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NOVEMBER 1983

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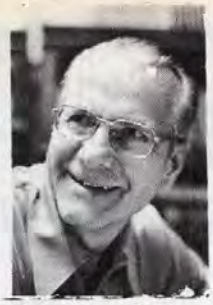
John Root



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GLEANINGS IN BEE CULTURE

Since 1873

November 1983 (ISSN 0017-114X) Vol. 111, No. 11
Created to Help Beekeepers Succeed
111 Years Continuous Publication by the Same Organization

Contents

Cover Story

For many beekeepers, November is a time for assessing the season past and preparing for the upcoming needs of next year. This month's stark, black and white cover photo portrays the atmosphere of a beekeeping world in repose and waiting.

NOTES FROM THE BEEYARD

GLEANINGS RESPONDS TO READERS' REQUESTS

In April of this year, we began experimenting with new promotional projects and format changes for GLEANINGS. Although all of that is still in the process of becoming a more permanent way of doing things, we are pleased with what has happened so far. For instance: since April, our circulation has been increasing at a rate much more than we evened hoped for. Several months, we've leaped ahead by more than a thousand new subscribers. Obviously, that gladdens us, but it also makes us try even more to give our growing number of readers what they want. We are very aware of our responsibilities to you folks. We appreciate your patronage, and we intend to repay you with helpful articles and all that you need to succeed as beekeepers.

EASIER TO READ TYPE AND STILL MORE READING PER ISSUE!

One of our earliest changes, this past spring, was to reduce our type size as a way of giving you up to 35 per cent more actual reading per issue of GLEANINGS. We've heard from many of you who appreciated the extra information. But, we also heard from some readers who had difficulty reading the smaller type face. Well, we think we've solved that problem and can still offer you more reading than you were getting prior to 1983. We recently purchased a new typsetting machine. For those to whom it means anything: it's a Compugraphic MCS 8400. We're quite proud of it, not only in that the machine represents sophisticated state-of-the-art, but because it gives us much greater flexibility as publishers. It may be a few months yet before you see anything close to drastic changes in the way GLEANINGS looks, but good changes are coming. One change that you can notice with this issue, is that we've begun to use a different type style -- it is more open than the old style. Plus, we've increased type size and spacing just enough so that we are sure you'll all be able to read it without any trouble. Despite all that, you'll still be getting more and better reading with each GBC issue.

We all want to thank you for your feedback, suggestions and ideas about how to improve GLEANINGS. We work well together.

Every beekeeper, with the possible exception of those lucky enough to talk someone else into doing the job, has discovered the frustrations of putting frames together. Those who can never seem to pound a nail straight, end up with frames that bristle like porcupines. Nails puncture fingers, hammers crash down on misplaced thumbs & the elusive frames slip and slide out of grasp like greased weasels.

For those of you who need a little help in frame assembly, we present the following frame jig -- or frame holder, if you prefer to call it that. Years back, many more bee supply manufacturers offered this item in their catalogs. The fact that many no longer do, shouldn't stop you from making your own. Surprisingly few folks do, but it's really quite simple and can be built from odds and ends left over from other jobs.

Basically, the frame jig consists of these parts:

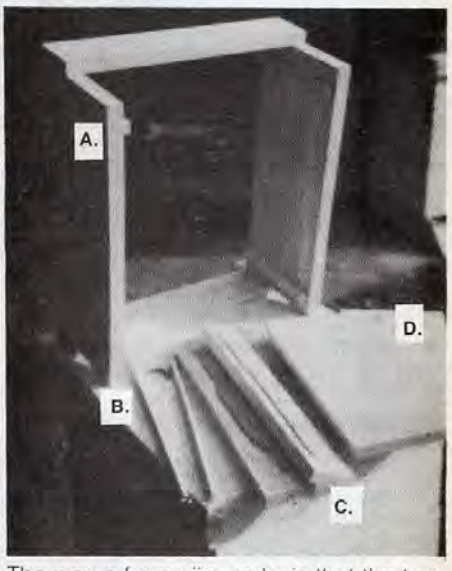
---Two side boards 15/16th x 7½ x 17-7/8ths
---Four End Boards ¾ x 16-1/6 x 3
---Two Insert Boards ¾ x 6-7/8ths x 14 1/8th

DOING A JIG: FRAME JIG, THAT IS!

---Four wedges for holding insert boards in place ½ x 5/8ths x 7
---Two 16 inch screen door springs
---4 eye screws
---Two pieces of weather stripping 1¼ x 13½
---Two 2½ inch box hinges (optional)
---Assorted nails

Some variation in size is possible. For example, the end boards on the jig we're showing come an inch or so below the top of the side boards. Make the end board deeper if you want them to come up flush with the top of the sides. We used basswood and pine for our construction because those woods were readily available.

PHOTOGRAPH ONE shows the various parts of the frame jig. A. The assembled body -- the bottom 2 halves of the four end boards nailed to the side boards.B. Screen door springs. C. The two top halves of the four piece end board unit (note that these are lined on one side with the weather stripping). D. Two insert boards.



The way a frame jig works is that the two bottom end boards and two side boards are joined to form a box just slightly longer than a standard frame, but an inch or two shallower than a frame for a deep super (obviously, depth can be altered to accomodate medium or shallow frames).

NEXT STEP: Glue and nail the four insert holding wedge pieces (½ x 5/8th x 7) ver-

tically into place -- one on each inside end of the two side boards. Position them so as to leave 7/16ths of an inch between the wedge and the bottom end board. That is the space in which you will eventually be putting frame end bars for assembly.

NEXT STEP: Insert eye screws, one in the middle of each end of the two top end boards. Attach one spring, on each side of the box structure, thereby joining the two top end boards with the weather stripped sides facing in toward each other. Position these two top end boards above the two permanent bottom boards. As you will see (or can see by the photos), the two top end boards will be held snug into place by the springs. Hinges can be fastened between the top and bottom boards to keep the top boards from falling off if the springs are disengaged, but that is optional and we've found it to be relatively unnecessary.

NEXT STEP. It is now almost possible to see exactly how the jig will work. Your final construction step is to slide the two insert boards (¾ x 6-7/8 x 14-1/8) in the gap left between the end board sections and the insert holding wedges you previously affixed one to each end of the two side board sections.

PHOTOGRAPH TWO a top view of how the inserts are to be positioned. The right hand insert has been purposely left half way out to demonstrate how these boards fit between the ends and the wedges.

You are now ready to assemble frames. You need not detach the spring-held top end boards -- simply pull back on them, one at a time, and insert your frame end bars in the space between the insert boards and the top end boards. The weather stripping will help hold the frame end bars snug against the insert board. A jig with the dimensions described above will accomodate 10 frame end bars on each side. Next, apply glue to the frame end bars if you wish, affix frame top bars and procede to nailing them in place. You will immediately recognize the advantage of having this frame device hold your frames tightly in place. Not only can you nail together entire supers of frames in much less the time, but your effectiveness and assembly quality will be greatly increased. When top frame bars are solidly in place, simply turn the entire jig over. Frames will be pressed upward in their slots and the bottombars can then be put into place in the same manner as was employed for the top bars.

PHOTOGRAPH THREE shows an assembled jig with frames in place.

Our special thanks for help, on this project, to G. Heitkemper and Chas. Bruner of Sprucedale Gardens Apiaries, Prentice, Wisconsin, and R. Sales and C. Papp of Medina, Ohio.

BEE BEARDS & *Beauties*

photo by Wayne B. Dow

Several months ago, our brother editor, A.B. Ferguson of the SCOTTISH BEEKEEPER, good naturedly chided American bee publications for being recognizable by their everpresent display of either honey queens or bee beard photos. Of the two, said Brother Ferguson, "a beautiful girl's picture seems a more attractive sight than a photograph of an old beekeeper with a swarm hanging from his chin." Well, A.B., this photo of New Jersey honey queen, Susan Post, certainly bears your comment out to be true. This combination of bees and beauty should leave no doubt that this issue of GLEANINGS is thoroughly American!

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STATEMENT OF OWNERSHIP MANAGEMENT AND CIRCULATION (Act of August 12, 1970, Section 3685, Title 39, United States Code). 1. Title of publication: GLEANINGS IN BEE CULTURE. 2. Date of Filing: October 1, 1983. 3. Frequency of Issue: Monthly. A. Issues # 12. B. Price $10.35 effective Dec. 31, 1983. 4. and 5. Location of known office of publication, headquarters or general business offices of the publisher: 623 West Liberty St., Medina, Ohio 44256. 6. Names and addresses of publisher, editor and managing editor are: Publisher, The A. I. Root Company, 623 West Liberty Street, Medina, Ohio 44256; Editor Lawrence Goltz, Medina, Ohio; Managing Editor, John Root, Medina, Ohio. 7. Owner: The A. I. Root Company, Medina, Ohio. Stockholders: The A. I. Root Company, Medina, Ohio; Alan Root, Medina, Ohio; John Root, Medina, Ohio; Stuart Root, Medina, Ohio; David Root, Sebring, Florida; Elizabeth Judkins, Silver Bay, Minnesota; Katherine Warner, Kent, Ohio; A. T. Spitzer, Medina, Ohio; Lillian Williams, Medina, Ohio; Blake & Co., Medina, Ohio; Ethel Calvert, National City, California; Donald Demuth, London, England; Rebecca Gehring, Alhambra, California; Mildred Goldthwaite,Urbana, Ill., Warren & Robert Heyer, San Diego, Calif., Ruth Packard, Tustin, Calif.; Barbara Tweedle, Grand Cayman, British West Indies; Clark Cooper, Medina, Ohio; Millard L. & Ruth E. Warren, Eustis, FL. 8. The known bondholders, mortgagees, and the security holders owning or holding one percent or more of total amounts of bonds, mortgages or other securities are: None. 9. For completion by nonprofit organization authorized to mail at special rates (Sec. 132-122, Postal Manual); Not applicable. 10A. Total number copies printed (net press run); Average number copies each issue during preceding 12 months: 18,007. Actual number of copies of single issue published nearest to filing date: 24,105. 10B. Paid circulation. 1. Sales through dealers and carriers, street venders and counter sales; Average number copies each issue during preceding 12 months: 254. Actual number of copies of single issue published nearest to filing date: 190. 2. Mail subscriptions: Average number copies each issue during preceding 12 months: 16,515. Actual number of copies of single issue published nearest to filing date: 21,984. 10C. Total paid circulation. Average number copies each issue during preceding 12 months:16,769. Actual number of copies of single issue published nearest to filing date: 22,174. 10D. Free distribution (including samples) by mail carrier or other means: Average number copies each issue during preceding 12 months: 120. Actual number of copies of single issue published nearest to filing date: 120. 10E. Total distribution (sum of C and D): Average number copies each issue during preceding 12 months: 16,889. Actual number of copies of single issue published nearest to filing date: 22,294. 10F. Office use leftover, unaccounted, spoiled after printing: Average number copies each issue during preceding 12 months: 1,118. Actual number of copies of single issue published nearest to filing date: 1,118. 10G. Total (sum of E and F should equal net press run shown in A): Average number copies each issue during preceding 12 months: 18,007. Actual number of copies of single issue published nearest to filing date: 24,105. **Total paid circulation as of October 1, 1983 GLEANINGS IN BEE CULTURE: 22,174.** I certify that the statements made by me above are correct and complete. (Signed) Lawrence Goltz Editor.

The Monthly Honey Report

LAWRENCE GOLTZ

August 10, 1983

The following figures represent the current prices reported by beekeepers and packers over the country. They are based on reports from many states averaged out for each region. Where insufficient information is received no price is shown. The retail prices represent the price of each size jar.

Wholesale Extracted — **Reporting Regions**

Sales of extracted, unprocessed honey to Packers, F.O.B. Producer. Containers Exchanged	1	2	3	4	5	6	7	8	9
60 lbs. (per can) White	42.00	37.80	31.20		35.50	38.40	33.75	35.00	35.50
60 lbs. (per can) Amber	42.00	33.50	33.00		33.50	32.40	31.00	34.50	34.80
55 gal. drum (per lb.) White			.58	.58	.58		.55	.56	.58
55 gal. drum (per lb.) Amber			.50		.56		.52	.55	.54
Case lots — Wholesale									
1 lb. jar (case of 24)	28.50	25.00	25.85	26.50	26.50	24.00	25.00	26.25	26.50
2 lb. jar (case of 12)	27.50	24.00	24.25	26.10	25.00	23.50	24.50	25.50	25.60
5 lb. jar (case of 6)	30.00	27.60	26.25	29.50	28.00	28.00	26.50	27.50	27.45
Retail Honey Prices									
½ lb.	.90		.90	.83	.90	.90	.90	.89	.90
12 oz. Squeeze Bottle	1.50	1.20	1.45	1.35	1.35	1.40	1.35	1.42	1.28
1 lb.	1.50	1.40	1.55	1.52	1.55	1.49	1.45	1.75	1.50
2 lb.	2.70	2.60	2.90	2.69	2.60	2.49	2.70	2.65	2.60
2½ lb.	3.50							3.35	
3 lb.	4.00		3.88				3.69	3.95	3.65
4 lb.	5.00	4.95	5.89	4.99			4.49	4.35	
5 lb.	6.00	6.00	6.25	5.89	6.00	5.50	5.59	6.00	5.65
1 lb. Creamed		1.55	1.55	1.79				1.55	1.50
1 lb. Comb	2.25	2.25	2.25				1.60	1.85	2.25
Round Plastic Comb	1.75	1.75	1.85	1.49			1.45	1.75	1.65
Beeswax (Light)	1.25	1.15	1.30	1.30	1.30		1.25	1.20	1.25
Beeswax (Dark)	1.15	1.00	1.20	1.20	1.20		1.20	1.10	1.10
Pollination Fee (Ave. Per Colony)	24.00	20.00	25.50		20.00		17.50	22.00	25.00

Misc. Comments

Region 1

Dry weather was the cause of a very small crop in Connecticut. Cost of beekeeper's needs has made it bad for everyone who invested in bees this year. Wax prices are much too low, making rendering unprofitable. Some beekeepers may not harvest their crop to save feeding sugar.

Region 2

There have been disease outbreaks reported in New York State. Fewer inspections and more problems than normal. Some beekeepers who wholesale honey have complained about a weak market. Best goldenrod and other fall flower flow reported in last ten years in New York, good fall honeyflow in Pennsylvania. Overall, an above average year. Bees should require little feeding for winter. Honey sales slow in New York and below

average in Pennsylvania. Much needed rains in Maryland in September. Tulip poplar honey crop is light in color. Good prospects for fall honeyflow in Maryland.

Region 3

The overall yield for the year was good in Ohio. Excellent in the northern portion of the state but something less than average where the drouth was the worst. Excellent fall honeyflow where the rains came periodically in late summer. Honey sales good. Bees in excellent condition. Sales up at wholesale in Indiana. A good crop of finest honey in years. A good fall honey crop in Indiana. Generic honey of poor quality being sold in stores for under $2.00 for a two pound jar. Very little fall honey due to the drought conditions in central Illinois. Bees in fair shape going into winter. Some feeding will be necessary.

Region 4

Honey sales are fair in Minnesota. Colonies are presently in good condition but many may require feeding to make it through the winter. Cool, damp weather prevented foraging in September. There are many "deals" on honey available in the Minneapolis — St. Paul area, and where one might be justified in a $1.00 per case increase in the price of bottled honey, as reflected by the increase in government price supports. I feel lucky to be able to hold at previous level of pricing. The largest bottler in Twin Cities area claims to be able to get all the light honey he wants at 58 cents delivered with drums returned and additional premiums for deffered pay-

Continued on next page

ment. This seems below what one could get from the Commodity Credit Corporation.

The summer heat ended in early September in North Dakota. First frost on September 20-22. Crops in North Dakota vary with area and the rainfall, from 170 pounds to less than 90 pounds per colony. Average sunflower bloom went quickly due to hot, dry conditions.

Region 5

Weather very poor for bees in North Carolina during August and September, hot and dry. Brood rearing very slow. Sourwood honeyflow was good in only a few areas. Grocery store sales of honey has been slow during the summer. In Central and South Florida conditions have been too wet for bee flights but pepper bush and melaluka have bloomed profusely. Fall plants in good condition over most areas of the State. Spanish needle blooming well in September as well as goldenrod.

Region 6

Due to dry weather the fall honey crop does not look promising from goldenrod and aster. Some colonies may be short going into winter. Honey sales are holding up well in Tennessee with no changes in price. Bakery grade honey is moving well.

Region 7

Colonies gathered a surplus in July and August in East central Oklahoma, averaging 70 pounds per colony of light colored, good flavored honey. Best crop in several years despite hot, dry conditions. Bees in good condition. Rains in September helped fall honeyflow.

Eastern and central Texas have had above average rainfall and later nectar flows. Honey high in moisture, delaying extracting. Western Texas very dry. Honey crops generally average or below for year. Bees in excellent condition. Ample pollen from broomweed and queen's crown. Cotton honey crop was fair to average in west and central Texas. Honey sales at the retail level are good, but much of the commercial crop will go to C.C.C.

Region 8

Honeyflows have been spotty in Utah with some areas, marginal in other years, have been good this year. Most beekeepers report colonies in good shape to start winter. Because of late honey flow, extracting was delayed two to three weeks in Utah. Most areas of Arizona have above rainfall to date. Much of S.E. Arizona had a fair to poor mesquite flow. Dry conditions through August to late September. Season running about two weeks late. Increased rainfall helped fall honeyflow. Most bees in fair to good condition in Arizona. The honey crop in Montana is variable, good in places which had rain and poorer in other areas. In general, the crops were short. Late summer rains will help next year's plant growth.

Region 9

Average honey crop inOregon despite rainy and cool summer. Local honey sales are good as fall arrives in Washington state. Honey crop was fair to poor. Some areas averaging only 25 pounds per colony. Bees in good condition. Having lots of problems with bears this year as there are no berries for them to eat. Bees in good condition in California with higher than average populations. A small fall flow due to September Mexican tropical storms. Some swarming activity September 20-27th. Honeys sales direct to bakeries at .72 cents per pound with market fair to good. Some serious ant infestations in colonies with some damage to colonies.

Judging Beeswax in Honey Shows

by ROGER A. MORSE
Department of Entomology
Cornell University
Ithaca, N.Y. 14853

The beeswax exhibit is an important part of a honey show. Presenting a block of bright-colored, clean beeswax is a challenge for the beekeeper. Some shows include classes for beeswax products, especially candles, which may be rolled, dipped, or molded. Car, floor, and furniture polishes made from beeswax were popular in past years, but because the must be buffed to give a good shine, such waxes have been largely replaced by synthetic waxes which usually need no special treatment after application.

Most honey shows require a two-pound block of beeswax to be submitted. Larger blocks are more difficult to prepare. Blocks and candles are easy to judge because so much can go wrong in their preparation.

The Eastern Apicultureal Society uses an illustrated judging card, the same as that recommended and published by Mr. S.E. Bland when he was Provincial Apiarist for Saskatchewan in 1958. The design of the card and the assignment of points have been standard for many years and may precede that date.

The following factors are considered in the judgement of beeswax.

Color

Beeswax produced by honey bees is white, odorless and tasteless, yet the color we associate with beeswax is a bright canary yellow. The yellow color develops when the wax is contaminated by pollen and propolis. Beeswax used for show purposes, whether in block or candle form, is usually rendered from cappings or new comb. Beeswax made from old comb is dark and dull colored; it may be greasy from too much propolis, and if used for candles it will cause the flame to sputter or to burn in short bursts of bright light.

Most honey shows do not have a class for bleached beeswax, though bleaching is a simple process. The Romans bleached their beeswax several thousand years ago. Sun bleaching is the most popular method, which involves chipping or flaking the beeswax and exposing it to the sun, or exposing liquid wax in shallow pans. Beeswax varies greatly in its reaction to sunlight; it is difficult to bleach certain beeswaxes because of the contaminents they contain.

Cleanliness

Judges assign the greatest number of points to cleanliness. For commercial production beeswax is filtered, but this is usually not possible for beekeepers. The best way to clean beeswax for a show is by settling. If a container of beeswax is kept in an oven with the heat off and allowed to settle for several hours, it will become very clean. After the beeswax has hardened, one may chip off the bottom portion or pour the clear liquid off the top of the pan while it is still molten.

Uniformity of Appearance

Beeswax that is cooled rapidly or poured as a liquid into a cool container will appear layered in a cake. Air bubbles can become entrapped in wax that is cooled too rapidly. Slow cooling eliminates this problem.

Exhibitors use a wide variety of molds for shaping a cake wax. I believe the bread-shaped mold is the best, though wax molded in a round bowl also has an attractive

Continued on page 589

EASTERN APICULTURAL SOCIETY

JUDGE'S SCORE CARD

Event: BEESWAX Class: _____ Entry No.: _____

Point Scoring		Item	Judge's Remarks
30		Color	
35		Cleanliness (freedom from honey, propolis & other impurities	
20		Uniformity of appearance	
15		Freedom from cracking and shrinkage	
100			

Award: _____

Research Review

By DR. ROGER A. MORSE
Research Editor of Gleanings
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Braula coeca Found in Florida

James Hall, Apiary Inspector with the Florida Division of Plant Industry, found a single specimen of the wingless fly *Braula coeca* near Umatilla, Florida, last March. The fly is a harmless thing but superficially looks somewhat like the mite *Varroa jacobsoni*. Both are about the size of a pinhead and are thus easily overlooked. The *Varroa* mite poses a great threat to beekeeping worldwide and some consider it to be the most serious cause of bee disease. Thus it is important that specimens of unknown creatures seen in bee hives be collected and identified. The common name for *Braula coeca* is the bee louse.

Over the years the bee louse has been found in several other states: Alabama, Delaware, Illinois, Maryland, Minnesota, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and Wisconsin. For reasons we do not understand it is especially common in Maryland but not elsewhere. In that state sections of comb honey are often ruined by the fly larvae tunneling under cappings. I'm sure that if people searched long and hard that they could find *Braula coeca* in every state though it obviously is not a common thing. In Florida it was found on a queen. Several people, especially in Europe, have reported it is especially common on queens. There is no known method of control and probably none is necessary.

Dr. Howared V. Weems, Jr., of the Division of Plant Industry, has prepared a two-page mimeograph about the bee louse. It features two scanning electron microscope pictures of the insect. Several references are also included.

More on Braula coeca

After writing the above my curiosity about this insect was aroused and I read more. The best reference on the subject is the thesis by I. Barton Smith, now Maryland's chief apiary inspector. It has seven and a half pages of references for those wishing to pursue the subject. Smith wrote in 1978, "Bee lice were found in 28 percent of Maryland apiaries and 18 percent of the colonies examined. In apiaries with lice, 50 percent of the colonies contained lice." That's a real contrast to Florida where a single *Braula* was found. So far as I am aware *Braula* has been reported from New York State only once. Virgil Argo, a graduate student at Cornell in 1926, found a section of Buckwheat comb honey infested with *Braula* larvae. The honey had been produced by a beekeeper who lived about 30 miles south of Rochester, New York.

Why should Maryland be the center of the infestation in the United States? I cannot find an answer to that question but I am aware that *Braula coeca* has been present there for a long while. Dr. E. F. Phillips, who at the time was in charge of the bee research program in the U.S. Department of Agriculture, wrote in 1925 that "probably not more than 10 percent of the colonies [in Maryland] contain *Braula*, and it is noteworthy that some of the strongest colonies, and those producing good honey crops, are infested." Phillips mentions that Carroll County in Maryland was the center of the Maryland infestation but he also says it occurs, apparently commonly, in south-central Pennsylvania. Carroll County is still one of the four most highly infested counties in Maryland according to Smith. He found *Braula* in 11 of 20 counties where he searched for it. (I have a few extra copies of Phillips' 12 page bulletin on the subject that I would be glad to give to libraries.)

Phillips also mentions that the name bee louse "is not an especially appropriate one, since *Braula* is not a louse, nor does its behavior in feeding suggest even the loose use of the word as a common name." He continues that the name is firmly fixed in the literature in many languages and that there is not use in trying to change that fact.

The feeding habits of adult *Braula* are curious. The adults seem to prefer to congregate on queen bees, where their mating takes place. Several beekeepers have reported removing more than a hundred lice from a single queen. When the lice want to feed they move to those worker bees that are feeding larvae and migrate to the vicinity of the bees' mouth, where the motions of its feet, armed with bent claws, produces a tickling sensation, perhaps disagreeable to its host, but at least provoking some movement of the buccal organs, which slightly open and release a small drop of honey which the louse at once licks up."

The bee louse is apparently most abundant in the fall and the best place to look for it is on queens. Smith searched for it on bees working in the hive as well as on foragers and found it much less abundant on the foragers. Some of the European literature suggests the bee louse is most abundant in warm climates but its continued success in Maryland apparently means it can thrive in more temperate areas.

Braula coeca

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Bee Talk

by DR. RICHARD TAYLOR

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We always draw inspiration from the lives of exemplary men and women, but sometimes the manner of one's dying is even more inspiring. We lost a good beekeeper and a good man here the other day, when a long and cruel illness finally took away our friend Mort Mac Cheyne. Death is, of course, the fate of every one of us, but I do not think anyone has ever confronted it with more quiet courage and disdain than this man.

That is the way Mort did everything. Noble and generous deeds were the routine of his life, done with the casualness with which most of us walk across the street or sit down to read the newspaper. As I watched him the last two years of his life, concealing his suffering from others in every way he could, his enthusiasm undiminished by his waning strength, I often wondered what lay behind it. Perhaps, I speculated, he had religious beliefs that eased the dread of early death. Some people are convinced that they will never die at all, that death is really but a higher form of life. I could never convince myself of that comforting notion, and apparently, to his great credit, it had no place in Mort's thoughts either. Of course there is nothing wrong with religious beliefs, which I think most of us nourish in our innermost and often unspoken thoughts, but it is no mark of courage for someone to face death with serenity if he thinks that death is not even real. Someone who accepts his own approaching end as a total extinction, and does not fret, may be right or may be wrong, from the standpoint of theology. No one knows. But one thing is without doubt, that such a person is strong and noble.

Mort apparently never went to church, and I could find none of his friends who had ever heard him express any religious ideas. He spent his Sundays in a very characteristic way: Cutting wood, and doing similar chores, for two sisters who lived by themselves, both of them elderly and one quite lame. I believe he was never asked to do that, and certainly he never expected or took any payment. It was just the sort of thing he did, but never talked about. I cannot help thinking that God would look with approval on that use of the Sabbath.

Mort had a zest for life, and a love for living things, that made him a natural beekeeper. He was the kind of man who would abandon his own concerns to restore a fallen bird to its nest. He loved fishing, but sometimes loved the fish too much to destroy them. Landing a beautiful rainbow trout one day, a fish of spectacular size, he kept it alive and healthy in a bathtub for over a week, watching its changing colors, then finally returned it to the stream. Finding an injured Canada goose in the road, he took it home, and for weeks nursed it back to strength, then watched it fly off. That was his approach to life, and to living things, and he worked with his bees with the same tender compassion.

Morton Mac Cheyne gained his livelihood as a cook in a nearby hospital, and as a carpenter, and, more and more as he got older, as a beekeeper. His grandfather had kept bees, and Mort had a lingering fascination for them. When a widow offered him her late husband's two hives, Mort took them, and thereupon began a career of a great beekeeper and teacher of beekeeping. He had an expertise with the bees that is as rare as it is remarkable. The cleverness with which he equipped his honey house was matched by his skill in the apiary, where one got the impression that his bees were like personal friends to him. We all, beginners and old-timers alike, always watched with fascination when he demonstrated apiary techniques for our bee club. Those were among his happiest moments, being with the bees, and teaching others.

A year ago last August, when the bee club was having its annual picnic at my house, the suggestion was made that someone volunteer to give a beekeeping course for beginners the following spring. Mort instantly volunteered, and I'm sure the same thought was then in everyone's mind, that he would not still be living to do it, for he was very ill. Then, come spring, and with the help of another member, he threw himself into the role with the enthusiasm of a man at the peak of his strength, exactly as he had always done, and before long thirty novice beekeepers had signed up for his course. Coming to my house a couple of times for supplies, he was too weak to stand, but there was otherwise nothing in his behavior or talk to suggest that there was the least thing wrong. The beekeeping course was a stunning success.

His strength, of course, kept waning, but he kept up a demanding and painful therapy and surgery in the face of a totally discouraging prognosis. A routine medical examination, with no suspicion of any disorder, had long since disclosed cancer, and the progress of the disease had since then been merciless and inexorable. But it left untouched his courage and spirit. The talk always turned to bees when I and his other beekeeper friends visited him, and we sometimes went out back to watch the hive of gentle Carniolans he kept there. My last good visit with him was of course about bees.

The disease gathered speed after that, and when I visited him soon after, in the hospital, there was very little left. His speech was inarticulate, and I could not understand him, but his wife translated for me the last thing I heard him say, which was, that he knew a beekeeper who might want to buy some used five-gallon honey cans, in case I had any to sell. He went home a couple of days later, at his own insistence, where he died. He was fifty-one.

Bees and Gardens

Compassion or Practicality

The golden days of another autumn are here as this column is written, thankfully replacing the blistering heat of our pat summer, which left many gardens limp and almost lifeless. While many people unhestitently give their lawns extra water during hot, dry spells many do not extend the same indulgence to their gardens. Understandably, gardens are frequently located out of reach of "garden hoses", but even when gardens can be reached from available water sources there may still be a reluctance to water gardens. Municipal water is becoming expensive to use liberally and even well water on the premises may become short during protracted dry periods. Think back to the past summer during, hot dry times. Were your sprinkling devices used as much for the garden as for the lawn? Of course some people use no supplemental water for either lawns or gardens at any time of the year.

Some beekeepers also do not feed their colonies of bees. They must gather sufficient stores or starve. Like watering the lawn or garden, the decision to provide assistance during the time of stress lies with the individual gardener or beekeeper. Nature generally balances out her shortcomings and surpluses over periods of time, but the shortages of rainfall for gardens and stingy nectar flows may cause temporary hardships that could reduce the yields of gardens and cause bees to starve during the winter or following spring. The endurance periods of some plants and some colonies of bees are not always sufficient to allow survival until nature comes full cycle.

Commercial growers of vegetables and most commercial beekeepers have a somewhat different philosphy of plant and colony care based, perhaps, on their higher dollar investment in irrigation equipment and their bee operation. The analogy of giving supplemental care in the form of giving water and fertilizer to gardens and the extra feeding of colonies of bees may end when we compare the reasons. Gardeners may not feel the same compassion for plants suffering from water stress as does the beekeepers seeing bees on the verge of starvation. The same individual may respond differently to the two situations. We no doubt rate bees higher on the evolutionary scale than plants, although biolgically this is not a valid comparison. Bees rate higher, in our emotional attachments, because of the very human tendency to show compassion for creatures which exhibit acts which remind us of our own vulnerability and suffering under duress.

Are these acts of compassion or practicality? Call it what you wish but the fact remains that an individual's interpretation of his or her role as a beekeeper and/or gardener is often different. Comparisons can be confusing. The purpose of this discussion is aimed at giving a better understanding of attitudes in respect to responsibility for colony care during periods of stress; namely, supplemental feeding in the fall or spring. Should you, or should you not, feed bees to prevent starvation? Surprisingly, some beekeepers show little interest in the welfare of their bees after the honey harvest and even less should there be no surplus of honey to take. Actually, when the crop is short is when the bees need to be watched closely, and will probably need feeding in the autumn or spring. In the years of good harvests the bees will also fill their brood chambers, especially if there is a late season honey flow.

Compassion and practicality may be confused, understandably. Economic necessity comes into the picture when a commercial beekeeper cares for bees in a manner which will keep them not only alive but healthy and productive. Commercial beekeepers, dairymen, hog farmers or poultrymen would probably never agree whether the overriding concern is compassion or economic consideration when their charges are threatened. The distinction is hardly ever made and likely never thought about at the time; taking the proper measures to relieve the distress is simply a responsibility that goes with the profession of livestock husbandry.

In the role of professional beekeeper or herdsman, for example, compassion may be a consideration in the assumption of responsibility for the proper care of animals, and even plants, but it cannot interfere with the judgement where measures of economic necessity are called for. The commercial beekeeper in the far northern regions must kill off colonies of bees which would die during the long, cold winters. Doing this quickly and mercifully in the fall and beginning with packages in the spring is an act of economic necessity and has no relationship to lack of compassion. For some readers who may feel otherwise, this procedure is being modified by limited increases in overwintering using packing, indoor wintering and moving bees to more moderate climates. In some instances the bees which were targeted to be destroyed are salvaged and sent to apiaries further south, a sort of package movement in reverse.

Some beekeepers may be so hardhearted as to feel no compassion for a starving colony of bees, knowingly or otherwise neglecting them when they are short of stores going into the winter: Perhaps being responsible for their condition by having robbed them too closely of their reserves.

Compassion or practicality? Where does each begin and end? I guess every beekeeper and every gardener must make decisions which reflect a personal philosphy about the importance of each in dealing with bees and their care. Achieving the necessary balance in respect to circumstances determines who are beekeepers and who are—well, have bees.□

CORRECTION

In the September, 1983 issue of *Gleanings*, page 493, the fourth paragraph in the right-hand column of the article entitled "A Very Effective Honeybee Presentation For The Classroom", by Lenore Bravo should have read as follows:

"The room where—etc.

Also, the caption on page 493 was not of the author but of an aid in the Richmond, California schools.

We regret the ommission and error.

Capping The News

THE EDITORS

"Beekeeping Small Talk"

GAMMA RADIATION AS A CONTROL OF AMERICAN FOULBROOD

From THE APIARIST, A New Zealand Beekeeping Journal, comes an interesting report concerning the use of gamma radiation in controlling American foulbrood. Acording to the report, which was based on an address delivered by Michael Hornitsky, of the New Zealand Department of Agriculture, experiments conducted with the Austrailian Atomic Energy research establishment have shown that gamma radiation from cobalt 60 is a viable alternative to antibiotics (which don't cure foulbrood) and fumigation methods that have become suspect because of their toxicity to humans or the possibility of toxic residues. Apparently, tests were first tried in 1982, although anti-bacterial effects of gamma radiation were known more than 80 years ago. Gamma rays kill foulbrood at a dose of one megarad.

Citing economic advantages, the report pointed out that the current value of hives, without bees, is Australian $65.00, not including paint and assembly. The cost of irradiation is approximately $6.00 plus transportation -- an obvious reason for using this method as opposed to burning. The report does point out, however, that although gamma rays will kill AFB and nosema spores and eliminate wax moths, it will not eradicate all spores of Streptococcus pluton, the causative agent of EFB.

But, what about the health risks? The report claims that gamma radiation is not powerful enough to make materials radioactive -- that irradiation takes only a few minutes and equipment is ready for use in seconds with no radioactive residue. Effects of repeated treatments are cumulative, however, although no tests have shown the effect on material after ten treatments of one megarad each.

NO, IT'S NOT GLOW-IN-THE-DARK HONEY!

Rick Jackson of Dalton, Georgia, sent us a clipping from the ATLANTA CONSTITUTION that reported that scientists in Oak Ridge, Tennesse have discovered local insects, including honeybees, that are contaminated with radiation. Furthermore, say these unnamed scientists, the bees' honey is radioactive. It is only at the very bottom of the article that it is admitted that the same scientists see no danger posed by that radiation. This is yet another example of media coverage that tends to negatively influence our industry without really meaning to.First, everything is naturally radioactive. Second, if such radioctivity is not dangerous, should such a pertinent fact not be stated immediately? Instead, we are left with an article, the title of which reads: OAK RIDGE FINDS BEES HAVE RADIOACTIVE HONEY. What do you suppose that suggests to the food buyer? Is it likely to cause an eagerness to try what is,and is likely to always be, a pure, natural food? It then becomes the responsibility of each beekeeper and association to deal with such media coverage as it occurs: factually, reasonably, but with the conviction that the whole story is not yet being told.

BEES AND MAGNETISM: A QUICK REVIEW

In reviewing our files on bees and magnetism, we've noticed a number of interesting things. The first, although not necessarily most important, are the many persons declared, by as many articles, to have discovered the natural magnetic material in the bodies of honeybees. Had as many seperate individuals been credited for discovering America, that single chapter in American history books would be as long as GONE WITH THE WIND. Admittedly, there are slight variations. Dr. Benjamin Walcott of the State University of New York has "discovered iron in the cells of honeybees." Dr. Walcott has found iron grains deposited around each ring of the bee's abdomen. Another notable, Professor James L. Gould, of Princeton, identified up to 15 million crystals of microscopic magnetite, a crystalline iron and oxegyn compound, in the abdomens of bees.

So what does all of this mean? First, it might answer some of the questions about how bees navigate. That is to say,the magnetic field establishes a relationship between the bee and the physical earth, permitting them to keep on track during cloudy days or to retain orientation within a dark hive. In short, an internal compass. Second, it has been suggested that bees use such a compass to home in on iron rich nectar sources. Yet another suggestion has been that bees use their own magenetic attractions to coordinate the building of parallel combs.

All this is, one must remember, unproven. The magnetic substance is present in bees, but what it does is still just a matter of educated conjecture. One of the more interesting accounts of field studies being done in this area, comes from SCIENCE DIGEST, September, 1983. Researchers James and Carol Gould tricked bees into dancing a nectar source location that was in the middle of a lake. Such communication was completely ignored. Only when the danced message told of a source beyond the lake did the bees respond and take wing. The Drs. Gould ask if it could not be that bees actually make mental maps of surrounding terrain and, given their capacity to communicate the easist way to a nectar source, will not respond when stimuli are contrary to what they have mapped out to be the best way to the flowers.

FURTHER REGULATION OF VETERINARY DRUGS AND FEED ADDITIVES?

The United Nations' Food and Agricultural Organization (FAO), and the World Health Organization, have formed a group Consultation for the purpose of studying residues from the use of veterinary drugs and feed additives. The Consultation's recommendations could lead to further regulations related to such items. Quoting the SAND & SCOOP, July 29, 1983: this could be 'an opportunity for importing nations to raise additional non-tariff trade barriers on livestock products.' Although there may be few immediate applications of this activity to American beekeeping, almost every beekeeper is aware that the use of drugs and additives is something that is swayed by many factors, and that a precident for tighter controls could be a forerunner to changes in the composition or availability of products nc v used in the U.S.

Continued on next page

Capping The News

THE EDITORS
"Beekeeping Small Talk"

AN EDB BAN?

EDB (ethylene dibromide), of which nearly 450 million pounds are used annually in the U.S. as a soil fumigant and insectide, seems ever closer to being further controlled by the Environmental Protection Agency. EDB, which is sold by some beekeeping supply houses for use in eliminating wax moths, has already been banned, as a fumigant, in several states including Florida. Now on the EPA's Rebuttable list as a chemical linked with causation of cancer, EDB has ben described in studies as one of the most potent carcinogens ever tested.

DON'T SIGN WAIVERS

The above warning appeared in a recent issue of the N.J. Beekeepers' Association newsletter. Reported in the article is an effort by Chemlawn Corp. to notify beekeepers asking them to waive all necessity for the chemical company to give prior notification in the event of applications of pesticides or other chemicals. Chemlawn, which purchased the mailing list of beekeepers from the N.J. Department of Environmental Protection, termed the notification law (effective March 3, 1983), "a very burdensome notification program." The program came about after 10 years of hard work by New Jersey beekeepers and associations. Signing a waiver of protection insured by law does not seem at all in the best interest of beekeepers.

SOMETIMES LESS IS MORE

A report in the September issue of THE AUSTRALIAN BEE JOURNAL entitled 'Beekeeping Not Viable' reported a survey of Victorian commercial beekeepers. It was admitted, in the article, that trends were difficult to identify. Labor, as could be expected, proved to be the largest single expense of beekeepers. Travel costs figured to be 23 per cent of all costs. That fact is quite interesting and brings to mind the question of whether or not American beekeepers, who do attempt to keep good records on their activities, are careful enough to calculate the full weight of similar expenses in their maintenance of outyards -- it seems to be a cost far too easily forgotten. The study continues to a sad bottom line which, after assets are weighed against liabilities and debts, turns out to be negative. A sub-item, however, may be one of the most important as relates to the many hobbyist and sideline beekeepers in the U.S. Although not an iron clad statistic, appearances would suggest that the smaller a beekeeping operation is, the more efficient. Obviously, numerous variables come into play here, but it is definitely a source for thought. Americans, in particular, tend to associate BIG with SUCCESSFUL. That, quite simply, isn't always so. Each individual must carefully determine exactly how much work (i.e. hive management) he or she is able to undertake given all other circumstances, financial, personal, environmental, etc., that might influence proper management of the business. In short, for some, 50 colonies can actually be more profitable than 100 or more, because the size is more suited to efficient tending by the beekeeper.

THE FOOD VALUE OF POLLEN

A report in the BEEKEEPERS ASSOCIATION OF CENTRAL ARIZONA newsletter makes mention of a study being conducted by the wife of Dr. Justin Schmidt from the Carl Haydon Research Center. Patricia Schmidt's experiments with mice centered on strictly controlled diets in three exact groups of nutrients. Each diet group was the same except for the protein source. One source was Mesquite pollen, one was lactalbumen and the third was whole egg. It was determined that mice would readily eat pollen and could live on it as a sole food source. Furthermore, it was established that the three diets brought almost equal results except that mice required slightly more pollen to maintain a protein balance. Hence, pollen showed no advantage over the other protein sources used. The indication here is that, for individuals consuming small amounts of pollen per day in hope of meeting a dietary deficiency, the desired result may not be in the making. In a comparison to the dietary needs of mice, a human would require ¾ of a pound of pollen per day if pollen were to be the sole source of sustenance. Exactly how much human intake would be required as a suppliment to a balanced diet, was not addressed by this study. Perhaps the best conclusion to be drawn from this is that pollen can best be sold for what it seems to be: a protein source as good as any other, but not necessarily a substance that will cure every woe of the human body.

Tennyson
A New Recording Artist

"I do but sing because I must,
And pipe but as the linnets sing."

In our home we have had a four frame observation hive for many years. Nearly every summer, because of crowded conditions, this observation hive sends forth at least one or more swarms. A few days after the initial swarm we hear the piping of a new queen. Most beekeepers have heard the piping of young queens in a conventional hive. The piping sound in an observation hive is much easier to hear. She may be heard clearly up to 25 feet from the observation hive!

One day upon hearing the unusually loud piping of a new queen bee, I decided to try an experiment: Would it be possible to recored the voice of the queen bee using an ordinary inexpensive cassette recorder? I decided to put the idea to the test. Luckily the idea struck at a time when everyone was out of the house! The house was quiet!

I removed the protective masonite cover from the observation hive, taped the small flat external microphone to the glass, and engaged the recorder. After twenty minutes I stopped the recorder, rewound and played the tape. How did it work? Amazingly well! Not only did the piping of the queen come through beautifully, the **quacking** (presumably of the young queens still in their cells) was also recorded with excellent clarity. The volume of both sounds varies as the proximity of the queen to the microphone.

It's a spledid simple project that can be carried out by any beekeeper, especially one with an observation hive. The one requirement is that the cassette recorder have a small flat microphone that can be taped directly to the glass of the observation hive.

If one can make such an excellent recording with an inexpensive recorder, think of the possibilities if one were to use sophisticated electronic recording equipment! Could the study of these recordings have scientific value? At any rate it's a lot of fun and it certainly is easily done. Playing this recording is a delightful way to spice up bee classes! It's good P.R. for both the bees and the beekeeper. Most people, including a few beekeepers, have not yet heard the piping of a queen!

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Beekeeping Technology

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The Polariscope — Its Construction And Use

A major opportunity for demonstrating the uniqueness of honey and honey products is at county and state fairs. We've all spent some time slowly passing display after display of everything from pumpkins to grammar school projects. Honey exhibits are usually somewhere mixed in this collection.

Honey exhibits are no more difficult to judge that other types of exhibits but I must admit that specialized equipment does help. Most honey grading equipment is quite expensive (eg. refractometer and pfund graders). However the palariscope is simple, easy to construct and extremely useful. Honey may appear to be perfectly clear but contain small crystals that are invisible to the human eye.

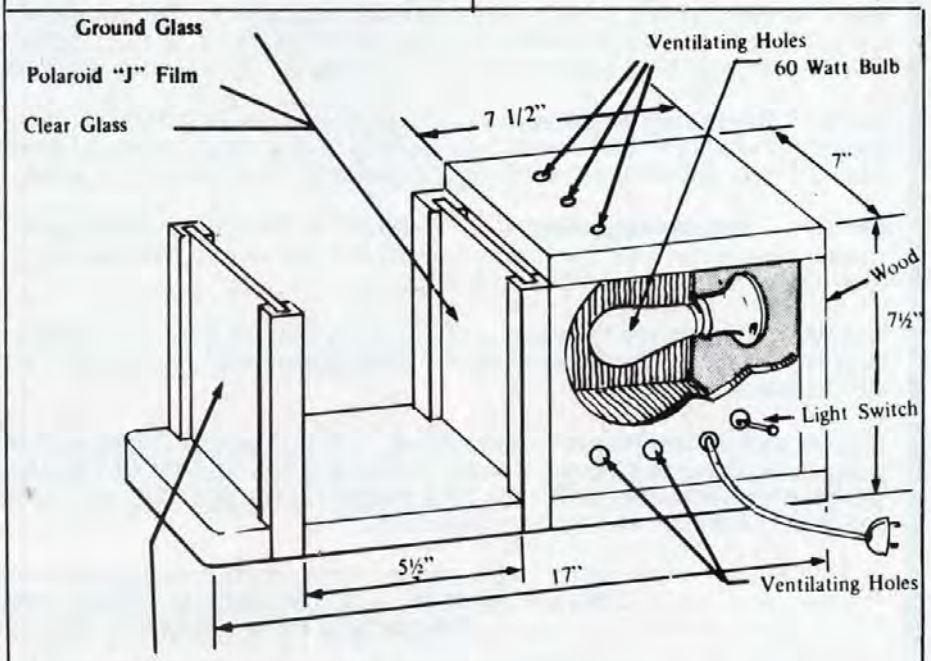
Such crystals are directly involved in the granulating process. Consequently, as a honey judge, I would want to know this. A non-beekeeping honey consumer is never impressed with honey that has "turned to sugar". Therefore exhibited honey should have as few granulation nuclei (crystals) as possible. The polariscope can show the presence of less than 0.004 percent of fine grained crystalized honey mixed with liquid honey. The dark background generated by the polarizing filters can actually make a single crystal visible to the human eye. (White, 1975)

The construction design of the polariscope is shown in the figure below. A honey sample is placed in the 5½" area between the two polarizing filters. The filters themselves are held between two glass plates 6" x 6". The filter nearest the light source is sandwiched between a piece of ground glass and clear glass piece (clear glass on the light bulb side). The filter nearer the burner is sandwiched between two clear glass plates. Polaroid "J" filters may normally be purchased at photographic supply stores. Specifically, ATI's polarizing filter has the designation HN32 x .030" stamped on the film. The main purpose of the polarizing filters is to provide a black background. In front of such a background, crystals and other contaminents clearly stand out.

Cheese cloth, lint, wax pieces, hair and bee parts are also clearly visible. The judge probably won't really care what the contaminents are as long as they're there.

The device is simple and maintenance free (barring bulb failure). The bulb does generate heat. A 60 watt bulb is as large as we use. Even then, after a few hours of use, the room is filled with the pleasant aroma of warm Pondarosa Pine resin coming from our pine polariscope.

A device as servicable is as simple to construct as the polariscope will be useful to honey judges, honey processors, honey buyers as well as school teachers. Plus, it attracts a lot of attention from passing people much like an observation hive.□



Polaroid "J" Film Between
2 Clear Glass Plates 6" x 6"

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HEADS OF GRAIN FROM DIFFERENT FIELDS

A GUEST COLUMN
By ALBERT BELL
And
PAUL JAMIESON

Super Bee Experiment

By ALBERT G. BELL
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Super bee is a concept that has fired my imagination ever since capture of my first swarm — the one that started me in beekeeping. My searches and tests produced some significant results for a sideline beekeeper and I feel there will always be temptations to purchase queen bees that have a promise or impressive production.

I used bees touted to be super producers from golden Italians to black Italians, Caucasians and other dark bees not related to Italians.

Golden Italians were my first bee strain and they did well for me in Minnesota through a succession of honey blossoms, from dandelions to golden rod. My notes indicated goldens averaged 30 pounds of honey per colony, but not a true indication of their abilities. Beeswax foundation had to be drawn into hexagon cells and my novice manipulations kept the colonies constantly disorganized. Golden Italians were nonpareil for a bee-ginner gentle, good housekeepers, healthy and winter hardy.

While in Minnesota, I experiemented with Caucasians but the colony became queenless, which leaves me nothing to report on these black beauties.

Montana became my next base of experimentation and here significant results were obtained with Caucasians. Caucasians wintered well, were frugal with provisions and hustled earlier in Springtime than Italians. Open hive covers indicated Caucasians' Spring expansion exceeded the Italians, which cuddled in the middle of the hive.

Experimentation resulted in a conclusion: I should phase out Italians and Caucasians and depend upon another strain of bees. Scientific analysis was dispensed with, but there appeared to be enough evidence and extra honey involved over a four year period to warrant a decision.

Six of my hives and two 4-H member hives, all stocked with various strains were involved. There were regular and hybrid Italians, Caucasians, regular and Hastings strain and Curneen Blacks.

Brother Adam's travels to locate better bees intrigued me and his problems to carry new bee strains to North America fascinated me.

Brother Adam traveled the entire world from Buckfast Abbey, Devon England, and his efforts developed bees referred to as Brother Adam I, Brother Adam II, Buckfast and Anatolian. I settled on Anatolians, which originated in Anatolia Turkey. Brother Adam noticed them in their native country and took some queens to Buckfast Abbey for breeding stock.

In 1964 Anatolians were brought to North America in egg form, because live bees cannot be imported into North America under present government regulations. Eggs were developed into queens and mated to Anatolian drones by artificial insemination. From this pure strain, Anatolian breeding stock was perfected as the nucleus for a bee breeding business in British Columbia, Canada, and Texas, United States.

Brother Adam propogated other strains for establishment in Canada and eventually were imported into the United States for other bee breeders to establish.

Anatolians became my selection and I requeened one hive with this variety in 1965. I would like to have tried every Brother Adam variety, but never had the chance.

My requeening process is carried out by utilization of a double screen, which was taught to me by Dr. M.H. Haydak, Department of Entomology and Economic Zoology, University of Minnesota. Double screen method worked 99% of the time for me and it is my procedure now.

Double screens were purchased from beekeeping supply manufacturers or were made by attaching a screen to both sides of inner cover escape holes. Double screens are made with an exit port for a flight hole, but inner covers usually need an opening cut for this purpose.

Two months before a main nectar flow is expected, the over wintered queen is placed in the lower hive body. Three frames of sealed and emerging brood with adhering young bees are placed in center of upper chamber. Upper and lower hive units are separated by a double screen with entrance port located to furnish an upper colony exit. Fresh grass is used to plug upper chamber port and sufficient combs of honey provided to support bees behind grass blocked exit.

Sugar syrup is trickled over the queen in her shipping cage to entice bees to her for introductions. Candy queen cage plug is pierced to facilitate her release by the bees. Caged queen is placed screen side down over the center of brood frames and then an inner cover, without an exit port, is placed over the upper colony. A can of sugar syrup, that has a few small nail holes in it, is placed over the bee escape hole so the bees are motivated to the location of queen in her cage. The syrup can is protected with an empty hive body and capped with an outer cover. Make certain there are no crackds or holes to permit escape of bees from the upper chamber.

Three days should be sufficient for the bees to release the queen from her cage, but it is best to leave the colony alone until a week or more passes and bees are observed flying from the flight hole that was plugged with grass. Time dries grass plug and bees also work it loose from inside. Young bees in upper unit will orient to its entrance and essentially there are two colonies at one location. Warmth from the lower colony will heat upper one and facilitate brood rearing and egg hatching.

After my new queen's brood is emerged, I make a decision on future operations. Upper and lower colonies can be united by removal of double screen and queens can determine mother survivor. Another option replaces the double screen with a queen excluder and colony can be operated as a two queen hive. Or, remove lower colony to another location and leave upper colony on parent stand to collect field bees from lower unit.

Anatolian queen right colonies were desired so I left them as two queen units until honey flows were established before

Continued on page 602

IT PAYS TO KNOW

How to . . .

By P.F. THURBER
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How To Calculate Bee Behavior

Anyone who writes a magazine article about a gadget, widget, contraption or whatever to make the physical art of beekeeping easier is generally not up to his ears in trouble. The "whatever" is either accepted by the readers — and perhaps improved on — or with a shrug of the shoulders rejected as not needed.

On the other hand, pity the unwary who makes the mistake of writing about bee behavior. Not only the beekeepers but also the scientific community is likely to clobber him. We have, I venture to guess, more bee behavior experts than beekeepers, so take this as gospel — I assure you it is so and yet I am going to discuss a fact of bee behavior. Put on your caulk boots.

It is like this. Assume a good overwintered colony of 30,000 bees and a still young queen from a good strain and adequate stores in three deep supers, and then let's assume what is sickeningly typical in the Puget Sound area and probably is not unknown in your area . . . the weather turns cold and wet and stays that way for ten days. The first sunny day or two what is likely to happen? Oh, you know? That is right. Your hive swarms. Now: next question. Do you know why? Well, a lot of people do not so let me give you some information and then give you a mathematical solution.

Before we can set up the math showing why the colony will swarm, you should first know that Dr. James Simpson of the Rothamsted Experimental Station, Harpenden, Herts, England, back in the 1960's studied colony strength and swarming for a period of about six years. He found a lot of interesting facts about bees and the first was that bees live from 30 to perhaps 45 days. Another researcher, Dr. H. Shimanuki at the USDA Beltsville Bee Lab, a little later showed that other things being equal the life of the be depends on the pollens it is fed. Dandelion pollen for example, produces a bee with significantly shorter life span than others fed different pollens. Unfortunately Dr. Shimanuki's research was not made in depth so we do not have a good long broad list of pollens with length of life correlations to work with, but I guess we should be thankful we have any information. We can, perhaps, hope some student working towards a graduate degree will expand Dr. Shimanuki's work. With the recent vast improvements in pollen traps, trapping pollen that would give bees a longer life would probably be highly productive.

Going back to a possible mathematical reason why bees swarm after inclement weather, let us arbitrarily assume the bees under consideration would normally live 40 days. Forty days divided into one hundred gives a normal die off of two and a half percent per day, but the two and a half percent per day figure is only really valid when bees fly, wear out their wings and die. When it rains or is too cold, they do not fly and the daily rate of death becomes relatively insignificant.

Let's go on for a moment more. I said we would assume the hive had ample stores and a good young queen. Various authorities have said queens during a build- up will lay from 1,000 to 3,000 eggs a day and, assuming a healthy colony, let's further assume a probably unrealistic 100 percent viability. In other words that all the eggs hatch become larva then pupae and emerge as honeybees. Since I do not think 100 percent viability is ever encountered, and I have reservation about 3,000 eggs a day queens, let's say the queen in the hive under discussion has 1,500 bees a day actually hatching out.

We now have all the necessary parts to put together. Thirty-thousand times two and a half daily mortality times 10 days equals 7500 bees that did not die because they did not fly and wear out their wings. So we still have 30,000 bees in the hive. But what about the bees hatching at the rate of 1500 a day? 10 x 1500 equals 15,000 more bees which you have to add to the 30,000 for a total of 45,000 bees shoehorned into the hive.

Going back to Dr. Simpson's 1400 bees per frame, let us multiply that by 30 and we get 42,000 bees. Do you see as the bees approached the 42,000 number they started queen cells, and would in all probability swarm when good weather resumes?

Now what can be done about this sort of miserable weather? Unfortunately not a darn thing, but if you do not want your bees to swarm after say a week of inclement weather, wouldn't it be a good idea to add a super or do you keep your empty supers for the cat to sleep on?

Another thing — even though we assumed the hive used for our math example was well provisioned, in actuality there are, I think, very few hives which have on hand pollen which will last for ten days of inclement weather. I agree that lack of pollen won't stop the bees from hatching out, but when a colony runs out of pollen the queen stops laying and/or the bees eat her eggs or her diet causes her to stop egg laying. The net result is you get a break in the brood cycle and further down the road you do not have sorely needed bees hatching out when you want them. You can, of course, get around this obstacle by trapping pollen, freezing it, and then making supplement cakes to add to the hives when you add the extra super after a week of bad weather. When you use pollen, use your own from a disease-free hive and, in addition, you should be aware that some pollen (even frozen pollen over a year old) has been found to be nearly worthless as a means of sustaining brood rearing. You wonder what pollens I trap for my pollen-pollen supplement cakes? OK, I trap first blueberry and then blackberry pollen. Of course you know that bees won't lug home just one pollen. The traps show pollen of various colors indicating a mixture of pollens are in fact collected, but I think the blueberry pollen runs at least 70 percent blueberry pollen and a higher percentage of blackberry pollen is trapped at blackberry locations.

Well, I guess that about covers most of what I wanted to rap about except here is as good a place as any to mention one more of Dr. Simpson's findings. His studies showed maximum hive strengths were highly variable. Some colonies never made it past 35,000 bees. A good colony made it to nearly 50,000 bees, and a scattered few almost made it to 60,000 bees, but no single queen colony actually achieved that 60,000 population!

Now let's go back to the 1400 bees per frame as a sure swarming point. Since swarms we don't want, let's assume a practical maximum number of bees per frame is 1200. When you relate the 1200 bees per frame to a maximum of 60,000 bees in a single queen colony by dividing 1200 into 60,000, you find you may need 50 deep frames just to give a colony's bees a place to spend the night or (here) a place

continued on page 599

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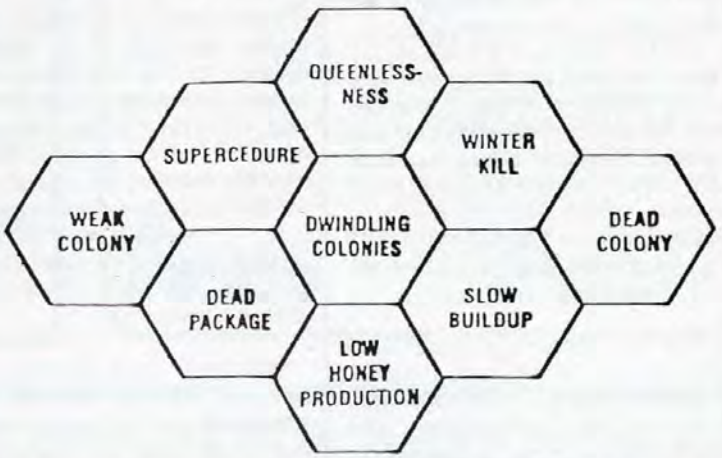

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Questions and Answers

Q. Our local association was recently asked to compile a list of bee pasture plants that the State of Indiana might use for roadside plantings.

We realize that not all plants of value as bee pasture would be acceptable as roadside plantings.

Can you offer any suggestions that would useful both as ground cover and also shrubs for windbreaks?

Are any states presently involved in such bee pasture plantings?

We will appreciate any information.

Henry A. Harris
1301 Harrison Street
Elkhart, IN 46516

A. I would suggest checking the following list for a suitable bee plant that may be used for roadside planting:

Alfalfa
good — may have limited use

Sweet clover
excellent — grows rather tall and may spread

Huban sweet clover
excellent — an annual sweet clover

White clover
excellent — reseeds easily, good ground cover with grass

Bur clover
good, very low growing

Alsike clover
excellent, good in low, heavy soils

Red clover
good, seed readily available

Crown vetch
not a honey plant, but excellent ground cover for slope

Purple vetch
not a honey plant, but excellent ground cover for slope

Birdsfoot Trefoil
Excellent hney plant and good ground cover

Phacelia
Good honey plant

All clovers are excellent soil building plants and most are good nectar and pollen plants.

Purple loosestrife
Good in swampy areas. May become a nuisance

Shrubs

Pussy willow
Easy to grow

Honeysuckle
Some are good honey plants

Beauty bush
good nectar plants

Trees

Black locust

Basswood

Red bud

Tulip tree

Maples

I have heard reports of roadside plantings that benefit bees in Illinois, Texas and the Province of Ontario.

L. Goltz

Q. I am interested in increasing the late summer bee pasturage on my farm and while reading a book by Frank C. Pellet, American Honey Plants, I read about a plant called figwort *(Scrophularia marilandica)* **that recieved much attention in** *Gleanings* **in the late 1800's. Seed was distributed at this time under the name of Simpsons Honey Plant.**

Would you know where I might presently acquire a seed of this plant for a trial plot?

Gary E. Smith
RR1
South Gillies, ONT.
POY 2VO — Canada

A. Since Pellet Gardens has gone out of business I do not know of another source of seed except possibly for the following:

Garry De Young
Hull, IA 51239

This gentleman is developing a plant nursery that may have a supply of the seed or know of a source.

L. Goltz

Q. Boys in the neighborhood (vandals) used poles to upset six of my colonies, then threw bricks, stones, roots, and miscellaneous materials into the brood chambers and supers. This was about two years ago.

I have been able to salvage some of the comb honey, but it is unfit for human food. Could I use these combs from the brood chambers and from the supers for feeding the bees in the winter? It looks pretty good, but some of it has a "sour" odor.

Oscar Jacobs
2097 W. Market Blvd.
Lima, Ohio 45805

A. I would suggest feeding the honey either this fall or better yet next spring. The sour odor is due to fermentation due to exposure to dampness. A moderate amount of fermentation will usually do no harm if the bees can fly regularly but using it to feed during a period of confinement may or may not cause dysentary.

L. Goltz

Q. When should the hole in the inner cover be closed, and when should it be left open?

Bruce Fleagal
869 E. Main
Somerset, PA 15501

A. It should be kept on all summer, to prevent ants from nesting on the inner cover. In winter it should be mostly, but not entirely closed. The small opening allows moisture to escape, even when the regular outer cover is left in place.

Richard Taylor

Continued on next page

Questions and Answers

Q. What is the best method of controlling wax moths?

Bruce Fleagal
Somerset, PA

A. Keep the combs in the presence of bees, or in other words, on strong colonies, during warm weather, and store them in a cold place in winter. When combs cannot be used in strong colonies during warm weather, as in the cae of extracting combs from which the honey has been extracted, the wax moths and larvae can be controlled with moth crystals. Put about a third or half cup over every four of five supers, spreading in on a piece of newspaper laid on the top bars. This should be done only with dry combs, not combs sticky with honey, as honey absorbs the odor. The fumigant from Paradichlorobenzene crystals is heavier than air, so the crystals must go over the combs, not under them.

Richard Taylor

Q. Is it more work to raise comb honey in square sections than in round ones?

Sam J. Yoder
R. 1
Hazelton, Iowa 50641

A. It is considerably less work to raise comb honey in round sections. The super can be assembled and made ready for the bees much more quickly, but more important, the round sections do not need scraping to remove stain and propolis. The round sections also get filled more quickly and more completely, since they hold less comb honey and have no corners to be filled. The chief disadvantage to round sections is that the equipment is more expensive to begin with. The special plastic frames are durable, however, and the investment is quickly recovered.

Richard Taylor

Q. In the July "Bee Talk" the author seems to suggest that it is all right to let the bees supersede their own queens without a regular replacement program of his own. Please correct me if that is wrong, because I have quite a time finding the queen and do not like to tear up hives for this.

Also, I'd like some idea of how many bees to look for on the cover for swarm indications.

George J. Lawn
Adrian, Michigan

A. Skilled and experienced beekeepers sometimes requeen every two years as a means of maintaining and improving their stock, and also discouraging swarming. since colonies withthe oldest queens are most likely to swarm. it is not necessary to do this, however. A colony, left entirely to itself, will almsot never become queenless, and will usually store up good crops of honey. It is, moreover, difficult to requeen an established colony. The bees are likely to kill the new queen you give them, then raise another from a hastily built queen cell, so you end up with a supersecure queen without knowing it, wasting the cost of the new queen and putting the colony behind for weeks while the supersedure queen gets raised and mated.

The number of bees on the inner cover is not in itself a reliable indication of swarm preparations. It is, however, a good guage of colony strength, and during the swarming season, and just before, it is the strongest colonies that are most likely to swarm. After the swarming season, colony strength is no indication at all of likely swarming.

If the inner cover has bees more or less distributed over its entire area, then you have a storng colony, but if there are only a dozen or so around the open inner cover hole, then it is not a very strong colony. The more populous the colony, the more the bees tend to overflow into this space.

Richard Taylor

Q. Dr. R. Taylor writes that you can kill wax worms in comb honey by placing it in a freezer, but he doesn't say how to prevent moisture from condensing on the honey when you take it out of the freezer. How is that done, to prevent the honey from becoming damp and fermenting?

Clitus Richards
Ellisville, MO

A. You have to put comb honey in a plastic bag before putting it in the freezer. I then leave it in the bag until it warms back up to room temperature. The condensation forms on the bag instead of on the honey.

Richard Taylor

FIRST FLIGHTS

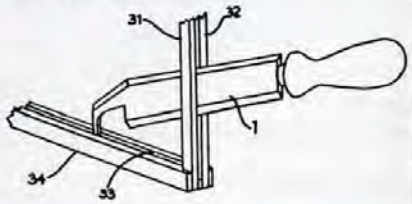
New Ideas & Products

We invite submissions to this new products column. Descriptions must be kept very brief. Patents must be pending on products exhibited here. Publication of material is at the editor's discretion and does not constitute an endorsement. Product user feedback is welcomed.

DIAGNOSTIC LABORATORY FOR BEE DISEASES

Perkiomen Valley Apiaries, Rt 73, Obelisk, PA 19492, recently announced their offer of laboratory services for the purpose of helping beekeepers identify brood diseases, nosema, honey moisture, color grade and HFCS contamination. Results are promised within 36 hours. For additional information and price list, write to the address provided above.

THE BEDDOES FRAME CLEANER



From Vernon J. Beddoes of England, comes this tool designed to help during the tedious chore of cleaning frames prior to fitting replacement foundation. As can be seen in the illustration, the Beddoes frame cleaner employs a hook that is suited for removing wedges, old comb, scraping straight edges of the frame, including the top bar wedges and cleaning out both side bar grooves and between bottom bars. For further information, contact TAYLORS, E.H. Taylor, Ltd., Beehive Works, Welwyn, Herts, AL6 OAZ.

New York Annual Meeting

The annual winter meeting of the Empire State Honey Producers Association will be held Friday and Saturday, December 2 and 3. The location will be the Hilton Motor Inn in Syracuse at the junction of the New York State Thruway and Interstate 81. The meeting will include a honey show with eight classes: light, light amber, amber and dark liquid honey, rectangular or square sections, round sections, cut comb and the eighth class is for two pound blocks of beeswax.

BEEKEEPING FOLK ARTS

Honey & Hive Products For Cooking & Other Home Uses

by Amos Arbee

Cook & Bake With Honey

Most readers are probably very well aware, by now, that I have a real obsession with cliches and parables. Here is another that has been added to the already existing list that I possess. Not too long back I overheard one person saying to another, "I am going to ask you more questions in the next few moments, than a fool could answer in one month's time." This particular cliche probably strikes my fancy for a couple of reasons. First of all, I cannot help but think of beginning beekeepers coming into the picture for the first time. Their questions (which are well intended), seem as though they are endless and everlasting: as if they would like to learn the whole craft of beekeeping in just moments of time and all in bite size form. Of course the seasoned beekeeper knows all too well that is both impossible and also impracticable. Secondly, with regard to cooking and baking with honey, if someone has success with a certain recipe and someone else has the opportunity of tasting the goodies, they too will deluge you with questions. This of course is all well and good. But usually the couple questions they ask can seem to take forever to try to answer. One quick for instance, "I have some honey at home that's a little off flavor, is it OK to use it in a cookie recipe?" My personal cliche for this question would be, "Start with the best and probably you will no doubt finish with the best."

"Albanian Honey Walnut Cake"

½ cup butter
2½ cups mild honey
2 eggs, beaten slightly
2 cups flour
1 tsp. baking powder
1 tsp. baking soda
½ tsp. cinnamon
⅔ cup sour milk
1 cup chopped walnuts
Grated rind of lemon
½ cup water

Cream butter and 1 cup honey and eggs in large bowl. Sift dry ingredients and add alternately with the sour milk. Stir in nuts, lemon rind and mix well. Pour into greased baking dish, 13 x 9 x 12" and bake at 350 degrees for about 45 minutes. Meanwhile make a thick syrup by boiling together the remaining 1½ cups honey and water for about 15 minutes. Pour over the cake while it is still warm and put back into the oven just after it has been turned off. Leave for about 5 or 6 minutes and then cut into diamond shapes.

Can serve warm or cool. I prefer it slightly warm with whipped topping or whipped cream.

Beeswax Sealant

Next time you may be looking for an outstanding "Sealant" especially for those tricky type joints using rubber connections to copper tubing where leaks are an absolute no-no, try using a combo of 90 parts beeswax and 10 parts rosin mixed together. You may be surprised at its ability to work for you in a pinch.

Obituary

Ervin V. Reinert, long time beekeeper of Tracy, Minnesota passed away on the evening of September 27th at the Tracy hospital. Born in a sod hut on the prarie of Murray County, Minnesota in 1903, Ervin as a teenager began to care for the family's two beehives on the home farm. He later advertised for a beekeeping position, and was hired by Tanquary Honey Farms. He spent three years in the Fargo, North Dakota Tanquary operation, and then returned with his wife Lucille to southwestern Minnesota where he lived for the remainder of his life. Ervin operated bees in the Tracy area, first with his brother Elmer, and later with his son, Charles. He continued to be active and interested in the beekeeping business until his death at the age of 80. Reinert was a long time member of the American Beekeeping Federation, The Minnesota Beekeepers Association, The Southern Regional Beekeepers Association, and Sioux Honey Association. He is survived by his wife Lucille, three daughters and a son, and by eight grandchildren. His wisdom, counsel and love will be sorely missed. □

HONEY BEE WINGS

Honey Bee Wings

By MARK E. HEADINGS
The Ohio State University
Agricultural Technical Institute
Wooster, Ohio 44691

The wings of the honey bee are essential for the performance of a number of important activities. These include collecting (nectar, pollen, propolis and water), air conditioning the hive, mating, swarming and protecting the colony. Insects usually have one or two pairs of wings. In fact, most have two pairs of wings as exemplified by the honey bee. Some insects such as house flies, *Musca domestica* (Linn.), have one pair of membranous wings whereas others such as the beelouse, *Braula caeca* (Nitzsch), have no wings at all. Incidently, the bee louse is not actually a louse but rather a wingless type of fly (Borror, DeLong and Triplehorn, 1981). True lice (both the chewing and sucking types) are also wingless. All invertebrate creatures which have wings are insects because no other non-insect arthropod whether it be a spider, mite, tick, centipede, millipede, or sowbug ever has wings.

TYPES OF WINGS — There are a number of different types of insect wings.

These differences serve as useful characteristics for identifying insects. A beetle has hard shell-like front wings whereas a moth has scale type of wings.

In fact, under magnification, the wings of a moth resemble shingles on a roof or scales on a fish. The honey bee has membrane type of wings. The front pair is considerably larger and has a different shape than the hind pair (Firgure 1). Some insects such as damselflies and winged termites have two pairs of wings of equal size and shape. The honey bee, as is true with most other winged insects, is able to fold its wings over its back when at rest. An insect such as the dragonfly is unable to do so. Therefore, they remain out-stretched. The wings of honey bees, wasps and flies enable these insects to be very agile fliers when compared to those of grasshoppers and beetles. It is essential that honey bees have superior flying capabilities when considering the great distances they must often fly in order to ensure an adequate food supply for the colony.

Honeybee wing with hamuli indicated

WING STRUCTURES — Veins are usually present in an insect wing. some of the parasitic wasps have very few veins whereas lace wing insects (Neuroptera) have many veins in a net-like arrangement.

Honey bees have what might be considered a moderate number of veins in their wings. The veins are actually hollow and blood flows through them. They also serve as supporting ribs which add strength to the wing. Another interesting structure on the hind wing of the honey bee is a row of hooks along the front edge called hamuli (Figure 1). These hooks attach to a fold on the back edge of the front wing thereby holding the two wings together during flight. When the wings are folded over the back of the bee, the front and hind wings become uncoupled. The wings of an insect are attached to the middle section of the body called the thorax. There are three segments in the thorax and the wings of the honey bee are attached to the second and third segments.

WING MOVEMENTS — The wings of the honey bee are moved as a result of muscle contractions inside the thorax. The muscles not only cause the wings to move up and down and forward and backward but also to twist in a manner which contributes to the forward movement of the insect. The speed with which the wings move is truly remarkable. In the genera *Apis* and *Musca* which include honey bees and house flies, the frequency of the wingbeat is about 190 per second. The wingbeat frequency of butterflies is 4-20 per second. Wingbeats of 30 per second or less are believed to be the result of a single nerve impulse producing a single muscle contraction. Higher frequencies result from a single nerve impulse producing a succession of muscle contractions (Chapman, 1971).

In summary, it has been said that a single honey bee would need to fly a distance equal to two and half times around the earth if it alone were to gather sufficient nectar from flowers to produce a pound of honey. Whether that is accurate may be open to question. However, the fact remains that during the one to three week period the honey bee performs as a field bee, it literally wears itself to death with intensive foraging activity. The two pairs of wings carry the bee many miles during half of which it is probably loaded with nectar, pollen, propolis, or water.

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SEND YOUR HONEY SOME FLOWERS

Beekeepers are always searching their minds for creative ideas to sell honey. Interestingly, TELEFLORIST has come up with an inventive way to sell flowers. Inadvertently, they are also promoting honey. Teleflorist's special Honey Jar Boquet features a display of flowers in a vase that can also double as a decorative honey receptacle. A sweet idea.

A GLEANINGS INTERVIEW

Jack Matthenius, New Jersey State Apiarist

Jack Matthenius was born in Plattenburg, N.J. on April 21,1928. Jack's involvement with bees began at an early age, as his father kept bees and produced comb honey to pay his taxes with. At he age of 12, Jack went to work for a local commercial beekeeper at 15 cents an hour painting and repairing equipment. He worked there until graduating high school. In 1947 he was able to get a job with the N.J. Department of Agriculture as a Deputy Bee Inspector. After a two year hitch in the army during the Korean War, Jack returned to the department as Inspector of Bee Culture. In 1956 he was promoted to Supervisor of Bee Culture and, in 1982, became the N.J. State Apiarist. Jack is well known for his energy and extensive activities in bee association events as well as for his involvement in the Tall Cedars of Lebanon, a fraternal and charitable organization to which Jack was recently installed as Supreme Tall Cedar, the highest office of that organization in North America.

Jack, anyone who has ever talked with a bee inspector knows that one of the biggest challenges faced by such an official , is dealing with beekeepers who are reluctant to cooperate, especially in cases when there is an order to burn for disease. Is it your impression that those persons are unaware of how important the problem is or that they feel you don't have the right to tell them what to do?

I think a little of both. You run into some people who really don't understand the problem and how bad it can be as far as cutting down production in apiaries. Once you show them what the problem is and how to correct it, you generally get cooperation. I think the major problem comes when you find somebody who should know better, particularly professional people like doctor, lawyers, and so on. They know better, should be able to take care of the problem themselves and don't think they need someone coming in and saying: "Hey, I'm the policeman, you need to take care of that problem!" In many cases I find professional people a bit harder to cope with because they don't feel they have to submit to inspection the way the state wants them to.

Have there been positive changes as far as cooperation?

I've seen major changes in beekeeping in a number of areas. In 1947 when I started with the department, you're talking 2,000 beekeepers and 18-20,00 colonies. Today, in N.J., there are about 6,000 beekeepers and 60-65,000 colonies. One of the major changes I've seen over the years is ETO [ethylene oxide used for fumigating for diseases] and this has made for a whole different ballgame when it comes to cooperation. We've been using ETO since 1971-72. For the first couple years we were up to our ears in equipment from beekeepers who were supposed to burn their equipment years ago, but had it stashed away in some barn or attic instead. A lot of beekeepers are pennywise and dollar foolish and will keep junk around and keep the problem there and will wonder why they can't produce. For the first couple years using ETO we didn't charge so we could break down that barrier. I see much better relationships with beekeepers. At least they're trying to do something to save bees and their equipment.

What are your thoughts on promoting both beekeeping and hive products?

I was brought up in the old school and we go to honey shows, state fairs, put on live bee demonsrations and cooperate closely with beekeeping associations in our state. Education public relations is probably as much of the inspection game as the inspection itself. If you can educate a beekeeper and get him on your side and thinking in the right direction, you've helped the whole area he lives in -- he's going to become the one doing the best public relations work and keeping other beekeepers going straight. I feel we should have at least half again as many bee inspectors as we have. We're no where near enough to cover the number of colonies in the state. So, we have to depend on educated beekeepers to keep on top of things. If they're in an area where there's a problem, they'll give a call.

In your line of work, you must see certain mistakes repeated again and again. Will you share some of these?

One mistake that hobbyists often make is to take green honey. They don't process it properly, they don't keep it in containers, keep it tight so it doesn't pick up moisture; they sometimes don't

Continued on next page

Gleanings Interview with Jack Matthenius, Continues

super on time and don't inspect colonies well enough before or after supering. For some years we were moving colonies out of certain areas because of spraying. We put little wooden cleats on to fasten bodies together so they could be moved easier. Well, you go back now, up to six years later, and can sometimes still see those little cleats. Beekeepers just put on supers in the spring and took them off in the fall expecting honey. They'd never broken the hives down to the bottom to inspect for disease. Some lucked out, but those that didn't blamed it on spray programs and everything but the real problem. Another thing I find is beekeepers who want to drill a hole in the hand hole or the bottom board or the lid -- or other things to make the equipment look different than how it was in the first place. Most of that's wrong in my book. Basically, you've got what you need when you buy equipment. If you use it properly you can do as well as anyone else. Beekeepers will drill holes in the hand holes and get stung on the finger taking off supers. If they drop the super they get a broken foot. Either way, they walk around with fat fingers.

If you were to advise someone about what should be their state of mind when going out to the beeyard, what would you say?

I get the impression that, sometimes, people go out without any frame of mind at all. They go out to do their work and they find themselves in the middle of a beeyard and perhaps they're in a hurry that day or something. I think, right off, if you're going to go work bees, you better have the proper clothing. Prepare yourself for going into the bees the way you want to be prepared. Don't think you're a sissy or a bad beekeeper because you want to wear gloves or put a suit on. If that is what it takes to do the job properly, then do it. You also have to keep your hive tool and smoker real clean and think of those things before going out into the colonies. Secondly, I think you've got to visualize what you want to do there. What am I looking for? Why am I doing it? Do they need more space? Am I looking to see what kind of queen I've got? Do I want to reverse? I think you can manipulate a colony 15 minutes a year and do a major job of it. Five minutes, three times a year.You should go in the spring around fruit bloom, check your colonies for disease, make sure you've got a good queen, reverse if it needs be, add supers you want to add, then leave things alone.Go back sometime in the early summer, take off the top to see where the bees are, see if they're full of honey. If so, extract it and put supers back on or add more supers, whichever way is necessary. In the fall of the year, after killing frost, take supers off. Make sure you leave at least 60 pounds of honey for overwintering bees. Put your entrance reducer in to keep rodents out. Take your supers home, extract your honey, store your equipment and begin again in spring. I think you've got to have a system. If you have one you'll do better with your bees each year. Some beekeepers want to be in their bees every 10 days, two weeks or so on. That's why they have bees as a hobby. If you want to do that, do it, but I don't think you'll get the best amount of honey that way. The big thing is to do things when they need doing. It always makes me laugh when the bee inspector goes in and finds a colony that needs supering and the beekeeper says:"I was going to do that tomorrow." Well, most often they don't do it because they just don't set aside the time to do it. They don't set a system for them to do it by.

Judging Beeswax

Continued from page 568

appearance. The mold should be uniform with no ridges or indentations. In some shows molds with imprinted names, numbers or letters will cause the cake of wax to be disqualified. Most beeswax exhibitors present their wax wrapped in plastic to be removed by the judge.

Freedom from Cracking or Shrinkage

When beeswax turns from a liquid to a solid state, it shrinks 9.6 percent. Blocks of wax sold commercially almost always have a large crack in the center, which results from the outside protion of the wax cooling more quickly than the center. If rapidly cooled wax does not crack, the top usually has a concave or sunken appearance. Cracked cakes of wax are usually disqualified, and those with sunken or concave surfaces are most often heavily discounted.

Exhibitors generally rely on two methods of cooling wax slowly. One is to heat an oven to about 200 degrees F., then turn it off and place the pan of molten wax inside. Since ovens are insulated, they cool over a period of several hours. The wax will also cool slowly, without a cracked or shrunken surface. An exhibitor in England recommends placing several large fire bricks in an oven and heating them thoroughly for an hour or more. The bricks will retain the heat and the oven will cool more slowly. The second method is to place the container of liquid wax in a large pan or tub of hot water. The water cools slowly and so does the block of wax.

Other Factors

Judges sometimes break off and taste the corner of a block of wax to ensure that it is free of honey. It is easy to dissolve a large quantity of honey in beeswax just as beeswax can be dissolved in honey and give it a waxy flavor.

A block of beeswax should be recast after each show because it has been handled by the judge. Blocks should be free of fingerprints.

Precaution

Because beeswax is highly flammable, it should never be heated over an open fire.

A popular and safe way to render and mold beeswax is using a solar wax extracor. An extracor gives high quality, clean wax, though when comb is rendered only about half the wax is recovered. For commercial use, beeswax is usually liquefied using either direct steam or steam-jacketed vessels. Water-jacketed double boilers also work well and are reasonably safe.

Beeswax may also contain a large amount of dissolved water. If such beeswax is heated to the boiling point of water, it will suddenly froth and foam. If much water is present, it can flow over the sides of the container and cause a serious fire over an open flame.

Beeswax is an important by-product from the bee hive. Though its high price prevents its wide use today, at one time in our history beeswax was almost the only wax readily available and it was used for many items including polishes, salves, writing tablets, insulation, and as a light source.□

CHARLES DARWIN'S HONEY BEE EVIDENCE

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Charles Darwin, the founder of evolution by natural selection, is more prominent in biology today than he was earlier in this century. The revival of Darwin scholarship, has brought added interest in his work and motivation. In order to shed some light on Darwin's method of operation, I examined his use of bees.

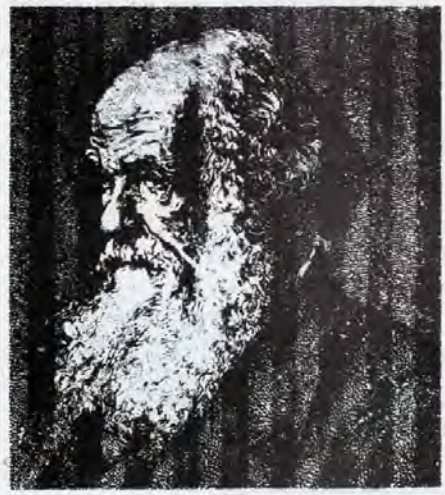
Darwin first mentioned bees in his published writings in the *Journal of Researches* or now popularly called the *Voyage of the Beagle* published in 1839. During the voyage, Darwin spent most of his time working on geology. But his interest in bees developed as he concentrated on zoology. From 1854 to 1861 Darwin made careful observations on the humble bees that were observed flying around Down house. In particular he was concerned with the routes traveled by the bees and noting the plants they were visiting (Freeman 1968).

What is often overlooked in Darwin scholarship are his published papers and letters. In fact, it is his published research papers that show his long standing interest in bees. Darwin published on bee pollination in 1857. He also mentioned bees in papers published in 1855, 1858, 1860, 1861, 1863, 1864 1869, 1873, and 1877 (Barlett 1977).

But in order to understand what contributed to the pressure to study bees, I examined the first edition of *The Origin of Species,* published in 1859 and compared it to the sixth edition published in 1872. The difference between the two editions combined with information from several letters illustrated Darwin's motivation.

Darwin used bees as an example in Chapter 3 entitiled "The Struggle for Existence". In 1859, Darwin did not inlcude the observation that the Australian hive bee was pushing out the native stingless bee. Darwin had an interest in the relative population numbers of bees. He wrote to various scientists commenting on the scarcity of hive and humble bees and asking verification.

In the first edition, Darwin comments on the benefits of bees on the pollination of various flowers. The is done in a nebulous fashion citing as evidence "from experiments which I have tried, I have found that the visits of bees if not indispensible, are at best highly beneficial. Humble bees alone visit the commen red clover as other bees cannot reach the nectar." That



Charles Darwin

passage was changed in 1872 to read: "I find from experiments that humble bees are almost indispensible to the fertilization of the hert's-ease (*Viola tricolor*), for other bees do not visit this flower. I have also found that the visits of bees are necessary for the (pollination) of some kinds of clover; for instance, 20 heads of Dutch clover (*Trifolium repens*) yielded 2,290 seeds, but 20 others heads protected from bees produced not one. Again, 100 heads of red clover (*T. pratense*) produced 2,700 seeds, but the same number of protected heads produced not a single seed. Humble bees alone visit red clover, as other bees cannot reach the nectar." It is obvious that Darwin became more specific in his treatment of data.

Darwin spent considerable time, if the number of letters are to be used as a judge, verifying that bees were "indispensible for (pollination)". In a letter to Joseph Hooker (Darwin 1903) written on June 12, 1858, Darwin said: "Now what I want to know is whether any of these have flowers are as small as a clover; for if they have large flowers they may be visited by humble bees, which I think I remember do exist in N. Zealand; and which humble bees would not visit the small clover. Even the very minute little yellow clover in England has a every flower visited and revisited by hive bees, as I know by experience. Would it not be a curious case of correlation if it could be shown to be probable that herbaceous and small Leguminosae do not exist because when (their) seeds (are) washed ashore (and) (!!!) no small bees exist there. Though this latter fact must be ascertained. I may not prove anything, but does it not seem odd that so many quite independent facts, or rather statements, should point all in one direction, viz., that bees are necessary to the (pollination) of Papilionaceous flowers?" By 1877 he had established the correlation between bees and pollination noting that in New Zealand, clover did not seed prior to the introduction of the hive bee.

This is an interesting example showing how Darwin assesses information. In the letter to Hooker in 1858 Darwin refers to the need of bees for pollination of papilionaceous flowers, with a "?". Yet in the first edition of the *Origin* he says "So necessary are the visits of the bees to papilionaceous flowers, that I have found, by experiments published elsewhere, that their fertility is greatly diminished if these visits be prevented". And by 1872 he had removed "That I have found, by experiments published eleswhere." I should note that Darwin published a paper on bees pollinating papilionaceous flowers in 1858. But over a twenty year period he stopped questioning need for bees for pollination. Darwin used the cell making instinct in bees to help prove that instinct like morphology evolved. Darwin cited the humble bee using its old cocoons and separate rounded wax cells for honey storage as the simplest example and the honey bee comb with its six sided cells as the most advanced. To illustrate the transition he cited the *Melipona* which makes a wax comb of cylindrical cells for brood production and round cells for honey storage.

He described in 1859 that the average cell wall of a honey bee cell was 1/400 inch thick. He further said that natural selection favored the honey bee comb because it was a more efficient use of wax and therefore used less honey fed to the bees to produce it.

Even though this elelgant example was a masterful use of comparative behavior, Darwin was still attacked for using the example. Adam Sedgwick in a letter to Darwin after he read the *Origin* wrote: "Were it possible (which, thank God, it is not) to break final cause humanity, in mind, would suffer a damage that might brutalize final

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Darwin & the Bee

Continued

cause and send the human race into a lower grade of degredation than any into which it has fallen since its written records tell us of its history. Take the case of the bee cells. If your development produced the successive modification of the bee and its cells (which no mortal can prove), final cause would stand good as the direction cause under which the successive generations acted and gradually improved" (Darwin 1888). Moreover, Darwin was attacked using the thickness of the bee cells as evidence against him. If the cells are so regular as to be 1/400th inch thick this must provide evidence of a conscious design.

This set Darwin into action. He had written to Alfred Wallace asking him to send samples of bee combs and bees. Darwin also had been corresponding with William H. Miller who verified the structure of *Melipona* cells. In a letter to Miller (Darwin 1903) on December 1, 1859, Darwin wrote: "Some months ago you were so kind as to say you would measure the thickness of the walls of the basal and side plates of the cell of the bee. Could you find time to do so soon?" In the sixth edition Darwin wrote "The accuracy of workmanship of the bee has been greatly exagerated." And rather than 1/400th of an inch, Darwin in 1872 wrote: "These walls, as Professor Miller has kindly ascertained for me, vary greatly in thickness; being, on an average of twelve measurements made near the border of the comb, 1/352 of an inch in thickness; whereas the basal rhomboidal plates are thicker, nearly in the proportion of three to two, having a mean thickness, from twenty-one measurements, of 1/229 of an inch. By the above singular manner of building, strength is continually given to the comb, with the utmost ulitmate economy of wax."

Even though the essence of what Darwin wrote in 1859 was still accurate, he went to great pain to crush the criticism that the bee cell making instinct was too perfect to have evolved.

With all the examples of changes made between the first and sixth edition we see Darwin fine tuning his arguments. Becoming more exact or definite in his statements. Moreover, he responded to criticism with a sword of detail destroying the complaint. This is consistant with the thesis of Neil Gillespie (1979) who wrote *Charles Darwin and the Problem of Creation.*

Gillespie believes that Darwin had to attack "creation" and "design" to force the intellectual change favoring evolution. Darwin's detail on cell wall thickness struck down the perfection of bee cells and returned the honey bee comb as evidence for the evolution of instinct.

In summary, Darwin's interest in bees included behavior, genetics, coevolution with plants, and morphology. In all, Darwin's writings and letters contain 204 references to bees (Kritsky 1981). His treatment of bees show how he responded to criticsm. Over a 13 year period Darwin used bees not only to establish that evolution occurred but to attack the problem of design.

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Wintering The Honeybee Colony Repositories Part I

Drs. Johansson and Johansson discuss, in this two part series, The Uses and the Misuses of Cellars, Clamps, Bee Houses and Above Ground Repositories for Wintering Bees.

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The first colonies of bees kept by humans may have been swarms that chanced to occupy an empty basket, a clay pot, or a fallen hollow tree near a village where inhabitants usually obtained their honey by robbing the nests of bees in tree cavities or rock crevices. Later, hives were made by coiling straw or weaving wicker skeps, cutting sections of hollow logs, or constructing box hives of planks from water-powered saw-mills or sawn by hand with pit saws. Such hives in England and Europe were covered with straw or rushes for protection against the winter's cold, or placed in sheds open on one side or recesses in stone walls (bee boles). The Zeidlers who used hives cut in living trees in the forests of Germany and Austria were the most advanced and highly organized beekeepers, especially in Silesia and Carniola. Such tree hives in Poland were rarely molested (by other than bears) as human offenders, when detected, were punished by cutting out the navel and winding the intestines around the tree.[1]

The general practice in the United States and Canada during the 19th century was to leave hives on their summer stands without any particular preparation[2]. It should be remembered that box hives were ubiquitious in America then, and even in the 1920's most beekeeping was done in "nail kegs and good boxes"[3]; not until 1937 could it be said they were "fast becoming a thing of the past[4]. In 1950 isolated mountaineers in the Southeastern states were still keeping bees in box hives or log combs similar to those their Anglo-Saxon ancestors used in England 300 years earlier[5].

The introduction of the movable comb hive and sophisticated management by Dzierzon in 1845 started a revolution in beekeeping, was acknowledged by Wagner in a letter included in Langstroth's 1853 manual. In 1830, the establishment of steam-powered saw-mills increased the output of dimension lumber, and made quantity production of modern hives feasible. These new hives permitted manipulation of combs, confinement of bees while transporting them, and stacking hives close together in repositories for their protection.

CELLARS

If we take Langstroth's 3rd edition (1859) as an indicator of the state of the art at that time, we find a brief reference to Quinby's use of cellars in America, and a quotation from Dzierzon. It was customary in some parts of Europe to winter all stocks of a village in a common repository or cellar. Langstroth concluded that the best ways ". . . .can only be determined by careful and long-continued experiments".

In 1861, a 33 page article on bee-culture by Buckisch of Horontown, Texas was published in the Patent Office Report for 1860. The author had been president of the Bee Association of Silesia in Germany for several years, and one of the earliest advocates of the Dzierzon system. The description by Buckisch of how to construct a Dzierzon movable comb hive and its managment is apparently the first to appear in English until Dieck and Stutterd's translation in 1882. Langstroth did have access to Wagner's translation and his extensive knowledge of German beekeeping literature.

Dzierzon's specifications for wintering are those also considered critical by recent investigators: 1) Place colonies in the cellar after frost; 2) Maintain absolute darkness; 3) Maintain temperatures a few degrees below rather than a few degrees above freezing. In Europe, the major advantage of using a cellar, besides protection from the cold and a lower requirement for honey, was protection against the pilfering of hives or honey. The alternative was to move hives close together, and fasten them to each other by various means such as chains and locks to make them less vulnerable; or to build a bee-house in which hives were protected the year around.

Although Phillips and Demuth did not provide references in their 1918 bulletin, they indicated some of the best beekeepers had practiced cellar wintering for many years[6]. Very little of the extensive contributions by these beekeepers in bee journals can be included here, but the article by C.A. Hatch in 1906 is an excellent example[7]. Illustrations and useful items that appeared in *Gleanings In Bee Culture* were incorporated in the *ABC & XYZ Of Bee Culture*. The editions from 1877 onwards can be consulted for information available prior to publications by the U.S. Department of Agriculture.

The change to outdoor wintering that Phillips and Demuth noted in 1918 had almost entirely replaced cellars by the 1950's. One of the advantages of leaving colonies outside in a sheltered place is that the beekeeper does not have to watch the thermometer and worry that the bees will heat up and become restless[8]. However, with increasing costs of colony replacements and transportation, the practice of indoor wintering is getting a second look[9].

Feasibility. If bees are not confined by cold weather for 3-5 months without a break, as in England where winter weather is very changeable, colonies are best left out of doors[10]. Phillips and Demuth considered cellar wintering possible with average January temperatures of 15-25 degrees F., but almost obligatory below 15 degrees F.

Continued on next page

Repository Wintering

Continued from page 594

Although cellar wintering is more troublesome than outdoor wintering on summer stands, particularly for the inexperienced[11]; beekeepers such as Pease in Connecticut recommended it as the best way to go: "all winters look alike to my bees, and wintering is the least of my worries". That he had not lost one of his 500 colonies in 12 years contrasts sharply with mortality of bees wintered outdoors during severe winters[12]. The requirements for successful cellar wintering have been debated in bee journals, and the major factors are examined below.

Temperature. Mendel recommended a cellar in which the temperature could be kept at 41 degrees F.[13]. As noted earlier, Dzierzon considered a few degrees below freezing. On the basis of research, Phillips and Demuth suggested 57 degrees F. was an ideal temperature around the cluster, with the cellar kept at 50 degrees F. But Corkins, in less humid Wyoming, found a cellar temperature of 32-36 degrees F. and hive temperatures of 40-44 degrees F. preferable[14]. The objective is to maintain a temperature at which the bees do not become restless, and begin fanning to circulate air within the hive; such activity will raise the temperature even farther. The ideal temperature suggested by various authorities has ranged between 32 degrees and 45 degrees F. Earlier opinions have prevailed and recommendations are now suitable for different climatic conditions: 50 degrees F. in the humid east, 45 degrees in the Mississippi Valley, 40 degrees in the Missouri Valley, and 35 degrees in the Rocky Mountain region[15].

The best answer to the question of the proper temperature for a cellar may be Demuth's, "That depends"; or Miller's, "The right temperature for **your** cellar with **your thermometer** at which the bees remain most quiet. . . . " (Miller found seven thermometers differed by as much as 8 degrees)[16].

If the cellar cannot be kept cool, the bees will have to be carried outside when they become stressed. Bags of snow or ice have been placed against the ceiling to reduce temperatures[17], and Hamilton hired a snowplane to blow cold air through a window[18]. Thermostatically controlled ventilators are useful as long a outside temperatures are cooler than the cellar. An air-conditioning or refrigeration unit is economically feasible if the investment is balanced by a lower consumption of honey during the winter, and a higher survival rate of colonies. But a home-type air conditioner is not suitable because the coils are subject to frosting at the necessary low temperatures[19]. It requires 15 watts or 50 BTU's per hive to maintain 41 degrees F. all winter long with 20 R insulation in the walls and 30 R in the ceiling[20]. Without air-conditioning, each hive should be allotted 30-35 cu ft. of space; with air-conditioning 15 cu ft.[21].

Colonies moved outside for three days during five days of mild weather in mid-March had 46.7 square inches of sealed brood April 23rd compared to 187.6 square inches for those left inside[22]. Diemer reported temperatures ranging from 36 degrees to 58 degrees F. without any problems, and deliberately warmed the room up to 80 degrees one day each month[23], although more than five successive days at 80 degrees is detrimental[24].

A cellar whose temperature remains much below freezing is of value only as a windbreak. But the heat from the bees is considerable (10-12 watts per hive), and the small amount of additional heat required to warm the room will reduce the amount of honey consumed by the bees, and keep them quieter. If the room is insulated, it is unlikely that it will be necessary to provide heat except below 20 degrees F. The authors recorded 36 degrees F. in an uninsulated, covered well pit when it was 10 degrees in an empty box on the ground outside.

Light. The room must be "not almost but absolutely" light tight with light traps fitted to all openings such as doors, windows, ventilators, etc. Any cracks or leaks must be plugged carefully so there are not even pin holes[25]. The requirements are the same as those for building photographic darkrooms using weatherstripping, sliding panels, and baffles to prevent light from entering the room. Light traps at air intake and fan openings can be designed to effectively eliminate light, and yet cause a minimal restriction of airlfow[26]. Auxiliary fans in ducts turn the air and keep it hugging the outer side of the elbow to reduce friction[27]. Painting the interior of traps with flat black paint reduces reflection.

Where light can get in, bees become restless in the warmer cellars[27]. When a room was warmed up to 80 degrees F. and a bright light turned on for a few minutes, the bees rushed out of the hives. Manipulations can be done at night to avoid light which would distrub the bees or by using red light which bees cannot see. If the bees must be moved in the daytime rather than at night, a light tight extension of the building can be used to load a covered truck.

Humidity. In 1886, Detwyler was surprised that the hygrometer was not used in practical apiculture, and that an effective, encap instrument was not available[29]. Instruments suitable for recording humidity in a hive have become available recently, but unfortunately they are not inexpensive. Although research data is not available, general observations about the effects of various levels of humidity have been recorded by beekeepers.

The regulation of humidity is critical because the bees become restless if the air is too dry. As the temperature rises the relative humidity decreases, and the atmosphere must be humidified to keep the bees quiet[30]. In 30 cellars bees were quiet longer in those too wet than those extremely dry. Even colonies in cellars with water running through them showed no harmful effects of dampness and temperatures remained more uniform. Pushing back the hive cover ¼" will prevent mouldy combs in a wet cellar, but will not let mice get in: a 1" auger hole does not provide sufficient ventilation[31]. L'Arrive recommended the room be kept at a relative humidity of 50-60 percent[32], but Villeneuve found a range of 40-80 percent was satisfactory provided ventilation was sufficient to prevent combs moulding at the higher levels.

It may require 10-15 gallons of water per week to prevent a "blow up" when restlessness causes the temperature to rise irrespective of how low the temperature may be outside[33]. If very dry, the floor should be thoroughly drenched[34]. The cellar can be 2-3 degrees warmer if the cellar is damp. However if the air becomes so humid that the bees become wet, they lose the insulative value of their body hair. Differences in climate will call for different managment; In Wyoming, abundant top and bottom ventilation is recommended; In South Dakota, hives with tops and bottoms removed died, but those with them in place did not[35]. Excessive dampness or dryness are both to be avoided.

Various expendiencies have been used to provide water to colonies that became restless as temperatures rose above 45 degrees F. causing a substantial decrease in relative humidity. These include saturated sponges or cloth, shallow pans or saucers, flat bottles with a cloth wick, pieces of comb filled with water, and plastic cups. Some colonies took as many as five cups of water, but the bees quieted down and the room temperature dropped several degrees[36].

Ventilation. Ventilation is necessary to remove carbon dioxide, excess heat, and moisture produced by the bees. It was once recommended that underground tile drainage pipes for an air inlet near the floor be laid to the back of the cellar below the

Continued on page 597

Repository Wintering

Continued from page 595

first line so the air could be warmed before it entered the cellar. The air from such a 4" pipe laid 3-4' deep was no lower than 43 degrees F. the entire winter although air in the cellar was as low as 36 degrees, and outside was -14 degrees[37]. Specifications ranged from one 12" long tile (4" inside diameter) per colony to a total length of 100-300'; Hofmann suggested using a factor of 7 to determine carrying capacity and length of pipe. Outlets opening near the ceiling totaling 3-4 square feet, or equivalent to 1 square inch per colony, were used with a light proof canopy; as well as ducts, stove pipes with angles, or a chimney with openings near the floor and ceiling. Thermostatically controlled ventilators and fans can increase the capcity of a cellar by 30-50 percent.

During cold weather ventilation can be reduced as much as 90 percent. But since each colony produces carbon dioxide and 3-10 grams of water vapor per hour, it is necessary to replace air in the cellar with sufficient fresh air from the outside to prevent the bees from becoming restless and overheating. Where many colonies are housed, a direct intake does not chill the cellar too much[38]. Hatch observed that the bee cellars under dwellings seemed more successful, whether because of better ventilation or the closer attention given them. Where there is a room adjacent to the cellar, preheated air can be drawn from there into the cellar, or it can be heated with a stove. In a large cellar, an electrically heated blower can be used to warm air as it enters the cellar directly.

When the outside temperature is higher than required to keep the bees quiet it is necessary to cool the air being drawn in. This may require refrigeration that is both expensive to install and to operate. In smaller cellars it may suffice to circulate cool air at night to reduce the temperature sufficiently to prevent a crisis. Ventilation is especially crucial during the last two or three weeks of wintering when brood rearing is underway, and the increasing temperatures may cause restlessness in the bees.

Carbon dioxide. The venting of carbon dioxide may deserve special attention as some systems of ventilation have been designed on the assumption that since this gas is heavier than air, it will settle to the floor in a stratified layer. The outlets are therefore located near the floor and the inlets for fresh air are placed near the ceiling.

"The carbonic acid gas question" was a lively subject of discussion at beekeeper's conventions, as in 1861, when it was reported that carbon dioxide on the bottom of the hive extinguished a candle. Corneil published analyses and statements by engineers and scientists that carbon dioxide is uniformly dispersed throughout unventilated rooms. A more recent statement by Budel that gases are not stratified appeared in 1969. Clarke contended that such mixing with other lighter gases takes place only when air is confined; not where there are vertical air shafts (as in rooms where hives are tiered up) permitting the carbon dioxide gas to sink. However, air is confined in the air sacs and trachea within the bee's body, and would permit mixing of the gases (as also happens in the alveoli of vertebrate lungs)[39].

The requirements of a bee repository are the reverse of a house heated by a hot air system wher the heavier, cold air sinks to the floor, is carried by gravity through ducts to the furnace where it is warmed, and then rises through ducts and registers to warm the house. The critical problem in the bee repository is to keep the bees cool. It might be worth considering whether using the excess heat from the bees to move the carbon dioxide and moisture out through top ventilators would be more efficient than forcing air past the hives to outlets at the bottom of the room. Cold air admitted at floor level rises of its own accord as it is warmed, and mixed with less dense water vapor. The need for fans to remove foul air accumulated at ceiling level would be reduced, and the danger of heat building up in the event of a mechanical or power failure would be diminished. Root cut a 1' square hole in the roof of his house apiary for ventilation when water was dripping from the walls and ceiling. The problem was corrected although the temperature dropped to -10 degrees F., and one hive with a tight cover had frost above the insulation[40].

Colony size. Mendel concluded that under mid-European conditions strong colonies are best left outside with protection against cold winds, and the results of Tomsik's investigations during the 1950's are in agreement[41]. In North America, where bees may be confined in cellars for 5-6 months, beekeepers found medium sized colonies of young bees wintered more successfully[42]. The smaller colonies rear brood at a faster rate, and the colonies are approximately uniform by the time the major honey flow arrives.

Stores. The weight loss of 35 stocks after five months in a cellar ranged from 6-15 pounds (average 10)[43]. Pease reported averages of 6½, 8¼ and 9¾ pounds for 109, 142, and 135 days respectively[44]; Snider recorded 6-7/8, 9-1/8 and 9-2/3 pounds for 144, 151, and 125 days[45]. These records support Doolittle's contention that a colony uses as little as one pound per month when quiescent (5-7 pounds if restless)[46]. Getax found an average consumption of 12 pounds during 5½ months, and Bingham reported an average of 20 pounds[47]. Phillips and Demuth suggested colonies have 20 pounds of honey when placed in the cellar, although 15 pounds would be safe. In Alberta, indoor colonies are provided with 25-30 pounds of honey, and may require feeding in the spring[48]. The recommended total food reserves required by a colony from frost until the first nectar flow in the spring is 90 pounds [49]; most of it being used for brood rearing in the spring. A full super of honey is given to each colony when they are moved out of their cellar.

Construction. The once common root cellar for storing fruits and vegetables could be used to winter a few hives of bees, and the same construction has been used for larger cellars. Woodward in Clarksville, New York described his concrete cellar built in 1921 with information from the engineer who built one for the A.I. Root Company[50]. The winter of 1917-18 was the hardest on bees in 35 years, and E.R. Root visited beekeepers who had little or no wintering loss. The published information was used to design his own cellar[51].

Mr. Running's cellar that Root admired most had an opening at floor level "for the outlet of foul air". However the heavier fresh cold air, that also entered at floor level, would stratify and flow over to the outlet at the other side without effectively replacing the warm air near the ceiling containing carbon dioxide and water vaopr. When a door is opened between a warm and cold room, the cold air settles around the feet and the hot air near the ceiling escapes under the top of the door opening. Designs for water pump pits include a short pipe in one corner of the top deck, and a long pipe at the opposite corner "to vent both the upper and lower portions of the pit"[52]. The ventilator chimney in Root's cellar was constructed with both a top and a bottom opening, the former to be opened when "it is desired to take the warm foul air from the top of the cellar". Gilbert's cellar was designed with two openings in the floor for cold air to enter, and a top ventilator in the center of the ceiling through which warm air escaped. To facilitate air drainage, the roof sloped 6" from side to center. Thermocouple measurements showed the air was evenly diffused. Fans as well as cooling and heating units were incorporated into the lower ventilator[53].

The size of cellars was limited by economy of construction, and the increasing difficulty of controlling temperature as the number of sticks was increased.

Continued on next page

Repository Wintering

Continued from page 597

Although some beekeepers considered 100 an ideal number, Alexander wintered 725 in a cellar with a capacity for 1,000; the temperature rarely changed more than one degree either way from 46 degrees F.[54].

Plans for less expensive cellars have been published using poplar poles in Manitoba[55]; corrugated iron roofing in North Dakota[56]; and 18" dirt walls and ceiling in Ohio[57]. Wood used in the above structures will decay in time, but a permanent structure could be made using the ancient rammed earth (pise de terre) method of making thick walls of soil; at least for the portion above ground level. This labor intensive technique might be useful where insulative materials such as fiberglass or styrofoam are beyond the beekeeper's means, or unavailable[58]. Where the soil is firm, and will not cave in, sustaining walls are necesary[59].

A bee cellar can be incorporated under a building used for extracting, storage, shop, etc. The cellar in the apiculture building at the University of Guelph was carefully insulated to prevent heat from the floor above or the rooms around it from affecting the bee cellar. The same precautions must be taken if bees are placed in a portion of the cellar under a residence[60].

Management. N.D. West summarized the chores of managing a bee cellar[61]. After determining that colonies are queenright, free of disease, and provided with sufficient bees and stores, they are left outside until it is cold enough to cause them to cluster. This may occur between the first week in November and the first week in December depending upon latitude, altitude, and particular season. Ideally the bees should have their final defecating flight shortly before they are moved into the cellar. Tiers of four or five hives were placed on 2 x 4's to provide for ventilation, and some beekeepers built benches 8-12" high.

West opened the entrance to bee hives three minutes after filling the cellar with smoke. But Grow advised against using smoke, and instead plugged the entrance with snow when available[62]. C.C. Miller used a wet cloth. One beekeeper secured a cage to the front of the hive to collect dead bees, and prevent bees flying out when they became restless or were attracted to light. A patented front enclosure incorporated a dead bee trap that could be emptied at intervals[63]. Such devices might insure the bees could be controlled at all times, and even moved outside for flights if warm weather caused the colonies to overheat. A successful practitioner of cellar wintering cautioned against using such cages, or entrance screens of any kind[64].

Once in the cellar there is little to do except monitor the temperature and humidity, and insure the bees remain quietly clustered on the combs. Bees that fly out and die should be swept up. There was some debate in the early 1900's about the advantage of giving the bees a flight out of doors during a warm spell in mid-winter, but a consensus prevailed that the dangers outweighed any possible gain. The 1886 suggestion to winter hives in a cistern would permit their being raised or lowered to suit weather conditions (a possible use for decommissioned missile silos?)[65]. Moeller suggested placing colonies on flatbed trailers that could be rolled outdoors during warm periods[66].

The decision to set stocks back on their summer stands is also tied to the vagaries of weather. They should be taken out of the cellar as early as possible before the bees become agitated with the onset of brood rearing and warmer weather, but certainly no later than when pollen is available. Delay may create a crisis, as when 17' snowdrifts into May forced a neighbor beekeeper to remove his bees to a lower altitude where they broke out into frenzied swarming.

The time of day for taking out bees was also debated. Doolittle recommended setting out 10 or 20 stocks each day about 4:00 PM, on widely separated stands to reduce drifting[67]. Others preferred shifting them after dark, or on a cold, cloudy day to keep bees from leaving the hive. The hope was they would come out gradually the next day, and orient to their hive. Dzierzon and Dadant, amongst others, advised placing colonies on the stand they occupied in the fall, to avoid bees drifting back to their old locations. A recent study by Jay and Harris confirms these practices[68].

Disadvantages. Gilbert listed 14 disadvantages of cellar wintering based on the conditions and procedures in cellar wintering. The chance of losing all the colonies because of a fatal mistake, or some disaster such as fire, flood, etc. is more likely in a cellar than with wintering out of doors. But other hazards are not unique to cellars such as the detrimental effects of long confinement, spring storms, lack of water, insufficient stores, robbing, mouldy combs, etc.

After many years of experience with wintering bees in cellars and out of doors on summer stands in Wisconsin and Minnesota, Schaefer concluded that more honey was produced per colony with the least labor, and the colonies were in better condition, when wintered out of doors[69]. Similar results were obtained in Manitoba with a minor difference in honey consumption. The six year average was 40.13 pounds outside and 41.20 pounds in the cellar[70]. It is apparently only a purely fictitious account of beekeeping that bees kept in a cellar were stronger than those wintered in open air.[71]

Studies in Norway, U.S.S.R., etc. have shown that colonies wintered out of doors started rearing brood sooner, reared more brood, had less Nosema, and produced more surplus honey. It has been suggested therefore that stocks be moved out from cellars in February, but in severe climates they may then require packing which would entail additional expense and labor. Wilson cautioned that packing should not be too heavy or the bees might not be warmed up sufficiently by the sun to take advantage of the first cleansing flights in early March. Such a warm spell is also a good time to set out colonies short of stores so they can be fed.[72]

Advantages. Gilbert saw no advantage in cellar wintering, since his outdoor colonies (in sawdust packing cases or groups of 12 wrapped in tar paper) survived and were in better condition. But in winters with longer periods of extremely cold weather and piercing winds, the clusters in outdoor colonies may not be able tomove to new combs of honey and starve. In 1882 and 1903, ¾ of all the bees in northern states were lost; those that survived were weak. In such circumstances, the fact that colonies from cellars were not as far advanced as outdoor coloneis were in good years would seem less important. Any colony with the potential for building up would be welcome. The authors saw a teacup sized spring cluster develop to occupy six hive bodies and produce 150 pounds of honey. In good beekeeping areas such as Peace River country (Alberta), colonies established with packages develop so rapidly they are split before the major honey flow.

E.G. Brown with 1,000 colonies and 35 years of experience in Iowa wintered out of doors as well as in cellars, but the results confirmed his preference for cellars. Other beekeepers placed their average sized colonies in cellars, and packed their largest colonies outside[73]. This is a little like betting to "place" and "show" in a horse race, and hoping to have a winner in spite of the vagaries of weather. Gambling to "win" is a poor bet in any agricultural pursuit. **To Be Continued Next Month**

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Continued on page 609

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How To—
by Thurber

Continued from page 581

to come in out of the rain. Now does this surprise you? It sure did me so about 15 years ago when I first worked this out, I immediately wrote Dr. Simpson and said, "Hey does this mean I need five deep supers just for bees plus supers for honey too?" Dr. Simpson was kind enough to respond that, yes, the bees could use the same supers for housing and honey storage.

Now, I know that five deep supers is not what the major mail order house in the USA says you need. Their wish book shows a starter hive and then supering kit of two shallows. You want to know what I think a bee starter kit is? I will tell you it is the start of a disaster if you believe you can get by with one deep and two shallows. So you believe Dr. Simpson not Dr. Sears & Dr. Roebuck.

One last gasp. We went through what probably would happen with a hive of given strength, etc. with ten days of rain. We did not take a look except indirectly at what would happen if the weather remained good. Let's do it now. Thirty-thousand bees times two and half percent daily mortality equals 7500 bees dead from normal causes plus 15,000 hatched out so. . .30,000 minus 7500 plus 15,000 equals 37,500 bees in the hive. That is not to the swarm point of 42,000, but it is getting towards it so maybe kick the cat off the super stack and give another super to the bees every 10-15 days in the build up just might be a good idea.□

A Trap To Use To Requeen Ba Bees?

When, in a moment of weakness, I accepted a part time job of bee inspector, I did so primarily because I wanted disease samples to put in an ETO chamber I had made. The pay was atrocious — $2.50 an hour, would you believe, and I had turned down $185 per day plus a company car, a watts line, a secretary and money for appraisal data, etc.. The conversation with my then to be boss is perhaps of interest. I said "$2.50 per hour! You must be kidding. Think I'm crazy?" The boss said he sort of thought so, and since I thought I was crazy too we agreed I would have the job although my wife was all for having me committed.

The first day of the new job I met with the Chief Inspector who started out by saying that he knew a good deal about bee diseases but he would like to see how much. So off we went and soon arrived at the first location. We put on coveralls, fired up the smokers, and I thought were about ready to start when the chief said, "Hey, those are nice looking gloves. Let me see them." I handed them over, he glanced at them and tossed them in the trunk of his car which he promptly locked. I looked at him like I thought he was nuts so he said, "Oh I forgot to tell you about the $2.50 per hour, and how it breaks down. It is 50 cents an hour to inspect bees and $2 an hour for getting stung." Would you believe he meant it? I did not but he did. His thinking was this. When one works bees, he gets honey, propolis, etc., on his hands. If he is bare handed, he has to wash his hands. If one encounters disease and washes up carefully, the action of the soap, water, and alcohol mechanically removes nearly all disease organism, but since one would not normally wash gloves after each location, one could easily spread disease by disease picked up on the gloves. As a matter of fact the chief and all of us did carry cheap vinyl gloves which we were honor bound to use only in dire emergencies, but they had better be true emergencies or he would have your hide. So it was that new inspectors almost instantly got extremely competent at firing up a smoker, keeping it lit, and using it properly. Incidentally any really good inspector could write a book on proper and improper use of a smoker. Actually a man really expert with a smoker you rarely encounter among hobbyists and surprisingly not all commercial beekeepers really are real good with a smoker. Well anyhow.

Inspecting city and suburban kept bees was not too bad if one used a smoker and used it right, but golly out in the stump farms with which Western Washington abounds there were some real rotten tempered bees. Even the chief would comment, but he had a way of grading ill tempered bees that blew my mind. The rating were as I remember (1) A bit techy, (2) a mite unfriendly, (3) a wee bit hositle (4) Hostile (5) darn hostile (6) bad tempered, and (7) durn near unworkable. I won't bore you with how the classifications were divided, but as I remember only once in the five or six summers I was a bee inspector did he ever rate a colony as "durn near unworkable". That colony would not respond to smoke. It came roaring out and covered his coveralls and veil so he could not see and he wandered around bumping into things and finally fell in an irrigation canal, at least so I heard. Incidentally, you think drowning bees won't sting? Me, I don't know, but someone said the chief said they still were at him like a flock of woodpeckers.

The above boils down of course, to the fact that most bees can be handled, but a few are almost impossible, and unfortunately I have encountered my share. The what to do about bad tempered bees accordingly caused me to do a lot of thinking. In a city or suburban situation there may be no solution except to kill off the colony and restart again with a package and a queen from a good breeder or take it out in the country onto acreage and requeen it far enough from livestock and people. The normal techniques of breaking down the hive and killing the queen and putting in a new one probably is not too acceptable. The old queen's brood and bees are still there so you can still have a bad tempered bee problem for as long as nine weeks after you successfully requeen a hive, and that successful part is not always that easy. With your luck and mine likely as not a bad tempered hive would kill the new queen.

In an out in the country situation far enough away from livestock and people your options are broader and over ten years ago I cam up with a gadget I then called my Handy Dandy Fighter Trap. *Gleanings* even ran an article on it. A few were built, but unless you have an extremely bad tempered hive it is not useful. Actually it works and works well only on hive which when touched causes a massive out pouring of thousands of bees eager to gnaw you up and spit out the pieces. For that type of hive it is amazing. You sneak out, put the trap on the front of the hive, then bang on the hive. In a very few minutes you may have three or four pounds of angry aggressive bees trapped. Then you take the trap off, set it in the shade, and with all the fighters trapped you work the hive. . . kill the old queen, put in a new one, and then go open the door of the trap and run as fast as you can. Incidentally when I have encountered a hive like that I do not try to let them eat out the candy method of releasing the queen. I cage the queen without attendants, put a wood plug in the end from which I removed the attendants and put a screw eye in the wood plug. Then I tie a piece of mono filiment line which the bees cannot chew and lead it out the back of the hive. At the end of the week with the queen still not released, I go in and cut all queen cells, and three or four days later I gently tug on the monofiliment line. That opens the hole and the queen starts laying because by the end of ten days there is little likelyhood of any hive killing a just released queen who has been in the hive that long. I do caution you to not go check for at least a week after the queen has been released. You do not want to get the queen balled and killed.

Continued on next page

How To—

by Thurber

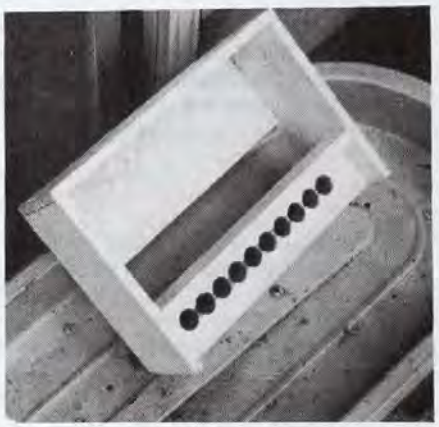
Continued from page 599

Now there is a sneaky purposes to this article. Like many of you I have seen movies of the Brazilian African bees. The movies show that they often do in fact pour out by the thousands to attack, and so after I listened to Dr. Tom Rinderer of Baton Rouge Lab, who has been doing a lot of work on the BA bees, I asked him if a gadget that would trap most of the fighting forces might make requeening a BA hive a little easier. He said something like that might possibly be useful so since I had much enjoyed his talk at the 1983 American Beekeeping Federation Convention in Hawaii (and other talks I have heard him give) I told him I would make him such a gadget to test. This one photographed is considerably easier to make than the Handy Dandy Fighter Trap photographs of which were shown in *Gleanings* because back say then years ago bee escape cones had not been to my knowledge invented. Now they are available. As far as I know they are not widely distributed, but they are in the current A.I. Root catalogue. At any rate making the trap with the cones is really a snap now because making cones out of screening and installing them is a lot harder and more time consuming than just stapling in the plastic cones over appropriate size holes.

1. Front View — I left the hardware cloth off the bad tempered bee trap so you can see construction details. Note escape cones face outward.

I took the photographs before I stapled 1/8● hardware cloth over the openings in the front and the back of the box. In my original trap I could not get as many cones built in as I could with the store bought plastic cones. Here you will notice I use ten. Obviously the small opening (at the back of the trap) goes up against the hive entrance. You can hold the trap in place just with a stick laid against the ground and angled up to touch the front of the trap.

2. Front & Side veiw — "Let them outdoor open — Hardware covers all space.



3. Back view — area above portion will be covered with hardware cloth.

Well I guess that is about it. I hope you will never have to make up such a gadget, but with the BA bees now in Panama who knows what is in store for us all. If they get here and some would say "When they get here", and if they are as fierce as they have been say in northern south America for sure we will have to be very vigilant — use marked queens, check our marked queens regularly so we know they have not been replaced by intruding BA queens, and be ready and able to requeen very bad tempered hives.

In the meantime I will now go staple on the screen, and mail the trap to Dr. Tom Rinderer. I hope he finds it useful. Maybe he will even tell us about how it worked out for him.

Incidentally I have not dimensioned the trap for you. The sides should be no more than five inches front to back and no more than 10 inches high (figuring it will be used on a Langstroth hive two or more stories high.) With the concept in your head you can lay out your own dimensions. I used half inch marine plywood throughout.

That is it. Have fun if you build one, but I hope you never need it.□

BEES OF A FEATHER FLOCK TOGETHER?

From THE ART OF TRAVEL by Sir Francis Galton, 1856. As part of his book of advice to travelers, Sir Galton provided instructions as to how one might find honey where bees are about. He wrote: "Catch a bee, tie a feather or straw to his leg, which can easily be done, throw him into the air and follow him as he flies slowly to his hive." We'll make no comment.

Head of Grain

Continued from page 578

elimination of lower hive queens. This provided colonies with field forces from two queens for honey collection. All other non Anatolian colonies were maintained as two queen units to keep the test on a comparable basis.

In 1966 this requeen procedure established an Anatolian queen above a 1965 colony and in two months a different decision had to be made. Bees were so numerous that I had to split this unit into two definite colonies. A full depth super of drawn comb was given to old colony and upper colony received a full depth super of beeswax foundation to draw into golden honey comb cells.

The original Anatolian colony produced 112 pounds of extracted honey in 1965, 143 pounds in 1966 and 103 pounds in 1967.

The upper colony division drew out beeswax foundation for a second brood chamber, foundation for honey supers and produced 77 pounds of liquid honey, 21 pounds of section comb honey and 38 pounds of cut comb honey for a total of 136 pounds. A total of 220 pounds of extracted honey was produced by this colony in 1967. Imagine the total production for 1966 if this colony were given drawn comb instead of foundation that required extra effort and honey to produce wax cells.

YEAR	TOTAL	ANATOLIAN AVERAGE	STATE AVERAGE
1964	52 pounds		63 pounds
1965	75 pounds	112 pounds	72 pounds
1966	92 pounds	139 pounds	80 pounds
1967	112 pounds	133 pounds	98 pounds

It is noted that total average honey production per colony adhered close to state average, but Anatolian average colony production was well above them.

Prices for Anatolian queens were slightly higher than other good quality queens, but increased honey production made up for extra price. One section comb of honey or two pounds of extractd honey at that time made up difference in price. Extra supers of honey made me decide to have my entire operation devoted to Anatolian populations.

My bees completely supported themselves and every piece of hive and extraction equipment was purchased from honey profits. Extraordinary honey production allowed some of the profits to commingle with the family budget and it is easy to determine my appreciation for Anatolian production.

Super bee, super production, extra supers of honey makes it sould like super promotion by utilization of "super" to convince a public rush to buy Anatolians.

Lack of scientific evidence of existence of these bees in North America and hasty purchase of untried queens taught me a lesson on making quick decisions, even on a queen. Anatolians had a genetic package that dictated extraordinary nectar gathering abilities, but it did not contain a disease resistance genetic code.

In 1969 and 1970 the Anatolians were completely full of brood disease and the colonies had to be eliminated by fire. Fire, that great sterilization agent, removed Anatolians from my operation and taught me not to be smitten by any publicity agent's boast about well shaped queen bees.

Recent bee periodicals indicated that the Buckfast queen is the only Brother Adam strain offered by bee breeders now. Buckfast queens have survived the experimentation and scientific tests necessary for public sale, but I am reluctant to give Buckfast ladies a try.

After moving to Billings, Montana, in 1973 my experiments with bees continued and included Mraz, Beemaster, Carniolans, Caucasians, and Carniolan-Italian and Caucasian-Italian crosses.

My conclusion settled on Carniolan and hybrid Italians from Jerry Foster Apiaries, primiarily because of good honey production and over wintering abilities. Jerry's brother, Don Foster selected some of the queens for breeding purposes from his Montana commercial operations. It is important for me to have all my colonies survive the Montana rigorous winters and be on the starting line for nectar collection when the major honey flow begins.

Montana's nectar flow is hsort and intense. Super populations of super bees are needed to capitalize on the nectar flow and get loads of honey.

In 1982 the average total production in Montana was about 120 pounds per colony and my bees garnered an average of 160 pounds per colony. A significant difference.

Continued on page 602

Heads of Grain

Continued from page 601

Say, have you read about brand new development in queens at popular prices with enticement in advertisements? Should I resist her, buy her or forget her? Does she have a better genetic code? SUPER BEE!□

1983 4-H Essay Winner Named!

This year's essay contest saw a repeat performance by the Jamieson family of Honesdale, PA. The unanimous choice of the panel of judges was the essay by Dean Paul Jamieson of R.D. 3, Honesdale, PA! (Dean's sister, Mary Ann, was the 1982 winner!)

Dean is eleven years old and an active 4-H member who has had projects in Forestry, raising 2000 Norway Spruce seedling, and vegetable gardening, where he used honeybees to pollinate his squash and melons. Dean's beekeeping experience has come from helping a neighbor take care of his colonies.

The 2nd place winner was Janet Carol Fisher, a 17 year old Senior at Mt. Carmel High School in Mt. Carmel, IL. Janet has been a 4-H member for nine years and her interests include playing piano, collecting insects, target shooting, swimming, needlepoint, knitting and photography.

Third Prize went to 18-year-old Shirley Tisdale of Stanton, TN. In addition to her 4-H activities, Shirley has been a cheerleader, Secretary of the Student Council, a member of the Art Club, the Band, the Symphonic Choir and the Show Choir.

Our congratulations to these winners and to the other 37 state winners!!

The Honey Bee's Place In The World

By PAUL JAMIESON

The honey bee has been a predominate factor in the world even before historical records were kept. The influence of such a tiny insect has had a lasting influence on the world's eating habits, natural vegetation, and even architecture.

In the ancient history of the world, the honey bee was important both as a food producer, wax producer and as a symbol of power. Many countries of the world used the bee as a source of wax for candles. Egyptians made wax tablets to write on and also used wax to paint with.

The modern world would be different without the honey bee. With all the computers and modern audio-video equipment, the world still needs the honey bee to help Mother Nature grow certain food crops. Today almost every developed country in the world uses the honey bee to pollinate their food corps. "As much as ⅓ of the world's food supply is pollinated by the honey bee."

There are four species of honey bees in the world and each one is native to certain areas. In the U.S. we use the *Apis mellifera*, but in tropical countries they cannot adapt because of diseases and insects. In these areas native bees must be used.

Let's take a mini-tour of the world and visit some of the major honey producing countries and see how the beekeeping methods are different.

A trip 'south of the Border' to Mexico shows us bees existing in a mild climate with average highs of 70 degrees and lows of 45 degrees. Overwintering of bees is definitely not a problem because of warm winter temperatures and natural food. However, dry weather and ants are major problems. Until 1982 Mexico was the world's second largest exporter of honey. This is mainly because Mexicans don't eat much honey! Beekeepers of Mexico see lots of potential for their honey production, but at the present time the economic situation is limiting its growth.

From a country of mild climate let's go to a tropical situation in Brazil. With average high temperatures of 105 degrees and lows of 67 degrees, heat is definitely a problem. The bee hives must be shaded constantly and also elevated because of all the tropical ants. Today the aggressive African bees are considered the normal race of honey bee in Brazil. Even though the Africanized bees are more aggressive than the European bees, Brazil's indudstry is bettter organized and the honey production is increasing. An advantage of a tropical climate is the constant supply of flowers so the beekeeper does not have to move his hives. In 1981, Brazil was rated the 7th largest honey-producing nation in the world. However, the honey sold in supermarkets in Brazil is usually not pure. Most honey has additives of water, corn syrup, or glucose that are cheaper than pure honey.

Now traveling on to Africa, the "killer" bees are the major honey producers. Despite numerous attempts, European races of bees have never been successfully introduced into tropical Africa. Currently it is illegal to import bees into Kenya.

The beekeepers have three problems: the unsociable killer bees; the driver ants; and the honey badger. For this reason Africa has unique beekeeping methods. They hand hollowed log hives in trees away from ants and badgers. The beekeepers harvest the honey in the black of night and use alot of smoke to help avoid stings. East African countries are the world major exporters of beeswax. A table of grade honey is not the goal of many beekeepers because large quantities of honey beer is made for local consumption.

Continued on next page

Heads of Grain

Continued from page 602

After looking at beekeeping in several tropical countries, let's go North to a cooler climate and see the problems encountered there. In Ireland, summers are late so the bee hives require a lot of winter and spring feeding. This is a large expense for the beekeeper. Heather, briar and rape are main honey crops. As a tribute to beekeeper—, a ¾ acre 'Bee Garden' is being established with models of old and new types of hives.

Poland has a unique opportunity for young beekeepers. A school near Warsaw teaches 25-35 students each year the techniques of beekeeping. This is the only subject taught and over 400 colonies of bees are at the school for students to care for. Basically Poland is a cool, semi-dry country with a fairly dense population with not too many beekepers.

Russia produces a lot of honey but 90 percent of it is consumed inside Russia. Climate, again has a large effect on the beekeepers expenses as winter temperatures can average -20 degrees F.

"China today produces between 15 and 20 percent of the world supply of honey." Much of it is produced from wild flowers and Dragon Eyes blossoms. The honey is extremely thick, dark and strong. The Chinese bee equipment is minimal, simple and often homemade. Propolis doesn't seem to be a problem. Beekeeping is mainly a migratory business. The bee hives

Continued on page 608

The Public Doesn't Know . . .

By GRANT D. MORSE, Ph.D.
Saugerties, N.Y.

Most members of the public don't know very much about beekeepers. Many of them wish they did, for, to them, the beekeeper has an interesting life— dealing with an insect he likes, harvesting vast quantities of honey rather effortlessly, and making money easily.

They fear being stung but they assume that the beekeeper works by some magic formula by way of which he escapes most stinging. Many of them harbor the suspicion that bees seldom sting a beekeeper because they know him, and therefore exempt him from their assaults.

A Beekeeper's Investment

Of course, you can't expect the typical layman to know the dimensions of the investment that a beekeeper has in his bees, his honey house, his processing equipment, his trucks, and so on.

Since a beekeeper needs, desirably, not fewer than a thousand colonies in order to make an acceptable living, his over-all investment may run to as much as $175,000. This does not include his dwelling. I estimate a four to six hivebody colony as worth not less than $100; his honey house at $35,000.; the processing equipment at $20,000.; and his truck(s) at $15,000.

Many a beekeeper by dint of effort and good fortune, may have been able to acquire a beekeeping outfit for less than this amount— often by buying it for less than it was worth from a beekeeper's widow— but the fact remains that this is likely to be its current value. Many beekeepers have kept their costs down by manufacturing their own equipment. How valuable it is depends upon how competent they are as craftsmen. In many cases the result is very satisfactory.

The Bee Yard

Non-beekeepers don't realize that an operator of a thousand colonies of honey bees must have them distributed in as many as 30 different locations— at least two miles apart, preferably farther apart.

What is the cost to the beekeeper of using 30 or more plots of land that belong chiefly to farmers? It depends. There's no fixed price. Usually the plot used for the bee yard is not tillable, but it often would be used for pasture if not occupied by bee colonies. It's usually (and desirabley) within view of the landowner's dwelling so it has more than normal value.

Many farmers realize the value to them of free pollination service by honey bees so they incline to be less severed in setting a price for use of land. A year's supply of honey is the usual price. But some landowners use an amazing quantity of honey. I can recall that I once gave a farmer 20 pounds of honey as rent. I learned afterwards that he complained to others that I had short changed him. He fed three hired workers in addition to the members of his family. I estimate that he probably needed about 60 pounds of honey annually to satisfy his table needs, maybe more.

Some advocate a beekeeper's attempting to acquire a title to the acreages where his apiaries are located. This is doubtless desirable but it is not always practical, nor does it eliminate all conflicts.

Almost every beekeeper has been asked at some time in his life to move his bees from a particular yard. It seems to happen oftenest when the colonies have been supered for the flow, or after the supers are half full.

It can happen for a variety of reasons. I'll cite three. In my first expereince the farmer who owned the plot where my yard was located had a boy who was severely allergic to stings. I had not known this. In the second instance the farmer's wife who, as I saw it, was something other than a lovely lady, was afraid their cows would get stung. She demanded an immediate move.

The third instance was the experience of another beekeeper who had operated a certain yard for 30 years without trouble. One day the farmer who owned the land where the bee yard in question was located set out to shingle his bard. It seems that the bees at that time were working a field of alfalfa on the hillside above the barn. The bees were flying directly over the barn to the beeyard below. The men at the shingling were being bombarded by an unending series of nectar laden, fast-flying honey bees. The shinglers demanded the removal of the colonies. The hives were already laded with half their crop. The beekeeper reluctantly—very reluctantly— moved his bees, immediately.

In addition to rent for land, the beekeeper in many instances has to build a barbed wire fence to keep cattle away from the entrances of his colonies. I've never experienced any trouble from deer in my yards. A deer is more discerning than a domesticated animal.

Thirty bee yards spread at intervals of not less than two miles from each other can extend over a fairly large area—maybe as much as 100 miles or more. They typical layman has little idea of the rather extensive travel schedule such an operation entails. He probably doesn't think such an operation is very expensive when his is guaging the price he would like to pay for a pound of honey.

Enemies Of Bees

The typical layman doesn't have much of an idea what enemies a colony of bees has. And he probably seldom, if ever, thinks of the impact these enemies of bees can have on the economic welfare of the beekeeper.

That skunks and mice destroy or damage from one to two percent of all honey bee colonies is not likely to occur to the layman. He simply has no concept of the nature or extent of such depredations.

Likewise, he has probably never heard of a wax moth, the destroyer of an even greater quantity of bee equipment than mice and skunks.

That black bears destroy millions of dollars worth of colonies and equipment annually in the United States is almost totally inconceivable to the non-beekeeper. The average layman looks upon the black bear as an interesting wild animal to be admired and protected—until hunting season. Non-beekeepers do not realize that black bears are a real menace to the investment that beekeepers have in their bees and equipment, and that there is little protection against them, even by using electric fences. An experienced black bear is usally more than a match for even an expensively erected electric fence. Furthermore, the non-beekeeper has no concept of the expense entailed in erecting and maintaining a number of electric fences.

I believe that the hope of beekeepers to secure state legislation to reimburse them

Continued on next page

What The Public Doesn't Know . . .

(Continued)

for loss from the depredation of bears that are proteted by game laws for the pleasure of hunters, is to disassociate bears from deer when framing a compensation law.

Deer are certainly destructive to property, though in different ways, of course. In the Catskill Mountain area of New York State which extends south to north for approximately 100 miles, and from east to west for a somewhat similar distance, it is relatively impossible to maintain an unfenced gaden against the destruction by deer. Orchardists and the growers of such crops as cauliflower have similar problems with deer. Growers of grain find deer tread down even more than they eat of such crops.

As I said above, if the beekeeper is to succeed in securing the cooperation of his state legislators in enacting protective legislation against depredation by bears, he must insist that it to be a fact that bears and deer operate in different categories and hence necessitate different legislation.

Bears threaten the property of beekeepers chiefly and almost exclusively. Bears are much less numerous than deer. Their numbers can easily be controlled if the public will permit it. The damage they cause can be kept within the ability of the public to pay for a marauding wild animal that it willingly propagates and permits to proliferate. Bears are seldom involved in traffic accidents as are deer. The two animals present different problems and their control deserves different solutions. Furthermore, bears are a threat to the pollination benefits provided by the work of honey bees, so they are an extra public concern.

The public likewise has little knowledge of the damage to bee colonies from the use of insecticides. The best protection that beekeepers have against loss from this and all other threats to their colonies of bees is to give wide publicity to each and every loss. In order to secure compensation for loss, plus wise use of insecticides, it is essential to keep the public informed—constantly and repeatedly.

The Significance of Pollination

The general public pays a good bit of lip service to the part honey bees play in pollination. But the typical citizen has a very incomplete knowledge of the role honey bees play in this function.

The average citizen is not aware that approximately one third of the food on our tables is there in large part because honey bees pollinate the blossoms of the plant-that produce that food.

Nature employs pollination, that is, the transfer of the male element, pollen, from the anther of a flower, usually to the stigma of another flower of the same species. Despite the fact that some plants are self-fertile, that is, can produce fruit without the need for the transfer of pollen to them from another unit, substantially all plants profit from cross pollination at some time in their history. Wind, too, is a very common agent of transfer of pollen in most grasses and grains. But honey bees are the chief insect agents that accomplish pollination that leads

to fertilization. That is, in part, because they are transportable to the fields and groves and orchards where they are needed in large numbers.

A great deal of lack of information about pollination prevails among many gardeners. They often wonder whether they need to import bees in order to secure good yields. Some garden vegetables

Continued on page 615

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Heads of Grain

Continued

are trans ported to as many as six locations in a year and placed among relatives so that actua l owners do not move with their bees. Roy al jelly is in great demand by Chinese r nedicine dealers, and many beekeeper s produce it. Most of it is sold to Japan f or as much as $160.00 per pound.

There are only a relatively few colonies of the small n ative honey bee left in Japan. European ho ney bees are now the most common bee for honey production. The average sun mer temperature is 72 degrees and v vinter 46 degrees with lots of rain annually /. The importance of honey bees for pollin ation is great in Japan as growing green house crops is a large industry there, esp ecially strawberries, which require a lot of pollination. The Japanese eat a lot of hone y, royal jelly, and a 'Relish' made from boi led drone brood in soy sauce.

Beekeeping al so takes place on some of the larger Paci ific Islands. On the Marshall Island, temp eratures vary from 78 degrees to 86 degrees year around. Therefore bee hi ves must be shaded, usually with palm fr onds. There are some advantages to isla nd beekeeping. For instance, a species c an be reproduced or pure bred queens raised without cross-breeding taking pla ce.

Canada has certai nly benefitted from the honey bee. Rapeseed is Canada's second most valuable crop fo llowing only wheat. As some varieties o f rapeseed require cross-pollination, bee s are a must for higher yields of rapes seed.

Our mini-tour of the world has brought us back to the United States. The type of hives, plants, and clima te have differed but each country had on e basic common factor—the helpful hon ey bee. They are much needed for pollina tion of the world's food supply.

Wherever we go the be nefits of the bees' products will be there. In church, the candles of wax. At the disco we know the master disk was made with wax. Museums have many statues cast using the "Lost Wax Process." Encaustic paintings a re available, and the varnish on musical instruments has propolis in it. The pharma cy has pollen tablets and other bee product remedies. The supermarkets are loaded with fresh fruit an d vegetables because of bee pollination.

God cr eated the world—th e honey bee has helped to make it flouris h!□

Repository Wintering

Continued from page 598

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NEWS AND EVENTS

Colorado Beekeepers Annual Meeting

Mr. Roy Weaver of Weaver Apiaries, an internationally recognized queen breeder, will be the featured speaker at the annual meeting of the Colorado Beekeepers Association (CBA). The meeting is scheduled for Saturday and Sunday, December 3rd and 4th, 1983. A full program of speakers of interest to both hobby and commercial beekeepers will begin at 9:00 a.m. Saturday. Mr. Weaver will speak about the queen rearing operations at Weaver Apiaries at Navasota Texas and in Hawaii. At 5:00 p.m. the CBA will host a beekeepers social to give the members time to socialize and renew old friendships. The annual business meeting of the CBA will be held on Sunday morning.

It should be noted that this year's meeting will take place at a different location than in past years. The Saturday sessions will be held at Green Center on the campus of Colorado School of Mines in Golden, Colorado. The business meeting will be held at the Denver-West Days Inn, 15059 W. Colfax Ave. (Colfax at I-70). Beekeepers may wish to make reservations for overnight accomodations at this Days Inn to take advantage of group rates.

All beekeepers are encouraged to attend these meetings. Voting at the business meeting are reserved for dues paying members of the CBA. Bee equipment suppliers and manufacturers are also invited to display their products. For futher information send a self-addressed stamped envelope to:

Randy Fischer
Vice-president, Colorado Beekeepers Association
3007 Moore Lane
Ft. Collings, CO 80526

1983 Iowa Honey Producers Association Annual Meeting STARLINE MOTEL Ames, IA

Highlights Include:

Friday, November 4

Federal Extension Program
Basil Furgala, Ext. Apiculturist

Economics of Beekeeping, Financial Recording
Bob Wells & Tom Wood

BANQUET 6:30 p.m.
"There Is A Better Way, But We Don't Use It."
Marvin Regier, Walton, KS

Saturday, November 5

Effects of Nosema And Queen Experimentation
Dr. Basil Furgala, Mark Sugden

State Apiarist Report
Glen L. Stanley

The Washington D.C. Scene
Glen Gibson, Minco, OK

Queen Rearing in Alabama
Louis Harbin, Navroo, AL

Bonnie Le'Febrvre, Maine Honey Queen, Susan Post, New Jersey Honey Queen and Cray Briggs, American Honey Princess at the EAS Conference banquet held in Orono, Maine. Over 700 were in attendance.

Michigan Beekeepers Association Winter Meeting

The Michigan Beekeepers Association will hold it's winter meeting November 4th and 5th in Bloomfield Hills, Michigan. The Southeastern Michigan Beekeepers Association is pleased to host the event at the Holiday Inn on 1801 South Telegraph, Bloomfield Hills, Michigan 48013. Registration will be held from 9:00 AM to 9:30 AM on Friday and Saturday. The registration fee is $3.00. The meeting will adjourn at 5:30 PM on both days. A banquet will be held 7:00 PM Friday. Reservations are necessary. Saturday the meeting will reconvene at 9:30 AM. A lunch will be held on Saturday at 12:00 noon. Reservations are necessary. Reservations can be made to Dan and Joyce Gutherie, 46100 Ryan Rd., Utica, Michigan 48087 by October 29th, 1983. Cost of the dinner is $9.50 and cost of the lunch is $6.55. Checks should be made payable to the Southeastern Michigan Beekeepers Association.

Featured speakers will include John Root, *"Gleanings In Bee Culture."* Dr. Roger Hoopingarner, Dept. of Entomology, Michigan State University. Gloria DiGrardi Hoffman, Dept. of Entomology, Michigan State University.

The Annual Business Meeting will be held as part of the meeting on Friday.

For further information call the Guthries at 313-731-8697.

New Mexico Beekeepers Association New Mexico

A great convention is being planned for the New Mexico Beekeepers Association for 1983. The meeting will start with registration at noon, December 2, and the meeting will run thru Saturday, December 3.

The convention will be held at Kostas Restaurant, 600 W. Reinken, in Belen, New Mexico.

The program will be of interest to hobby beekeepers as well as commercial beekeepers.

A luncheon banquet will be held Saturday noon. Everyone is welcome and asked to bring goodies for the coffee breaks.

Puerto Rico

The Beekeepers' Association of Puerto Rico, Inc. was founded in 1979. In 1977 we had a work committee in Lares which was worried about beekeepers and founded the Association to protect bees from extinction.

The same thought was for help to the legislature branches, government agen-

Continued on next page

cies, universites, press, and agricultural groups in the country.

We can say thanks to this movement, although a bit later, the action brought about by this groups was a success.

Although the beekeepers in Puerto Rico contribute to millions to the Puerto Rico economy, it worries us why the government of Puerto Rico hasn't developed a program which in some way will help the beekeepers and protect the scarce beehives left in Puerto Rico.

Mr. Nieus, President of Puerto Rican Association.

The Association expects a program which responds to the development of beekeepers in Puerto Rico and stops the negativism towards beekeeping.

For more information write: El Apicultor, Boletin Oficial De La Asociacion De Apicultores De Puerto Rico Inc., Apartado Postal 471, Lares, P.R. 00669.

Saskatchewan Beekeepers Association

A bee beard contest was held at the Saskatchewan Beekepers Association annual field day which was held June 11, 1983. The field day was hosted by Steve Clifford in Nipawin, Saskatchewan.

The field day consisted of a bee yard tour where wintered colonies and spring established package colonies were observed and compared. This was followed by excellent talks by Steve Clifford on queen rearing and queen introduction, and by Dr. Don Peer on self-sufficiency and winter management.

The highlight of the day was the bee beard contest. The five competitors were all members of the board of directors of the Saskatchewan Beekeepers Association. The winner of the event was Grant Hastings of Birch Hills, who was judged tohave the largest and best shaped beard.

During the field day Mrs. Linda Gane honey promotion committee member for the Saskatchewan Beekeepers' Association presented two cheques totalling $20,000 to Mervyn Abrahamson, president of the Canadian Honey Council. The two cheques represented a $10,000 contribution from the members of the Saskatchewan Beekeepers Association and a $10,000 matching contribution from the Market Development Fund of the Saskatchewan Department of Agriculture. The $10,000 donation from the Saskatchewan Beekeepers Association was also matched by federal monies so that the S.B.A.'s contribution to the Canadian Honey Council's generic honey promotion fund totals $30,000.

The Canadian Honey Council will initiate a generic promotion capaign on September 1, 1983. The promotion campaign is costing $75,000 and is aimed at the major market areas of Canada. It is hoped that the generic promotion will put honey into the consumers mind and will generate increased domestic consumption.

Southern States Beekeepers News Media Cooperation Fantastic

The opening scene is a typical family cook-out with all the usual "fixings". Next, we see a "close-up" of a honeybee gathering nectar from a flower. A soft voiced announcer talks about the bee and the importance of her services in pollination. Again, we see the family picnic table as the camera "zooms" in on the foods thereon. As the announcer continues, one by one the food items vanish from the table, illustrating visually the foods which would be missing without the work of our honeybee.

If you live in the southern states of our nation, you have probably seen the above video spot on your own T.V. screen. This 30 second promotional was produced by the Southern States Beekeeping Federation. Since early last spring our T.V. stations, radios, and newspapers have been helping beekeepers promote the value of our bees. Their cooperation in providing free public service announcements has been fantastic. After an awakening of interesting facts about bees, the news media sent reporters and camera crews to local bee yards to produce segments to use on local news spots and some crews even filmed "series specials". Reporters with cameras wrote articles which were used on front pages in local papers. Radio announcers, during breaks between "top-twenty" records, related interesting facts about the value of bees.

This sudden interest developed as a result of efforts made by the reorganized Southern States Beekeeping Federation. It is only the beginning. . .You will be seeing more good coverage on P.M. Magazine after their crews cover the conference S.S.B.F. will host at Myrtle Beach, South Carolina.

S.S.B.F. is **full** of promotional ideas, and during the conference this year they plan a "round-table" workshop for the leaders of state, regional or national bee organizations. Leaders will be sharing ideas which have helped their organizations re: programs, record keeping, conference planning, etc. If you now hold office you will find this workshop most beneficial.

By now you may be asking "who, on earth, are members of S.S.B.F.?" Well, just a few short years ago, I asked the same

Continued on next page

question and found to my surprise that I was already a member because I was a dues paid member of my State of Georgia Association. No dues are collected, but you are a member of S.S.B.F. if you are a member of any of the following state organizations: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, Missouri, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia and West Virginia. Other states who may wish to include their membership should contact our president, Steve Forrest, Rt. 1, Box 135, Moravian Falls, North Carolina 28654 or call him 919-921-3640.

Ms. Jacqueline A. Armstrong of Florence, Kentucky — 1983 Kentucky Honey Queen.

Texas Beekeepers Support Special Course

The Texas Beekeepers Association will sponsor two beekeeping training programs in conjunction with their annual fall meeting, set for Austin Texas.

On November 3rd, a program on INTERMEDIATE BEEKEEPING will be conducted by Dr. Larry Connor, Consulting Entomologist, Cheshire, Connecticut. topics include: The management triangle, Increasing Colony numbers, Simplified Queen Rearing, Treating Beekeeping as a Business, Honey Bee Diseases, Honey Production, Packing, and Peddling; and a question and answer session.

The registration fee is $25 per person, or $40 per family.

On November 4th, a program entitled BEEKEEPING BASICS will be conducted. Designed for non-beekeepers, new beekeepers, and beekeepers wanting a thorough review of basic beekeeping ideas, the program will review basic level information on most subjects important to new or hobby beekeepers.

A special feature will be a presentation of the film: Sexual Encounters of the Floral Kind. The registration fee is $15 per person or $20 per couple.

Registration information should be requested from Lester Haines, 13808 Dragline, Austin, Texas 78728; phone 512-836-1675.

Western Connecticut Offers Intermediate Course

In response to membership surveys the Western Connecticut Beekeepers Association will offer an intermediate beekeeping course titled BEEKEEPING CONCEPTS. The program is coordinated by Fairfield County Extension Agent Howard Kemmerer, and Larry Connor, Beekeeping Education Service, Cheshire, CT.

The program will run Wednesday evenings from November 16th to December 14th except the course will meet Tuesday, November 22, because of the Thanksgiving holiday.

Topics will include: Ways to Winter Bees, Increasing Colony Numbers (Swarms, Packages, Divisions/Nuclei), Raising and Using Queens, Pest and Parasite Biology and Control (or Factors affecting Nectar Secretion), taught by Dr. Connor. In addition, Dr. Thomas Seeley, Yale University, will discuss The Division of Labor among workers and how it relates to the origins of the bee nest, and The Annual Cycle of the Colony and How the Colony Collects its food.

The fee will include SOME IMPORTANT OPERATIONS IN BEE MANAGEMENT by Johanssen and Johanssen, plus additional reprints. The registration fee is $50 per person, or $75 per couple. Checks payable to Beekeeping Education Service should be sent to Howard Kemmerer, Coutny Agricultural Extension Agent, Route 6, Stoney Hill, Bethel Connecticut. Phone 203-797-4176.

The 1983 California Convention

By DON NULL

The time is fast approaching when the California State Beekeepers Association, Inc. will be holding its 94th Annual Convention. This year the convention will be in Southern California on the R.M.S. Queen Mary. You can't miss it, it's in Long Beach Harbor at Pier J right next to Howard Hughes' "Spruce Goose" (the worlds largest airplane). You should plan to arive by 8 pm Monday, November 14, 1983 for the reception and presentation of our honey queen candidates or at the latest by 10:00 am the next morning.

Everyone is invited to join us in Long Beach this year. All attendies are required to register for the convention ($30.00 at the convention) and are asked to pay their next years dues if they are not already a member of the Association. Member dues are just $30.00 per year.

As you can see below we have encompassed in our program many new, educationsal, and entertaining activities to ensure an outstanding convention. Two things that are only hinted at in the program are the comprehensive and impressive manufacturers exhibits (equipment that is "new, better, improved, or redesigned"); the other is the extensive Ladies Auxilliary Program which is separate from the main program and is intended to keep the rest of the family contented.

An advantage to membership is the opportunity to participate in our Theft Reward Program which has resulted in sharply reduced incidence of hive theft among our members. In a nutshell, this program offers a reward of up to $10,000.00 for information leading to the arrest and conviction of those responsible for vandalism, theft, or intentional poisoning of bee colonies belonging to participating members.

Those wishing to stay on the Queen Mary should contact the hotel directly at Hotel Queen Mary, P.O. Box 8, Pier J, Long Beach, California 90801 or phone (213) 435-4747. If you desire additional information, please contact our secretary Mr. Frank Johnson, 2114 Westminister Drive, Riverside, CA 92506.

AMERICAN HONEY PRODUCERS' CONFERENCE --Albuquerque, New Mexico

The American Honey Producers will meet, January 9-14, at the Classic Hotel, in Albuquerque, New Mexico. Among the featured speakers will be Dr. Bill Wilson and Dr. Elbert Jaycox. For further information, write the Classic Hotel, 6815 Menaul, N.E., Albuqurque, NM 87110 or call (505)-881-0000. Look for additional information in the December GLEANINGS.

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MAGAZINES

THE AMERICAN BEEKEEPING FEDERATION needs your support! Join in supporting efforts to stop adulteration, to improve marketing conditions and to encourage the continued research on African Bees and Varroa and Acarine Mites. Send for information, membership application and sample copy of bi-monthly News Letter! Write To: **THE AMERICAN BEEKEEPING FEDERATION, INC., 13637 N.W. 39th Avenue, Gainesville, FL 32606.TF**

THE SCOTTISH BEEKEEPER — Magazine of The Scottish Beekeepers' Association. International in appeal. Scottish in character. Membership terms from A. J. Davidson, 19 Drumblair Crescent, Inverness, Scotland. Sample copy sent, price 20 pence or equivalent. TF

The INTERNATIONAL BEE RESEARCH ASSOCIATION urgently needs your membership and support to continue its work of publishing information on bees, beekeeping and hive products. Write for details about publications and the benefits of membership to USA Representative, H. Kolb, P.O. Box 183, 737 West Main, Edmond, OK 73034 (phone (405) 341-0984); or to IBRA, Hill House, Gerrards Cross, Bucks SL9 ONR, UK.
regularly publishes new information on bees, beekeeping, and hive products, for beekeepers and scientists all over the world. Mail inquiries from USA: H. Kolb, P.O. Box 183,, 737 West Main, Edmond, OK 73034, Phone: (405) 314-0984. IBRA PUBLISHES: **Bee World,** a quarterly journal for the progressive beekeeper. **Apicultural Abstracts,** a survey of scientific literature from all languages. **Journal of Apiculture Research,** for original bee research papers. Books and pamphlets on all beekeeping topics. Catalogues of publications and details of journals and membership $1. Specimen copies of **Bee World**, **Journal of Apicultural Research** or **Apicultural Abstracts** from INTERNATIONAL BEE RESEARCH ASSOCIATION, Hill House, Gerrards Cross, Bucks. SL9 ONR, England. TF

DAIRY GOATS—for milk, pleasure and profit. Excellent for children, women and family! Monthly magazine $11.00 per year ($13.50 outside U.S.A.). DAIRY GOAT JOURNAL, Box 1808 T-3, Scottsdale, Arizona 85252. TF

BEEKEEPING. A West Country Journal—written by beekeepers—for beekeepers. 1.50p inland or 1.80p ($4.00 Overseas). 10 issues yearly. Editor, R. H. Brown, 20 Parkhurst Rd., Torquay, Devon, U.K. Advertising Secretary, C. J. T. Willoughby, Henderbarrow House, Halwill, Beaworthy, Devon, U.K. TF

SCOTTISH BEE JOURNAL. Packed with practical beekeeping. Sample copy from Robert NH Skilling, FRSA, 34 Rennie St., Kilmarnock, Scotland. Published Monthly. $4.00 per annum. TF

BEE CRAFT — Official (monthly) magazine of the British Beekeepers Association. Contains interesting and informative articles. Annual Subscription (Sterling cheque 2.22 p.or U.S. $6.) Post paid. The Secretary, 15 West Way, Copthorne Bank, Crawley, Sussex. RH10 3DS TF

INDIAN BEE JOURNAL Official organ of the All India Beekeepers' Association, 817, Sadashiv Peth, Poona 411030. The only bee journal of India Published in English, issued quarterly. Furnishes information on Indian bees and articles of interest to beekeepers and bee scientists.
Annual subscription postpaid in foreign countries: For individuals US $7.00 for institutions, companies and corporate bodies US $10.00 or it's equivilent, to be received in advance by IMO or bank draft, payable in Poona (India). TF

WANTED

WANTED—All varieties bee gathered pollen. Must be clean and dry. Pollen traps available. Hubbard Apiaries, Onsted, Mich. 49265. Phone: 517-467-2151. TF

WANTED — Old Beekeeping Books and Bee Journals. James Johnson, 107 State Ave., Terra Alta, W.V. 26764. TF

Wanted In Hawaii: Two beekeepers. Powers Apiaries—Kona Queen will furnish housing and temporary transportation. Starting January 1, 1984. Write — don't call: Powers Apiaries, P.O. box 327, Babson Park, Florida 33827. State age, education, experience, give references. NO DRUGS. 11/83

FRESH GOOD TASTING BEE POLLEN. ROUND COMB, EXTRACTED HONEY, CLEAN PROPOLIS. SAMPLES, PLEASE. MOON SHINE TRADING. 3976 CANAL LN. WINTERS, CALIF. 95694. 1/84

BEELIEVABLE PRODUCTS INC. are looking for distributors in United States and Canada for quality propolis, pollen, and royal jelly products. Excellent moneymaking opportunity. Contact: D. Willder, P.O. Box 1081, Chatham, Ontario Canada. 11/83

Communication with bee keepers who have served with the peace corps. Contact Bob and Eleanor Spiegelberg, 16914 E. Park Dr., Cleveland, OH 44119 11/83

FOR SALE

Protective Clothing for Beekeepers. Write now for brochure. B. J. Sherriff, Dept. GBC P.O. Box 416, Nacoochee, GA 30571 TF

INSEMINATION DEVICES. For prices write Otto to Mackenson, Box 1557, Buena Vista, CO 81211 TF

4-SALE: Bees & Equipment. Call: 712-366-0425 or 712-366-1927. GS 11/83

For Sale — Bulk Pollen. Minimum order 300 lbs. 806-896-4552. 12/83

22 3-stories healthy Italian Beehives for sale. Tel: 516-48-6-3992. JGR 11/83

For Sale — Small commercial beekeeping business. Approximately 130 colonies. All equipment. Chuck Goodwin, Rte. 1, Box 39A, Blair, Oklahoma. 73526. PH: 405-563-2723. 11/83

800 — 9-5/8" supers with 9 drawn combs in each super, mostly worker comb. 3000 California style bottomboard $2.50 each. Please no Friday evening or Saturday calls. (209) 562-1110. 11/83

WATER WHITE AND EXTRA WHITE HONEY, KNOX APIARIES. 306-862-3879. 11/83

COMBAT BEEKEEPING IGNORANCE WITH CONNOR'S TWENTY EDUCATIONAL SLIDE PROGRAMS. Box 817 Cheshire, Connecticut 06410. TF

FOR SALE: 50 strong colonies in 1½ story hives. Mostly 8-frame, all with plenty of stores for winter. Location possible. Louis Dubay, 241 States St., San Francisco 94114. 415-861-5636. 11/83

For Sale: 250 strong bee hives and equipment. Carroll Couture, Belleville, KS (Northcentral Kansas area) 913-527-5805. 2/84

McMORMICK HORSE MOWER 75.$, 2 ROE CULTIVATOR FOR 1937 JDB TRACTOR 125.$ OR TRADE. MAURICE EVANS, 6705 LONDON GROVE PORT RD., GROVE CITY 2, OHIO 43123. 11/83

For Sale: 360 storng 1½ story colonies full of honey. Winter ready. $55.00 each. Hirsch Apiaries. Schulenburg, Texas. 409-743-4209 evenings. 11/83

HIVE MONITORING STETHOSCOPE
SPECIAL DESIGN
OVER-WINTERING or SPRING BUILD-UP
YOU SHOULD BE LISTENING
$9.95
PKECO, Dept. C, P.O. Box 448, Louisville, KY 40201
12/83

Mail Auction Beekeeping Equipment closes November 20th. Larry Lindoken, Route 2, Box 240, Mount Horeb, WI 53572. 608-523-4978. 11/83

For Sale: Oil painting (1978) by Crossan Hays Curry. Portrait of Lorenzo Lorraine Langstroth the "father of modern international apiculture". Included are a bust of Langstroth in clerical costume, his revolutionary beehive, his Oxford, Ohio home which is now a National historic landmark and other autobiographical details. Painting is on fine Belgian linen. Size: 30 x 40 and is mounted in a massive antique, gilt frame. Price: $750. Contact C.H. Curry, P.O. Box 105, Oxford, Ohio 45056. TF

BEE SUPPLIES FOR SALE

WRITE FOR CATALOG—Quality Bee Supplies at factory prices. Prompt shipment. Satisfaction guaranteed. Hubbard Apiaries, Manufacturers of Beekeepers' Supplies and Comb Foundation. Onsted, Mich. TF

FOR TOP QUALITY BEE SUPPLIES and advice on beekeeping problems, visit your nearest Root dealer and send for your FREE Root catalog. Satisfaction guaranteed. The A.I. Root Co., P.O. Box 706, Medina, OH 44256. TF

BEE EQUIPMENT MANUFACTURERS. Supers ends rabbet-jointed for added strength and durability. Our frames are one of the best on the market. All beekeeping supplies at commercial prices. Write or call for price list.MONCRIEF BEE SUPPLIES, Post Office Box 625, 1105 Lakewood,Lakeland, FL 33802. (813) 858-6754. TF

WE CARRY A COMPLETE LINE OF BEE SUPPLIES and containers. Write for price list. E & T GROWERS. R. 1, Spencerville, Ind. 46788. (A suburb of Ft. Wayne). Phone 657-5136. TF

ALL WESTERN BEEKEEPERS: Lock-corner supers — tops — bottoms — frames. Complete stock — supplies & equipment. Phone or write for quantity prices. UNITED BEE CRAFT COMPANY, 600 Harbor Blvd., West Sacramento, CA 95691. (916) 371-9340. TF

QUALITY CYPRESS BEEKEEPING SUPPLIES — dovetailed hives and hive parts, beginner's kits, complete supplies. Write: BEE-JAY FARM, Dacula, GA. 30211. TF

RADIAL HONEY EXTRACTORS-5 and 10 frames, Patented, factory made of stainless steel. GAMBLE'S HONEY EXTRACTOR CO., P.O. Box 7997, Greensboro, NC 27407. Phone: (919) 299-3973, Day or Night. TF

HONEY EXTRACTORS FOR HOBBY BEEKEEPERS — Affordable Prices. FREE Literature. BEE LINE MANUFACTURING, 1019A Saint Elmo, Austin, TX 78745 TF

Nucs 4 frame, Golden Italian stock, $35.00 each or 3 for $100.00. Queens $5.00 each, all postpaid. Small orders only. Johnny Pennington, 194 Cooper Hurst Rd., Pearl, Miss. 39208. Ph: 601-939-5994 12/83

NEW NO HEAT OR ELECTRICITY USED. Uncapping fork (not just a scratcher). No flavor loss and better flavor retention. No burnt fingers or shocks. Honey from dark comb not discolored as with hot knife. $11.00 each pp., Blossomtime, P.O. Box 1015, Tempe, AZ 85281. TF

60 — 2 and 3 story 9-5/8" hives with 1981 queens — 100 extra 10-frame supers — electric honey pump and 12 foot electric hive loading boon. $5,000.00 Croft 346 S., 700, West Cedar City, Utah 84720 10/83

PINE BEE SUPPLIES

9-5/8" Hives dovetailed **$4.00** each
6-5/8" Supers Dovetailed **$2.75** each
5¾" Supers Dovetailed **$2.50** each
Select Grade Heavy Duty Frames, All Sizes
Bee Pallets Cut To Order **$6.50 & Up**
Foundation Available — Plain or Wired
Sale Price **$3.00** LB. in 25 LB. Box ONLY
$31.00 per 100 **$280.00** per 1000
Hoffman 9 – 1/8", 6¼", or 5-3/8" Specify Style
Power Super Frames 6¼", 6", and 5½"
Wooden Lids and Bottoms (Migratory)
$2.25 each OR **$4.50** per set
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Allow Manufacturing Time On All Orders
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(512)-251-3823 10/84

BEES & QUEENS FOR SALE

WE USE ALL POSSIBLE CARE in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for a certificate of inspection as a matter of precaution.

GENTLE ITALIAN QUEENS. All breeders individually tested DISEASE RESISTANT. 1 — 9 $6.50; 10 — up $6.00; C/M 50¢ ea.; deduct $1.00 after June 1st. **GOLDEN WEST BEES, 436 Norvin, Grass Valley, CA 95945, (916) 273-4606** TF

Carniolan Bees & Queens. Queens $6.50, 3 lb. pack with Queen 122.50, 2 lb. pack with Queen $16.50.
Health certificates furnished. Shipments begin April 10th. **King Bee Apiaries,** Rt. 4, Box 90, Greenville, AL 36037, Ph: 205-382-2305 TF

GENTLE ITALIAN QUEENS. All breeders individually tested DISEASE RESISTANT. 1 — 9 $6.50; 10 — up $6.00; C/M 50- ea.; deduct $1.00 after June 1st. **GOLDEN WEST BEES, 436 Norvin, Grass Valley, CA 95945, (916) 273-4606** TF

Nucs $25.00 — 3-frames/queen — Hybrid — guarantee live delivery — Shipped in cardboard container. F.O.B. Dixie Honey Company, E. A. Cannady, 919-579-6036. Rt. 3, Box 206A, Shallotte, NC 28459. TF

Colonies for sale in Florida. Call Evenings only. (904) 567-9495. No Collect Calls. Terms Negotiable. TF

HONEY WANTED

BEEKEEPERS TAKE NOTICE — We cannot guarantee honey buyers' financial responsibility, and advise all beekeepers to sell for CASH only or on C.O.D. terms except where the buyer has thoroughly established his credit with the seller.

WE BUY AND SELL all varieties of honey. Any quantity. Write us for best prices obtainable. Hubbard Apiaries, Onsted, Mich. TF

BUCKWHEAT, light and light amber honey. Bedford Food Products, Inc., 209 Hewes St., Brooklyn, N. Y. TF

All Grades of Honey. Any quantity drums or cans. Call Toll Free 800-248-0334. Hubbard Apiaries, Inc., Box 160, Onsted, Michigan 49265. **TF**

WANTED—All grades of extracted honey. Send sample and price. Deer Creek Honey Farms, London, OH. TF

WANTED: comb and all grades of extracted in 60's or drums. Send sample and price to MOORLAND APIARIES INC., 5 Airport Drive, Hopedale, MA 01747. TF

WANTED—All grades of extracted honey. Send sample and price to MacDonald Honey Co., Sauquoit, New York 13456. Area Code 313 315-737-5662. TF

WANTED — Several new suppliers of clover extracted honey in drums. Send samples. Wayne Stoller Honey, Box 97, Latty, Ohio 45855. 419-399-5786. 11/83

HONEY FOR SALE

CLOVER, ALFLALFA, Buckwheat, Tulip Poplar, Wild Flower, or Orange in 60's. Dutch Gold Honey, Inc., 2220 Dutch Gold Dr., Lancaster, PA TF

HONEY IN 60's FOR SALE. Bedford Food Products Co., 209 Hewes St., Brooklyn, New York 11211. Telephone: 212-EV4-5165. TF

CLOVER, ORANGE, U.S. and Yucatan Wildflower, in sixties. Other flavors and bakery grade available. MOORLAND APIARIES, 5 Airport Dr., Hopedale, MA 01747. TF

POLLEN

FRESH, PURE, Bee Pollen available in 1 pound containers at $8.50 per pound postpaid. 10 pound bulk pack at $7.90 per pound. Large lots, ask for price. Hubbard Apiaries, Inc., Onsted, Mich. 49265. TF

Pure Fresh Bee Pollen, 1 lb. jar $7.50 postpaid. Prarie View Honey, 12303 12th Street, Detroit, MI 48206 TF

What the Public Doesn't Know . . .

Continued from page 605

definitely do require pollination, usually by honey bees, in order to produce a crop. This is true of most of the fruit trees, and of the berries, and most of the nut trees. Some gardeners do not think of these producers of food as garden items but many complete gardens include them.

Many garden vegetable plants will produce a one-year crop for their tenders without the benefit of action by the bees. This is true, for example of such vegetables as beans and carrots. The cucurbits do require cross pollination in order to produce a satisfactory yield of fruit. Among them are the cucumber, squash, cantaloupe, watermelon.

But the seed grower from whom you and I purchase our seeds each year must depend in almost every case on the pollination efforts of honey bees in order to produce those seeds. In almost all cases small scale gardeners get their plants pollinated free of charge by the bees maintained by their neighbors. Many of them don't even know it is taking place.

How Should Honey Be Labeled?

They typical citizen knows little about honey except that it is sweet—and he likes it.

Most lay people think one need but buy a hive of bees and remove the honey as soon as it is ready. They know little or nothing about the effect upon honey production of swarming, disease of the brood, starvation of the bees, poor wintering, drought, depredation by enemies of bees, vandalism, theft of colonies, etc.

Most lay people know little or nothing of the variety of honey flavors available in the market, or of the causes of crystalization, or spoilage.

Beekeepers themselves sometimes ponder how frank they should be in labeling their honey. For example, should they state that it has been heated, and why? Should they reveal that it has been filtered, and the reasons for doing so? Should they use the word "pure" to describe it, or the word "natural"? These are all challenging questions. Personally, I think the packager of honey should let the buyer know if the product has been heated; whether it has been filtered; and whether it is truly natural.

Certainly, there's nothing wrong with heating and filtering honey before placing it on the retail market. Therefore, why not level with the potential purchaser? And what about the use of the word "natural"? One way to answer the problem is to omit use of the word. Likewise with the word "pure". But though the use of the word "pure" is superfluous, it may nevertheless be reassuring to the buyer; likewise with the word natural.

But is a preheated, filtered honey totally natural? Many would say no. And if that is true, and you use the word, why not say natural except that it has been heated for so many minutes to a certain degree of temperature in order to destroy the yeasts, and the crystal nuclei on which new and additional crystals may otherwise grow and thus yield a non-liquid product which many do not like? And why not admit that it has been filtered in order to assure that bits of wax have been removed, thus presenting a clearer product which is what many purchasers prefer? But it should be admitted that filtering removes any polllen that is in the product—probably a valuable component of honey.

And what about comb honey? What does the public know about it? There are probably as many as 98• of the honey consuming public that have never tasted comb honey.

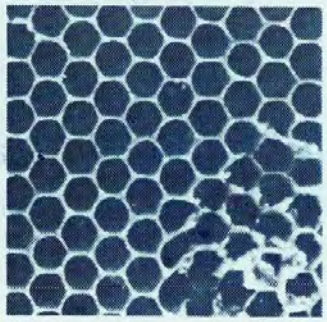
I believe that beekeepers are missing an opportunity to acquaint the public with the virtues of comb honey, and thus increase the number of honey users. Comb honey is special. It has qualities that may be lacking in liquid honey. It's easy to convey the news of the qualities of comb honey to a uniformed public.

Furthermore, cut comb honey, the production and sale of which are comparatively new in this country, is so much easier to produce than section honey or cobana rounds. Today we have plastic containers which protect cut comb honey from mistreatment by curious or ruthless samplers of food displayed on shelves. Cut comb honey fetches a good price, too.

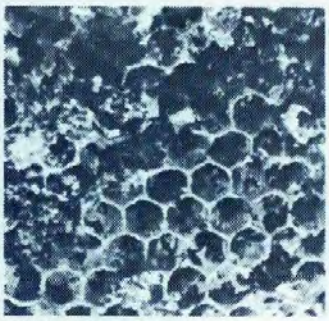
The more the public knows about honey and its true qualities, the more likely it is to purchase it.□

Index to Display Advertisers

GIVE WAX MOTH LARVAE THE TREATMENT!



Honeycomb treated with Certan.



Without Certan.

Your bee hives are no place for wax moth larvae. Knock 'em out with Certan™!

Its unique biological formula contains natural bacterium which, when eaten by wax moth larvae, paralyzes and destroys the digestive tract, resulting in death.

As a commercial beekeeper or hobbyist, Certan benefits you in these important ways:

- Certan has been scientifically tested.
- Certan provides economical, long-lasting control.
- Certan does not affect honeybees or colony activities.
- Certan does not affect the taste of honey.
- Certan is nontoxic to humans, pets, wildlife and beneficial insects.
- Certan is a natural biological control.
- Certan is a water-dispersible liquid concentrate.
- Certan eliminates dangerous fumigant handling and storage.
- Certan is easy to use.
- Certan is available in convenient 4-ounce bottles for hobbyists and 1-gallon containers for commercial beekeepers.

Give wax moth larvae the treatment! With Certan, the *natural* insecticide.

SANDOZ

SANDOZ, INC.,
CROP PROTECTION
480 Camino Del Rio South
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Use pesticides effectively. Read and follow label directions carefully.

A BEEKEEPER'S SHOPPING LIST

☐ . . . Observation bee hive (Something I've always wanted, and **ROOT'S** has a dandy on page 35 of their catalog

☐ . . . A galvanized steel, air-cooled smoker (to replace that "bargain" I bought.)

☐ . . . Heavy duty veil (**ROOT'S** has even lowered prices on these.)

☐ . . . 50 shallow frames, foundation to match, and a C13 pack of 5 honey supers (This time I'll be ready for the first nectar flow.)

☐ . . . Hive tool holster (Holds a pen and scissors, too--easy way to make life a little easier for $3.60.)

☐ . . . Subscription to my favorite magazine, *"GLEANINGS IN BEE CULTURE."*

☐ . . . _____

_____

My favorite **A.I. ROOT** dealer can be reached at _____.

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