in poor condition. This past year seems to have set records. Last Spring I talked with more than one beekeeper whose bees were late and who was about to call and tell off the package producer.

In fact, the producers did hear from a large number of unhappy beekeepers and the language

wasn't always polite.

Obviously, package producers can make mistakes. They too are human. But don't blame the producers for the weather, for the huge demand for packages, for the inadequacies of the postal service, or for anything else that is obviously not their fault. They understand fully that if bees don't arrive on time crop pollination may be jeopardized or the nectar flow may be over.

involved for shippers all across the country.

Since shipping mishaps do happen, producers must self-insure where the postal service falls short. The cost of such insurance, of course, comes back to the beekeeper. Cost, though, is not the total issue here, as important as it may be. What is of more concern is the loss of the bees. The delay is at least inconvenient to the receiving beekeeper and often critical. But beyond that, the lost bees are sometimes irreplaceable. This past year was a case in point. Because of weather conditions, bees were in short supply, and package production was unavoidably late. Because of the heavy Winter losses across the country, the demand was up. Producers were stretched to their limits and beyond. They stopped taking orders, and in some instances were unable to fill some of the orders they had accepted. A dead shipment became a nightmare.

Another aspect of this is those packages of bees that didn't die but were poorly treated en route and arrived in marginal condition. Most beekeepers receiving such shipments try to make the best of it, but those colonies may never recover and the beekeeper is the loser. A first-year beekeeper may not even realize that anything is wrong.

Another season is fast approaching. Many of us have not made up all of our losses from last year, and new beekeepers are coming on the scene all the time. Presumably, the demand for packages will be vigorous. What does this mean to those of us who want packages for the 1997 season? At least two things. Get your orders

in early, and think about transportation.

In years past, beekeepers have started thinking about their package bee needs in the late Winter or early Spring. Many have ordered successfully in April and May. Don't count on such a schedule this year. Beekeepers have already started reserving packages. It is not possible to predict at this time, but Spring may be too late to order. If you normally buy your packages through an intermediary, a local dealer, for instance, be sure that person thoroughly understands the situation and places a timely order with the producer. Some such third parties may assume that last year's experience won't repeat and that an order can be placed in the Spring as usual.

Then, how will you have your package delivered? No matter who you buy from, shipping comes down to two options – the postal service or direct trucking to an individual or distributor at the destination. While one or two producers have good words for the postal service, most do not. They see service declining and don't see ready solutions to the problems. Individual producers and representatives of the industry have talked with postal service officials, but understandings and agreements do not filter down to the working level. As an institution, the postal service means well, and its policies and procedures, if followed, can result in timely and successful delivery of packages. In practice, watch

Continued on Next Page



This small pickup carried 96 three-pound packages from Georgia to Massachusetts. As may be seen, a few more would have fit. When planning to transport bees, keep in mind that a three-pound package actually weighs quite a bit more than three pounds.

days, and perhaps this is the way of the future. A small pickup with temporary four-foot sides can handle at least 100 packages. A pickup with a small trailer can double that capacity. It takes time out of our busy Spring, and such a trip requires stamina, but the rewards are there. Assured delivery, a short interval from the time of shaking to the time of hiving, and, depending on distance and number of packages involved, a possible savings in transportation costs.

If you have no recourse but postal shipment, take some precautions. Find out from the producer when the bees will be shipped. Most producers can give you a reasonable estimate if not an actual date. Talk to your local postmaster. Arrange for a call as soon as the bees arrive, and discuss how they should be treated until you get there. Try very hard not to leave the bees at the post office for long. If you cannot get away during the day, find a stand-in who can make the pickup for you.

For most of us over the years, ordering and receiving package bees has been a straightforward, trouble-free process. We would like to think it will continue so, but problem situations do seem to be increasing. Do your part to make things go smoothly. **EC**

Richard Bonney is an Extension Educator for the State of Massachusetts. He is a regular contributor to these pages.

SHIPPING PACKAGES ... Cont. From Pg. 41

out. We are still dealing with people. Human nature and human failings affect the postal service as much as anywhere. Few non-beekeepers understand how to handle bees, and

most individuals will do so only with reluctance.

This brings us back to direct trucking. I hear of more individuals driving south for a load of bees these

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Alsike Clover

B.A. Stringer

Well suited to cool, moist areas, Alsike Clover makes excellent pasture, a great soil rejuvenator – and a nearly perfect honey plant.

Alsike Clover seems to have been the first plant to receive serious beekeeper attention, according to Frank Pellett in *The History of American Beekeeping*. Because farmers were amenable to its propagation for pasture and for hay, the plant spread rapidly over a wide range, improving pasturage for bees and beasts.

Alsike Clover, a native of Northern Europe, is also called Swedish Clover after the country of its origin. Alsike is the name of a parish in Upland, Sweden, where the plant was first discovered and where it is very abundant. The seed was brought to England in 1834, and the plant was introduced into the United States in 1839 by the editors of the *Genesee Farmer*, who distributed seed to their readers. By 1866, it had a widespread reputation as a good honey plant, as can be seen by Moses Quinby's comments in *Mysteries of Beekeeping Explained*: "The Alsike or Swedish White Clover also has much to recommend it. The plant being valuable for soiling cattle, or for hay, would be a desirable acquisition to the bee-

keeping farmer, as well as to others on whose land it will thrive."

Seed companies were quick to recognize the market for bee plants and, in 1868, J.M. Thorburn & Company, New York, advertised Alsike, along with Bokhara Clover, mignonette and chicory for sale.

Query number 151 in the November, 1885, *American Bee Journal* echoed the interest of beekeepers in planting for bees: "What seed is best to sow this Fall or next Spring for honey plants for bees?" The editor responded, "I know of nothing better than Alsike Clover. I do not know of any seed that will pay to sow for honey alone." Professor A.J. Cook added that "Alsike Clover is splendid."

In 1886, *Gleanings in Bee Culture* received a letter from an enterprising gentleman who had increased bee pasturage around his apiaries by sowing Alsike Clover. Mr. George O. Goodhue bought Alsike seed in bulk for 12 cents per pound, and sold seed to farmers within two miles of his yards for 10 cents per pound when local prices were 16 to 18 cents per pound. The farmers mixed the Alsike seed with timothy for seeding down land. Mr. Goodhue therefore got pasturage lasting "from two to five years, of the very best quality of honey, at the small cost of \$7.50 for 100 acres." Some other beekeepers estimated that Alsike would produce 500

Continue on Next Page



pounds of honey per acre in a good season.

Alsike Clover has small, rosy pink or white, fragrant flowers which are well worked by honey bees for nectar and abundant pollen. It usually blooms for about three weeks from early to mid-summer, the flower stems forking rather than arising directly from the ground like white clover. The honey is light with a heavy body, delicate flavor and pleasant aroma.

Widely planted in the North-eastern United States and Canada as a soil rejuvenator, Alsike Clover easily reseeds along roadsides and in waste places. The plant has a branching habit, like Red Clover, and its foliage and seeds are relished by a variety of wildlife. Although Linnaeus named the plant *Trifolium hybridum*, supposing it to be a hybrid between red and white clovers, it is now believed to be a distinct species.

The utility of Alsike Clover as bee pasturage became well-known. The 1901 *ABC of Bee Culture* stated that "Alsike and white Dutch clover, buckwheat, rape, mustard and the like, it will do to invest in. . . . Buckwheat, rape and Alsike Clover are the only cultivated plants that have given paying crops of honey, without question, so far as we have been informed."

Alsike Clover, grown alone or in combination with grasses, was found to be especially valuable for produc-

ing a fine, soft hay which was nearly all consumed by livestock. It is particularly well-suited to moist, cool areas. According to Joseph E. Wing, editorial correspondent for the *Breeders' Gazette* in Ohio (1907), "On certain soils, rather inclined to wetness, Alsike Clover thrives better than the Red Clover, and is an excellent forage and bee pasture." Such positive recommendations in the agricultural arena helped maintain the popularity of Alsike Clover for many years.

Mr. John Lovell suggested in *Honey Plants of North America* "Beekeepers should not only preach the gospel of sowing Alsike, but should also offer to pay a part of the cost of the seed . . . The quality of the hay is improved, and the quantity of the honey increased." The value of the plant appears to depend on the region, as Lovell describes it as occasionally failing to yield due to drought (in Ontario) or very wet weather (in NY) or as being "fickle" in Oregon.

In 1974, the Illinois Department of Conservation began a roadside management plan to provide nesting sites and protective cover for native birds and animals, including pheasants. The plan was based on research done by the State Natural History Survey, which showed that replacement of legume plantings by increased use of agricultural chemicals, clean row-crop culture and reduction in livestock and pastures had all contributed to a 75 percent decline in pheasant numbers between

1962 and 1966.

Mr. Eugene Killion, supervisor of apiary inspection at the time, suggested including clovers in the seeding mix. The Illinois State Beekeepers Association donated 240 pounds of Alsike Clover seed, which was sown in a mix of 10 lb clover: 60 lb alfalfa at 20 pounds per acre.

The benefits of the plantings were long-term and widespread. Bird and bee pasturage increased up to 50 percent; the seeded areas were almost maintenance-free; the roadside was beautified; the Alsike established quickly, decreasing erosion and increasing nutrients to the soil; and bees visited the Alsike and pollinated the alfalfa, providing reseeding at no further cost.

Signs posted along the highway read: "Roadsides remain unmowed and have been reseeded with the cooperation of farm operators to provide nesting cover for pheasants and for the associated benefits to all wildlife species."

The current *Oregon Interagency Guide for Conservation and Forage Plantings* seeding recommendations include Alsike Clover in mixes for upland game birds and waterfowl. Consider asking your county Soil Conservation Service and Highways Department to consider including Alsike Clover in their areas of use. ☐☐

B.A. Stringer is a plant and honey bee specialist who routinely contributes honey plant articles. She is from Blodgett, Oregon.

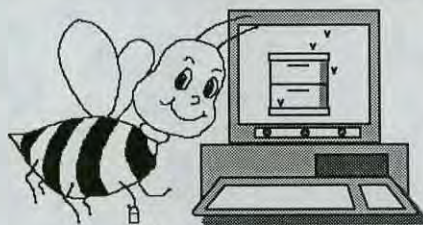
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THE SECRET LIFE OF A HONEY BEE EGG

James E. Tew

Honey bee eggs are tiny, but they play a BIG role in the life of a honey bee colony.

The beginning

The beginning stage of a honey bee's life is the smallest and quietest of any of the four developmental stages - egg, larva, pupa, and adult. In fact, many beekeepers have problems even seeing eggs at all, but that's not a criticism. Even the best of eyes can have problems seeing a tiny white egg (looking like a miniature grain of rice) standing on end in a cell of snow-white comb. Eggs are not much longer than a type-written dash ("-") (1/16 inch) and weigh nearly nothing (0.12-.22mg) which means an egg doesn't weigh much more than a type-written dash either. Yet the presence or absence of eggs and their quantity, are good measurements of activities going on in the hive.

Getting a look at eggs under field conditions

First, you need to get your mind right and your glasses adjusted. Think small. With either dark or light comb, hold the

frame at a 30-40 degree angle before you - you decide the distance. Have the sunlight coming over one shoulder. Using the top bar as a pivot line, raise and lower the bottom bar about 3-5 inches — all the while scrutinizing randomly selected cell bottoms.

Let your eyes scan the cell bottoms. Eggs tend to be laid in patches of cells. Once you find one egg, you will probably begin to see them all around in surrounding cells. I think eggs are equally difficult to see in either color cell (light or dark). In dark cells, the

polished cell bottom can glisten and look much like an egg. Alternatively, the white cell bottoms of new comb cells can camouflage the small white egg. Take heart, what seems impossible at first does get much easier as you train your eye.

Naturally, look for eggs in logical places within the brood nest. The center of the brood nest (normally the center of the hive) is the best place to look for eggs. But suppose you are trying to decide how well a queen is performing or what kind of a future population of bees you will have within the next few weeks. To determine that estimate, you need more than just seeing eggs in the center comb. Work from the center out-



Continued on Next Page
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wardly toward both sides of the colony. Be careful not to damage your queen. Under the crowded conditions of a late spring colony, there is a risk of rolling the queen off the comb if you remove a center comb first. How far out on either side did you see eggs or brood? If it's early spring and you're finding capped brood and eggs on the center three frames and then eggs on the next two frames (3-6 frames of brood), you should have a colony that will build up on a normal build-up schedule. Anything more, and you are probably going to have a boomer colony while anything less may indicate a failing queen, bad weather, or low honey and pollen stores.

Most beekeepers will accept seeing eggs as a substitute for seeing the queen during a quick inspection. Finding eggs means that you had a queen in that colony at least three days ago. It's not a conclusive analysis, but it is quick and will satisfy most inspection needs. What if you found no eggs nor brood at all? Under some conditions panic is in order while in other situations, seeing no eggs at all is normal. In climates having a cold winter, egg/brood production will completely stop during the early cold part of the season. If you're inspecting a colony during a warm day in that period, expect no eggs - ergo no brood. But can you assume there is a queen in place in the colony? Unless you happen to see her, you have no other choice but to assume she's there.

However, if winter is waning and spring is on the way and you are not finding eggs along with older stages of brood, a failing queen would should be suspected. Anytime after mid-winter in most areas, a colony should have varying amounts of brood in all stages.

Larvae and capped brood, but no eggs?

The larval stage lasts about 5.5 days. You can forensically decide if you killed the queen the last time you were in the colony. Since larvae are present, your colony had a queen about 5-6 days ago. Were you in the colony during those days? If the time of the year is right (anything warm), consider either swarming or supersedure as the reason. If all stages are

present except eggs and you have ruled yourself out, the colony could have swarmed or could be replacing its queen. Swarms cells are generally on the bottom edges of the frame (but not always) while supersedure cell are on the "face" of a brood frame (but not always).

Time spent waiting for the new queen to show herself is a difficult period for many beekeepers. It's much like a surgeon saying, "We won't know how well the surgery went until the patients awakens." So how do you tell if the queen has shown herself? Look for eggs as described above. Once you see them, get out of the colony. The queen is not in conclusive control of the colony until she has her own open brood present.

Too many eggs - in fact, multiple eggs per cell?

It could be laying workers. This is not good news. Worker bees can't mate nor store sperm. They're also missing genital structures and some behavior patterns. In essence, an adult worker bee cannot become a true queen. Since laying workers cannot fertilize eggs, any eggs produced become drones. Fertilized eggs (32 chromosomes) become either queens or workers, while unfertilized eggs (16 chromosomes) only become drones (males). Unfortunately males don't contribute much more than reproductive activities to the colony.

After a colony becomes hopelessly queenless, laying workers will generally develop within 23-30 days or so. Colonies may have one to many laying workers. A major indication of the presence of laying workers is multiple eggs within single cells - all of which will ultimately become drones. By the time the colony has dealt, unsuccessfully, with its queenless situation (about 30 days), it will have become noisy (excessive orientation fanning when the colony is opened), nervous, and possibly a bit aggressive. The colony will be weak and its hive members old. It's probably not worth saving - but it will have eggs all over the brood nest area. In this case, abundant eggs per cell are not good.

There are other times when a colony with a perfectly good queen can have multiple eggs within single cells. If, at any time, the beekeeper introduces a strong, productive queen into a small, but biologically

balanced colony, the queen's egg output may exceed the smaller colony's ability to provide space for all the eggs. In that case it is common for a queen to place two to several eggs per cell. But, in this case, all eggs are fertile and the colony is in no danger of collapse. In this case, abundant eggs per cell are good (or at least okay).

What happens to extra eggs within single cells? They are probably eaten by nurse bees, though not necessarily very quickly. It may take several hours even to a couple of days for nurse bees to remove either dead or misplaced eggs. In fact, when grafting larvae for queen production, I've frequently seen two eggs, and later two larvae, occupying the same cell. I've wondered, given the tremendous growth rate of larvae, if occasionally one larvae eats the other or is it always the nurse bees that remove the extra larvae? I don't know.

Biology and behavior

The egg is a hardy developmental stage of the bee's growth. It is attached to the bottom of the cell with a glue-like substance secreted by the queen. It always has the small end down. It's an iridescent white with an ever-so-gentle curve to it. The egg is positioned with the to be larva's head-end up. After about three days, the egg gradually leans over until it lays on its side on the cell base. The egg's outer membranous covering (the chorion) slowly dissolves as the larva emerges. It's a slow, quiet process. Nurse bees soon begin to place hypopharyngeal gland secretions (brood food) around and under the larva which has a voracious appetite. Beekeepers frequently say that an egg hatches when referring to a larva emerging. As such, the bee egg does not "hatch" though the word transfers the concept. However, due to the membrane dissolution, don't ever expect to see tiny bee-egg shells drop from cells containing new larvae.

Though the egg normally develops within three days, it's reported development range is 2 - 6 days. Temperature appears to play a role in the duration of the egg's development. Eggs can commonly withstand room temperature for several hours without the ill effects shown by larvae and pupae held under the same conditions.

Haploid (drone) versus diploid (female) eggs.

The egg is filled with cytoplasm, a nucleus, and a yolk. The nucleus is near the big end of the egg and plays a major role in the development of a future bee. A newly fertilized honey bee queen will have nearly seven million sperm stored in a special pouch - the spermatheca. Sperm can be stored there, apparently in somewhat of a suspended animated state, for several years. Adult female worker bees can't do all this hence a major difference between the anatomy and physiology of workers and queens. The adult, fertile queen has a muscular valve and pump which are used to withdraw a small amount of sperm from the spermatheca, pump it down the duct to an opening in the vagina where a vaginal valvifold forces the egg's micropyle (an opening in the larger end of the egg) against the opening of the vaginal sperm duct. The connection made, one or more sperm is passed into the egg. The newly fertilized egg becomes diploid (a full chromosomal content) and develops into a female. Shut down the entire sperm-releasing mechanism and the egg remains sperm-free, resulting in a haploid egg (one half of the chromosomal number). The unfertilized egg becomes a drone. A queen can seemingly tell a worker cell from a drone cell by measuring the cell diameter with her front legs and will deposit the appropriate egg. However, mistakes are occasionally made. Nurse bees, ever alert to errors, clean up the mistake by eating the errant egg.

The egg output of a good queen

This simple question is still not answered conclusively, though many respectable estimates have been made. The most accepted estimate is 3000 eggs per day during the height of the egg-producing season. This is about twice the weight of the queen and is about 1,500,000 eggs for her entire career (a little less than three years). This estimate is dependent on many factors - temperature, food availability (including pollen), and inherited characteristics.

Ironically, our view of the queen as a regal monarch is not a good one. The queen literally has food stuffed in one end while eggs are pushed

from her other end - probably about one egg per minute - not exactly a leisure life. Nurse bees can control the egg flow by controlling the food input. Slow the food input and the egg rate drops. Other house bees are responsible for preparing cells for receiving eggs. Incoming nectar and pollen may also affect the egg flow by directly affecting the nurse bees that care for the developing brood. So the queen systematically (if she is a good one by our beekeeper standards) searches for prepared cells. Upon finding one, she puts the appropriate egg (drone or female) egg in the appropriate-sized cell. If she's not fed well or if clean and polished cells are not ready, she decreases egg laying proportionally. But apparently it was not her decision to do so. If the queen can't produce enough eggs when pushed to do so, she will be superseded by the same nurse bees. There's not much of a retirement plan for queen bees.

There's no cause to make honey bee eggs any more or less important than they should be. However, due to their small size and their quiet existence, I don't know if they always get their due regards. Even in this article, I skimmed over the amazing biological complexity and changes that occur within eggs after fertilization. Though biologically interesting, I'm not sure it's beekeepingly useful. However, as a beekeeper, eggs give me useful information concerning the presence (or absence) of a queen, an indication of her performance, the overall health of the colony, and an estimate of the colony's immediate future. Even though they are small, they can tell you a lot - if you can see them. ☐

For more information on honey bee eggs, check out these references (I did):

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James E. Tew is State Specialist in Apiculture, The Ohio State University at Wooster, Ohio.



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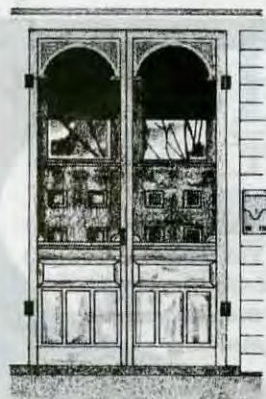
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More Southern Cooking With Honey

Now that the winter is really cold up North and snow is decorating the evergreens, continuing our culinary trip to the South should be most welcome. If you remember, back in November we had just begun to sample some of the foods characteristic of Southern cooking. There's still much more, so let's continue our journey.

HONEY CRUNCHY PECAN PORK CHOPS

It is possible to find recipes that combine several Southern ingredients. In this next recipe you will find citrus, pecans, cornmeal and pork chops.

- 1/2 cup soy sauce
- 1/4 cup lemon juice
- 1 tablespoon honey
- 3 tablespoons onions, chopped
- 2 teaspoons horseradish
- 5 boneless center cut pork chops
- 1/4 cup finely chopped pecans
- 1/4 cup white cornmeal
- 1/4 cup flour
- 1/2 teaspoon salt
- 1/4 teaspoon pepper
- 3 tablespoons olive oil

Combine first 5 ingredients in a dish or plastic bag. Add pork chops and marinate at room temperature for 30 minutes, turning several times. Combine dry ingredients in a small bowl. Coat chops, one at a time, with mixture. In a large skillet, heat oil. Sauté chops for 5 minutes, turn and continue cooking an additional 5 minutes or until done.

Golden Blossom Honey Beeline

ANGEL BISCUITS

How about some wonderful biscuits to accompany the meat dishes. Biscuits made with yeast are a bit different but it gives them a wonderful texture, light and "melt in your mouth."

- 1 cake yeast
- 2 tablespoons lukewarm water
- 5 cups plain flour

- 1 teaspoon soda
- 3 teaspoons baking powder
- 3 tablespoons honey
- 1 teaspoon salt
- 1 cup shortening
- 2 cups buttermilk

Dissolve yeast in water. Into a bowl sift flour with other dry ingredients. Cut in shortening, add buttermilk, then yeast. Stir until flour is dampened. Knead on floured board for about 1/2 minute. Roll into 1/2 inch thickness, cut with biscuit cutter. Bake at 400° for 12 to 15 minutes.

Mississippi Homegrown
Mississippi Beekeepers Association

PEANUT DRESSING

Here's a quick and easy salad dressing with peanuts and citrus that is good on fruit salads.

- 1/3 cup peanut butter
- 1/4 cup lime juice
- 1/4 cup honey
- 1/4 cup water

Process ingredients in blender until smooth.

Feasting On Raw Foods
Charles Gerras

PEACHY-HONEY FLOAT

Now we need to use the peaches. Since it is not peach season in the South at the moment, perhaps you can save these next recipes for next summer. You can certainly experiment with canned peaches, but the flavor will not be quite the same.

- 2 cups crushed fresh peaches
- 1/2 cup honey
- 1 quart milk
- 1/2 teaspoon almond extract
- 1 quart vanilla or cherry vanilla ice cream

Combine fresh peaches and honey. Add half of the milk, beat and blend, then add balance of milk, almond extract and half of ice cream. Beat until smooth. Pour into tall glasses; top with balance of ice cream. Yields 6 servings.

Mississippi Homegrown
Mississippi Beekeepers Association

SUMMER COMPOTE

- 4 large peaches
- 1/2 cup berries (your choice)
- 1 teaspoon lemon juice
- 3 tablespoons orange juice
- 1 tablespoon Grand Marnier or Curacao
- 1-1/2 tablespoons honey

Scald the peaches to loosen their skins; peel and cut in thick slices. Place in a serving bowl and sprinkle with the lemon juice to prevent discoloration. Add the berries. Combine the orange juice, liqueur and honey and pour over the fruit, mixing gently. Cover and marinate in the refrigerator at least an hour. Accompany with a platter of honey cookies.

Honey Feast
Gene Opton & Nancie Hughes

HONEY GLAZED HAM SLICE

Honey and ham always make a good pair. Recipes for ham glazes are quite common, but this next recipe is for a ham slice. Since it is made in a microwave, it's quick and easy.

- 2 lbs fully cooked ham slices, cut 1-1/2 inches thick
- 1/4 cup honey
- 2 tablespoons orange juice
- 1 tablespoon vinegar
- 1 tablespoon cornstarch

Combine glaze ingredients in a 2-cup Pyrex measure. Microwave on High for 1-1/2 to 2 minutes, or until slightly thickened, stirring after first minute. Set aside. Slash fat on ham slices. Place ham in 12X8 inch dish and cover with wax paper. Microwave for 10 minutes on 50% power. Drain. Pour glaze over ham. DO NOT COVER. Microwave for 7 to 10 minutes at 50% power, or until ham is hot.

Mississippi Homegrown
Mississippi Beekeepers Association



PECAN PIE

I told you to save room for dessert. Well, what could be more appropriate than a pecan pie? This recipe is very easy and incredibly good. If you want a prize-winner in a cookery contest, try this recipe - it worked for me.

1 9-inch pastry shell, unbaked
 1-1/2 cups honey
 1/4 cup butter
 1/4 teaspoon salt
 3 eggs
 1 cup chopped pecans

Cream together honey, butter and salt. Beat in eggs, one at a time. Add pecans and beat well. Pour into pastry shell. Bake at 350° for 1 hour and 10 minutes.

The Honey Kitchen
 Dadant & Sons

MASHED SWEET POTATOES IN ORANGE SHELLS

This next recipe contains an ingredient suitably named for the Deep South. Southern Comfort had its beginnings more than a century ago. Its unique flavor makes it a versatile ingredient in a variety of recipes.

8 oranges
 2 1-lb cans sweet potatoes
 1/2 cup butter or margarine
 1/2 cup honey
 1 teaspoon cinnamon
 1/2 cup Southern Comfort
 2 eggs
 1/2 teaspoon salt
 1/2 cup chopped pecans
 1/4 cup honey

Cut the top quarter off each orange and remove the sections. Set shells aside and combine orange sections with all remaining ingredients except the pecans and the 1/4 cup honey. Beat the mixture until consistency is even. Fill orange shells with mixture. Combine pecans with the honey and sprinkle on top. Place oranges on cookie sheet and bake at 350° for 30 minutes. Serves 8.

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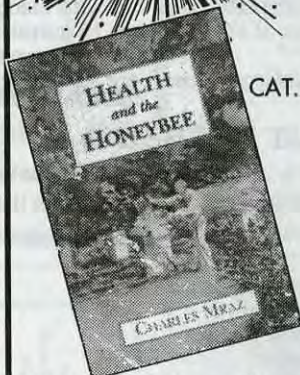
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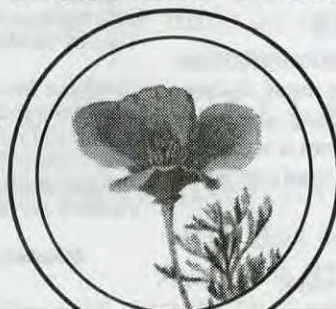
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Bee Talk

“Consistently happy people derive their happiness from life’s small, routine joys.”

Faithful readers of this page, if there are any such, may have noticed that I sometimes wander off into philosophical ruminations. Well, I recently found that one of my ideas that from time to time surfaces in these bee talks has received some confirmation from people who are presumed to know what they are talking about, namely, psychologists. Some of these professionals have been saying that people have a sort of built-in capacity for happiness which fortune’s blows, and blessings, do not do much to upset. A generally happy person will suffer grief, loneliness, humiliation and great loss and then, before very long, his or her general level of happiness and contentment will go back to where it was. Similarly, the melancholic person can have thrust upon him some great and unexpected blessing, like sudden wealth, and before very long will revert to the same glum and spiritless person as before. These things – great and unexpected goods, or sudden blows – do not make much difference, they say, to our basic happiness over the long run. Consistently happy people derive their happiness from life’s small, routine joys, like the smile on the face of a dear friend, an unexpected kiss, a child’s laughter, things like this, which make little impression on those of dour disposition.

Well, I’ve known that, more or less, since I was a boy, and it probably had more to do with my going into beekeeping than anything else. I knew a couple of old men, neither with much worldly fortune, who were beekeepers, and I sensed their deep contentment. I used to help one of them, going around to his bee yards in his old Model-T Ford, and I knew one thing for sure, that I was very

happy doing that. Those joys have accompanied me through all these beekeeping years. Some wonderful, sometimes enviable things have befallen me, of more worldly significance than my beekeeping, and I have also suffered dark and dreadful grief, loss and humiliation, but in the end they have left me much the same, and they have pretty much lost their significance. It is the small joys that nourish the spirit, things hardly worth calling attention to. They come from everywhere, without my even seeking them.

And now, with those reflections on the printed page, for whatever they may be worth, I shall get back to the subject of bees.

About a year ago, I offered to send some seeds of the Chinese Evodia, or Bee Bee tree, to anyone who would send me a stamped and addressed envelope. I didn’t expect much response, but was in fact flooded with hundreds of requests. And that was a disaster. All the envelopes went out to a postal distribution point where they were put through sorting machines that ground the seeds to powder. Maybe a few got through, but not many.

Well, this Summer, my Evodia tree had a profuse bloom, so I anticipated an abundance of seeds, and repeated the offer, having learned about wrapping the seed packets with bubble wrap and having them all hand stamped. I told readers to send me three loose stamps and their name and address – nothing more – and they would get a little packet of seeds. And again, I was deluged. At last estimate, I had about 500 new requests on hand, and they are still, late in November, coming in. It turns out to take about six minutes to deal with each request, which means, if my arithmetic is correct, about 10 per hour. So by doing what I can each day when I have some spare time, I

am hoping, with the help of my dear Connie, to complete the distribution by Christmas or soon after. I have lots of seeds, so I’m not going to run out of those. It is only a matter of finding the time.

There are going to be a lot of Evodia trees growing and blooming far and wide in a few years, and I just hope I am doing a good thing here. The bees certainly love these trees. I have wondered a bit about propagating, on such a scale, a non-native species of plant, but the Morris Arboretum in Philadelphia has been distributing these seeds for many years, and I think I can assume that the people there know what they are doing.

And this brings to my mind another non-native species, Purple Loosestrife. I used to see vast meadows of this in Massachusetts where, I was told, the seeds got imported on wool from Australia, when there were lots of woolen mills there. Now it has spread far and wide. It takes hold near ponds and lakes, and wherever the soil is damp. They say it is becoming a great pest, driving out the cattail plants that are important to waterfowl, though I must say that I often see the two growing together in ditches around here. There are large spreads of this plant about 30 miles north of me and, to the eye of a beekeeper, it is a lovely sight. But I have often wondered about the quality of the honey the bees make from it. I have heard that it is not very good – dark, greenish, and strong flavored. Well, this past Summer, a stranger who lives up there stopped by and left a jar of loosestrife honey with my Connie. I never did learn his name. But now I know what the honey tastes like. I found that the rather distinctive taste is familiar, so I evidently have tried it before, mingled with other honeys, but without know-

Continued on Page 56

Bee Behavior

Larry Goltz

Understanding the basics will one day save you, or your business.

Bee behavior is a subject that is seldom addressed to any extent in apicultural literature. One possible reason is that it is less fully understood than most other topics concerning the care of bees and the economics of the industry. Hardly anyone interested in the natural sciences wants to risk making statements that may reflect upon their reputation. Beekeepers have fewer qualms, at least those of us who have no claim to professional status in science but nevertheless have had experience with an interest in bee behavior. After all, we've had to contend with the enigma over the years, and answer questions from the general public about the actions of bees. Often the queries are about stinging and the attendant problems relating to the interaction of honey bees and humans. The arrival of Africanized bees in parts of North America will certainly emphasize the necessity of every beekeeper having at least a rudimentary, accurate knowledge of bee behavior.

Beekeepers and Bee Behavior

First, consider a few comments about beekeepers and bee behavior. Not understanding bee behavior is often the reason beginning beekeepers fail to continue with beekeeping or is the cause of neglect in the proper care of their colonies. Honey bee behavior is usually considered tolerable by experienced beekeepers, insufferable by many beginning beekeepers and intolerable, even dangerous by most of the general public. Regardless of how we view the behavior of

honey bees we must eventually come to some understanding of our charges in order to provide at least minimal care of our colonies. And, since some individuals have no interest in learning anything about animal behavior, particularly about venomous stinging insects, we must be cognizant of a responsibility to respect such attitudes among the public and take such into consideration when forming our own opinions and actions.

No beekeeper, regardless of how experienced, can claim to a complete understanding of bee behavior. However, we encourage population build-up, the urge to gather nectar and pollen, build comb and maintain a continuity of life of a colony while preventing or discouraging swarming, supersedure, excessive stinging, disease and depredation.

Take Advantage of Behavior

In 55 years in and out of beekeeping I have been charmed, angered and on a few occasions, frightened by my bees. Frightened not so much for myself but what may have happened to others. In such instances a knowledge of bee behavior and how to control or modify any threats posed is an important safety measure. More importantly, knowledge of how to *prevent* such incidents should be a part of every beekeeper's training and know-how. Preventing embarrassing or perhaps even dangerous situations is your responsibility. Only recently I was moving a load of bees to a new location some 50 miles away, some of the route

being through a residential area and along traveled highways. The weather was very unsettled. Ordinarily, smoking the entrances a few moments before leaving on an evening or early morning move settles the bees in the hives but in this instance a rough ride to the road caused already irritable bees to excessively cluster out. Most moves are fairly routine but use whatever safeguards are at hand including entrance screens and nets.

Misinformation & Misconceptions

Selling honey at our local Farmer's Market for a number of years and talking with customers about bees and honey has been more amusing than informative. Many a grandfather, I have learned, has been a fountain of misinformation.

A typical commentary:

"Grandpa never got stung when he robbed his bees. Never wore a net or nothing. Those bees knew him."

"Did he use smoke?"

"Uh, nope. Well, maybe a cigar or pipe a few times after dinner."

Knowing the habits of bees also teaches us that there are limits to our ability to control their behavior. It is nearly impossible to accurately predict the mood of a single colony or a whole apiary until opening one or more of the hives. Invariably a maverick shows up. It is prudent to bypass these until a later visit. Writers often advise requeening abnormally aggressive colonies, which for the novice may turn into a disaster for himself and new queen. Requeening a mean-spirited, populous colony of honey bees involves, beside the me-

chanical manipulations, a finely tuned understanding of the consequences of tampering with a temperamental, defensive lot of bees. Though often smoothly executed by experienced beekeepers, no two are likely to agree as to what is the best procedure. Success is only attained when you know both the local conditions and have an understanding of bee behavior.

Learning About Bee Behavior

The object of serious beekeeping is to build strong colonies in order to secure a honey crop, provide pollination services, and for queen and package bee production. Medication, feeding and brood body manipulations, if harmonious with the colony's natural tendency to build strength in the Spring, help reach these goals. A knowledge of bee behavior, then is essential in performing these steps, and it is something not easily taught. It comes from a combination of reading, instruction and most importantly, working with bees. Many of the principles of animal behavior apply not only to bees but other domestic animals as well. Most livestock keeping guidelines provide at least some explanation of these behavioral principles.

Swarming Behavior

For years I have been called upon to collect swarms. Nothing else in my beekeeping experience has made me aware of how many misconceptions exist among the general public in respect to bee behavior. Uppermost in the public's mind, it seems, is the anxiety - it's a threat to themselves or the public, or a member of their family "allergic" to bee stings.

Usually I can assure them that if undisturbed the bees are fairly docile and if left alone will soon depart.

Basis of Bee Behavior

The basis of bee behavior is closely linked to heredity plus such

environmental influences as disturbance to the hive, weather, foraging conditions, colony health. Stability in bee behavior, and there is much of it that is consistent, has been firmly established over millions of years of evolution - pollination and their ability to store surplus honey have been firmly established over time. These traits are relatively unalterable whether bees are established in modern hives or live undisturbed as feral colonies. The use of the sting, though, has enabled the honey bee to survive their enemies, predators preying on their honey stores.


If bees can reason, as some think, or claim to have proven, then it is all more the reason to admire their flexibility in living in what to them must be a hostile environment. Bee behavior, long in development, reflects nature's best selection process, a harsh one to be sure, but probably the only one that determines the ultimate survivors.

Future Relationships

As beekeepers we represent a segment of agriculture on a collision course with a public wishing for increasing security, a risk-free society in which each individual is entitled to the basic necessities of food, shel-

ter and whatever else is considered paramount to survival. Like other natural resources the food supply is not eternally expandable. The supply of land suitable for agriculture and the allotment of resources to maintain and expand the world's food supply (that includes bees to supply pollination) may become less than adequate in the future. Political powers hostile to the needs of agriculture could act in the name of a predominant urban population with negative results.

Looking at the long range prospects of beekeeping is pure guesswork, but bee behavior problems may not be an important consideration in the future. Behavior modification by genetic alteration may not be so unattainable as once thought.

It is sufficient to say that honey bee behavior has had a pronounced effect on the number of individuals who have difficulty accepting the idiosyncrasies of their behavior. Handling sometimes-testy bees is an acceptable task for beekeepers with acquired skills and tolerance for proper handling. In the future, what will be most important is our ability to maintain and improve relationships with a sometimes intolerance and occasionally hostile public. 

Larry Goltz is the former Editor of Bee Culture, and a sideline beekeeper in Redding, CA.



"No, I'm not out jogging . . . I upset the beehive."

Questions?

Readers please note: Questions not accompanied by a stamped envelope do not receive a direct response.

TMite Terminator?

Q I have read that tracheal mites can be controlled by putting a sheet of newspaper over the brood nest and soaking it with cooking oil. The bees then chew away the newspaper, thus distributing small amounts of the oil through the colony. Is this correct?

F. B. Barrett
Springport, IN

A This is an effective way of getting traces of oil distributed through the colony and thus temporarily reducing tracheal mite infestation, but the shortcoming of this method is that it is only temporary. Grease patties, made by mixing sugar and vegetable shortening, last much longer and are thus more effective. No such procedures eliminate all the mites; they merely reduce their numbers.

How Hot To Heat?

Q I have an insulated box for warming honey similar to those described in the November Bee Culture, except that mine holds only one bucket and is heated with two 75-watt bulbs. Is it possible to overheat the honey by this method? How hot should it be allowed to get? And should you check the temperature of the air in the box or the honey itself?

Noah Schrock
Middlebury, IN

A A box holding two 5-gallon buckets and heated with two 100-watt bulbs will certainly not overheat in 24 hours. Mine gets the honey up to a temperature that allows it to flow nicely without making it hot. I consider 130°F to be about maximum temperature for honey, but prefer that it be considerably less. A candy thermometer can

be put directly into the honey if you want an accurate reading.

Resistant Yugos?

Q Will Yugoslavian stock truly allow me to do away with menthol treatments?

Mitchell Drinnon
Sneedville, TN

A No. We do not have truly mite-resistant bees yet.

Black Bee Trial

Q I am considering trying the so-called black bee in my hives. Have you had any experience with this bee, and can you tell me where I can learn more about it?

Jeffery E. Mignot
Osceola Mills, PA

A The black bee was once native to the British Isles, but I believe it is no longer found there. You may be thinking of the Carniolan bee, which is very dark, and is a good honey producer. There are bee companies in this country that specialize in these, and their ads can be found in this magazine.

Balling The Queen?

Q What is the cause of balling? Can hive movements cause it?

Anas Dughman
Benghazi, Libya

A "Balling" refers to the manner in which the bees in a colony seemingly attack and destroy a queen. The worker bees attack her in such numbers they form a cluster or ball around her. That mode of attack is never directed against any other bee. If a foreign queen enters a hive that already has a queen she is instantly balled. Moving a hive does not normally cause it to occur, but occasionally gross disruptions will.

Why Did They Leave?

Q Two of my hives went into the winter of '95 with plenty of honey. Cold and snow came in November and lasted until January, when we got some warm spells. I then found that one of the hives had no bees in it, but there were scattered patches of brood, some with nearly mature dead bees in the cells. Outside this hive were many dead bees in the snow. Why would an entire population leave the hive after cold weather and snow had come?

Bill Garrison
Bountiful, UT

Evodia Update

Q Can Chinese Evodia seeds be planted in pots indoors in the Fall or Winter, and then transplanted outdoors in the Spring?

Many Readers

A No, that is not a good idea. The seeds need the conditioning of Winter cold before germinating, so they should be planted *outside*, in a garden or in pots, in Fall or Winter, or, if that cannot be done, the seeds should be kept in a freezer until Spring.

A These are the classical symptoms of tracheal mite infestation. Grease patties, that is, dollops of sugar and cooking oil mixture, mixed at about three parts granulated sugar to one part cooking oil, should be left in the hives, close to the brood chamber or cluster area, all year to keep mite populations low.

How Long Will They Last?

Q I bought Apistan strips from a bee supply dealer and when I asked him how long they would keep he said "indefinitely, as long as they are kept in a cool dry place and out of direct sunlight." Why, then, can't they be

reused? A beehive is dark and fairly cool in Spring and Fall.

**J.B. Barrett
Gaston, IN**

A Only the fluralinate that is on the surface of the Apistan strip is available for mite control, and once the strip is in the beehive the surface ingredient begins to disappear. Essentially, it is rubbed off onto the bees by their contact with it. After a couple of months the strips are relatively ineffective after they have been used in the hives.

Dig That Beat!

Q Gene Stratton Porter's book *Keeper of the Bees* mentions a "bee drum" to gather swarms. What is it?

**Windy Kshywonis
Wooster, OH**

Answers!

Richard Taylor

INNER ... Cont. From Pg. 6

another. Both produce a specific queen for a specific need. And there's more needs out there. Lots more.

But these programs aren't cheap, or easy. Big time funding is needed to begin and maintain one of these that must come from within this industry. Either a group of producers will get together, the industry will fund an organization to do the work, or some real smart already-producer will undertake the project.

It will happen. It must happen. We can no longer afford to do things the way our grandparents did.

If you raise queens to sell, or just for your own use, is just O.K. good enough anymore? I don't think so, neither should you, and your customers definitely won't. Be prepared.

Two short items. First, does your association have a plan for next year? Whether you meet four or eight or 12 times a year, you should have some plan of action. Minimum *why* are you having each meeting. If you don't

have a well defined answer to that question, stop right now and get one. If you don't have a reason, why should anyone attend? "Just because," isn't reason enough. Nor is, "We always meet then."

If you're a club leader, then lead. Schedule topics to cover, speakers to speak, things to do, places to go - reasons for people to come to your meetings.

The plan? Lay out your schedule, first. And *NOT* the first Wednesday of the month. Give dates, time and place. For *every* meeting. Just because *you* know where the back door to the library basement is doesn't mean that new member does who started in the middle of the year.

Topics? Well, for starters, think seasonal. Spring things *before* Spring. Summer things *before* Summer . . . simple, right? Other topics? What about all the *other* things beekeepers do, like candles, selling honey, honey plants, honey tasting . . . This is a *long* list.

The plan, written down *now*, and given to each member and every *new* member will make your life easier, keep your members informed and

A It was once erroneously believed that a swarm of bees would come down in response to beating on pans, etc. I believe the author is referring to this once common practice.

Questions are welcomed. Address them to: Dr. Richard Taylor, Box 352, Interlaken, New York 14847, enclosing a stamped, addressed envelope.

BEE TALK ... Cont. From Pg. 52

ing what it was. I like it all right, though it is a bit strong, and there is a bit of bite to the taste. I think it should be blended with other honeys, and that it would probably improve the flavor of those that are somewhat bland, like clover and alfalfa, two of our major sources.

Incidentally, I am still happy to send out Evodia seeds, as time permits, to anyone who will follow the directions - three loose stamps and an address label, nothing else. **EC**

Richard Taylor is a philosopher & lifelong beekeeper who lives in the Finger Lakes region of New York.

interested, and give new members and every member for that matter, a *reason* to come to your meeting.

Second item. Magazines deal with the Post Office for a living. So do people who ship package bees through the mail. We both have some wonderful, and some terrible tales to tell. But in all fairness, the *people* who work for the Post Office are, for the most, the best part of the system. And magazines, and package producers must deal with the people, and the system. And that system managed to deliver several *billion* pieces of mail last year, mostly to the right places, and on time. And, they made a profit of several million dollars doing it.

So if you have a delivery problem, remember that almost all the bees delivered each year manage to do so without a hitch. Be patient. The USPS isn't perfect, but then, neither is democracy, but they're both better than anything else that's similar.

Kim Flottum

Gleanings

JANUARY 1997 • ALL THE NEWS THAT FITS

Florida's Ulee Jackson BEEKEEPER OF THE YEAR

Ulee Jackson is Florida's 1996 Beekeeper of the Year. This prestigious title was awarded at the Florida State Beekeepers Association convention in Gainesville, Florida. Many familiar with the industry in Florida and elsewhere may not recognize Mr. Jackson's name as prominent in the beekeeping arena. That's because he is a fictional character played by Peter Fonda in an upcoming Orion picture release, "Ulee's Gold."

Although not a "real beekeeper," Ulee Jackson as Florida's Beekeeper of the Year may do far more for the beekeeping industry than other apiculturists who might have qualified for the award. By showing the lifestyle of the average beekeeper on the silver screen, Ulee Jackson may cause many more citizens to appreciate this unique avocation.

Perhaps Deputy Commissioner Carl Carpenter, Florida Department of Agriculture and Consumer Services (FDACS) said it best at the recent Florida State Beekeepers Convention in Gainesville, Florida: "Thanks to the movies, there are many fictional characters who have become part of popular culture; Forrest Gump, Captain Picard, Mickey Mouse . . . to name a few. Many times, people learn as much from movies and television as they do from school. Generations of beekeepers who have cultivated bees, harvested honey and contributed so much to FL are a real mystery to us. Ulee Jackson will probably change all that. This movie, "Ulee's Gold" that celebrates and illuminates the life of a beekeeper - however fictional - has touched a common chord. Beekeeping is not just a profession - it is a way of life. It takes patience, dedication, and a true love of what you do. In this day and age, that life seems more fiction than fact."

Although the real Ulee Jackson was not available to accept the award, his actor alter ego, Peter Fonda, was.



Peter Fonda

Taking in both the traditional fish fry and banquet, Mr. Fonda took these events by storm. Most found that he inhabited the character of Ulee Jackson so well that if the paparazzi had not been around, his celebrity would have gone unnoticed. His presence at the banquet was also an economic boost to the association as participants eagerly snapped up everything from Afghans to honey personally autographed by the actor. In addition, the crowd was offered a preview of the film by the director Mr. Victor Nunez, who also was present.

Honey Bee Research EAS FOUNDATION

The EAS Foundation for Honey Bee Research is a competitive grant program developed from donations received from beekeepers and others interested in funding research on topical problems in honey bees. Proposals are hereby solicited with awards to be announced at the 1997 annual meeting. Awards should be considered "seed money" to provide investigators the opportunity to collect preliminary data or as "add on" funds to combine with other funding sources to continue present research. Students working on degrees may find these funds especially appealing as they seek to complete graduate degrees. These grants may be used for supplies, equipment, salaries, travel or other appropriate uses by the recipient.

EAS will award two grants of \$2,000 each in 1997 at the annual banquet. Awards will be determined by July 14, 1997 with funds immediately available. Deadline for application is May 24, 1997. For information regarding proposal submission criteria contact: EAS Foundation for Honey Bee Research c/o Loretta Surprenant, EAS Secretary, Box 300A, County Home Rd., Essex, NY 12936

The Eastern Apiculture Society of North America awarded two \$1,500 grants to honey bee researchers at the 1996 Annual Conference in

Harrisonburg, VA. Research proposals submitted by Dr. Scott Camazine, Department of Entomology, Penn State University and Dr. Gard W. Otis, Department of Environmental Biology, University of Guelph were selected from a number of highly competitive requests for funding submitted in 1996. Scott Camazine's research concerns "A new Method of Menthol Application for the Treatment of Tracheal Mites" while Gard Otis' research focuses on "Selection for Varroa Resistance Based on Short Postcapping Duration of all Bee Castes."

The EAS Foundation for Honey Bee Research is a competitive grant program developed from donations received from beekeepers and others interested in funding research on honey bees. These awards are "seed money" which provide investigators the opportunity to collect preliminary data or to combine with other funding sources to continue ongoing research. Students working on degrees may find these funds especially appealing since grants may be used for supplies, equipment, salaries, travel or other appropriate uses by the recipient.

For information regarding proposal submission criteria or how to make a tax deductible contribution to the EAS Foundation for Honey Bee Research contact: Loretta Surprenant, EAS Secretary, Box 300A County Home Rd., Essex, NY 12936.

Send Your Meeting Notices To
Bee Culture At Least Two
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Publish Them.

Insects To Detect Chemicals BEES PUT TO WORK

They're busy as well as bees, and the Army spies on their every move, counting their comings and goings, sniffing them, even gauging the amount of wind generated by their wings.

Thousands of honey bees have been put to work at the Aberdeen Proving Ground, enlisted as environmental monitors to detect traces of escaping chemical weapons at one of the nation's most toxic dump sites.

Their mission: Simply to do what bees do, buzzing from flower to flower, gathering nectar and pollen and, inadvertently, particles of everything else they happen to touch.

"A honey bee is probably nature's most superb monitor of materials," said Jerry Bromenshenk, a University of MT biologist who designed the project for the military base near the top of the Chesapeake Bay.

"You've got a little flying fuzzy creature with electrostatically charged hairs," he said. "They're like flying dust mops."

The trick is shaking out the dust. In a half-dozen previous projects at other contaminated sites, Bromenshenk periodically vacuumed bees from their hives, ground them up and studied their remains.

This project is more sophisticated, with 14 beehives enclosed in wooden boxes shaped like two-drawer filing cabinets that are loaded with high-tech instruments.

Researchers periodically draw air from the hives through tubes loaded with carbon filters that trap volatile chemicals.

"We look for the strange and unusual, or the increasing or new chemical in the hive," said Bromenshenk, who wear a bee-patterned tie.

More specifically, they're looking for evidence of chemicals that have been produced at the installation's Edgewood Area since World War I. The Environmental Protection Agency added the area to its Superfund cleanup list in 1990.

SPRAY COULD REPEL BEES

A co-op agreement between the USDA ARS and Consep, Inc. of Bend, OR, to develop a spray that would immediately repel attacking bees, including highly defensive Africanized honey bees has been made. Small canisters of a safe, non-toxic, pleasant smelling bee repellent could be handy protection for letter carriers, meter readers, utility and

construction workers, campers and others. The bee spray being investigated by ARS scientists has as its major ingredient a mimic of a natural repellent that queen bees produce to keep worker bees out of their way. Africanized bees invaded the United States a few years ago via Mexico. They now are found in Arizona, California, New Mexico and Texas.

WEATHER TRIGGERS IN WEEDS...

A two-year study of several weed species from OH to CO and MO to MN showed each species has a different weather trigger that prevents seeds from sprouting. Scientists found this trigger an important reason why weed sprouting varies each Spring, typically from one- to 100 percent of the buried seed. For example, if the top inch of soil warmed to about 90°F for only a single day in April, giant foxtail seeds went into dormancy, refusing to sprout for the

rest of the season. Dry soil in the Spring induces a similar all-season dormancy for pigweed seed, which is why pigweed was a major problem in areas with a wet Spring this year, such as west central MN. The discovery helps the ARS weed simulation computer model, called WeedCast, more accurately forecast each weed season. The forecasts can be used with the WeedSim model that helps farmers reduce herbicide use by advising them when it's not needed.

...AND ON THE INTERNET

Scientists are working to put the model on the Internet so farmers worldwide can generate forecasts by typing in local weather data. ARS is also putting the model on computer disks. The forecasts can also be used with the WeedSim model which advises farmers if and when to use herbicides based on predicted weed emergence and subsequent growth.

Minnesota field tests with corn and soybeans over the past four years have shown that these predictions can cut herbicide use by more than two-thirds - a potential savings of \$20 an acre. The tests show that a little extra weediness at certain times does not hurt yields. WeedCast forecasts on the Internet are at: <http://www.mrsars.usda.gov>.



HIVE MANAGEMENT
A Seasonal Guide for Beekeepers
RICHARD E. BONNEY

HIVE MANAGEMENT

by Bee Culture Popular Contributor
Richard Bonney

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?Do You Know? Answers

- True** The almond flower is self-incompatible. A pollen tube of a flower of the same tree, the same variety and sometimes of certain other varieties will not grow down the style, leading to pollination. A profitable almond crop depends upon the cross pollination of practically all flowers. Only the bees that carry pollen from the flower of one variety to another receptive flower of a different variety contribute to fruit set.
- False** The primary reason that isomerized corn syrups are fed to honey bee colonies to supplement food supplies is that the syrups are cheaper than sugar. Economics, not nutrition, are the primary reason for using the isomerized corn syrups.
- True** Isomerized corn syrups are made by converting starch to glucose and then some of the glucose to fructose. Since the final product contains both glucose and fructose, its composition is similar to that of honey.
- False** Several studies have shown that Terramycin® is relatively unstable in honey and syrup solutions, therefore, it is normally mixed with powdered sugar and dusted over the tops of brood combs.
- True** Swarm preparations are less frequent among colonies with queens reared in the current year than among those queens of the previous year. Queens either produce less queen substance as they age or enter a cycle of production with periods of lowered secretion that are more conducive to swarming.
- True** In the fall, honey bees normally cluster between the combs near the bottom of the stored honey. During the winter, bees gradually eat their way upward between the combs and are normally found in the uppermost hive body by spring. Since heat rises, this is the warmest part of the hive.
- False** Chalkbrood affected larvae are normally found on the outer fringes of the broodnest

where sufficient nurse bees are unavailable to maintain broodnest temperature.

- False** *Varroa* mites have a definite preference for drone brood over worker brood for reproduction. This preference is believed to be associated with the longer life cycle of drones, giving the mites a longer time to complete development. This preference is also possibly related to the amount of food required by drone larvae or lower temperatures found in the outer regions of the broodnest.
- False** Female *Varroa* mites feed on the blood of larvae, pupae and adult honey bees. The male mites are incapable of feeding as the anterior pair of appendages (chelicerae) are modified for sperm transfer rather than obtaining food. Mating occurs in the brood cell before the female mite emerges and the males die after copulation.
- E) *Apis cerana*
- C) Menthol
- D) Fly
- E) *Varroa* Mites
- Colony swarms
Colony absconds
- Calms the bees
Drives the bees downward
- The jar only holds a quart of

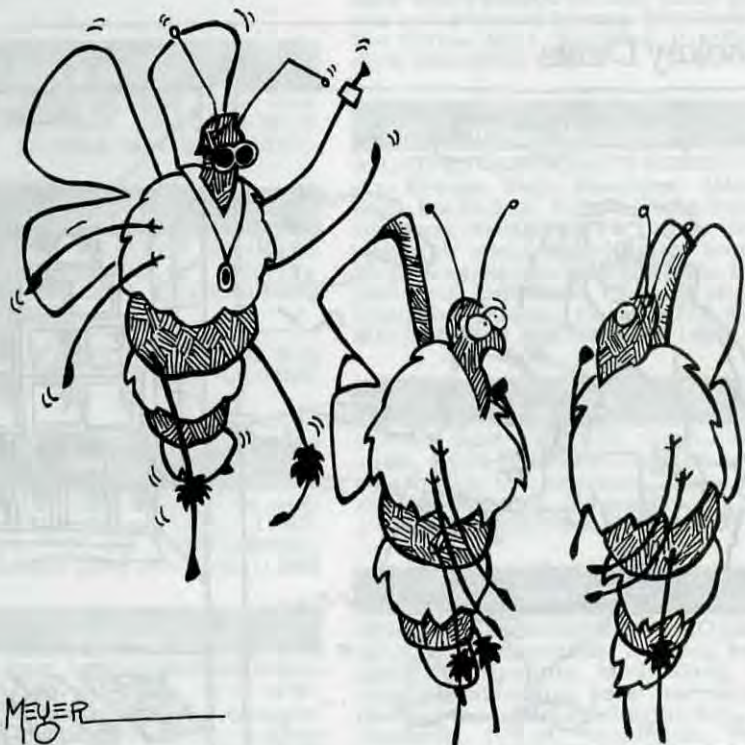
syrup, whereas a colony in need of supplemental feeding probably requires several gallons of syrup. Bees will probably not collect syrup from it on cold days or at night.

Boardman feeders may leak and attract other insects such as yellow jackets or robber bees.

- B) Isomerose 900
- A) Isomerose 100
- B) Isomerose 900
- A) Isomerose 100
- Getting brood and used combs increases the potential of transferring bee diseases. Exchange of used equipment or need to return equipment after nucleus colony has been transferred into your own equipment. Shipping of nucleus colonies is difficult; brood care, temperature, size etc.

There were a possible 25 points this month. Check table below to determine how well you did. If you scored less than 12 points, do not be discouraged. Keep reading and studying- you will do better in the future.

Number Of Points Correct	
25-18	Excellent
17-15	Good
14-12	Fair



"I couldn't tell, was that a right or a left?"

BOOKS & NEWSLETTERS

AN EYEWITNESS ACCOUNT of Early American Beekeeping by A.I. Root. The pioneers of beekeeping as close your bookshelf. Cat. No. X1, \$3.69 postpaid. The A.I. Root Co., 1-800-289-7668. (TF)

PERIODICALS

RURAL HERITAGE - bi-monthly magazine in support of farming & logging with horses, mules, & oxen. Sub. includes THE EVENER Workhorse, Mule & Oxen Directory; \$22 for 6 issues; sample \$6. Rural Heritage, 281-B Dean Ridge Lane, Gainesboro, TN 38562.

WANT INFORMATION ON EXOTIC animals & the marketplace? Subscribe to *Wings & Hooves*. \$16 yr. Dept. 1, Rt. 1, Box 32, Forestburg, TX 76239-9706.

THE SCOTTISH BEEKEEPER. Magazine of The Scottish Beekeepers' Assoc. Rates from D.B.N. Blair, 44 Dalhousie Rd., Kilbarchan, Renfrewshire, PA 10 2AT, Scotland, U.K. Sample \$1.

DIE NEUE BIENZUCHT Monthly magazine for beekeepers interested in German beekeeping. Hamburger Str. 109, D-2360 Bad Segeberg, West Germ.

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SCOTTISH BEE JOURNAL. Monthly magazine. Sample copy from Robert NH Skilling, FRSA, 34 Rennie St., Kilmarnock, Scotland. \$4. per annum.

BEE CRAFT - Monthly journal of British Beekeepers Assn. Sub., including postage is £13.68 surface mail to L. Connor, P.O. 817, Cheshire, CT 06410.

THE AMERICAN BEEKEEPING FEDERATION needs your support in efforts to stop adulteration, improve marketing conditions and encourage research on African Bees and Varroa and Acarine Mites. For information, membership application and sample of bi-monthly News Letter write to: THE AMERICAN BEEKEEPING FEDERATION, INC., P.O. Box 1038, Jesup, GA 31545-1038.

IRISH BEEKEEPING. Read *An Beachaire* (The Irish Beekeeper) Published monthly. Subscription \$15.00/year, post free. Mr. Seamns Reddy, 8 Tower View Park, Kildare.

THE AUSTRALASIAN BEEKEEPER. Published monthly by Pender Beekeeping Supplies Pty. Ltd. Send request to: The Australasian Beekeeper, PMB 19, Maitland NSW 2320, Australia. Sub. \$US 27.00 per annum, Surface Mail (in advance). Payment by Bank Draft. Sample free on request.

RARE BREEDS JOURNAL. Bi-monthly journal about exotic, minor & rare

breeds of domesticated animals & their owners. \$18.00 (U.S.)/year, \$24.00 Foreign; \$2.50 for sample copy. Rare Breeds Journal, Dept. Bee, HCR 1, Box 45, Hebron, ND 58638 (701) 878-4970.

BRITISH BEE JOURNAL. Monthly single copies 33p + postage. \$15./yr. U.S. Annual subscription postpaid. Sub-agent: 46 Queen St., Geddington, NR Kettering, Northants, NN14 1AZ, Eng.

Bee interested. For beekeeping information read the *AMER. BEE JOUR.* New editorial emphasis on practical down-to-earth material, including question & answer section. For information or free copy, write to: AMERICAN BEE JOUR., Hamilton, IL 62341.

THE AUSTRALIAN BEE JOUR. Monthly. SeaMail \$30. (Aus.). AirMail \$50. (Aus.). Write to: Victorian Apiarists' Association Inc., Editor, Judy Graves, 23 McBride Rd., Upper Beaconsfield, Victoria, 3808, Australia. Sample \$3 (Aus.) on request.

ANIMALS EXOTIC & SMALL The premier journal of the Exotic and Miniature animal industry. Subscriptions \$10.00/one year, \$19.00/two years, \$29.00/three years U.S. MasterCard, Visa, American Express and Discover welcome. AES, 1320 Mountain Ave., Norco, CA 91760-2852 (909) 371-4307 FAX (909) 371-4779 e-mail AES01@aol.com.

THE NEW ZEALAND BEEKEEPER. Published 11 times a year Feb - Dec. by the National Beekeeper's Association of NZ. Write for rates & indicate whether airmail or surface mail. NZ BEEKEEPER, Farming House, 211-213 Market Street South, P.O. Box 307, Hastings, NZ.

SOUTH AFRICAN BEE JOURNAL. The official organization of the S.A. Federation of Bee-Farmers' Associations. Published bimonthly in English & Afrikaans, primarily devoted to the African and Cape Bee races. Subscriptions including postage (six copies). 1995 all subscribers outside of South Africa R100-00 surface mail, payment made in S.A. Rands. NB. Sample copies available on receipt of a donation. P.O. Box 41 Modderfontein, 1645, South Africa.

INDIAN BEE JOURNAL: International in appeal; keeps you updated with beekeeping developments in India and the world. Issued quarterly. Publishes research on Asiatic honey bees, tropical apiculture and pollination. Solicits your support and welcomes your subscriptions. Annual Subscription (foreign; including surface mail): U.S. \$20 for individuals and U.S. \$40 for institutions, by Bank Draft payable in Pune (India) drawn in favour of *Indian Bee Journal*, Pune and sent to Dr. K.K. Kshirsagar, Editor, 1294 Shukrawar Peth, Pune 411 002, India.

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BOTTOM... Cont. From Pg. 64

less and less practicable. He believed most emphatically in mixing business and religion - in conducting business on Christian principles; or, to adopt a modern phrase, doing business "as Jesus would do it." As might be expected, such a policy drew an immense clientage, for people far and wide believed in him. But how few, comparatively, in this busy world, go beyond the practice that honesty is the best policy! While A.I. Root believed in this good rule he did not think it went far enough, and, accordingly, tried to adopt and live the Golden Rule.

The severe strain of long hours of work, together with constantly failing health, compelled Mr. Root to throw some of the responsibilities of the increasing business on his sons and sons-in-law. This was between 1886 and 1890. At no definite time could it be said that there was a formal transfer of the management of the supply business and the management of the bee department of *Gleanings* to his children; but as time went on they gradually assumed the control, leaving him free to engage in gardening and other rural pursuits, and for the last 10 years he has given almost no attention to bees, devoting nearly all his time to travel and to lighter rural industries. He has written much on horticultural and agricultural subjects; indeed, it is probable that he has done more writing on these subjects than he ever did on bees.

Mr. Root, ever since his conversion in 1875, has been a most active working Christian. No matter what the condition of his health, he is a regular attendant at church and prayer-meetings. He takes great interest in all lines of missionary work, and especially in the subject of temperance. He annually gives considerable sums of money to support the cause of missions, and to the Ohio Anti-saloon League; and now that the heavier responsibilities of the business have been lifted from his shoulders he is giving more and more of his time and attention to sociological problems. - E.R. Root, 1905

Published in the 1905 issue of ABC & XYZ of Bee Culture.

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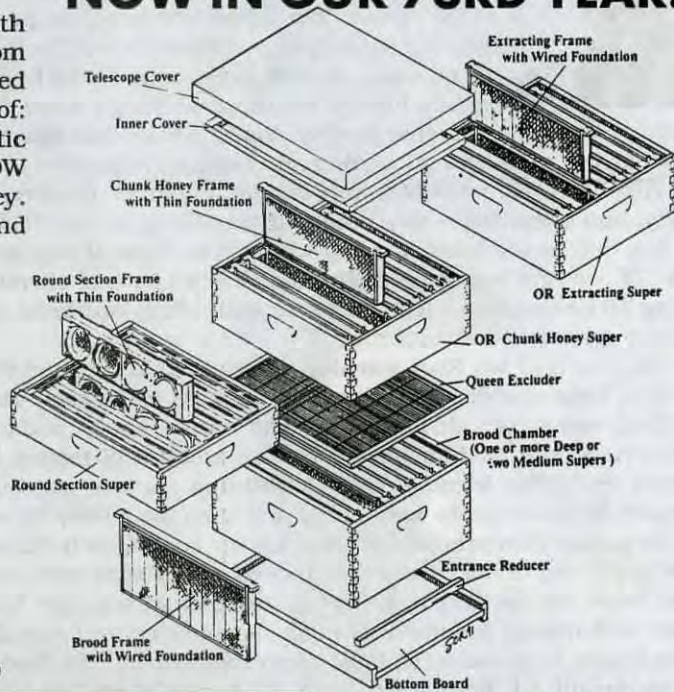


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I. Root was born in a log house, in December, 1839, about two miles north of the present manufacturing plant of The A.I. Root Co. He was a frail child, and his parents had little hopes of raising him to manhood although some of the neighbors said his devoted mother would *not let him die*. As he grew older his taste for gardening and mechanics became apparent. Among his early hobbies were windmills, clocks, poultry, electricity, and chemistry – anything and everything in the mechanical line that would interest a boy who intensely loved machinery. Later on we find him experimenting in electricity and chemistry; and at 18 he is out on a lecturing-tour with a fully equipped apparatus of *his own construction*.

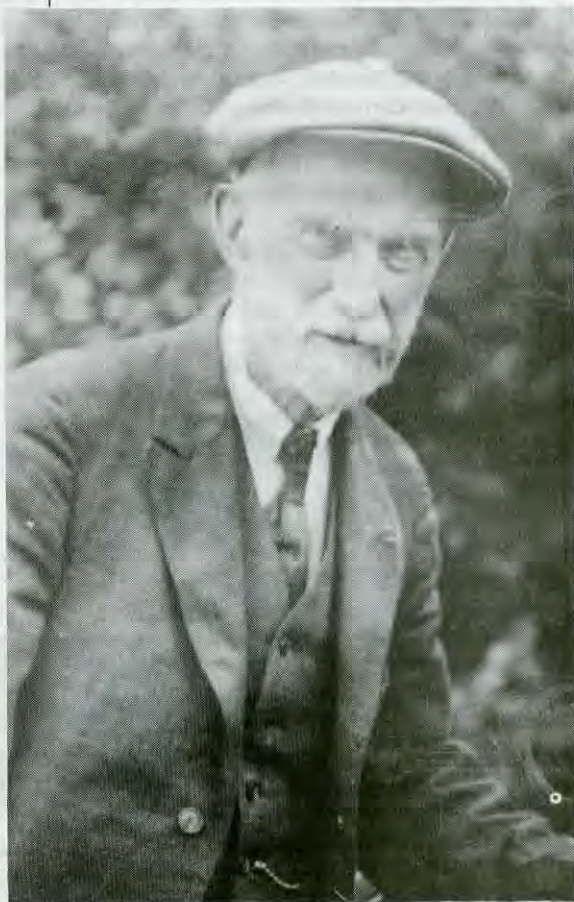
We next find Mr. Root learning the jeweler's trade, and it was not long before he decided to go into business for himself. He accordingly went to an old gentleman who loaned money, and asked him if he would let him have a certain amount of money for a limited time. This friend agreed to lend him the amount, but he urgently advised him to wait a little and earn the money by working for wages. This practical piece of advice, coming as it did at the very beginning of his career, was indeed a God-send and, unlike most boys, he decided to accept it. Imbued with a love for his work, and having indomitable push, he soon *earned* enough to make a start in business without borrowing a dollar. The business prospered till A.I. Root & Co. were the largest manufacturers of *real* coin-silver jewelry in the country. From \$200 to \$500 worth of coin was made weekly into rings and chains, and the firm employed something like 15 or 20 men and women.

It was about this time, or in 1865, that a swarm of bees passed over his shop; but as this incident is given so fully in other articles I omit it here. Not long after he became an ABC scholar himself in bees, he began to write for the *American Bee Journal* under the *nom de plume* of "Novice." In these papers he recounted a few of his successes and many of his failures with bees. His frank confession of his mistakes, his style of writing, so simple, clear, and clean-cut brought him into prominence at once. So many inquiries came in that he was finally induced to start a bee-journal entitled *Gleanings In Bee Culture*. His business grew to such a size that the manufacturing plant alone covered five acres, and employed from 100 to 200 men.

As an inventor Mr. Root has occupied quite a unique field. He was the first to introduce the one-pound-section honey-box, of which something like 50,000,000 are now made annually. He made the first practical all-metal honey-extractor. This he very modestly styled the "Novice," a machine of which thousands have been made and are still made. Among his other inventions may be named the Simplicity hive, the Novice honey-knife, several reversible frames, and the metal-cornered frame. The last named was the only invention he ever patented, and this he subsequently gave to the world long before the patent expired.

Some of the secrets of his success in business may be briefly summed up by saying that it was always his constant aim to send goods by return train, and to answer letters by return mail, although, of course, as the business continued to grow this became

Continued on Page 62



A.I. Root, A Biography

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