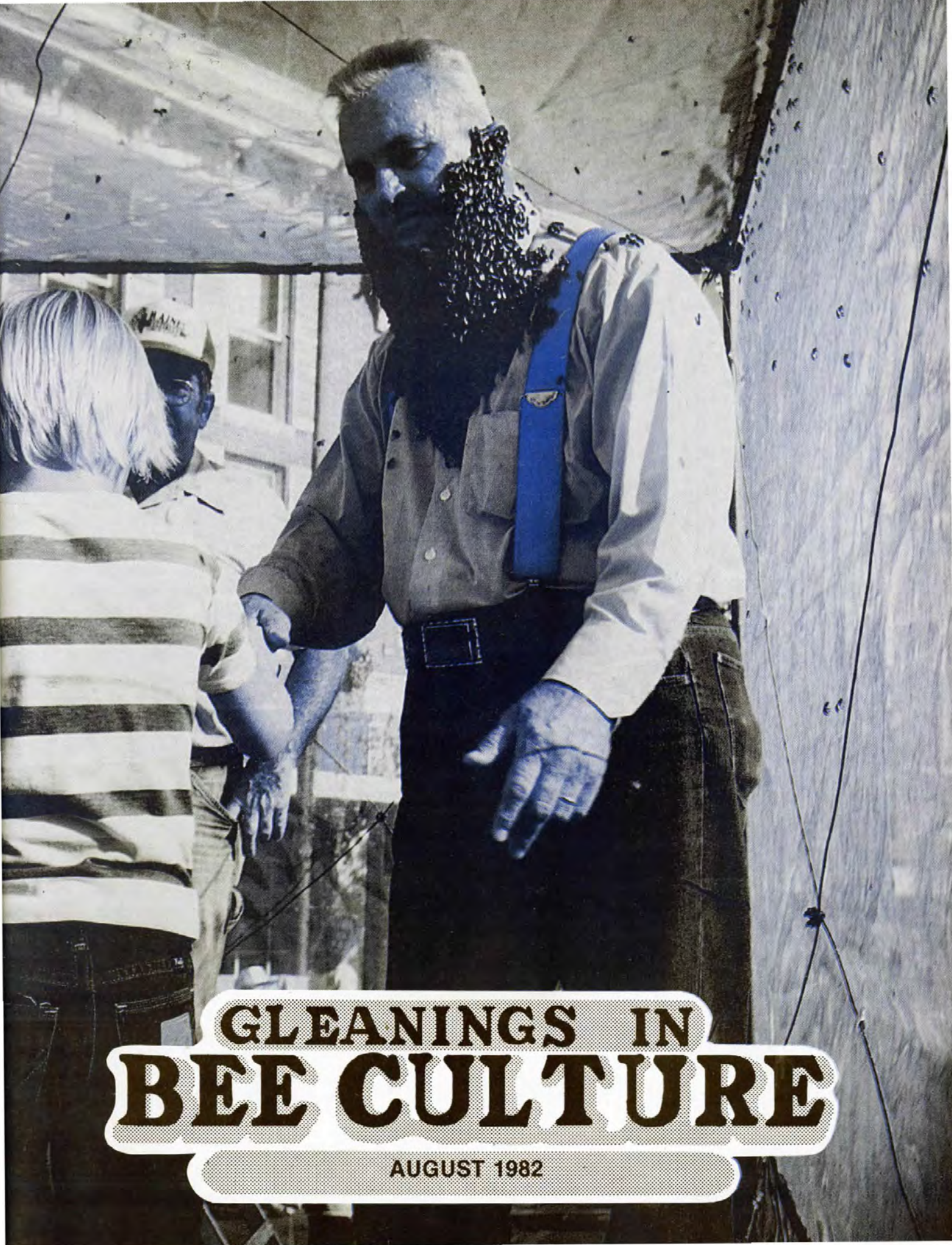

GLEANINGS IN BEE CULTURE

AUGUST 1982

John Root

Lawrence Goltz

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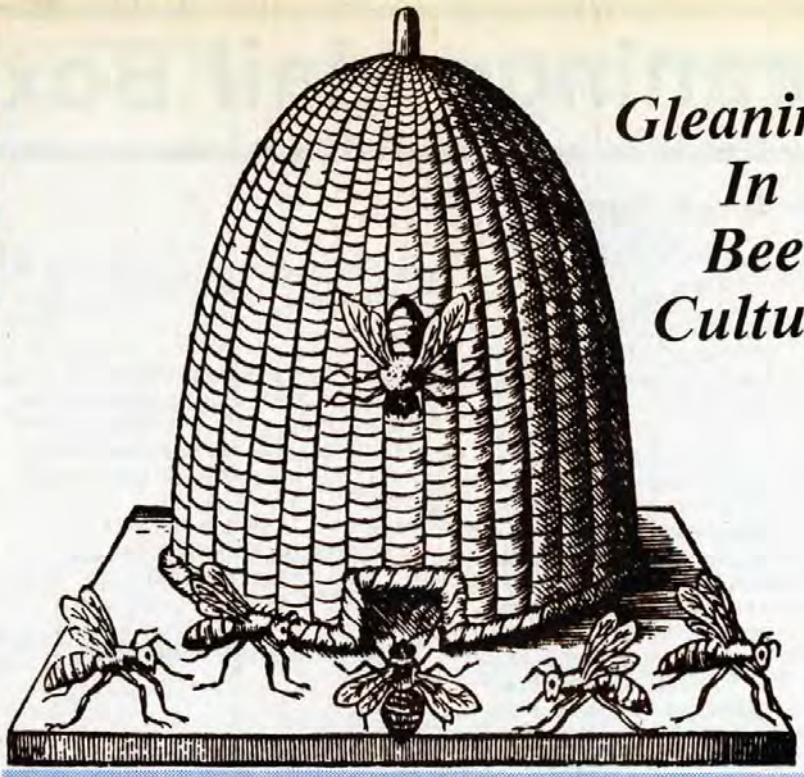
Cover Story

This photo, taken by Jim Steed of Richmond, Kentucky, was taken at the Ohio Honey Festival held in Lebanon, Ohio in September, 1981. This is one of the three beekeepers that put on bee beards at the Ohio Honey Festival. It is one of the largest festivals of its kind in the country.



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109 Years Continuous Publication by the Same Organization

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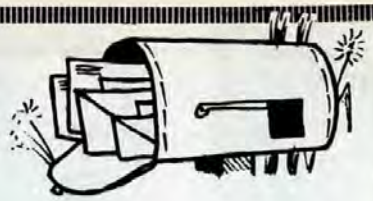


On Green Honey

Dear Editor,

In your December '81 issue of *Gleanings* I have read the article on green honey. On the whole it sounds like kidding but let me just put one fact into the right light: The honey from silver fir (*Abies alba*) is of almost black color with sometimes slight greenish iridescence. It is in greatest demand of all German honeys except heather honey. As to the source of the "green honey," it belongs to the typical honey dew honeys. The honey dew is produced by special silver fir aphids and then collected and converted by the honeybees. The male and female flowers of the tree are not visited by the bees, the tree is a typical wind pollinator with pollen of minor quality for the bees.

Dr. Dietrich Mautz
Fed. Rep. Germany

Spores Are Clue

Dear Editor,

I read with interest an article in the May, 1982 *Gleanings In Bee Culture* entitled, "Botulism Toxin Absent" on page 260.

Of course botulism toxin was not found in honey. The osmotic content of honey, which is due to its high sugar content (levulose), does not permit the growth of bacteria clostridium botulinum. Since the bacteria cannot grow, no toxin is produced. Hence, classical botulism, which is an illness resulting from the ingestion of food contaminated from pre-formed botulinum toxin, is not possible.

The spores of clostridium botulinum, however, can exist in a high concentration of sugar. In fact, botulism spores have been identified in some samples of honey tested by the Center for Disease Control in Atlanta, Georgia. For reasons that are not well understood, when honey containing these spores are ingested by an infant under the age of 8-months, occasionally the spores germinate and clostridium botulinum grows in the intestines of these infants and elaborates a toxin in situ. This disease does not occur in adults. These children develop symptoms of the disease known as infant botulism.

As you can see from the above line of reasoning, the presence or absence of the toxin is irrelevant. The investigators should have been looking for the presence of clostridium spores.

Eric J. Slosberg, M.D.
Beekeeper and Pediatrician
Kalamazoo, MI

Milk-Honey Feeding

Dear Editor,

As a young mother in the late 1950's I did not know how widespread allergies are. All I knew was that our #2 son, Scott born July 15, 1957 at Ellis Hospital in Schenectady, NY was disgnosed as "allergic to the fat in milk" by a prominent Schenectady physician. What was the formula ordered? Skim milk and honey! The late 1950's were hardly the dark ages. Scott thrived on the formula. I am more amused than anything to read that honey shouldn't be given to infants.

Mrs. Alfred Cavalari
New Windsor, NY

Additional Comments

Dear Editor,

When I read my article (Nov., Dec. 1981) in print it seemed some footnotes might have been useful, and I can now also add some corrections from Murray Reid (items 10-17).

1. In December 1981 there were 5,578 beekeepers owning 238,000 colonies. In three years beekeepers increased by 36% and colonies by 13%.

2. D. Crowson's idea to use plastic trash bags to cover supers of honey appeared in A. I. Root's 1979 *Hints from the honey house.*

3. Page 626, first column, last paragraph, line thirteen should have the following words in italics inserted: "are moved, *there is no harm done. But if it is different , as when bees were moved* from a higher to a lower. "

4. Ragnar Frisch, Norweiagn Nobel Laureate in econometrics, and an amateur beekeeper, proposed to replicate colonies considered desirable without the necessity of identifying the genes involved. Although the geneticist Sewell Wright supported his proposal, the U.S. apiculturists he visited in 1947 did not. Norway now has established a national bee breeding program, but whether it is based on Frisch's model is not known.

5. Warwick E. Kerr recently suggested using a pool of 5,000 colonies for breeding to avoid infertility caused by a reduction in the number of genes on the X chromosome. This method of "stratified mass selection" has had spectacular results in plants, and a few beekeepers have tried it in Brazil. When an analysis of the results is published, others may be persuaded to undertake the effort.

6. Bee breeding is not the private affair it is with other livestock as drones may mate with virgin queens from colonies as far away as ten miles. The resulting crosses may be less productive and, more importantly, the genetic pool for future selection is diluted proportionately as beekeepers purchase hybrid queens. If bee breeders kept unselected stocks in isolated "bee parks," this would provide a source of "mongrel" bees for sale to beekeepers who do not want the expense and trouble of annual requeening, and for selection of new hybrids in the future.

7. Page 627, first column, line eight should read "two stirrings of one-half hour each per day."

8. I was asked for additional information about the revocation of the Dyce patent, and shall comment in a separate communication.

9. A large revolving drum filled with cold water used to cool cooked syrups in the manufacture of candy,

(Continued on page 449)

Beekeeping Research And Production In California

By M. M. IBRAHIM
and
M. M. MAZEED
Ministry of Agriculture
Dokki, Egypt

BEEKEEPING IN EGYPT was recorded by paintings in the tombs of the Pharaohs several thousand years ago, and is now carried on as a sideline in the villages in much the same way as it was in olden times. The native bee, *Apis mellifera lamarkii*, is kept in mud tubes laid horizontally in piles, and honey in the comb is cut from one end of the tube. Other beekeepers, with several hundred to several thousand colonies in modern frame hives, produce honey commercially. These commercial beekeepers prefer Carniolan bees that have been imported from Europe. Because of the danger of bringing in bee diseases with imported queens, a bee genetic and breeding program to improve the Carniolan bees in the country and establish a permanent stock center was included among the program of the Agricultural Development Systems — AID — Egypt project of the University of California.

Queens have been reared in Egypt for distribution to beekeepers by the Apiculturists of the Ministry of Agriculture for some time and queens are reared for sale by some beekeepers in the delta region of the country but the supply does not meet the demand for queens, and queen rearing methods that are used by the queen breeders are less efficient than those used in the United States and in several other countries.

The University of California, which supervises the establishment and initial operation of the breeding program, included in the program a provision for a month in California of practical training in commercial queen rearing and packaged bee production for the four of us who are responsible for the breeding work in Egypt. This training took place in April 1981. Drs. M. M. Ibrahim and M. M. Mazeed of the Ministry of Agriculture, and Dr. M. A. el-Banby and Mr. M. E. el-Sherif of Ain Shams University left Cairo March 28, 1981, and after a rest stop in New York City, arrived in Sacramento March 30. The visit concluded May 4, when we returned to

Double mating nuc boxes. Photo by H.H. Laidlaw.

Egypt, accompanied by Dr. Harry H. Laidlaw.

We thank the genetics project for the opportunity to visit California beekeepers, and appreciate the encouragement of Dr. Laidlaw in the arrangement of our trip to California. He scheduled the visits, accompanied us all the time, and drove the car during our visit.

We were welcomed to the University of California in Davis by the staff of the Bee Biology Facility and we spent several days visiting the UCD Campus, the Entomology Department, the staff members, some post-graduate students, and the Library. To obtain more information in beekeeping, it is important for the beekeeper to visit different beekeepers to understand and try to employ the contributions of many beekeepers and research workers. Dr. Laidlaw described beekeeping in his home state and gave a very interesting and authortative review of the history of beekeeping. He showed us his mutants, and hopes to use them in proving the arrangement of sperms of successive matings in the queen's spermatheca. With Dr. Thorp we discussed the renting of colonies of bees for pollination, which is still a problem in some parts of the country. An easier and cheaper way of providing bees for pollination is being sought. A discussion was also raised about the role of beekeeping extension and the problems with encouraging some beekeepers to consider new ideas.

Following the success of the laboratory tests in Davis, Dr. Gary carried on studies on the effect of microwaves on honeybees. He trained the honeybee colonies living in the dark under the microwave unit of forage in the field and also, passing through dark and twisted tunnels, to collect sugar syrup from plates put under the microwave unit. At last he found that the microwaves have no effect on the behavior of honeybees. He showed us one film on queen mating in nature and another film on the bee behavior. We talked with Dr. Christine Peng and her postgraduate students about research on drone rearing, sperm preservation, and honeybee feeding, digestion, and absorption. Another research program of hers is a study of the relationship of endocrine glands to the reproductive system of drones.

The facilities provided by the University of California for meetings, and using the car for transportation allowed us the maximum time to enjoy the program with very little travel time. We joined Dr. Laidlaw when he went to Alameda to give a lecture to the beekeepers' association members on artificial insemination of queen bees. He also promised to give them a lecture on beekeeping in Egypt at a later date.

We had a short visit along the coast of the Pacific Ocean, and in San Francisco we made a short tour in the streets of the city. We also visited the Steinhart Aquarium in Golden Gate Park and the UCB campus where we spent some hours in the Department of Entomology museum. Later we visited the Diamond International bee supply shop at Chico where we saw bee supplies, a big and well equipped workshop for manufacturing hives, and boilers used for wax rendering and bleaching. We saw also Shasta Dam on the Sacramento River north of Redding on our first trip north to Palo Cedro.

After returning to Davis we drove to Southern California where we met Mr.

Charlie Duncan, who was the President of the Western Apicultural Society and who spent two days with us visiting and discussing beekeeping problems. In Riverside we met Mr. Larry Atkins in his lab on the UC Riverside campus. He is interested in research on the toxicity of pesticides to honeybees and is the foremost authority in the Americas on this subject. In Los Angeles we also visited the Los Angeles Honey Company, owned by Chase Walker, his wife, Vi, and his son Larry who are commercial beekeepers. They sell beekeeping equipment and pack honey and wax as well. At Anaheim we visited the Sioux Honey Association. It is a branch of the principal honey packing plant founded in Iowa for marketing honey cooperatively. Before leaving the Los Angeles area, we spent a day in Disneyland, and another pleasant day was spent in Marineland where we saw the wonderful groups of fish and the intelligent playing of sea lions and seals.

On April 25th as we were asleep in a hotel in San Diego, we were shaken severely by an earthquake at about 4:00 a.m. In the morning of the same day we saw the festival of the Western Days. On the way to Davis from southern California we drove to the shore of Salten Sea and stayed that night at Fish Camp in the Sierra Nevada mountains near Yosemite National Park. The next day we spent some hours to see the huge old trees of Yosemite.

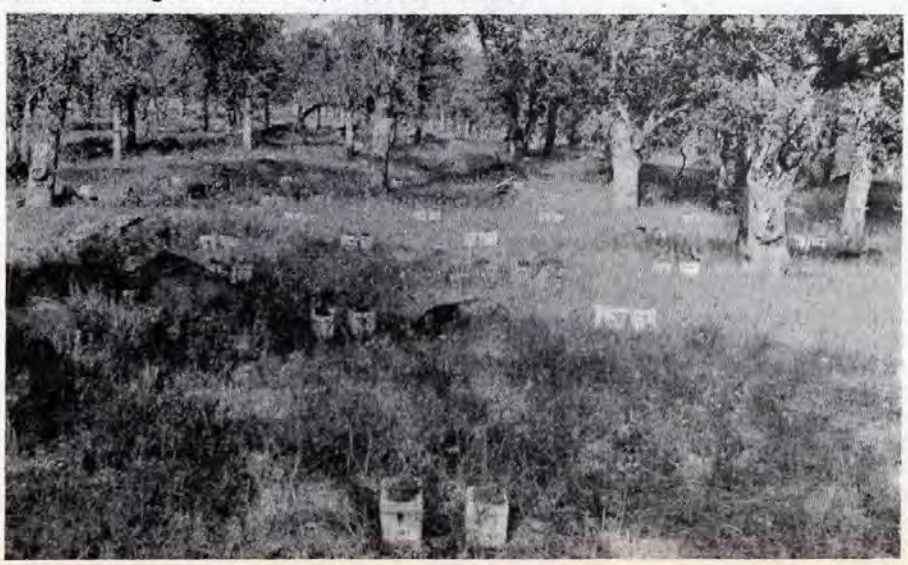
Several major tours were conducted to different professional apiculturists among whom were: Homer and Lois Park (Palo Cedro), Steve Park, Jack Park(Palo Cedro), R. M. Gannon (Redding), Penner (Red Bluff), Howard Foster and his sons, Jerry and Jim (Colusa), Oliver and Nora Hill (Willows), Clarence Wenner and his son Daryl (Glenn), Bob and Bill Koehnen (Glenn), Gene Walker and his son (Live Oak), Don Strachan (Yuba City), Steve Taber (Vacaville), Gene Stiles and his son, Gene, Jr. (Davis), Bill Huston (Corona), Charles Morse (San Diego), Buddy Ashurst (El Centro, Imperial Valley). Each of those operates the business for himself in one or more of the commercial beekeeping activities of queen rearing, honey production, pollination, package bees, and other different branches of the beekeeping industry.

Queen rearing colonies at Park Apiaries, Palo, Cedro, CA.

It is always hard to keep within bounds when describing such a trip. It was a delightful occasion as is always the case when you meet bee people. We would like to tell more about every beekeeper we met and something about what was carried on, but unfortunately there is no room for more.

There are four major divisions of bee management we observed that we condsider to be the most valuable part of the whole time we spent among the beekeepers we have visited. These are: Queen rearing, Package bees, Production of honey, and Pollination of different plants.

Queen mating nuceiei. Photo by H.H. Laidlaw.



Queen Rearing:

As we all know, the basis for a maximum measure of success in beekeeping is to understand and employ the fundamentals of queen rearing. There is always a demand for the improved methods of queen rearing. It is a fact that most systems of queen rearing are tedious and require a great deal of labor.

Most methods of queen rearing consist of grafting young larvae into wax cell cups and depend mainly on three kinds of colonies which differ from each other in function: the queen mother, the starter colony, the finisher colony. The way of using the three kinds of colonies differs from one beekeeper to another. Italian, Caucasian, and Carniolan are races raised by the beekeepers visited. The common race is the Italian.

The queen mother

Homer Park confines the mother queen on two combs between two queen excluders in the middle of the brood chamber. The two combs are covered with young bees; one contains brood, honey, and pollen, and the other is empty for the queen to lay in. On the second day he moves the comb with the eggs, after it has been dated, to the other side of the excluder in the same body and replaces it by another empty comb. On the fourth day the comb that was moved to the other side of the excluder and now has newly hatched larvae can be used for grafting. The grafting room is provided with a heater and four spot-light lamps for four grafting persons. The strict instruction for grafting is complete sanitation. The grafting needle must not be touched by fingers or licked by tongue as some beekeepers do.

Howard Foster uses bodies isolated from each other by wire screens. The two lower bodies contain a normal queenright colony for warmness production, has an entrance, and is separated from the supers above by a double screen. Every super above is transversely divided into four equal parts with a special entrance to each. Each part is provided with a breeder queen on three small combs arranged according to the date of laying the eggs. Every comb is taken on the fourth day of laying eggs to be used for grafting. He prefers to graft larvae 12-18 hours old. After grafting he washes the combs in order to remove the remaining larvae. His grafting room is heated to 94°F and provided with a 150-watt lamp directed from above.

Don Strachan uses a normal single story breeding hive divided lengthwise into three parts. The middle part is divided transversely into two parts, one in which the queen mother is confined by queen excluders. The small combs are arranged according to the date of laying the eggs. On the fourth day, the small combs with the newly hatched larvae are used for grafting. The grafting takes place on a small desk under an ordinary lamp.

Well developed queen cells. Photo by H. H. Laidlaw.

Oliver and Nora Hill isolate the breeder queen on three combs by means of a movable queen excluder at a side of the brood chamber in a two-story hive with the upper body separated by another queen excluder. The combs with the newly layed eggs are marked and transferred daily to the part of the lower body outside the queen compartment. On the fourth day of laying eggs the combs with the newly hatched larvae are used for grafting. The colony is always fed with sugar syrup and also examined from time to time to remove any queen cells built by the the bees. The grafting room is heated electrically and the floor is wet by water before grafting. The light comes from two fluorescent lamps directed over the brood comb when grafting.

The starter colony

Homer Park uses queenless two-bodied colonies, each provided with a special feeder on the rear of the hive. Every colony is strengthened by adding ripe searled brood combs, and by young bees after they are sprayed with sugar syrup. The grafted cell cups are put between two brood combs that have small larvae, and two honey combs, for two days in the upper body. The starter colony is rearranged 3-4 hours before being used.

Howard Foster uses queen-right colonies with three bodies. The queen is in the lower body and is separated from the second body by a queen excluder. The upper body which is separated from the colony by a wire screen has two pollen combs, two division board feeders, and a large number of nurse bees shaken from the second body about two hours before grafting. He uses continuous heavy feeding for these isolated bees, between which the grafted cell cups are kept for 24 hours only.

Don Strachan uses single story queenless colonies after they are provided with great numbers of nurse bees. The grafted cell cups are kept in the cell building colonies until the ninth day from grafting,, and then the sealed queen cells are transferred and kept in an incubator for 24 hours ready to be distributed after that to the nuclei.

Oliver and Nora Hill use queenless colonies where the grafted cell cups are kept till the end of the feeding stage. According to the starter colonies used by the previous beekeepers we think that the way of Foster is the most practical one to have more accepted bee cells, because of the big number of nurse bees without any immature stages except the grafted ones.

The finisher colony

Homer Park uses queenright colonies with a queen excluder between the two bodies where the queen is kept in the lower one. The started queen cells are put in the upper body between combs of unsealed brood. On the ninth day after grafting, the queen cells are transferred to an incubator where they are kept for 24 hours, ready to be distributed after that to the nuclei.

Howard Foster uses groups of colonies, each group has three colonies — one support and two finishers. The support colony of the group is queenright and is used to support the two finishers with sealed brood. The finisher colonies are three-bodied and are fed sugar from a feeder on

(Continued on page 434)

Beekeeping Research And Production In California

(Continued from page 430)

the back of the hive. The queen is confined on one comb by perpendicular queen excluders in the middle of the second body. Every three days the comb full of eggs is transferred to the support colony and is replaced by another empty one. The started cells are put to the side of the queen excluder cage, first on one side and then the other, every four days. On the 9th day from grafting the ripe cells are transferred to an incubator in which they are kept for only one night.

Grafting larvae at Homer Park Apiaries, Palo Cedro, CA. Photo by M.M. Ibraham.

Don Strachan uses the colony as a starter and finisher as we mentioned before.

Oliver and Nora Hill remove the sealed cells from the starter finisher colonies and put them in a queenright colony with the queen confined to the lower body by a queen excluder as an incubating colony till the ninth day from grafting. The cells are then removed to the incubator for one day, ready to be distributed after that to the nuclei.

The commercial raising of queen honeybees is a complex process. If the starter colonies are maintained correctly by over populating with nurse bees, with an abundance of pollen or pollen substitutes, and with sugar syrup, the acceptance of the grafted cells will be high. Such a start will also help the finishing colonies produce queens with the proper size and body weight. Before we go further we can say that the way used by Don Strachan is more practical, economical, and needs less work than the other ways practiced and has the same efficiency as that of the other beekeepers.

Mating of the Virgins

We saw different ways of making the mating nuclei. Their operation varies according to the nucleus size but the fundamental principles such as enough bees of different ages and sufficient food present to enable the nurse bees to provide the emerging virgin queen with proper nourishment govern the use of each type of nucleus. These types of colonies differ from one beekeeper to another.

Homer Park in one of his mating yards uses a nucleus box divided longitudinally into two separate compartments each containing three standard combs, and each has a separate entrance. In another mating yard he uses the nuclei of a quadruple type with each part containing three small combs.

Howard Foster uses in his mating yard a box divided longitudinally into three parts using the standard combs.

Don Strachan uses the standard body divided lengthwise and crosswise into four nuclei with small sized combs. Each compartment entrance is located on a different side of the box.

Oliver and Nora Hill use baby nuclei with frames half the size of the standard.

Some other queen breeders as Steve Park use the hive body divided into four partitions as nuclei by three crosswise partitions. R. M. Gannon uses a very small baby type as nuclei for mating.

(Continued on page 438)

Filling packages from a shaker box. Photo by M.M. Ibraham.

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Monthly HONEY Report

LAWRENCE GOLTZ

July 10, 1982

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	33.60	34.80			38.40	34.50	35.50	34.00
60 lbs. (per can) Amber	42.00	28.80	33.60			35.00	32.10	35.00	33.50
55 gal. drum (per lb.) White			.58	.56	.58		.54	.58	
55 gal. drum (per lb.) Amber			.56		.56		.49	.56	
Case lots — Wholesale									
1 lb. jar (case of 24)	27.50	24.90	25.80	24.48	26.60	24.00	25.96	24.50	24.00
2 lb. jar (case of 12)	26.50	23.30	24.20	22.56	24.80	23.00	23.90	22.75	23.50
5 lb. jar (case of 6)	30.00	27.80	26.25	25.90		26.50	26.50	26.00	26.20
Retail Honey Prices									
½ lb.	.90		.90	.81		.75	.82	.89	.92
12 oz. Squeeze Bottle	1.50	1.25	1.45	1.15	1.35	1.30	1.45	1.39	1.30
1 lb.	1.50	1.45	1.50	1.40	1.45	1.45	1.59	1.48	1.51
2 lb.	2.80	2.60	2.85	2.69	2.75	2.50	2.79	2.45	2.80
2½ lb.	3.15					3.15			
3 lb.	4.00	4.25				3.75	3.40	4.10	3.85
4 lb.	5.00	4.95		4.89		4.80	4.10	4.85	
5 lb.	6.00		5.95		5.50	5.50	5.10	5.95	5.89
1 lb. Creamed			1.55					1.59	1.69
1 lb. Comb	1.75		2.25			1.75	1.80		
Round Plastic Comb	1.50						1.65		
Beeswax (Light)	2.00	1.90	1.95		1.85	1.85	1.90	1.90	1.80
Beeswax (Dark)	2.00	1.80	1.90		1.80	1.80	1.85	1.85	1.75
Pollination Fee (Ave. Per Colony)	30.00		27.50		18.00		18.00	15.00	18.00

Misc. Comments

Region 1

Looking for record honey crop in Connecticut, but must wait unitl later to confirm. Pollination went well with fruit growers. Growers and beekeepers may adapt new system for colony pollination strength rating. Swarming late. Honey selling well in small lots. Spray damage light in Connecticut but parts of Massachusetts hit very hard. Light swarming in Maryland. Honey prodcued below average. Eastern Maryland shore is dry.

Region 2

Colonies in good condition in New York. Less swarming than normal. Poor weather conditions in West Virginia during June, but prospects good for basswood and sumac. Little swarming. Honey flow better than average in Pennsylvania. Prospects look good for balance of honey flow at the end of June. Honey sales fair.

Government support price may make a real crisis in the honey market.

Region 3

Ohio has had very unsettled weather during honey flow but some good gains reported by strong colonies. Light swarming reported. A good spring honey flow in Indiana but variable weather conditions have interfered withe main flow. Much rain and cool weather during June. Winter loss during 1981-82 has caused many hives to remain unoccupied. Honey slaes good in Indiana. Southern Illinois has had too much rain and a very poor honey flow through June. Beekeepers waiting for soybean honey flow. Bees in good shape.

Region 4

Bees in southwest Iowa benefited from good sweet clover honey flow and from white clover. A good honey crop in prospect for Iowa if rains do not interfere, which have delayed flow. June was cool and dry in Minnesota. Plenty of white clover but doesn't yield because of unfavorable nectar conditions. Yellow sweet clover plentiful and good source of nectar. Basswood flow only moderate. Cool weather slowed plant development. Cool weather may have been caused by volcanic ash in the atmosphere. Late summer flows may yet produce good crop in Minnesota. Spread between government support prices and import honey bulk prices may be big worry for producer-packer or anyone who has planned to use domestically produced bulk honey for their packing.

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Beekeeping Research And Production In California

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It is our idea that using the nuclei with the standard frames is much better than using the small types with small frames. Their operation is better for many beekeepers because these nuclei can be made up easily and quickly by using the honey combs and the brood combs and bees taken from populous colonies. Also the interchangeable frames facilitate the addition or removal of bees, honey, and brood to keep the nuclei in proper strength.

It is also found that all beekeepers must put in their mating yards a number of drone mother colonies to have available sufficient number of drones in the mating area. Homer Park uses one strong colony with two drone combs for every 100 nuclei. Steve Taber prefers to use natural drone comb in the drone mother hives and not use drone comb foundation in order to have different ages of drones available at any time.

The Package Bees

April marks the beginning of shipping package bees and queens for beekeepers in many parts of the United States. California beekeepers are among the main producers of queens and packaged bees. Generally they start raising queens late in February or early in March, and then beekeepers from the surrounding areas, the northern states, and Canada are able to drop by in April and pick up the number of packages they had previously ordered. The bee shippers always collect their mated queens from the mating yards in advance and keep them in queenless colonies, called the queen banks, before preparing the packages.

The steps of preparing the packages begin by shaking the bees from different colonies into a collecting cage, "a shaker box," then shaking two pounds bees weight from this cage into each individual package. A caged laying queen is put in each package. The packaged bees are provided with 1:1 sugar syrup in a can coverted to a feeder. Different methods are used by the beekeepers in preparing packages.

Homer Park and Steve Park put the upper brood chamber, already separated from the lower brood chamber in which the queen is confined by a queen excluder, directly on the collecting cage and shake the bees into the collecting cage.

Howard Foster does not use the queen excluder in the hive, but puts the upper broodnest directly on the shaker box that has an excluder and shakes the bees into the excluder compartment from which the bees moved down through the excluder into the collecting cage leaving the drones on the excluder and the queen if she had been in the upper broodnest.

Oliver Hill uses an empty shallow body with ten transversely fixed wooden boards instead of frames. This is a "cluster box." At first he removes the cover of the hive, puts a queen excluder on the broodnest and then the empty cluster box. A few puffs of smoke are given at the entrance from a smoker with a repellent material added to its fuel, and the bees pass quickly to the cluster box. After a short time the bees are shaken into the collecting cage.

Generally, the beekeepers use two sizes of package cages: single queen with two pounds bees weight and double queens with four pounds weight. The groups of packaged bees are usually stored in a cool area until being trucked. During the time of transferring bees to the packages, many older field bees fly and return to their old location.

Production of Honey

California is one of the more important beekeeping states. There are numerous forage plants growing wild in the forests, such as oaks, eucalyptus, pepper tress, buckwheat, acacia, sages, manzanita, and certain others. Cultivated oranges, almonds, peaches, alfalfa, and many crops are grown extensively. Really the list of California honey plants is a very large one. It is estimated there are more than half a million colonies of bees in California. The average production is between 48 pounds per colony and 70 pounds. In Westmorland we visited a shop for selling dates in which we saw different varieties of honey: alfalfa, cactus, mesquite, orange, sage, tamarisk, eucalyptus, clover, and avocado, all packed in jars.

Our beekeepers in Egypt are suffering from pesticides, so we asked about the pesticide situation in the United States. Until now it has not been solved and a majority of beekeepers are finding that they cannot operate their bees for pollination purposes or for honey production unless there is some basic control of the applications of chemicals in the areas in which they operate. We heard about the colonies which were being killed every year in the Imperial Valley and more thousands in other parts of the state. So some hardy beekeepers have tried to increase the number of their colonies in widely scattered areas with the hope that a sufficient number will escape damage from pesticides. Several states have passed strict laws and others have started research programs. It is not easy to conserve our health, save our bees, and use pesticides as needed. Many beekeepers in the state practice migratory beekeeping. They extract honey from one honey flow very quickly and transfer the bees to another area for another flow. Bill Huston in Corona uses an extractor on its side with a capacity of extracting 180 combs at one time. He has a wax presser which presses the cappings and makes it into blocks of wax. He owns about 10,000 colonies scattered in different sites. The site we visited was in an area where we saw the sage shrubs and the manzanita blooming.

There is a satisfactory market and evergrowing demand for honey in the

Hives in seed alfalfa. Photo by J.E. Eckert.

United States and we saw to what extent some beekeepers prepare their honey for use. Chase Walker and his son, Larry, pack the extracted honey in plastic containers about 27 kg. weight. Other kinds of honey, which will be used in soft drinks, cereals, cakes, candy, and other prepared food, are kept in barrels of about 300 kg. weight. Manzanita blossoms yield heavily and the honey is very good. Sioux Honey Association follows a highly mechanized and sanitary system for honey packing.

Generally all liquid honey will crystallize when allowed to stand for a period of time, especially at low temperatures. However, all the honey commercially sold in bottles was in the liquid form. The way of heating and the mechanized system, filtering, and clarifying of honey packing we saw let us say that the honey will become darker, destroys enzymes, vitamins, the delicate flavor, and takes out the tiny bits of pollen. So we hope that Extension Service of the Government, beekeepers, and the honey industry in general will think about promoting a campaign to inform consumers that crystallized honey is unadulterated and is better in many ways than the liquid heated honey. At the same time we can say that honey can be kept always in warm stores if it is needed in a liquid form.

Pollination of Different Plants

California produces a large share of the legume and vegetable seeds of the United States. Large acreages of melons, almonds, prunes, pears, apples, citrus crops, and others are dependent on bees for pollination services. A majority of the growers are aware of the value of bees and of beekeeping to their operations, and they rent bees to pollinate their crops. Beekeepers who engage in pollintion services should have colonies with prolific queens, be disease free, and have adequate stores and with a standard strength.

On our visit to Imperial Valley we saw hives of rented bees located on different sides of fields owned by onion seed growers, and for pollinating different kinds of cantaloupes. Honeybee colonies should be protected when pesticides are applied because we saw great numbers of dead bees in front of the hives. Apparently in the United States they have the same trouble with spary problems as we do in Egypt. It is estimated that orchard fruit trees need one colony per acre, alfalfa 2-3, other legumes 1-2, cantaloupes, squash, and cucumbers 1, and onion, carrot and asparagus 1-2.

It is worth mentioning that the bees in California suffer from many diseases, such as AFB, EFB, Nosema, Chalk brood, and sac brood, and enemies such as the wax moth. AFB is the most common and contagious disease. The treatment of AFB is not an easy one. Much care has to be taken not to make any mistakes during the whole process of treatment.

At last we must say that we learned much during this visit, and we hope other Egyptian apiculturists can visit California. We think, too, that California beekeepers would find a visit to Egypt to see modern beekeeping there, and the ancient way bees are kept in cylindrical mud hives by villagers to be very interesting and instructive. □

Ohio Beekeepers Display in COSI

Ohio State Beekeepers Association President Zale Maxwell (left) and State Representative Thomas Gilmartin stand in front of the new beekeeping display in the Center for Science and Industry (COSI), Columbus, Ohio. Each year hundreds of thousands of students and adults tour the center. The display graphically portrays the importance of beekeeping to the well being of mankind and is a good public relations effort originally suggested by past OSBA president Jay Schafer.

Ohio State University is presently breaking ground for a new beekeeping laboratory to house the work carried on by Dr. Walter Rothenbuhler and his research group. The new laboratory is largly the result of the efforts of Rept. Gilmartin, a good friend of the honeybee and H. A. Fulton of Columbus and elder statesman of Ohio beekeeping.

Bees and Gardens

LAST MONTH WE talked about the pollination of fruit trees and necessity of honeybees in small fruit growing. The pollination requirements of fruit trees are highly variable. In general, the honeybee contributes to the quality and the yield of tart cherries, peaches, nectarines, apricots, strawberries and gooseberries while plums, prunes, apples, sweet cherries, avocados, kiwi fruit, pears, raspberries, blackberries, cranberries, blueberries and almonds depend upon insects,particularly honeybees, either totally or in part, for pollination. Grapes, the citrus fruits and olives, for example are a few of the vine or tree fruits that require little or no assistance from insect pollinators for fruit set, being either self-fertile or wind pollinated.

Most gardeners are limited to vegetable growing, their few fruit trees or vines will receive adequate attention from bees or other insects in the immediate neighborhood without bringing in additional colonies. Commercial fruit culture is another matter. The number of blossoms concentrated in small area may require visits from insects far beyond the capability of the few colonies nearby. Most gardeners with a few fruit trees and some small fruit need not have too many worries about getting adequate pollination.

Garden vegetables are propagated by two basic methods; by seeds (sexual) and vegetative (asexual). Sexual reproduction in seed plants involves the fusion of two cells to form a fertilized egg which developes into an embryo within a seed. When the seed germinates a new plant is formed. The pollination of flowering plants is one of the steps in seed formation. Vegetative reproduction involves the separation of a portion from the parent plant. We will disregard vegetation reproduction of garden vegetables in this discussion since seed production, pollination and fertiliation is not directly involved. Vegetative reproduction is very important in horticultural practices, however, being the method used to propagate such commercially important crops as grapes, raspberries, strawberries, potatoes and other plants produced by grafting, budding, cuttings, bulbs and tubers. The capacity to reproduce vegetatively is largely confined to herbacious and woody perennials.

Garden vegetables may be classed according to seasonal growth. Annuals are plants in which the entire life cycle, from germination to seed bearing, takes place in one season. Examples are peas, beans, melons, cucumbers, squash and pumpkins. Annuals may or may not require honeybee pollination to form seed. It depends upon the degree of self-fertility of the flowers and the natural mode of pollen transfer from stamens to pistil of the flower. The dependence on insect pollination may even vary between varieties of each vegetable. The blossoms of the garden pea, for example, are largely wind pollinated as are the various beans. Other annual vegetables commonly grown in home gardens are egg plant, radish and lettuce. As gardeners we are usually less concerned with harvesting the seed of the cucurbits (melons, squash, pumpkins and cucumbers), watermelons and egg plant, than we are with gathering the fleshy "fruit" surrounding the seed. What we must remember, though, is that while we blithely discard the seeds, growers in some distant place are carefully growing and selecting indentical seeds so that we can have an ample supply to plant in the spring of each season. These garden annuals grown for seed often require intensive bee pollination, perhaps in one of the warmer states or in Mexico, or whereever the enormous quantites of seed stock is grown. For this reason home gardeners are largely dependent on honeybees. Though no bees ever visit your rows of radishes, for example, there would be no seed available for gardeners wishing to plant radishes in the spring unless a few plants were allowed to mature and form seed in the home garden, a practice seldom followed by the average gardener. A better grade of seed usually comes from the commercial seed growers as they practice intensive care and are carefull to provide good cross pollination in selected varieties. A gardener is interested in the radish for its succelent root, not the fleshy seed coat as is the case with the cucurbits and the tomato. Though we are not particularly interested in the seed of the cucurbits their formation is closely linked with the development of the edible, fleshy portion. To produce the fleshy part surrounding the seeds the plant must receive adequate pollination by insects, mainly honeybees. The pollen of the cucurbits is sticky and heavy and cannot be moved by the wind. Male and female blossoms are usually on separate flowers and the pollen must be widely dispersed between the blossoms (cross pollination in order for the fruiting body of form.

Some of the garden annuals do not need bee visitors (beans, for example) and are relatively self-fertile when grown commercially. Some vegetables grown for the commercial seed crop are improved in the quantity and volume of seed produced by having ample bee pollination. Hence, if you grow egg plants or cauliflower be thankful that bees are on the job in seed growing fields to assure that the seed you buy to start your plants in the spring is of the best quality and plentiful.

Another class of garden vegetables is the biennial. Common vegetables included in this category are carrots, beets, celery, cabbage, kale, turnips, brussels sprouts, kohlrabi and broccoli. When grown for seed, onions and lettuce may be classed in much the same manner as the biennials. During the first growing season the seed is sown and in the second growing season the bloom is formed and the seed is harvested. Because most of the biennials grown in the garden are harvested for food, not seeds, during the first growing season, few gardeners see them flower and mature. What is more, only a few gardeners concern themselves about the critical second season of growth when the important seed crops are produced by the commercial seed growers. For this reason the average gardener is unaware of the very important roll of the honeybee in raising garden vegetables for table use. Seed growers hire many colonies of bees in producing the seeds of carrots, celery and the cole crops (cabbage, broccoli, kale, kohlrabi, turnips and brussels sprouts). Lettuce grown for seed is a plant which has self-

(Continued on page 469)

READER SURVEY

We value your opinion. As a reader of *Gleanings In Bee Culture* perhaps you would be kind enough to check ✔ your preference in regard to several features in *Gleanings*.

I Read			Editorials and Features	I Read			Editorials and Features
Always	Some	Never		Always	Some	Never	
☐	☐	☐	Research Review (Roger Morse)	☐	☐	☐	Monthly Honey Report
☐	☐	☐	Siftings (Charles Mraz)	☐	☐	☐	Bees and Gardens
☐	☐	☐	Bee Talk (Richard Taylor)	☐	☐	☐	Questions and Answers
☐	☐	☐	Gleanings Mail Box	☐	☐	☐	News and Events
☐	☐	☐	Obituaries	☐	☐	☐	Buy and Sell
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What I like best about *Gleanings In Bee Culture*: _____

_____

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What is your reaction (on a scale of 1 to 5) to articles on the following? One (very interested) to five (not at all interested)

Rating	Subject	Rating	Subject
☐	Queen Rearing	☐	Swarm Prevention and Control
☐	Beekeeping in Other Countries	☐	Diseases and Treatments
☐	Honey Plants	☐	Bee Race Characteristics
☐	Formal Scientific Reports	☐	Pollen and Pollen Trapping
☐	Marketing Honey	☐	Medicinal Use of Hive Products
☐	Interviews With Beekeepers	☐	Bee Nutrition
☐	Write-ups of National Conventions	☐	Brood Nest Management
☐	General Bee Behavior	☐	Use of Queen Excluders
☐	Beekeeping Equipment	☐	Requeening
☐	Wintering Bees	☐	Control of Bee Pests
☐	Extracting and Processing Honey	☐	Two Queen System
☐	Reprints From Old *Gleanings*	☐	Moving Bees
☐	History of Beekeeping	☐	Selecting Apiary Sites
☐	Increasing by Division	☐	How To Start With Bees
☐	Hunting Wild Bees	☐	Observation Hives
☐	Beekeeping in Your State (Prov.)	☐	Bee Anatomy
☐	Women in Beekeeping		

I would like more information on: _____

_____

We welcome any comments you may have about the magazine in general: _____

_____

_____

I own _____ colonies of bees. I have worked with bees for _____ years.

I think that the most pressing problems facing beekeepers today are: _____

_____

Please answer yes or no:

I have a garden _____ — I expect to expand my beekeeping operation _____
I am a member of a beekeeping association _____ — I sell honey _____
I have attended a bee school _____ — I subscribe to more than one bee journal _____

Age: under 18 ___ 18-25 ___ 25-35 ___ 35-45 ___ 45-55 ___ 55 and up ___

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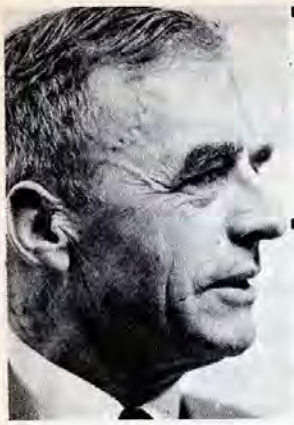

Siftings

By CHARLES MRAZ
Box 127
Middlebury, VT 05753

IN OUR LOCAL daily Vermont newspaper *The Burlington Free Press* in the May 15, 1982 issue, page 10-A is a small news item on left-handed sugar, which I believe is of importance to beekeepers. The news item runs as follows:

"Left-handed sugar may soon be inexpensive enough for dietetic foods, according to the product's maker, Biospherics. The company, which holds a patent on the sweetner, said it has discovered a way to make it for about $2 a pound. If it was produced now, it would cost $5000. Left-handed sugar, which has a different molecular orientation than ordinary sugar, cannot be digested by the body. In addition to not harming diabetics, Biospherics believes the sweetner will not be fattening or cause tooth decay."

This is one factor many people, even nutritionists, do not seen to understand about carbohydrate chemistry. While different simple sugars may have identical formulas — for instance dextrose and levulose are both $C_6H_{12}O_6$ — in the body the metabolism process is much different, due to their different molecular configuration. Dextrose, as the name implies, is a right-handed sugar in that it bends polarized light to the right. Levulos bends polarized light to the left.

This is only one form of left-handed sugars. A simple sugar can be left-handed not only in that it bends light to the left, but is left-handed, a mirror image, of its right-handed counterpart. It can be compared to your own hands. They look alike, but you cannot put the right hand in a left-handed glove. It is the same way with the digestion of metabolism of left-handed versus right-handed simple sugars.

The Japanese first developed isomerized corn syrup with fructose, which is apparently a right-handed form of levulose due to its molecular configuration, according to a reference I read from Japan. In this classification the levulose in honey could be the left-handed form (compared to the right-handed form of the corn syrup).

So far, it has been difficult to produce left-handed forms of simple sugars artificially. As indicated in the article, it costs $5000 per pound to produce at the present time. What is not clear is what the news item means by "ordinary sugar". Does it mean sucrose; cane or beet sugar? I have not yet seen any research that clearly demonstrated the molecular configuration and the metabolic action of these many different forms of sugars, either in natural form or produced artificially.

Personally I believe the natural levulose in honey also is not fattening and will cause minimum tooth decay. It is difficult to understand the statement in the article "Left-handed sugar . . . cannot be digested by the body." Most natural products that the body can metabolize are the left-handed forms. Many right-handed forms cannot be digested by the body.

This business of carbohydrate chemistry and metabolism cannot be dismissed by saying in simple ignorance "Sugar is sugar." There are many different sugars, and very little research has been done to test these differences. Some recent research by the USDA on simple sugars shows that honey causes less problems that can lead to heart disease than "ordinary sugar" or sucrose. This is only the beginning. Further research, I feel sure, will reveal many more advantages of natural honey over sucrose in the diet for both infants and adults.

Who will pay for such research? It will probably never be done until beekeepers are willing to pay for it. No one else will.

In the same issue of *The Burlington Free Press* on page 13-A is a news item *"Students Allow Insects to Live,"* in Ciudad Juarez in Mexico. Again this news item is of interest to U.S. beekeepers. When I first went to Mexico some 20 years ago, cotton production was big business in many areas of that country. At that time cotton was grown with full chemical methods. This included applications of herbicides, pesticides and "hot" chemical fertilizers. This was usually done on large areas of land that was leased from the owners, mostly farmers. For the most part the chemicals were applied by airplane.

For a while cotton production reached over two million bales of cotton per year. Then the "reaction" set in. After a few years, because of the accumulation of these hot chemicals in the soil, production dropped to the point where the soil would no longer produce a paying crop of cotton. After the high costs of these chemicals used in the cotton production were deducted, there was no money left to pay the landowners.

This happened in an area near a beekeeper I worked with in the state of Puebla. We could never keep bees near that area because of the high concentrations of poisons contaminating the soil. The greatest problem for the landowners was that after the cotton growers moved out, the land could not grow other crops for up to seven years, until the chemicals finally leached out of the soil. Well, cotton production eventually dropped 50% This broght a strong cry fo help to the government to stabilize cotton production, from the cotton seed oil processors. Because of the drop in cotton production, it meant a big drop in cotton seed and cooking oil production.

The government at that time, instead of using chemicals on the cotton, instituted a program to control insect pests on cotton biologically. At first these biological control advocates were attached by those pushing chemical controls. Fortunately the government, wiser for experience, sided with the biological control entomologists and they were encouraged to carry out their research, which has been going on now for ten years.

The heading of this article states *"Students Allow Insects to Live."* The students were protesting a cut in financing to the Hermanos Escobar

school. The students threatened to disconnect the life support systems of 15 million mosquito-like predators of the boll weevil to be used to protect the cotton crop. The farmers were pleading with the students to not destroy these insect larvae being raised in a laboratory in nearby Yaragasa. Quite a switch in the Black Mail business — using 15 million beneficial insects as hostages. What should be of interest to many beekeepers in the United States, is what is being done here with biological control for cotton? What a tremendous boost to beekeeping in many southern areas if toxic sprays were no longer used to control boll weevil on cotton. It would open new areas for honey production. There is some effort being made within biological control of the boll weevil, but not enough. I wonder if perhaps Mexican cotton growers have made greater advances in this field than the U.S.

Often these innocuous news stories have deep and important implications to many people. This is a sample of just two of them of importance to beekeepers, to increase production and consumption of honey.

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Questions and Answers

Q. As a hobbyist beekeeper I have obtained bees through swarms, packages, and divisions, etc. Most of my colonies are very gentle, however a few of them are aggressive and quick to sting. Would requeening those aggressive colonies be the easiest way to eventually make them more gentle? D.K., Texas

A. A cross colony of bees is never regarded in the same way by all beekeepers. Some beekeepers decide to eliminate the whole colony of very cross bees while others are more tolerant and will attempt to requeen the colony or even accept them as they are.

There are several problems involved in the often-repeated advice to requeen the cross bees. This advice sometimes leads me to suspect that either the author has never had to follow his own suggestions, which usually involves finding the queen in a strong, mean colony or that the advocate has discovered a way of doing it that he is keeping to himself.

The above remarks suggest the first problem in requeening a very strong, mean colony. If you are not a skilled and experienced bee handler I would suggest you think twice about shaking comb after comb of stinging, agitated bees from the combs to force them through a queen excluder to find the queen. If the bees don't drive you away they could be a real problem to the neighbors for hours afterward. It would likely be better to try to find the queen in the conventional way by searching each comb. However, first have your smoker going well with plenty of fuel, dress in a manner to protect yourself from stings, which of course includes a veil, coveralls tied at the ankles and very likely gloves with gauntlets. Don't try to be a hero. Pick a good day for working the bees and back off if they become unmanageable.

Another problem in requeening may possibly occur even after you have found and disposed of the old queen. A mean colony which has had their queen removed may be particulary reluctant to accept another, strange queen. About the only introduction that may have a chance of succeeding is to first introduce the new queen to a two or three frame nuc of young bees. Combine this nucleous colony with the young queen, with the colony you are requeening, by placing a sheet of newsprint between the hive bodies. The only other method that may work under the circumstances is to introduce the queen using the type of introducing cage in which the queen begins to lay eggs before she is released.

There is something to be said in favor of the beekeeper who can adjust to having a cross colony of bees in the apiary. Hopefully their disposition may eventually be changed through supercedure of queens. Surpurisingly, this often does happen.

For the beekeeper who does not have bees in an isolated country location but must be considerate of close neighbors a cross colony of bees simply cannot be tolerated. In this event a quick solution is needed and it may be necessary to replace the colony with another started from a package, a swarm or from a division from another colony.

★ ★ ★ ★ ★ ★

Q. I have read that robber bees eventually become smooth, shiny and almost black. Is it known why they exhibit these changes?

How can one tell if a colony is being robbed or is the robbing colony if such bees are present? L.M., Ohio

A. The presence of a few bees in a colony which are dark, smooth and shiny may not necessarily mean that they are robbers or that the colony is being robbed but if there are at least several hundred and they are clustered over capped and uncapped honey and in a highly agitated state of behavior the colony may possibly be in the process of being robbed. A few black, shiny bees among thousands is not unusual in a normal colony. Apparently a bee engaged in robbing is often attacked by hive defenders who tear hairs from the body of the robbers, causing the darkened appearance. Watching bees at the entrance is often a clue as to where robbers are entering or normal flight is in progress. Robbing usually causes extreme agitation at the entrance of weakend colonies being robbed.

Dr. Walter Rothenbuhler and his research associates at the Ohio Bee Lab. have discovered that there is also a disease organism linked to hairless bees that causes other bees to aggressively chew their body hairs off. A severe infection can reduce honey production.

★ ★ ★ ★ ★ ★

Q. 1. I have swallows that dive over my beehives and eat many of my bees. What can I do to correct this?

2. I made splits using double screen, by requeening the upper split. I have had great success. My question is do I have to move the upper hive three miles away or is there a system that I can do this in my own back yard, where they are now? L.W., Idaho

A. I have not heard of swallows eating bees, but of course they may. They do feed heavily on insects, perhaps right among the flying bees and this may be misleading. They may be catching other flying insects rather than bees. I have barn swallows nesting in a barn next to an apiary and I will make a point of watching them the next time I am out there.

As you say this is an excellent way to make divisions. I have done it both ways; leaving the divide right on top of the old parent hive, separated by a double screen or inner cover and have also made the division and moved the

(Continued on page 448)

Question & Answers

(Continued from page 446)

nuc to another yard. I could not see any difference. A few of the older bees, especially the foragers will return to the parent hive but not enough to seriously weaken the division on top, from my experience. The presence of brood will keep most of the bees on the combs. Reduce the entrance in the upper unit and push some green grass loosely in the entrance if you wish, which will confine the bees for a few hours. There is no longer a reason to move the divisions to another bee yard after they once become established, until you are ready to move them to their permanent location.

★ ★ ★ ★ ★ ★

Q. I read somewhere, I believe in one of the articles in your magazine, that the fall of the year is the best time for requeening a hive.

What do you think about it?

If the fall is the best time, how can I know at what time during the fall season to requeen? At the beginning of the season, while goldenrod and asters are in full bloom, or at the end of the season?

I live in the mountains of Southwest Virginia. Our seasons are similar to those in Roanoke, but a week or two later.

Thanks for any advice you can give me. I requeened two hives this spring, with good success, but the population explosion didn't come until the yellow poplar blossoms were about gone. W.F., Virginia

A. I don't think the time of requeening can be pinpointed as to the calendar date as much as by the conditions which exist. It is better to follow the rules of requeening than the seasonal or calendar dates. To accept a queen the conditions must be favorable: This means the absence of a queen or queen cells, or laying workers; a honey flow of some kind, or feeding; and plenty of young bees present. Sometimes favorable weather helps; at least, cold, stormy weather following a fair period can mean poor acceptance. If conditions such as the above occur in the fall, the requeening should be as good as in the spring. Avoid waiting too late. Requeen at least before all the honey flow ceases.

INTRODUCING . . .

Dwight Tew
Tew Paint and Equipment Company
P.O. Box 6597
1602 Montgomery Highway
Dothan, Alabama 36302
Phone: 205-793-3233

Dwight Tew is a full time paint and hardware dealer who serves the southeast corner of Alabama, the tri-state area. He keeps around 100 colonies of bees and has been a beekeeper for about six years. He sells honey along with Root bee supplies.

Dwight works with his father and brothers in the bee operation.

The Tew store carries a good inventory of A. I. Root beekeeping supplies.

Dwight Tew is married and his wife assists in the store.

Gleanings Mail Box

(Continued from page 426)

to minimize the change in color, was installed for cooling honey at Miel Carlota's in Mexico (1963).

10. The narrower frames now used in New Zealand (33 mm "fat width") does leave space for ten frames, and eleven when new. The wider 1-3/8 inch (34.925 mm) width of frames now used in Australia, U.K., and U.S.A. would leave a space of 15.75 mm when filled with ten frames (6.475 mm less than the 22.225 mm space in present U.S. hive bodies, and 19.25 mm less than the present New Zealand bodies with ten of the 33 mm frames).

11. Paraffin wax is used as a water proofer to prevent wood preservatives from leaching out. Preservatives add ten years to the 10-15 years with wax and paint alone. It is important that wood be perfectly dry before waxing, or the trapped moisture will cause blistering and decay.

12. It is Monterey Pine (*Pinus radiata* D. Don) that matures as rapidly as 25-30 years.

13. The honey levy was changed to a hive levy some years ago; the honey co-op was established in September 1981.

14. High fructose corn syrup is now available but not used extensively.

15. Kiwi fruit pollination fees of $48 in 1981 encouraged some growers to purchase their own bees.

16. Scorching equipment for American foulbrood has not been permitted for many years; boiling in caustic soda (sodium hydroxide or hot (150 °C) paraffin wax is permitted.

17. Apparently the whole family, including children, use deer velvet as a general tonic. The following excerpt is from a May 23, 1982 *New York Times* article "Venison down under" : "Ironically, the most profitable part of deer farming so far has not been the venison business, but the sale of "velvet," the fuzzy covering of the antlers. While the meat goes to the West to satisfy one kind of appetite, the velvet goes to the East to create another. Blenders of folk medicine in Asia are buying all they can get at $50 a pound — as an ingrediant in love potions."

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Capping The News

THE EDITORS

"Beekeeping Small Talk"

Changes In Pesticide Laws

THE SENATE AGRICULTURE Nutrition and Forestry Committee began hearings at the end of June on controversial changes in the nation's 35 year old pesticide law, according to the *Washington Report* of June 22, 1982.

The House Agricultural Committee completed a rewrite of the Federal Insecticide, Fungicide and Rodencide Act (FIFRA) in May of 1982 after nearly a year of hearings and negotiations among environmental groups, the pesticide industry, the AFL-CIO and Environmental Protection Agency officials.

Two of the controversial provisions in the House bill to amend FIFRA are expected to be at issue in the Senate as well. One concerns public access to information about the health and safety effects of pesticides; and the other involves state regulation of chemicals.

Several groups are unhappy with the legislation and are urging lawmakers to challange it when the House debates it.

Under FIFRA, the EPA administers a national pesticide program that regulates the domestic manufacture and use of pesticides.

Generally, a pesticide must be registered by the EPA before it can be sold and transported. The pesticide cannot legally be used in a manner inconsistant with its labeling.

Most states also administer programs that require state registration of pesticides in addition to national registration. Opponents and proponents of the proposed changes disagree over whether they would restrict public access to health information and whether they would limit the individual state's authority to regulate the use, manufacture and sales of pesticides.

Proponents of the proposed changes in the pesticide laws include the pesticide industry, which supports the House bill. The pesticide industry says the present law grants public access to certain data that would jeopardize trade secrets. Opponents of the proposed changes feel that the changes would undermine the state's authority to regulate pesticide use within a state.

It has been suggested that if FIFRA in the present form is not amended it may halt the development of effective new pesticides in the future.

Beekeepers may be interested in following the Senate hearing on the proposed changes in the pesticide regulatory laws. Certain states, which have initiated or intend to extend controls on pesticide use beyond the federal regulations may lose this option should the proposed changes be made. A state could only require special regulations if it was shown that it was dealing with a specific local concern, such as special crop practices.

On the surface, at least, the debate on pesticide control changes may be a forewarning to beekeepers of more difficult times ahead. The control of pesticides may be shifting back to the manufacturer and the user rather than government regulatory agencies. Depending upon the identity of the viewer, this could be good or bad. For the beekeeper the changes could mean higher bee losses.

Compensation Paid

A news release from the Communications Branch, Manitoba, Canada, Agriculture Production Branch, sent to *Gleanings* by way of Don Dixon, Manitoba Provincial Apiarist, announced that Manitoba beekeepers will be compensated for losses caused by the aerial application of Baygon spray last summer. The spraying was intended to combat mosquitos in order to avert a potential outbreak of western Equine Encephalitis.

"After consultation with the Manitoba Beekeepers Association the government has decided that this one segment of our society suffered unduly from the spray and therefore deserve some compensation for their losses," said Mr. Uruski, Agriculture Minister.

A survey taken in September, 1981 by Manitoba Agriculture entomologists identified 4,000 colonies owned by 75 beekeepers, which suffered some damage from the insecticide.

The survey also identified areas where losses were light, moderate and severe. This information will be used to adjudicate claims made by beekeepers.

Under the program registered beekeepers are elgible to claim four types of compensation depending on the extent of their losses. "Within the next few weeks we will mail a letter explaining the program in detail and an application form to all registered beekeepers in the province," added Mr. Uruski.

New Alaska Bee Law

On August 25, 1982 a recently passed law to control bee diseases goes into effect in the state of Alaska. This law prohibits entry of bees on combs and used beekeeping equipment into Alaska. This information comes from John W. Cramer, Agricultural Inspector, State of Alaska.

In another communcation from Edmund K. Knutsen of Soldotna, Alaska, *Gleaning* was advised of the passage of House bill #318, the above law.

The Inspector of the Division of Agriculture will be meeting with the beekeepers from the three associations to help get the rules or guidelines set down concerning the inspection of incoming bees, etc. Also, he will be available to the beekeepers should there be a problem and need advice from him.

"It had been a long hard battle to get any type of legislation presented but some of our legislators got behind us when they became aware of what type of problems we could have should there be a spread of bee diseases," said Knutsen.

The introduction of this new legislation in Alaska confirms what has been long known by states with older histories of bee health problems — that there is a need for inspection and control if bee disease and its spread is to be kept within bounds. Controls cannot be left to voluntary action despite the good intentions of most beekeepers to keep their colonies healthy.

Misinformation

The beekeeping industry and bees are probably subject to as much misinformation given out about them as some other facets of the natural world with which the general public has had little contact. A beekeeper recently called *Gleanings* very upset over a program on television which he says talked about a relationship between bee sting allergy and an allergy to pollen, which, are two unrelated conditions as far as the causitive circumstances are concerned. The beekeeper who called sells pollen and felt that the inaccuracy in reporting may harm the local sales of pollen. The TV program was put on by the University of Pittsburgh Nutrition Center.

Any allergy to the venom of the honeybee comes from the effects of stings or from the purposeful injection of venom by instrument. Perhaps in some rare instances the inhalation of venom crystals could cause a reaction as would happen when some sensitive individual handled the clothing of a beekeeper who had been stung repeatedly.

An allergy to bee-gathered pollen may or may not be manifested by physical symptoms resembling those of venom sensitivity. We presume that the severity of attack as well as the locale of the afflicted part of the body may vary according to the origin of the invading allergen. There is distinct difference in the routes taken by the two types of allergens, that is from bee venom and from pollen. Since pollen eaten as a food supplement is ingested it reaches the body tissues or blood stream by absorption from the disgestive tract, quite a different route from receiving bee venom by stings or injection. In either event the allergic reaction is triggered by the introduction of an alien substance in sensitive individuals, luckily very much in the minority among the general population. To discuss the histories of allergies, citing examples of venom and pollen allergies without clearly defining the differences between the two may be confusing to the average listener. The very unusual, often mild, reaction to consuming bee gathered pollen experienced by sensitive individuals should not be a serious deterrent to the general use of pollen as a dietary supplement. In any event, the reactions to food allergies, from whatever cause should have been carefully differnentiated from bee sting allergy during this reported discussion.

Preparing For Winter

By CLARENCE KOLWYCK
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PREPARING BEES FOR winter should start at the time of extracting in late July or early August. In the more temperate zones the deep hive body and one shallow super should contain forty to fifty pounds of honey, which should carry a colony through the winter. If less than that amount, mark the colony and feed accordingly, not later than October.

An absence of adequate honey might mean a failing queen. If so, requeen at once, but if less than two pounds of bees are found, kill the old queen and unite with another hive. The hive should be again examined in October for adequate honey and feed as indicated.

Now that the hive is strong and well fed, start preparing it for winter. Ventilating so as to insure discharge of moisture is very important. Many years of experimenting has taught me that a colony should have an escape hole about one square inch in the front rim of the inner cover; or, at least cover the bee escape hole so as to leave that amount. The bee escape hole should be covered by a screen sixteen strands per inch. The telescope cover should be elevated with three-quarters to one inch blocks at least in the front end so as to allow escape of moisture through the hole in the inner cover.

Some beekeepers bore a small hole near the top of the hive body, which serves the purpose of ventilation. This hole can be an invitation to robbing and can become quite unsightly with defecation by bees emerging during a warm spell in the winter.

Other beekeepers raise one end of the inner cover and prop it up with a piece of wood of sufficient width for the passage of bees. The complaint against this system is that it permits the escape of too much air.

The bee manufacturers are now making an inner cover with a hole in the rim in one end which, when reversed, will permit the escape of moisture and perhaps bees if the telescope cover is pushed against the beehive body from the opposite end. The same objections apply. In any event, reduce the entrance to about three-eights inch by four or five inches.

The first time the temperature reaches 60°F in February or March an examination of the colony should be made for adequacy of honey. So long as the outside frames in the super are full of sealed honey, the stores are adequate. When those frames become substantially empty, start feeding. This feeding should not be all at once but should imitate an early spring flow, say six pounds per week. Feeding should then be continued until the honey flow starts, then remove the entrance cleats. The colony should have by then launched a successful season. □

The Beekeeping Program In Burma

By ROGER A. MORSE
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OVER ABOUT THE last three centuries hundreds of colonies of European honeybees have been introduced into tropical and temperate Asia. These introductions have always failed in tropical Asia, but have been partially successful in temperate Asia. No Asian country, however, contributed any honey to the world market until the late 1960's, when China became a major exporter. Today China produces between fifteen and twenty per cent of the world supply, but little honey is seen from other Asian countries.

Only in 1962 was it suggested that mites that attack honeybee larvae when the brood cells are being capped might be responsible for the death of introduced colonies of European honeybees. The native Asian honeybee species are the natural hosts for these mites. Still, almost no mite research was undertaken in the 1960's; meanwhile, modern methods of transportation were enabling men to move bees around the world more rapidly than ever before. Men carrying queen honeybees from Asia in small cages — Asian species as well as European honeybees that had earlier bees introduced into Asia — managed also to carry their mite pests to Europe, North Africa, and South America. But about 1975 beekeepers outside of Asia were alerted to the fact that there was a serious threat to world beekeeping. The full impact of what was happening did not become apparent until the late 1970's. At the same time there was still no practical beekeeping in Tropical Asia.

The first United Nations Food and Agricultural Organization Program on honeybees in Tropical Asia was started in Burma in 1979. Dr. Cyprian Zmarlicki, from Poland, has been the Chief Advisor for the program. When he arrived in June 1979 he found five colonies of European honeybees that had been sent from Australia. In August 1979 one nucleus colony was sent from the United States. The people responsible for bringing these bees into Burma were well intentioned but were ignorant of what they were doing. The bees were brought in on drawn brood combs. When Dr. Zmarlicki inspected the colonies he found one was infected with American foulbrood and the disease has been a minor problem ever since. Bees that are to be transferred from one country to another should never be moved on combs that might harbor disease.

During the first year of the program, 590 packages of Italian bees were brought to Burma from Australia and the U.S. Unfortunately many of these colonies died before they arrived. There are nearly 1,000 colonies of European bees in Burma at present.

Since 1979, fifty persons from Burma have travelled abroad to study beekeeping; seven of these are women. Twelve of these students worked under Dr. James Tew at the Ohio State University Agricultural Technical Institute at Wooster, Ohio, in two groups, one in 1980 and the other in 1981, and an additional eight are there now. A delegation of eight individuals visited Washington, Cornell University, and Wooster, and attended the International Beekeeping Meeting in Acapulco, Mexico in the fall of 1981. In addition, ten persons have studied in Israel, six in Australia, four in England, and two each in Japan and France; two of these individuals have made two trips each. Most of these international beekeeping students are members of the army or police force, some of whom have had considerable combat experience in Burma against anti-govenment insurgents or those in the drug business. In fact, the area of Burma with the most honey plants and the greatest potential for beekeeping is the state that has had the most serious problems with insurgents.

The study program at Wooster has been financed by the Drug Abuse Control Program of the U.S. State Department, in coordination with the Food and Agriculture Organization of the United Nations. A major source of illegal heroin in the world market is the so-called Golden Triangle, the area where Burma, Thailand, and Laos join. Obviously, over the borders of three mutually unfriendly countries it is difficult to control the movement of legal or illegal goods. From the poppies grown here opium, morphine, and heroin are derived. The poppy farmers make only a bare living from their crops; the real profits are made by the processors, smugglers, and drug traffickers.

The U.S. State Department hopes that by encouraging beekeeping they can convince at least some poppy growers that they can do just as well, or possibly better, by keeping bees. If this could be done, additional substitution programs might be initiated, perhaps using crops that require pollination, like sunflowers and melons.

I have been asked, in Burma and in Washington, whether or not beekeeping technology can be transferred to poppy growers. That question is, of course, critical and difficult to answer. When I answer it, I say that if it can be proved to a poppy grower, or anyone for that matter, that he can do better financially with bees, he will do so. There are several places around the world where people with no formal training or education have become good beekeepers. In Kenya, and surrounding countries in East Africa, beekeeping has been a way of life for hundreds of years and great quantities of beeswax are exported every year. The honey is used to make the local beer. Another example is the Yucatan Peninsula of Mexico where beekeepers owning only 25 to 100 colonies each produce millions of pounds of honey. In Mexico the government runs a honey collection station at Merida from which the honey is shipped.

However, the attempt to control or reduce poppy growing is not the only force the beekeeping program in Burma. Agriculture in Burma is changing, much as it is in many parts of the world. As diets and nutrition improve we see a shift toward plants that require pollination. The twelve plants that now provide ninety per cent of the world's food supply — rice, corn, wheat, potatoes, etc. — do not require pollination. However, the variety and distribution of food crops is changing. In Burma watermelons have become a common crop in the past few years. Today there is a great need for bees to pollinate sunflowers grown for oil, which were introduced only recently. All over, the list of crops that need or benefit from bees is growing each year.

Burma's four-year beekeeping pro-

ject is now in its third year. A renewal for three years is under consideration and will probably be approved.

One of the first obstacles faced by Dr. Zmarlicki in Burma was to determine where in the country the bees would do best. As is true everywhere in the world some locations have many more natural nectar and pollen plants than others. No one has ever written about the nectar and pollen plants or practical beekeeping in Burma. In Rangoon, where much of the teaching is done, there are too few pollen plants to support large apiaries.

Shan State, the largest state in Burma, is the chief poppy growing area. Zmarlicki soon discovered that Shan State has the greatest potential for beekeeping with a great number of natural honey plants. This, of course, fits well with the State Department's program on drug control.

Chin State, on the western side of Burma, bordering Bangladesh, also has suitable honey plants and together with Sagaing Division and Kachin State represents more beekeeping potential. However, with fewer than 1,000 colonies in the whole country (Burma covers 261,000 square miles, which is almost the size of the state of Texas) it is still too early to determine the full potential.

A second problem, which has been solved, though it requires much labor, is the problem of parasitic mites. We are just beginning to understand the biology of one of the two mite species that cause damage, but little is known about the second. Both feed on, and are apparently dependent upon, developing honeybee brood, which they often kill or maim.

To reduce the mite populations the queen is caged for 21 days. During this time the colony is fumigated several times with phenothiazine, which dislodges mites from adult bees and kills them. The colony is also fed as much sugar syrup as it will take, to stimulate cell cleaning. At the end of the 21 day period any dead brood is uncapped by hand. It is an interesting fact that while honeybees are able to cope with many problems they usually cannot uncap cells that contain dead brood no matter what killed the brood. Once the brood cells are open the continuing feeding stimulates cell cleaning. Following uncapping and a final fumigation the queen is released and returns to egg laying and the colony recovers. In the colonies I have checked, the results have been good. No one knows precisely how long the treatment will remain effective, but we hope it will not be necessary more than once a year.

It is difficult to determine the beekeeping potential of Burma. Burma's neighbor, Thailand, now has about 6,000 colonies of European honeybees and the industry in Thailand is growing rapidly. It is estimated that bee hunters now harvest 500 tons of honey from the native Asian rock bee each year in Burma. This bee is the largest of the world's four species of honeybees. It is found throughout tropical Asia and often nests 50 to 100 feet in the air on cliffs and under tree limbs. The honey is used locally in medicines and to give variety to the diet; it is a well-known commodity in Burma. Beeswax from the native rock bee is readily available. At present it is being used to make foundation on a

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Research Review

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Roadside Marketing Up

THREE ARTICLES IN the June issue of *American Fruitgrower* indicate that the number of roadside markets in the U.S. is increasing rapidly; one of the articles is built around research conducted here at Cornell. One survey, covering 44 states, shows over 15,000 roadside markets today, up from 10,818 reported in 39 states in 1979. California showed the greatest increase: there are nearly 2000 roadside markets in California, five times the 1979 figure. In New York State there are 1200 in 1982 versus 950 in 1979. Nationally, dollar sales in roadside markets are up 75 per cent over what they were three years ago.

Forty-seven per cent of the roadside markets sell primarily vegetables while 27 per cent feature fruit. Of course, most sell more than one kind of item. Honey complements any type of produce, as well as other merchandise.

The number of farmers' markets has also increased — about a 40 per cent rise since 1979. In 41 states covered by the 1982 survey there are 1095 such markets versus 782 in 33 states in 1979. The state with the greatest number of farmers' markets is Pennsylvania with 125, New York is next with 95, and Iowa has 75.

The survey also asked how many roadside markets sell such items as pies and other bakery items, dried fruits, nuts and honey. All states reported there was some activity in this area, with New Jersey taking the lead. In that state 85 per cent of the roadside markets handle such speciality items.

Other articles in the same issue of the *American Fruitgrower* emphasize the importance of a parking area, a neat clean stand and product displays. I was impressed by one author who started his article by stating, "A good business is really a group of good employees..." He continued by pointing out that good relationships between the seller and the buyer are especially important.

There is an important lesson in all of these articles for the beekeeper who packs his or her own honey. Apparently people like to buy direct from the producer and the number who are doing so is increasing. The public wants a high quality product, attractively packaged. The seller can do much to increase sales through his or her attitude. I guess that's an old story. Since most honey is sold as an impulse item, and is not something many people add to their shopping list, it is important to keep abreast of changes in marketing, habits and conditions.

Questions About Varroa Disease

Last month Charles Mraz asked how the native Asian honey bees resisted varroa disease. This disease, caused by a mite, was once found in Asia only but is now widespread in Europe, North Africa and at least four countries in southern South America. Dr. David De Jong, from Cornell, has spent the last two years in Brazil working under a grant from the National Science Foundation. He has been investigating the biology of the mite, to determine how the disease can be resisted.

Apis cerana, the small native Indian honey bee, is the natural host for varroa mites. The bee resists the pest in at least two ways. Severely infested colonies abscond: the adult bees and the queen abandon their nest with the mite-laden brood and find a new residence. It is an effective method but the fact that *Apis cerana* is so prone to abscond also means it is not a good bee to use in beekeeping. When working *Apis cerana* colonies, one must be careful not to keep the hives open too long, or use too much smoke, for the bees may abscond under these circumstances, too.

Varroa eggs are laid on honeybee larvae and the young mites grow to maturity by feeding on the developing bee. Those who have worked with European bees (*Apis mellifera*) have observed that drone brood is more likely to be parasitized than worker brood. De Jong has some precise figures that confirm this. We do not know the reason, but it is likely that the longer development time of drones is involved, and the egg-laying mites somehow differentiate between drone and worker larvae. Unfortunately, with European bees, much worker brood is also affected. According to one report, this is not the case with *Apis cerana* in Sri Lanka; only drone brood is parasitized and this is the second way in which *Apis cerana* shows some resistance to varroa disease. If this is true throughout Asia we need to investigate the underlying mechanism protecting worker brood. Perhaps it can be applied to European bees.

There has been quite a bit of discussion recently about disease resistance in honeybees. Research by Rothenbuhler many years ago showed that behavioral American foulbrood resistance depends upon two of the bees' genes, one that allowed them to uncap cells containing dead pupae and the other allowing them to remove the corpses from their cells. I am of the opinion that these behaviors may also be important in relation to varroa disease. Varroa doesn't always kill the pupae but when this does occur the mites are confined to the cells for long periods of time but apparently they remain alive and are eventually freed. A method of varroa control used in Burma is to cage the queen and stop brood development, then when there is finally no brood to fumigate the colony and thereby kill or force the removal of most of the mites. At present the Burmese are going to the trouble of uncapping cells containing dead brood by hand so as to expose the mites to the fumigant. If the bees would do the uncapping promptly it would save a great deal of hand labor.

De Jong has already published a

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Bee Talk

By RICHARD TAYLOR
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YESTERDAY I STOOD in the middle of my apiary in the midst of a honey flow. There was such a roar of the bees' wings that I thought, as I got out of the car, that there must be a swarm in the air. But there wasn't. It was just a honey flow — sumac. I'd guess. I'd gone there to put on bee escapes, in preparation for my first harvest, and soon learned that I had twice as many supers to be harvested as I'd expected. That was from the black locust flow we had in June. And as I peered into one comb honey super after another, capped snow white, I thought of the special joys of a comb honey beekeeper. If those had been extracting supers then they would have been capped just as beautifully, but no one would have a chance to appreciate it but me. Now hundreds of customers will see, as I did, just how lovely honey in the comb can be. And I doubt that anyone has ever tasted nicer honey than the light, mild black locust.

I've got only this one apiary now; I used to have eight. So I could take my time and enjoy the afternoon and the bees. Supper was hours away. It's a perfect spot. An immense wild rose cascades over the low trees. A big sweet cherry tree rises in the middle of the apiary, though it looks like the birds are getting all the cherries this year. Some of my equipment has seen better days — the hives all need paint, some of the covers are in bad shape, and a few of the colonies find the rear entrances, created by cracks or breakage, more convenient than the front entrances. That's okay with me. The honey is beautiful, and so are the bees, and so was the setting, and the day. I thought, as I went about my work there, that no one on the face of the earth could possibly be happier, at that moment, that I was.

Last time I was saying something about harvesting and extracting honey, so I'll go on a bit more with that now. This seems to be about the right time of the year.

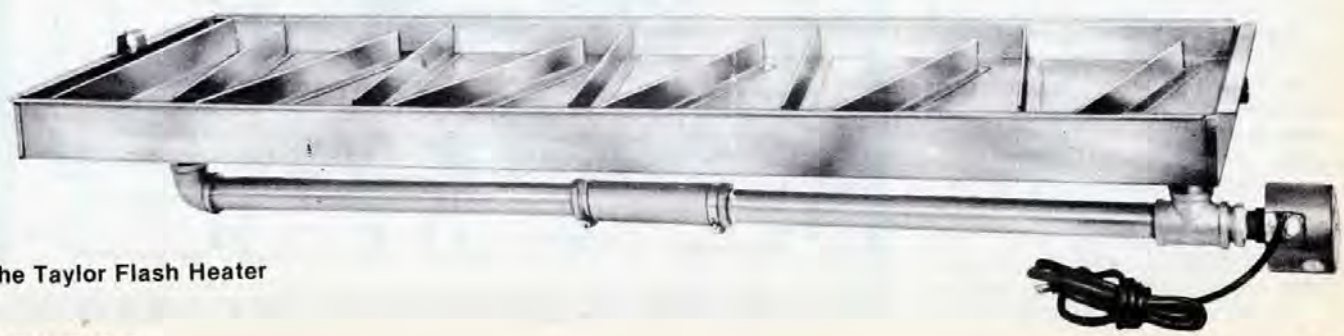
Two things crucial to packing honey are clarifying it, and not overheating it. Of course if you only have a few hives in the back yard, and you set the little extractor up in your kitchen a couple of times a year just to spin out honey for your family and friends, you won't heat the honey at all. If it crystallizes you won't have to explain to customers that it hasn't spoiled, nor have you added sugar to it, and that sort of thing. And as for clairfication, you won't care if a few cappings are mixed in. But if you are going to sell it, you have to make some concessions.

A flash warmer is essential to any fair sized extracting setup. This warms the honey, and goes a long way towards clarifying it. A flash warmer is a double jacketed pan. You fill the outer part with water and warm it with an immersion heater having a thermostat control. Honey flows from one end to the other and out, picking up heat. The pan should be baffled, to slow the flow of the honey from one end to the other and insure uniform heating. As I said last time, I think 130° is plenty warm. That will retard granulation without hurting the honey. The flash warmer I used for years, pictured here, was a dandy. I had a tinsmith make it up for me from stainless stell, copying a galvanized one I'd picked up years earlier for thirty-five dollars. The immersion heater fitted into the end of a copper pipe underneath, and that warm water flowed right up into the bottom of the flash warmer. I always thought that was about the neatest piece of equipment I had. By the time the honey had gone through my baffled sump, at the extractor, then been pumped up into a holding tank overhead, then flowed slowly over this flash warmer, it was all ready to bottle.

How about straining? Beekeepers naturally think that a strainer is the logical way to clarify honey. But actually, clarifying it with baffles, then warming it in a flash warmer, is better. I always used to let the warmed honey flow into my storage tank from the flash warmer through two nylon stockings, one inside the other, but not much actually got strained out that way. Still, it was simple, and the strainers cost nothing, so it was well worth doing. In any case, you certainly don't have to fix yourself any fancy or complex straining system. The system I just described, plus a couple of nylon stockings, will beat anything I've ever seen. And most important of all, the honey doesn't get overheated.

There's also the matter of moisture. I don't recall whether I said anything about that last time or not. A flash warmer will not drive out moisture. Nothing will, so far as I know. So avoid it. Don't store supers of honey in a basement or any humid place. And don't harvest it when it is raining, even lightly. Some honeys absorb moisture faster than others, for instance, Buckwheat. The slightest carelessness about moisture can give you a whole crop of buckwheat honey that is watery and ruined.

I'm sorry to keep coming back to this last point, but as I talk about extracting and straining and warming and all that, I can't help thinking how lucky one is if he can just raise comb honey. For instance, my escape screens went on yesterday. This afternoon, or maybe tomorrow, I can go get the honey, and as soon as its spent a day or two in the freezer, to prevent any wax worm damage, my customers can start driving up to my honey stand and loading up. No fuss, no bother, no great lot of honey apparatus — just beautiful, delectable comb honey. It's something to think about.



The Taylor Flash Heater

My Husband — The Beekeeper

By PAM KALIFF
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IT WAS ALMOST eight years ago when my husband placed his first two empty beehives behind our house and waited at the mailbox for his package bees to arrive. They did, and his excitement grew all summer long. Winter came and went and the first warm day of spring he was out checking his hives only to find out they had both died. He was heartbroken. I was not. I took this as an omen and told him so. I said, "Some people are meant to be beekeepers and some are not." He disagreed totally and told me so. He was going to find out what killed those bees or die trying.

So we invested $159.14 in books ranging from *Beginning Beekeeping* to *Comb Honey Production*, but his craving to learn did not stop here. We started attending monthly beekeeping meetings and subscribed to three monthly beekeeping magazines. In addition, he bought twenty more hives of bees, a large amount of equipment and instructed me I was his partner in all of the work from now on. I was not thrilled about that prospect.

The next spring we found we had only lost one hive. This boosted my husband's ego so much that he purchased fifty more hives and split his nineteen colonies into nuclei. I was going crazy.

Later in the fall he made the remark "I think I'd like to do this full time, you know, become a full time beekeeper." I reminded him we had two daughters who needed food and clothing and he should keep his dreams to himself. Needless to say, he didn't give up the idea. He told everyone, including the banker, about his plans. At first the banker was not thrilled with the idea of lending money to a man whose only ambition in life was to raise bees who made honey. Once again I thought I had won.

My husband didn't give up. In the spring the banker loaned him the money. Personally, I have never forgiven that banker, and never will.

We began nailing boxes and frames together. I was not a silent worker. I continuously voiced my opposition to this business adventure we were undertaking. My husband gracefully handed me a sheet of wax foundation, smiled, and quoted the following from a book, "Remember, with a bee-stricken beekeeper it's love me, love my bees." While he went right back to work I sat there looking at the sheet of foundation in my hand and replied "I know I don't love bees and I'm beginning to wonder about the other part." Alas, I had said this to myself, for he was already out the door.

Almost eight years have passed. My husband, the beekeeper, has gone from hobbyist to commercial.

Now fall was upon us and the frost came early that year. Of course we were already to begin with our work. We decided to start with the hives furtherest from home, about 100 miles away. The first week went well, only two flat tires and the weather was only moderately rainy. The second week showed little improvement. The weather turned cold, with a daytime high of 35 degrees F. The heater in the truck failed.

The third week the weather was decent, which is more than I could say for my husband. His nerves were so tight that anything could set him off into a rage. A typical example was the time I sat a super of honey down on his hand, crushing several fingers. All I could do was laugh and all he did was scream at me! Really, though, he did have such a funny look on his face! As I recovered from my hysterics he threatened to divorce me. Thank heavens, that was the last of the honey to be brought in.

The work was now confined to the honey house. The nice fall days needed last month while we were taking off the honey have finally arrived. Outside it was about 70 degrees; inside it felt nearer to 170 degrees. As days

passed (each day seemed like a week) the extracting room seemed to become hotter. My husband seemed to always find jobs elsewhere leaving him little, or no time, to help with the extracting.

What started out to be "easy as apple pie" had now turned into burnt apple strudel. We acquired a 1918 model fork lift (well, maybe a little newer) that we should have had the decency to bury, but we didn't. As I was jockeying this ancient heap of equipment around, the brakes suddenly failed and I creamed three fifty-five gallon drums of honey before I could stop. It took two days to clean up the mess and it was two weeks before my husband began speaking to me again. The bank called to see how things were going and I overheard my husband saying to him, "The honey flow is good this year." I didn't hear him say anything about my little accident and I didn't see any reason to bring it up since he was now finally speaking to me.

As unbelievable as it may sound, loading the truck and getting things ready to take the bees south for the winter went smoothly. I should have realized that the worst was to come. I waved goodbye to my husband on November 25. We were late going south, as usual.

I'm thinking to myself, finally, peace, solitude, and relaxation. I managed to get about eighteen hours of "relaxing", catching up on my housework mostly, when I received a rather unreal phone call at 12:05 a.m. Trying to sound awake, I heard a frantic voice saying something about money. The mention of money always brings me fully awake. Remaining as alert as I could, I listened to the whole story. I found out that my husband had been stopped by the police for speeding, which of course he denied vehemently. As the officer questioned my husband he found that the required permit he needed had somehow been left at home. In the process of trying to explain this to the officer they both became rather "hot under the collar."

My husband, the beekeeper, was calling from an Oklahoma jail with the following charges against him: speeding, no bee inspection permit, and assaulting an officer of the law. It amounted to posting a $1,000 bond and getting the permit papers to him immediately.

I left home immediately and as I started the long trek to Oklahoma the same thought kept racing through my mind — "How are we gonna explain this to the banker?"

After a long talk with the police sergeant the assault charge was dropped and the permit papers were all in order. There was the small fine for speeding which my husband still thinks should have been dropped. Some people never learn when they are well off.

I returned home to a house that would have taken me two months to clean properly, however I was given only two weeks. My husband returned home and boredom set in. He had more time than work and he was driving me crazy. I called the schools and arranged for him to give a few talks on the art of beekeeping. He was delighted and soon he had both his day and mine planned with various activities. He told me it was an enriching experience and it was making me a more interesting person.

Luckily, saving my sanity and preventing my taking a skillet to my husband for getting me so deeply involved, the lectures have stopped and spring is around the corner. Now, half of our time is spent hunting for just the right bee location for the coming season. Last night, on our way back, I told him the only thing we were accomplishing was wasting gas and my time. He started threatening me with some vague remarks about "going his own way" again, and letting him run his business. Needless to say, that was the last time he took me with him while hunting bee locations. Now the bees have been brought back from the South and another cycle is about to begin.

Oh yes, the bank called. It seems the honey crop had not been as good as had been expected. "But", I heard my husband, the beekeeper, reply, "Oh, but the honey crop will be good this year!" □

Pollen Trapping Basics

Paul Limbach
Silt, CO

Old style front of hive traps.

AS THE HEALTH food industry's emphasis on eating bee collected pollen has a nutritious food has grown, so as the number of beekeepers trapping pollen from their hives. Hopefully the market will continue to grow and consume the pollen we beekeepers can produce.

There are several requirements the beekeeper must meet for successfully trapping pollen from his hives. The first requirement is "bee tight" bee equipment. Older hives with cracks and holes in them are nearly impossible to trap pollen from, as bees would rather use any pencil size entrance to the hive than enter through the trap's pollen removal system.

Secondly, pollen trapping is much easier in a dry climate. Pollen begins to mold and spoil very quickly in warm humid conditions and traps must be emptied daily to prevent spoilage. In dry climates pollen can be collected at weekly intervals.

A third requisite for pollen trapping is a pesticide free bee forage area. Pollen is now used mainly in our nation's health food industry. Even a hint of pesticides found in domestic pollen could jeopardize this market.

There are many styles of pollen traps in use now and commercially available. All of them I have used remove pollen from the bees' legs in basically the same manner and all harvest similiar amounts of pollen. The traps I began collecting pollen with were traps that fit on the front of the beehive with a frame work installed between the brood chambers for the bee entrance, The disadvantage of this trap is interference with brood chamber manipulation.

The OAC type traps were developed in Canada and use 5 mesh hardware cloth in two staggered layers to remove pollen from the bee's legs. These traps usually go underneath the beehive in the bottom board position. There are many variations of this trap available. Many beekeepers add some of their own. There are now traps on the market with interchangeable pollen removal grids and pollen drawers so the trap can easily be turned "on" or "off." The only disadvantage I can see in this type is most of the hive debris falls directly into the pollen drawer.

A modified O.A.C. type trap.

I now use a personal modification of a pollen trap developed by Stan Chambers of Western Australia. This trap has a vertical pollen removal grid of flat plastic or metal with 3/16″ holes on a 1/4″ stagger. I believe the efficiency of this trap is slightly less than traps using 5 mesh hardware cloth. I leave my traps on year around so this is of some advantage to me. Also this pollen trap's vertical pollen removal grid and covered pollen drawer help keep hives debris from falling into the pollen drawer. This trap is now available commercially in the United States.

Most pollen traps incorporate some trype of drone escape or bee release system. My favorite was once again developed by Stan Chambers of Western Australia. It is a simple clear plastic tube with inside diameter of 1/2″. This tube is about 3″ long and placed near the trap's entrance bypassing the pollen collecting grid, and extending 2-1/2″ from the hive's entrance. Returning foragers have trouble finding this entrance and it is too restricted for extensive foraging. This tube allows drones and foragers to easily leave the hive. Bees can remove much of the hive debris

through these tubes. Mr Chamber's traps incorporate two such tubes and they can easily be plugged if too many returning foragers use them. Used in combination with the vertical pollen removal system, these traps produce very clean pollen.

One of the best things about harvesting pollen is its weight compared to honey. It is time consuming, however, as pollen should be collected as often as possible — weekly in dry climates down to daily in very moist warm climates. Well designed pollen traps have a screen bottomed pollen drawer supporting the pollen and allowing air circulation around the pollen while protecting the pollen from rain and soil moisture.

Harvested pollen must be cleaned to remove bee parts and hive debris before it is marketed. Most pollen producers use seed cleaners or vibrating gravity separation devices. Good seed cleaners have various sized grids to remove large particles like bees, and an air blowing system to remove small light particles like bee legs or wings. Small amounts of pollen can be cleaned by shaking through a 7 or 8 mesh hardware cloth, then pouring it slowly in front of a fan or in a good breeze to remove dust, wings, and legs. Cold or dried pollen is easier to clean. If anyone knows a better more efficent method, I'd appreciate the information.

Pollen can be preserved in two ways. First is dryng the pollen, which should not be done in the sun or at high temperatures. Most imported pollen I am familiar with has been dried.

The other method of preserving pollen is by freezing immediately after collection. Very moist pollen should still be partially dried. Most of my pollen customers prefer the soft texture of pollen with its natural moisture content for eating.

I don't think the food value of pollen for bees or for humans is of much doubt now. The two problems beekeepers need to be aware of are, pollen can cause allergic reactions in the person eating it and pollen can carry pesticide residues. Some people are allergic to eating certain types of pollen and can end up in the hospital from consuming even a teaspoonful of pollen. I recommend people taste a tiny bit to see if there is any itchy sensation produced in the mouth or throat. If not, it should be safe to consume larger quantities. This precaution should be taken with each new type of pollen. Many people report amazing results consuming bee collected pollen to combat air born pollen allergies. Bees, contrary to some available information do collect much pollen from grasses and other allergy causing plants including ragweed.

There are a number of disadvantages to the beekeeper harvesting

Vertical grid trap with covered pollen drawer and front drone escape.

Tray with plastic tube drone escape.

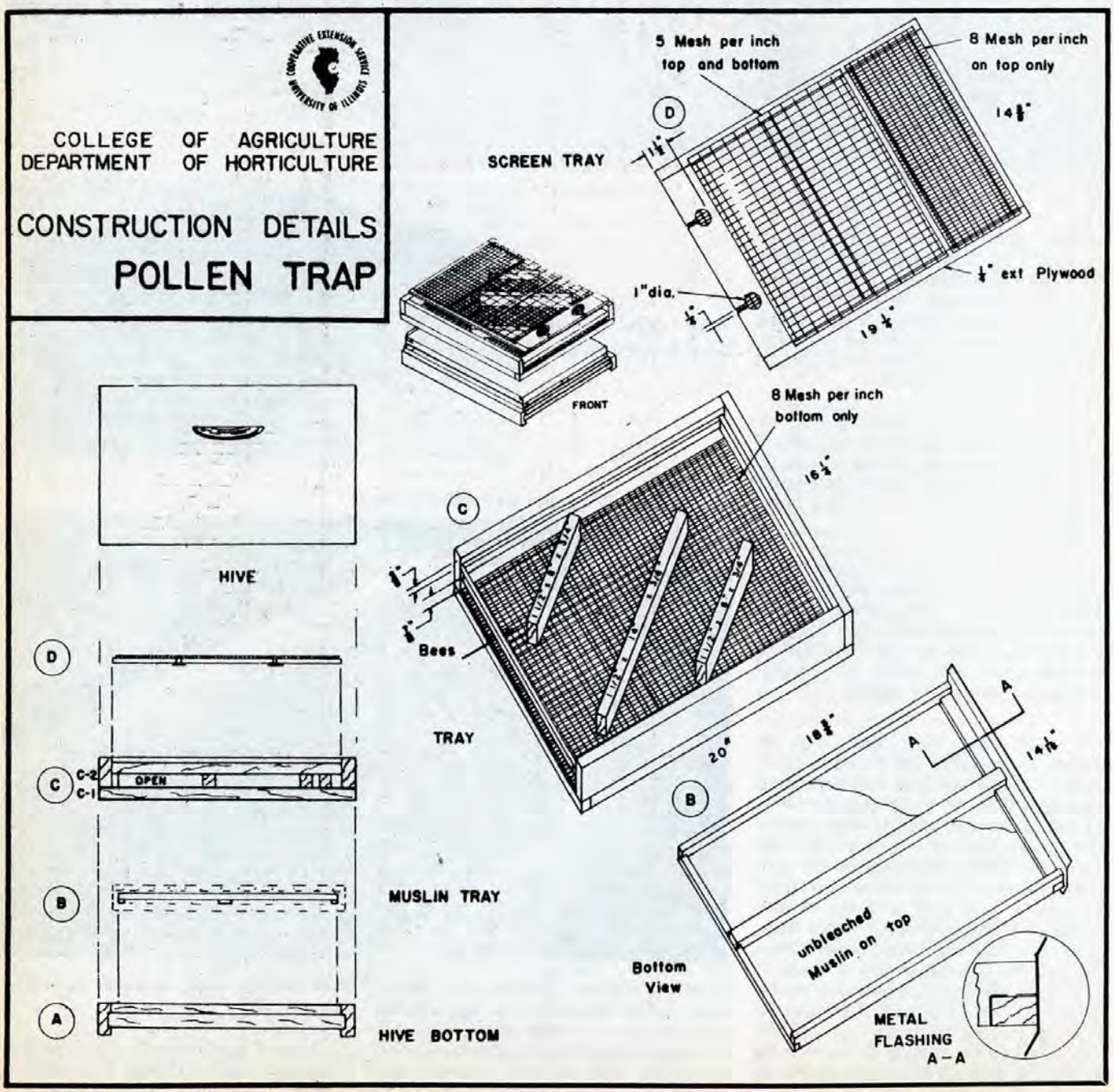
Nice pollen in screen bottomed drawer

pollen from his hives. It requires greater expenditures of time to gather pollen from the hives at frequent intervals. Bees do not like the restricted entrance through the pollen traps and will try to chew at every crack in the hive. Some strains chew more than others and slowly consume the beekeeper's equipment.

Pollen trapping also causes the bee colony problems. Research shows hives with traps have lower bee populations, less brood, less honey production, queen supersedure problems, and overwintering complications. I believe trapping my hives has cut my honey production at least 10%. I believe traps have more effect on fast nectar flows than slow ones. I estimate up to 5% loss of queens superseding and not being able to negotiate the drone escape-pollen removal system. Pollen traps may slow swarming but do not in any way prevent it.

The main advantage to trapping pollen is added income for the beekeeper. Here in Western Colorado honey crops are discouraging and increasingly difficult. Pollen trapping may increase the possible places economically feasible to run bees. I now move a couple hundred hives into wildflower areas at 9-10,000' elevation where there is little honey. The bees can gather 5-10 pounds of pesticide free wildflower pollen per hive per season.

In closing I would suggest beginners experiment with a few traps of different types before jumping in. Pollen trapping is very interesting, informative, and in some cases economically rewarding. It will also increase your work load and colony problems. Most per hive yields I am familiar with range around 10 pounds of pollen per trap per season. Pollen forage plants differ greatly across our country and so do pollen trapping averages. My yields have ranged from 8 to 12 pounds per season, the higher yields coming when I had fewer, better managed traps on selected colonies. □



The Use Of Egg Mortality To Detect Health Harzards To Bees

By JOHN R. HARBO
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FOR THE PAST few years much of the work done by my co-workers and me has involved honeybee eggs in some way: egg positioning by queens, eggs that fail to hatch, egg-development times, etc. The work has already been published in scientific journals, and this article is a condensed version of the results.

The work with eggs began as a natural extension of a sperm-storage project. We were developing a method of storing honeybee semen in liquid nitrogen (-320°F) that was similar to the way cattle semen is stored for 20 years and more. The objective was to store the semen of many lines of bees for a long time at a very low cost. By 1977, we had developed a storage technique that preserved the spematozoa in viable condition (1, 2,). We then wanted to evaluate the bees produced by this frozen sperm.

Why Study Egg Mortality?

Egg death and death of the unborn are very common in the animal world and have many causes, ranging from genetic disorders to nutritional and physical stresses. It is often nature's way of saying that something is wrong. Therefore, egg mortality and spontaneous abortions are often used to measure the effects of toxic chemicals, radiation, or diet on a population of animals. For example, if x-rays cause a group of laboratory mice to produce smaller litters than a similar group that receives no x-rays, then we might conclude that x-rays (at that particular dosage) are hazardous to mice. Litter size reflects the death rate of unborn mice. Similarly, egg mortality is a measure of death rate in a population of animals at their earliest stage of life, the egg stage. (Egg mortality in bees is not related to the spotty brood pattern that results from inbreeding. A poor brood pattern from inbreeding is caused by the workers removing newly hatched larvae, not by eggs that do not hatch.)

When queens inseminated with frozen spermatozoa produced many eggs that did not hatch, I knew we had a problem. Nonhatching of honeybee eggs had been reported earlier by others, and it can be caused by damaged sperm (3, 4). Yet, if we could produce queens from the eggs that survived and if these queens produced normal eggs and brood, our problem would be limited to the first generation. Serious genetic damage would be indicated only if nonhatching persisted in the second or later generations. My objective was to measure egg mortality to find out if genetic damage was present.

Background Information

In a project such as this, test groups are compared with untreated or "control" groups. One tries to keep the groups as similar as possible except for the item to be tested. In these experiments, the control queens were sisters to the test queens, reared in the same cell builder, and inseminated with semen from the same group of drones. The only difference was that semen for the test group was frozen and semen for the control was not.

The control group in an experiment is as important as the test group. In fact, for beekeepers the controls in my experiments are probably more valuable because they more nearly represent normal conditions.

Before describing egg mortality in bees and the effects of freezing sperm in liquid nitrogen, I will describe normal egg laying and hatching behavior.

Normal egg laying by queens.

Beekeepers recognize the eggs laid by a good queen. They are erect at the base of a cell, usually one per cell, and uniformly placed (Fig. 1, a and b). I found that this laying pattern depended on the insemination of a queen with live sperm (5). When queens were inseminated with dead sperm or not inseminated, the egg placement was no longer uniform; the queens seemed to drop or scatter their eggs rather than lay them uniformly. These queens also did not lay as many eggs as their mated sister queens. (Queens inseminated with dead sperm behaved just like uninseminated queens, so hereafter I will refer to mated or non-mated queens. The mated queens were those inseminated with live sperm; the non-mated queens were those inseminated with dead sperm or not inseminated.)

This reduced and non-uniform egg laying occured only when non-mated queens laid an egg in worker-size cells, cells that normally receive a fertilized egg. When I counted only drone-size (cells that normall receive an unfertilized egg), the laying behavior of mated and non-mated queens did not differ.

The reduced and non-uniform egg laying of non-mated queens seemed to be linked to the egg-fertilizing portion of laying behavior. Here is my interpretation: When a queen lays an egg, she needs to coordinate egg laying and subsequent body movements between the cells that receive the eggs. Nerve signals are sent that are much like those we send when probing in the dark to open a door. Nerves in our hand signal us that the key is in, the lock is turned, and the door is opening. From those signals we decide to walk in. If we miss any of those signals, progress stops. I think that when a queen lays an egg she relies on a similar series of signals. Obviously, she needs a signal to know when the egg is laid so that she can leave the cell. But, because fertilized and unfertilized eggs are placed differently when laid in worker-size cells, a queen must also have an earlier signal that tells her that the egg has been fertilized or that sperm have been released from her sperm storage organ (spermatiheca). When that signal is received, the queen can move on to the next steps in the sequence, to lay the egg and then move to the next cell. When that signal is not received, the queen holds the egg, time passes, she shifts her position or leaves the cell, but eventually she must release the egg. The result, fewer eggs laid and eggs laid non-uniformaly. Because queens lay unfertilized eggs in drone-size cells, a signal to fertilize the egg is not included in the sequence for laying in a drone-size cell. So, eggs in drone-size cells are positioned uniformly whether or not the queen has live sperm in her spermatheca.

Normal egg hatching.

If kept at the proper temperature

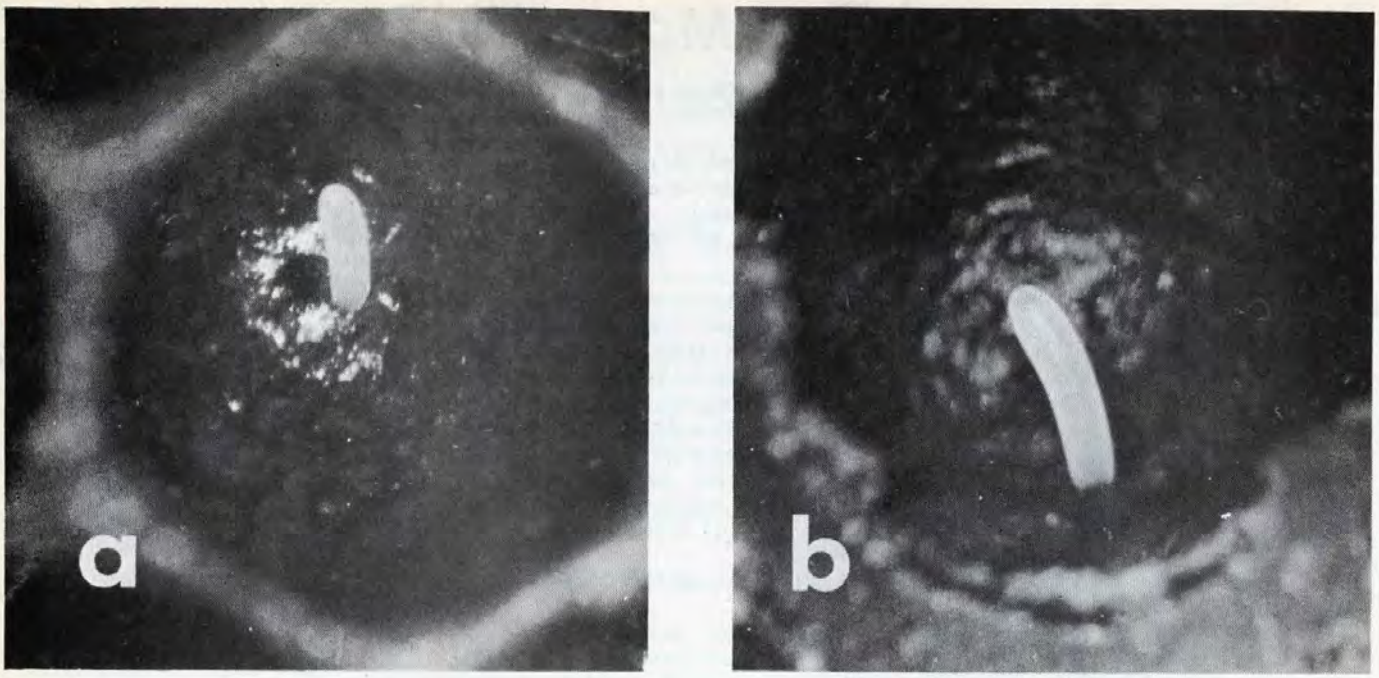
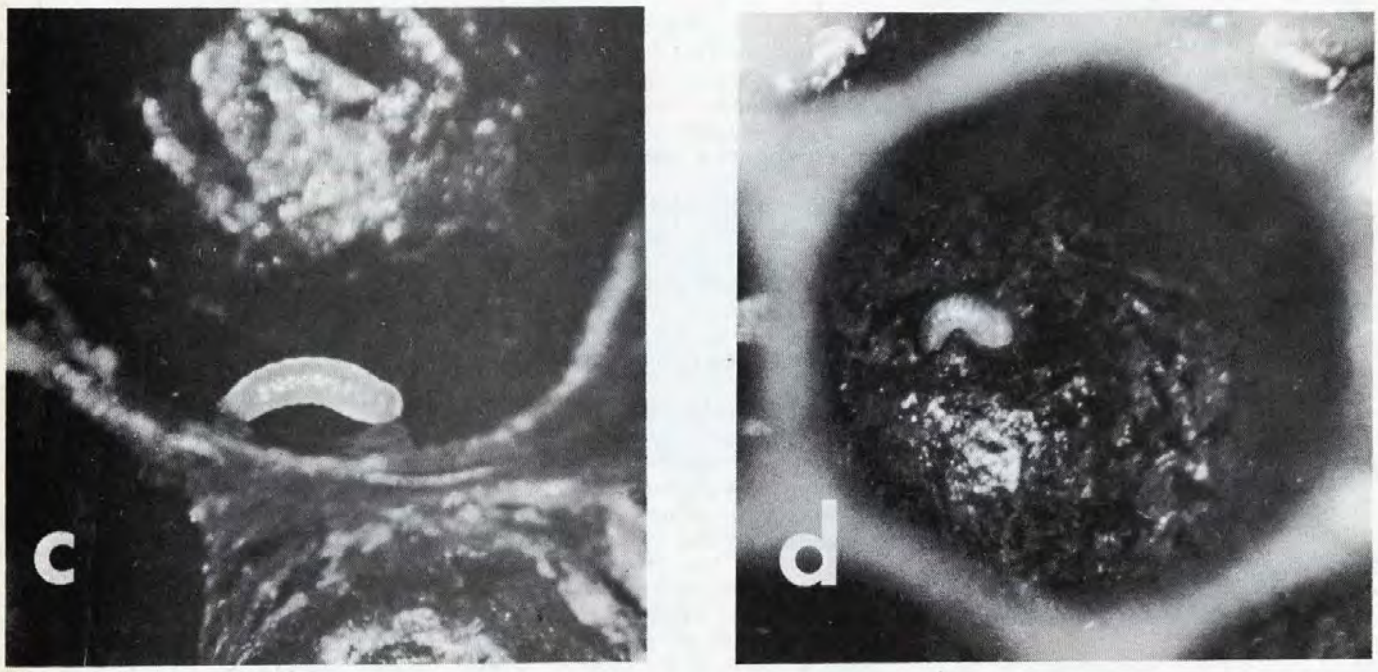


Figure 1. Eggs and newly hatched larvae. Picture *a* is a top view of an egg in a cell. In *b*, the cell is cut away to show a side view of an egg. The head end is up. A side view, (*c*), shows a larva after the outer covering (chorion) of the egg has dissolved. The newly hatched larva is arching over to touch the bottom of the cell with its head (head on right). Finally, *d* shows a newly hatched, unfed larva at the base of cell (top view).



and humidity, eggs will hatch outside the bee colony without worker bees present. Contrary to some popular notions, brood food is not put on the bottom of a cell just before egg hatch. (On rare occasions, I have seen brood food in cells with an egg, but the food was not necessarily put in the cell when the egg was near hatching age, and I have never known such an egg to hatch).

Normal hatching of the honeybee egg was described by Dupraw in 1960 (6). Hatching begins with gentle

movements of the head end of the egg. The movement gradually becomes more intense, and then a clear water-like droplet appears on the surface. The fluid remains in place for a short time and then disperses over the surface of the egg, causing the chorion (egg shell) to dissolve. The larva, which is now visible, continues flexing until its head touches the wax (Fig. 1, c). At this point, it pauses and then falls over on its side. The entire process requires about 20 minutes.

Eggs not in their usual position hatch about as often as upright eggs (7). An egg that is lying on its side, for example, will usually hatch; but it cannot exhibit the waving motion that is seen in an upright egg. Therefore, the waving motion is apparently not a necessary step, at least not when the larva is lying on its side.

The incubation time required for eggs depends on temperature and the sex of the egg. Female eggs develop more quickly that male eggs, and eggs develop slower at cooler temperatures. At 94.6°F, female eggs in worker cells required about 71 hours from laying to hatching; male eggs required about 3 hours longer. Female eggs required about 72½ hours when kept at 93.7°F and about 100 hours when kept at 88°F. The lower limit for complete development of 50% of the eggs was between 85.6 and 88°F. Only 1% of the eggs hatched when kept at 85.6°F (8).

Measuring Egg Mortality

To avoid problems with workers eating some of the eggs and with temperature and humidity variations among colonies, I had all the eggs hatch in an incubator without workers present. To keep things even more uniform, the eggs were laid in the incubator too, but workers, and of course a queen, were present during the 24-hour egg-laying period.

The total procedure to measure percent egg mortality required 8 days. On day 1, I fed the colonies a pollen supplement. Then, on day 3, I put a queen and about 1,000 workers from her colony into cage (Fig. 2, a). Before putting the cage into the incubator (95°F and 50%-60% RH), I put a feeder with 15 ml (about a tablespoonful) of sugar syrup and an empty frame containing 3 grams (about a teaspoonful) of pollen into the cage (Fig. 2, b). (If too much syrup was given, bees filled the cells with syrup and had room for fewer eggs). Twenty-four hours later (on day 4), I returned the bees to their colony, and the frame of eggs was left alone in the incubator. Since egg development requires 3 days at 95° F, eggs and larvae were counted 3½ to 4 days after the bees were removed (on day 8). All hatching was finished by then, and the precent mortality was equal to the present eggs remaining. The eggs that did not hatch were often shriveled by this time. Because the newly hatched larvae are very small (Fig. 1, d) and had no brood food around to flag the presence of a larva, counting was done with 10X magification of a dissecting microscope. A total of 200 (live or dead) eggs and larvae were counted from each queen.

Figure 2. Caging bees for egg laying in an incubator. I used cages that were made by Robert van Arsdall (Bee Breeding lab., Baton Rouge, LA) for emerging bees in an incubator. The cage above happens to be built for ½-length frames, but larger cages with standard frames also work well. In picture *a*, the queen is caged and about 1,000 of her bees are placed in the cage. The cage of bees is then brought to the laboratory. The queen is released and the feeder and frame are added just before the cage goes into the incubator (*b*).

Survey of Egg Mortality in Baton Rouge

The purpose of this survey was to estimate the rate of egg mortality that exists in a normal population and to estimate the variance. Since each experimental group consisted of uniform sister queens, they may not be typical of bees in general. Thus, the survey served as a baseline to compare the experimental controls.

Forty-six colonies were randomly chosen from a group of 281 colonies in the Baton Rouge area. Neither the size of the colony nor the age of the queen was controlled. Fig. 3 shows the egg mortalities as measured by egg development in an incubator. Half of the colonies had egg mortalities of 5% or less; 80% had egg mortalities below 10%. The average mortality was 7% (9).

The very high egg mortalities were re-checked by switching the queens in colonies that had very high (12%-45%) and very low (1%-2%) egg mortalities (see Fig. 3). Eggs were again collected 2 weeks after the switch. The 6 "high" queens measured 2%, 2%, 5%, 7%, 7%, and 18% egg mortality after the switch. The "low" queens had mostly higher mortalities after the switch: 2%, 2%, 6%, 6%, 9%, and 24%. So, in some cases, the present egg mortality was more influenced by the colony, in others by the individual queen. Apparently, then egg mortality in bees has many causes. This variety of causes is an important reason for keeping test and control groups alike in every way.

All experimental controls were well within the normal range predicted in the survey. Except for this comparison, the survey was not used in any experimental analyses.

Worker Eggs Compared With Drone Eggs

Drone eggs (normal, unfertilized eggs) had a higher mortality than worker eggs (9). Four groups of queens that produced fertilized eggs (not including the queens in the survey above) averaged 5%, 6.7%, 6.7%, and 4.6% egg mortality. Four groups of queens that produced unfertilized eggs averaged 18.4%, 51.0%, 61.3%, and 15.9%. (Queens within each group were sisters, and they were sisters to the four respective groups that produced fertilized eggs).

Because of this high mortality in drone eggs and because of the great variation within each group of queens that produced drone eggs, I concluded that a test of egg mortality should not involve drone eggs. With such a great variance in normal drone eggs, experimental differences as great as 10% would be difficult to detect. Of course, when checking frozen sperm, one must use fertilized eggs in the first generation; but, for the next generation, I had considered using unfertilized eggs.

Is Frozen Sperm Safe to Use?

In my opinon, frozen sperm is not yet safe enough. Queens inseminated with frozen sperm produced eggs with a higher rate of non-hatching than control queens inseminated with nonfrozen sperm (10). This non-hatching was still detected in the next generation, but at a much lower rate (9). There is some evidence, then, that freezing causes genetic damage.

is slight genetic damage a serious problem? One could argue that genetic damage occurs naturally and that all animal and plant populations carry imperfect genes and chromosomes. It is very possible that freezing sperm would cause no serious problem. In fact, the risk of a serious problem is probably small. Yet, I am not willing to take this risk.

Conclusion

Because of the results with progeny testing, the practice of storing hundreds of lines of bees in liquid nitrogen is delayed. Developing this method of progeny testing was tedious, but it yielded a useful technique plus information about egg laying, egg-development periods, and normal egg mortality. The progeny test can help ensure that future sperm storage techniques as well as other bee treatments or medications are safe to use.□

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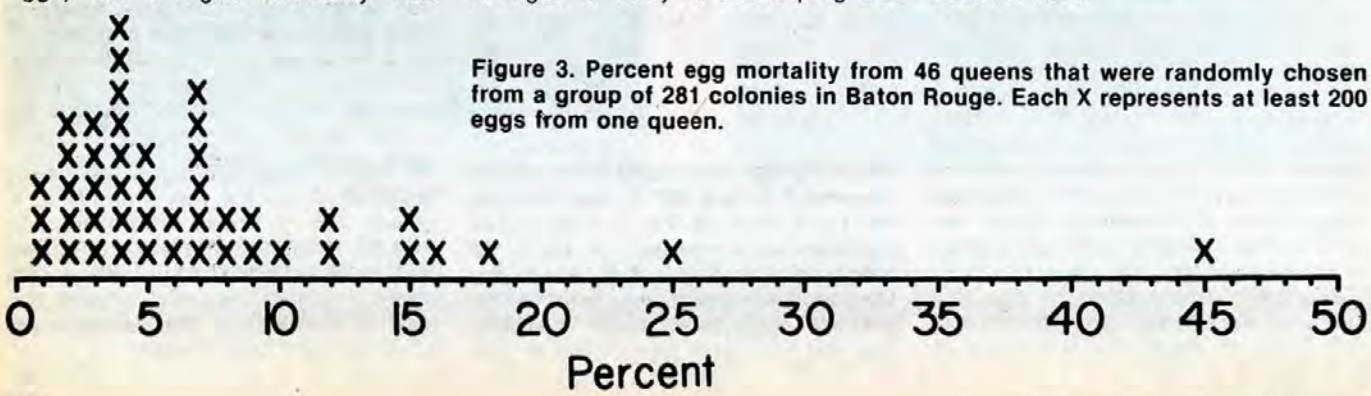

Figure 3. Percent egg mortality from 46 queens that were randomly chosen from a group of 281 colonies in Baton Rouge. Each X represents at least 200 eggs from one queen.

The Beekeeping Program In Burma

(Continued from page 455)

hand mill that was brought to Burma from Poland. The European honeybees accept the wax from the rock bees with no apparent problems.

It is hoped that Burma might someday support as many as 100,000 colonies of European honeybees. Today honey sells for $3.50 a pound; much of it goes to the tourist trade. Honey is a prominent article in the tourist hotels and the duty-free shop in the Rangoon Airport. Honey packing equipment has been ordered and plans are being made to market the honey locally as production increases.

Beekeeping in Burma faces some other problems, too. Ants are a very serious problem, and for protection colonies must be kept on platforms with their supporting legs in water. During the hot season colonies must be shaded to protect against the sun. Temperatures often go above 100°F in the spring. Protection is also needed in the rainy season; some parts of the country get over 100 inches of rain in a year. However, these are all problems that can be overcome with good management. In the brief five weeks I spent in Burma I was very much impressed with the progress and changes that have been made in a short period of time. As Burma diversifies its agriculture the bees will be badly needed.□

Research Review

(Continued from page 456)

brief note on the fact that varroa mites feed on royal jelly (in worker cells) and more detail will be out soon. The mites enter brood cells just before they are capped and the larvae pupate. At that time there is a small amount of royal jelly in the base of cells. The mites burrow into this. De Jong added some dye particles to the royal jelly and when he removed and washed some mites that had been in some treated royal jelly he found the dye particles in the mite intestines, proving they had fed on the jelly. After a brood cell is capped, and just before the larva spins its cocoon, it eats the last of the royal jelly. In the process it cleans the residual jelly off any mites that may be present. If the larva does not consume the royal jelly the mites remain trapped in it and die.

It has been known for some time that mite feeding may cause bees to emerge with deformed mouthparts, legs and/or wings. Such bees are apparently driven from the hive by the normal workers. De Jong and his coworkers in Brazil now have data to show that many bees are stunted by low level mite feeding but that they can survive and remain active, though perhaps not as fully normal participants in the hive workforce.

One of the chief questions not yet answered is how varroa is affecting honey production. Professor Katzenelson in Argentina told me again only recently that while the disease is widespread in his country it is not yet an economic problem. Since Argentina is one of the major honey exporting countries of the world it is important to watch what is taking place there. We are also aware that the Chinese have a method of controlling varroa — in fact, perhaps more than one method — and that they are using some chemicals. So far as I am aware no one is checking to determine if any of these are contaminating Chinese honey.□

Monthly HONEY Report

(Continued from page 436)

Region 5

Tulip poplar honey flows were fair to poor in North Carolina. Have experienced extremes of hot and dry and very wet conditions to date. Very little swarming. Don't look for good sourwood flow at end of June, judging by the appearance of the flower buds. Condition may have been due to heavy rains. In Florida early summer honey flows have been good in most areas, coming from a variety of flora. Rain has been heavy, drowning colonies in many areas. Above average rain fall may bring yield up above the bad conditons of the past three years in Florida.

Region 6

Few beekeepers report any surplus from tulip poplar in Kentucky. Light

(Continued on page 468)

(Continued on page 468)

honey flow from clovers in May and June. Most report small crop at end of June but hope July will make a normal crop. Nearly all honey was light in color and of mild flavor. Weather has been cool. Clover flow was fair in Tennessee but dry weather early in June cut it short. Honey sales are good at the wholesale and retail level. The demand for bakery grade honey remains good.

Region 7

Oklahoma weather unsettled through June bees with no surplus. Cloudy, cool with showers in East Central Oklahoma almost daily. Bees in good condition. Good honey production reported in northeast Oklahoma, much less elsewhere. Much swarming. Mid-Texas receiving more than ample rain. San Antonio area will average about three shallow supers of honey from horsemint, liqustrum, Chinese tallow and mesquite. East Texas tallow flow is very good. West Texas cotton honey flow is promising at end of June. For the first time in years Arkansas enters summer with a surplus of rainfall. Some very fine yields of honey are being reported. Honey sales not doing very well on the commercial level due to the economy. Packers are not buying new crop at the time except on delayed payment basis. Planting of soybeans has been delayed due to wetness which means a soybean honey crop would be late. Bees in excellent condition.

Region 8

Most of Colorado short of rainfall during June. Honey plants abundant but show lack of moisture. Colonies built up well. Retail demand for honey has been steady. Packers using up stock on hand in Anticipation of new crop offerings soon. Montana honey plants in bloom but bees unable to fly because of rain and overcast days. Some flooding. Volcano haze has blocked sunshine. Excessive absconding of new queens in splits and packages reported. Montana should have good year if weather warms.

Region 9

Good honey crop in Oregon but ended in early July in western part of state. No reports available from Washington and California but in general promises to be a good year to date.□

News and Events

MICHIGAN
Michigan chooses a "Honey" of a Queen

Since March, Michigan beekeepers have had a new Honey Queen, Miss Heidi Guthrie from Marlette, Michigan. She is the daughter of Mr. and Mrs. Ralph Guthrie and she attends Oakland University. Her goals for the future are music and drama. Heidi plans on traveling around Michigan promoting honey for the Michigan Beekeepers.

INDIANA
Michiana Beekeepers Association

August 15, 1982, 2:00 p.m. — Rum Village Park — Nature Center — 2626 S. Gertude — South Bend, IN — Ph. 284-9455.

Bees and Gardens

(Continued on page 441)

compatible pollen, therefore no bees are usually needed to grow the seed. Tomatoes are wind pollinated and consequently plants grown for seed are also free of the need of extensive bee pollination. Onions, on the other hand, bear seeds only when cross pollinated by bees or other insects. Most gardeners use miniture onion plants or "sets" which are commercially grown but one must remember that an ample seed supply is needed to start these sets in the beginning.

A third classification of garden vegetables includes the perennials. Asparagas and artichoke are two. The pollination requirements of the vegetable garden perennials are not particularly well researched but no doubt honeybees have at least some part in their propagation. Perennials live from year to year, with varying blooming periods. Perennials are either woody (trees, shrubs or vines) or herbaceous (plants in which the aerial portion is relatively short lived and the tissues comparatively soft).

During the past decade or two hybrid garden vegetables have been researched and some hybrid vegetable seeds have been available to the gardener. The development of the hybrids will herald a whole new pollinating role for the honeybee, during the seed production stage. One of the primary problems in growing hyrid seed is the efficient and extensive transfer of pollen required during hybridization. Only honeybees or other insects raised under controlled conditions are equal to the task.

We hope that the role of the honeybee is now more clear and that you as a beekeeper can be helpful in defining the exact part that insects, especially the honeybee, play in growing vegetables in the many gardens about the country. During the next month or two we will turn to the role of the honeybee in keeping the land green, beautiful and productive with the flowering and other ornamental plants commonly found in the home garden. □

References

McGregor, S.E. *Insect Pollination of Cultivated Crop Plants.* 1976 Agricultural Handbook No. 496 A.R.S. U.S.D.A. Washington, D.C.

Wilson-Loomis, *Botany*, Fourth Edition. 1966.

News and Events

(Continued from page 468)

Proceeding north on U.S. 31 turn west at Ewing for a few blocks to Park entrance. Nature Center within. Watch for signs . . .

Slide Presentation: HONEY PLANTS, (Major & minor honey plants from warmth of spring to fall freeze).

Discussion: PREPARING FOR FALL, (reducing entrances, medicating, mouse guards.)

PENNSYLVANIA
Delaware Valley College
Short Course

Favored by fine weather, the Delaware Valley College three day Beekeeping Short Course attracted over 100 people. Included in this group were people of all ages and backgrounds and people from seven different states were represented in the class. Also attending the course for one day was Mr. Imkermeister Piertiz and his son Chris, both of whom live in West Germany and who were spending five weeks visiting various beekeepers and beekeeping operations on the East Coast of the United States.

The course, one of two beekeeping short courses offered each year by Delaware Valley College, generated much interest and enthusiasm in honeybees and in beekeeping. There were many experienced beekeepers in the group as well as many novices. The course was under the direction of Dr. Robert Berthold, Assistant Chairman of the Biology Department at the College.

Due to the response to the course, Delaware Valley College plans to again offer their Spring and Summer courses in 1983, and anyone interested in information when it is available can write to Bees, Delaware Valley College, Doylestown, PA 18901.

OHIO
Ashtabula County Beekeepers Association

The Ashtabula County Beekeepers in Northeastern Ohio will have their annual summer picnic and meeting on Saturday, August 7th at the Saybrook Twp. Park on the shores of Lake Erie. The picnic starts at 12:00 and the regular meeting about 1:00. We have members from four counties in Pennsylvania and four counties in Ohio. Our mailing list for this meeting will go to almost 300 adresses. Visitors are always welcome. For more information contact either the president — O. G. Soule of R.D. 3, Rt. 307, Geneva, Ohio, 44041 or Secretary A. L. Westcott of 3476 St. Rt. 84 east, Kingsville, Ohio 44048.

CALIFORNIA
Los Angeles County Fair's Bee Displays

Bee exhibits at Los Angeles County Fair in Pomona, California, are always a beehive of activity. Fair dates are Sept. 9 through 26. Department Chairman is Roy K. Davis.

"People are intensely interested in the life style of a bee and it's not unusual to have them clustered around our observation hives for long periods of time." said Davis.

Displays this year will be large, if not larger, than those in 1981.

Davis recalls that eight booths with 100 feet of frontage space were staffed by organizations, packers and suppliers.

In addition, there were seven smaller displays.

He estimates more than one million people from the Fair's total attendance of 1,384,167, passed by the popular exhibits.

"Probably the most popular misconception among these people was that bees make honey from pollen rather than nectar," observed Davis.

Recipes provided by California Honey Advisory Board were distributed by the reams.

The 65-member Los Angeles County Beekeepers Association came up with an attention grabber.

A cut away of an enlarged hive showed bees on a comb and through the animation genius of a member, the bees simulated a dance.

Two four-framed observation hives were mounted on a 10-cubic lighted environment chamber where bees would go for water, syrup and pollen patty.

This Fall's exhibition will consist of five divisions including (1) bees, (2) honey extracted, (3) honey-other types, (4) beeswax and (5) feature exhibits.

Exhibitors must file entries by August 15, noted Davis. There are two bee classes — Caucasian and Italian.

Extracted honey can range from avocado to wildflower. A total of 18 varieties can be entered.

In other types of honey category, exhibitors can show chunk, creamed or crystallized honey, extracted frames and comb honey.

Feature exhibits division is open to hobbyists, beekeepers organizations, and commercial producers or handlers.

Judging in this category, said Davis, will be based on the most effective use of lighting, animation and color with creative and artistic ideas. "We're looking for show stoppers," added Davis.

A "Honey of a Trophy" will be awarded the exhibitor accumulating the most ribbon points. Each first place ribbon will be worth five points, second, three points, and third, one point.

Contact Bill Arballo or Steve Weiss, P.O. Box 2250, Pomona, CA 91769. Phone 714-623-311, Ext. 237.

OREGON
Pacific Northwest Bee School

The 1982 Pacific Northwest Bee School will be held October 21-23, Thursday through Saturday at the Oregon State University Foundation Center, OSU Campus, Corvallis, Oregon.

The activities will include selected expert speakers; Dr. Mark Winston, Simon Fraser University, British Columbia; Dr. Martha Gilliam, USDA, Tucson, Arizona; Professor Steven Taber, Taber Apiaries, Vacaville, California; Dr. Hachiro Shimanukl, USDA, Beltsville, Maryland; Dr. Carl Johansen, Washington State University, Pullman, Washington; Dr. Eric Mussen, University of California, Davis, California; Dr. John Ambrose, North Carolina State University, Raleigh, North Carolina; and Dr. Pongthep Akratanakul, Dasetsart University, Bangkok, Thailand.

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News and Events

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Topics will include: queen breeding for disease resistance, genetics of swarming parasitic bee mites, pesticides and bees, new developments in tropical beekeeping, Africanized bees, colony management, nectar and pollen sources and much more.

There will be honey show, social musicale, 1983 Oregon Honey Queen Coronation and Commercial Displays.

The registration costs are — $15.00 per day or $40.00 for the full three days.

The housing and meals will consist of arranging motel reservations on your own. Information on Cornvallis motels available on request. Inexpensive meals are available on campus. RV space (no hook-up available on campus).

For further information please contact the following individuals: Mr. James Schupp, OSU Foundation Conference Center, Corvallis, Oregon 97331 or Michael Burgett, Department of Entomology, OSU, Corvallis, Oregon 97331.

CONNECTICUT
Pratical Beekeeping Day

A combination of field and classroom instruction will be used to discuss various aspects of practical beekeeping at the New Haven County Cooperative Extension Services offices in Hamden, CT. The program will run from 10 a.m. to 3 p.m., August 14th, and will be taught by Dr. Larry Connor of Beekeeping Education Service, Cheshire, CT. Pre-registration is required and is $10 per person or $15 per family.

Register with Cynthia Rabinowitz, County Extension Agent, by phoning 203-789-7865. The Extension Service retains the right to cancel the program due to low pre-registration.

CONNECTICUT
Bee Breeding and Insemination Prgram

Bee breeding methods and instrumental insemination will be the subject of a special program offered by Dr. Larry Connor, Director of Beekeeping Education Service. The two day program will be held in August or early September. Dates and fees will be set after enrollment interest is determined.

"We will use video systems and hands-on experience to train people in the basic aspects of instrumental insemination," Connor said, "But this will not be a complete training program. Instead, it will introduce the beekeeper to the methods, and help them decide if this is for them."

Connor plans to hold the program in Connecticut, but will consider alternate sites if interest dictates. Contact Connor at P.O. Box 817, Cheshire, CT 06410. Phone 203-271-0155.

CONNECTICUT
Beekeeping Basics Course

Two identical six week courses for new and hobbyist beekeepers have been scheduled by the Connecticut Cooperative Extension Service. Both courses will be taught by Dr. Larry Connor, Director, Beekeeping Education Service, Cheshire.

In Farifield and Litchfield counties, the course will begin on September 16 and will run until October 21 on six Thursday evenings, from 7 to 9 p.m. The course will be taught at the Fairfield County Extension office in Bethel, CT, just off Interstate 84. PREREGISTER IN ADVANCE WITH AGENT HOWARED KEMMERER BY PHONING 203-797-4176.

In New Haven and Middlesex Counties, the six week program will begin October 12 and end November 16th, operating for 6 Tuesday evenings from 7 to 9 p.m. Register with Cynthia Rabinowitz by phoning 203-789-7865. THE COURSE WILL BE TAUGHT AT THE NEW HAVEN COUNTY EXTENSION OFFICES IN HAMDEN.

The registration fee for both courses is $50, and includes the BEEKEEPING BASICS program, and the textbook. Couples may register for $75, obtaining one set of materials.

Obituary

WENDELL P. SMITH

WENDELL P. SMITH, 82 of Sunbury, Ohio, died June 5, 1982 at Grady Memorial Hospital in Delaware, Ohio. Mr. Smith was a beekeeper for well over fifty years. Many beekeepers through the years depended on Mr. Smith's beekeeping advice.

In 1937, he started inspecting bees as the Delaware County Apiary Inspector. Then, on September 15, 1952, Mr. Smith became a State Apiary Inspector with the Ohio Department of Agriculture, until his retirement on December 31, 1970. During his thirty-three years as a county and state apiary inspector, Mr. Smith contributed significantly toward the reduction of American foulbrood disease in Ohio. After retirement, he devoted much of his time selling bee supplies at his residence. He was instrumental in helping develop the Ohio Honey Festival, held yearly in Lebanon, Ohio.

Mr. Smith is survived by his wife Gertrude Z.; sons, William Avery, Phoneix, Arizona; Ronald W., Santa Maria, California; daughter, Lois May Toth, Somerset, Ohio; eight grandchildren; three great grandchildren and two brothers.

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MAGAZINES

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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.

THE INTERNATIONAL BEE RESEARCH ASSOCIATION 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 copy of **Bee World** $1.50; **Journal of Apicultural Research** $1.50; **Apicultural Abstracts** $2.00, from INTERNATIONAL BEE RESEARCH ASSOCIATION, Hill House, Gerrards Cross, Bucks. SL9 ONR, England.

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.

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.

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.

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.

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.

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Book Review

Apicultue In Tropical Climates. International Bee Research Association, Hill House, Gerrard's Cross, Bucks SL9 0NR, England. 244 pages. Price 18.75 English pounds or $40.50, postpaid. This 1981 reprint is the full report of the First Conference on Apiculture in Tropical Climates, in 1976. The book is edited by Eva Crane. The demand for this book, increased by the use of bees in the tropics, has led IBRA to reprint it.

Bait Hives For Honeybees by Thomas D. Seely and Roger A. Morse. Media Services at Cornell University. 6 pages. Price $1.25. This bulletin is available from Distribution Center, 7 Research Park, Cornell University, Ithaca, N.Y. 14850. Refer to Information bulletin No. 187. Building and distributing bait hives can be an interesting and rewarding part of keeping bees. This excellent bulletin containes information, including drawings with dimensions for building the bait hive, and photographs that will help you to capture stray swarms with a minimum effort.

Hypersensitivity To Bee Venom, Dr. H.R.C. Riches. An IBRA reprint No. M 109. Order from International Bee Research Association, Hill House, Gerrards Cross, Bucks, SL9 0NR, England. Price $2.30, postpaid. □

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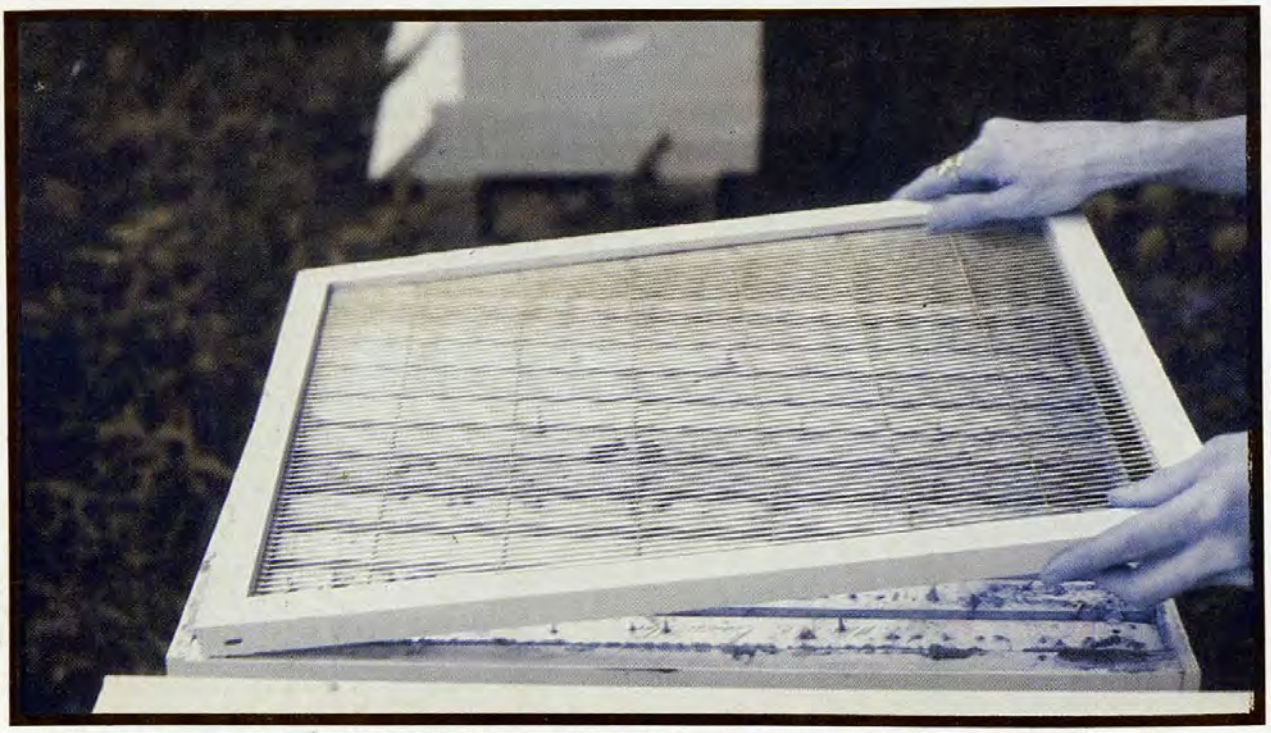

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