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In Bee Culture

September 1984

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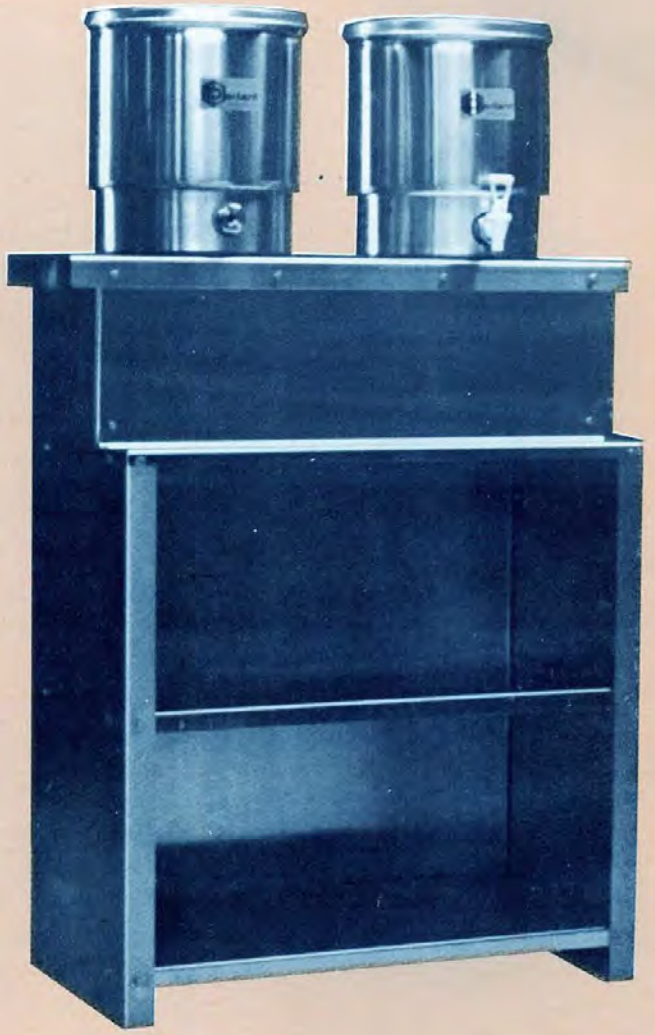

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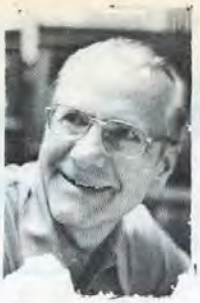

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GLEANINGS IN BEE CULTURE

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CONTENTS

COVER STORY

Honeybee Hendrix and his wife, from West Point, Miss., proudly exhibit the rewards of a good honey season. Photo by Bob Cole.

Capping The News

THE EDITORS

"Beekeeping Small Talk"

ACARINE MITE UPDATE

On August 10 the federal government imposed a quarantine on all or parts of 13 Texas counties in response to the infestation of *Acarapis woodi* mites found in various parts of that state. The quarantine prohibits shipment of bees to, through or from these areas until such a time that the mite has become irradicated. The states of Georgia and Louisiana have previously imposed quarantines or their own and there is a distinct possibility that the Canadian government may respond in some regulatory way.

There are many concerns centered on this infestation. One, of course, is that containment might not prove possible. The mite, which infests the tracheal systems of bees, has been treated, to some degree in other countries, with bromopropylate impreganted strips of paper marketed under the trade name *FOLBEX*. That product, although manufactured in the U.S., is not registered for use in this country. It is possible, though, that emergency use could be approved.

On a more positive note, extensive surveying by APHIS has, to date, indicated that bees shipped by Chandler Apiaries, where the mite was first detected, are free of infestation. Additionally, APHIS officials have been extremely complimentary to Texas beekeepers for their extensive help and cooperation. Instances were cited where beekeepers gave up vacations to help in the surveying efforts and commercial operators donated the services of their employees.

We suggest that all beekeepers watch the three major bee journals for further updates.

CONSUMED BY HIS INTEREST IN BEEKEEPING!

A recent issue of *THE BRITISH BEE JOURNAL* reported that a book entitled *The Book Of Losers* told the story of a man, in Brazil, who while fishing by a river accidently disturbed a swarm of bees that attacked him. To escape the bees he jumped into the river, only to be promptly eaten by piranhas.
Sounds fishy to us.

COUNTRY OF ORIGIN LABELING REGULATION

We recently received a ruling, by the Customs Office of Regulations and Rulings, stating that a prior decision, of October 14, 1983, stipulating that imported honey must be marked, on its container, as to country of origin, has been upheld. The earlier decision had been appealed by some U.S. packers who import honey. Their contention was that, because of their processing procedures, imported honey was changed substantially and, thus, was exempt from the intent of the labeling regulation. The Office of Regulations and Rulings disagreed, however, stating that "filteration, heating and blending with domestic honey" does not substantially tranform foreign honey, and that the labeling requirements apply. This decision is likely to be favorably received by beekeepers who have felt that imports have been hurting their honey sales and that the public, by-in-large, has been unaware of the fact they are often buying imported honey.

HONEY PROMOTION BILL

Frank Robinson, Secretary-Treasurer of the American Beekeeping Federation, reports that the Honey Promotion Bill has been recommended and forwarded by the House Sub-Committee on Livestock, Dairy & Poultry, and the full Agriculture Committee. Their recommendations were unanimous and the full House is expected to consider the bill after they reconvene. An identical bill is to be submitted to the U.S. Senate at that time. It is hoped, by bill promoters, that passage will take place before this session of Congress ends.
Readers may recall that the intent of this bill is to establish an assessment on domestically produced honey, with revenue going toward promotion and research.

POLLEN AS A HEALTH FOOD

An article in the April, 1984 issue of *FDA CONSUMER* by Tim Larkin, was highly critical of many claims made by promoters of bee pollen for human consumption. Larkin pointed out that pollen, when exposed to air, is rapidly attacked by bacteria, yeast and other fungi, thus is not a "giant germ killer in which bacteria cannot live. He went on to argue that, although pollen is undeniably good for bees, there has been no conclusive evidence to suggest pollen is any better or worse for humans than a variety of other foods. In fact, the protein content of pollen is between 5 and 28 percent, whereas soybean cake contains 46 percent protein. Round steak contains 20 percent. As to the health benefits claimed by pollen promoters, Larkin says that tests with athletes, conducted by the National Association of Athletic Trainers in 1975 showed no significant contribution. Furthermore, there is no existing evidence, based on legitimate experimentation, to substantiate the claims that pollen relieves diseases or retards aging. As to its ability to inhibit hay fever or allergies, even scientists involved in the bee industry, such as Dr. M.D. Levin of the Carl Hayden Bee Resaerch Lab, Tucson, AZ, warn that pollen consumption may, in fact, prove dangerous to persons with allergies by triggering a severe reaction.
At present, the FDA dictates that bee pollen may be marketed as a food, but not as a drug with theraputic claims. This seems quite prudent. We all, of course, hope that many of the health claims made about bee pollen can be substantiated in ways other than personal testimonials. Our industry certainly would benefit from that. In the interim, however, all beekeepers should exercise prudent judgement in representing this hive product to potential users. Remember -- misrepresentation can easily cause unwanted problems for all beekeepers.

Obituaries — Rolf Boch — 1928-1984

Dr. Rudolph (Rolf) Boch was born in the town of Stiefenhofen, Germany on November 9, 1928. His parents, Anton and Franziska Boch, operated a small farm, and his father had a typical German Bienenhaus in which he kept a few colonies of bees.

Rolf received his education in German schools, and completed his doctorate under the famed Professor Karl von Frisch, at the University of Munich.

His thesis work was concerned with the relationship between the bee dances and the distance of the nectar sources from the hive. Rolf was among the first to notice the change in direction of the dance with the changing location of the sun through the day.

Rolf came to Canada in 1956 to join the Bee Division under the late Dr. C.A. Jamieson. He was married in May, 1957 to Ana R. Bizetsky who had also studied at Munich with Prof. Frisch. He leaves a daughter, Suzanne and two sons, Eric and Ronald.

His first studies at Ottawa were on the relation between the size of queens and their productivity, proving what many beekeepers "had always known." He also developed, along with Mr. Fairburn of the Ottawa Valley Beekeepers Association a cardboard wintering case for bee colonies. His main career efforts were centered, however, on the effects of specific odors on bee behavior.

Specifically, he and his chemistry associates found that isopentyl acetate (bananna oil) found in the worker bee sting gland was mainly responsible for alerting and alarming hive bees for defense of the hive against intruders; that queen substance not only attracted drones to queens in flight but also attracted workers to queens in swarms and in the hive; this attraction was reinforced by worker scent produced in the scent glands of the workers themselves. In harmony with these findings were studies showing that acceptances of queens introduced to new colonies was controlled by the genetic makeup of a given queen plus "hive odor.

In recognition of these and other studies, Rolf was the first scientist to receive the James I. Hambleton Award for excellence in bee research, given by the Eastern Apicultural Society. As well, he was a co-holder, along with Dr. Hopkins and Jevans from NRC, of a honeybee food attractant from pollen.

In his personal life, Rolf was deeply involved with groups such as the German Benevolent Society; his love of the land led him to take keen interest in the operations of the Rideau Valley Conservation Authority, and in reforestation work on cottage and marginal farm land acquired over the years; as well, he participated in efforts to increase the bluebird populations near his land by installing special bluebird nest sites.

As a speaker, he was equally at home with scientific groups in seminars and groups; with commercial beekeepers; and with hobby beekeepers and with naturalists of all kinds.

He will be sorely missed by his many friends and associates.□

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The Monthly Honey Report

August 10, 1984

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	44.00	54.00		36.12	40.00	39.00	35.00	39.00
60 lbs. (per can) Amber	42.00	41.00	47.00		31.62	37.50	33.00	33.75	36.00
55 gal. drum (per lb.) White		.52	.54	.57			.62	.52	58
55 gal. drum (per lb.) Amber		.45	.47				.55	.47	.54
Case lots — Wholesale									
1 lb. jar (case of 24)	28.50	24.90	26.00	25.92	38.40	24.50	24.75	25.00	28.96
2 lb. jar (case of 12)	27.50	23.30	23.75	23.76	34.80	23.00	24.50	24.50	26.40
5 lb. jar (case of 6)	30.00	27.80	26.00	23.04	27.50	25.50	25.00	25.00	28.30
Retail Honey Prices									
½ lb.	.90		.85	.84	.84	.94	.88	.84	.90
12 oz. Squeeze Bottle	1.50	1.19	1.35	1.25	1.75	1.35	1.35	1.15	1.35
1 lb.	1.50	1.39	1.45	1.50	1.85	1.55	1.49	1.60	1.50
2 lb.	2.70	2.59	2.60	2.65	2.72	2.60	2.60	2.60	2.60
2½ lb.	3.35			3.27		3.25		3.20	
3 lb.	4.00		3.59	3.87		3.85	3.595	3.70	3.50
4 lb.	5.00	4.95		4.99		4.90	4.40	4.60	
5 lb.	6.00		5.75	5.90	5.99	5.80	5.30	5.45	5.50
1 lb. Creamed			1.45				1.80	1.45	1.55
1 lb. Comb	2.25		2.25		1.95	1.85	1.95	1.60	2.25
Round Plastic Comb	1.75		1.85	1.69			1.85	1.70	1.50
Beeswax (Light)	1.30	1.25	1.35	1.35	1.25	1.50	1.15	1.15	1.30
Beeswax (Dark)	1.20	.1.25	1.25		1.10	1.40	1.10	1.10	1.10
Pollination Fee (Ave. Per Colony)	25.00		27.00	18.00	19.00		17.50	19.00	25.00

MISCELLANEOUS COMMENTS

REGION ONE

Good July rains may extend an already good flow in CT. New pesticides in use that claim to cut bee losses in half.

REGION TWO

WV reports good early crop, but prices off some. From PA: early June honey flow best in years with thick locust honey. Clover not producing well, though. Honey sales off up to 25 percent during past year. Maryland beekeepers are speaking of a better than average year. Sales there good. Abundant rainfall.

REGION THREE

Illinois reports an excellent crop. Yellow mustard yielding a dark, mild crop in some parts, mixing in with clover. PIK acres of

sweet clover have helped in some areas. Very little crop in strip mine areas which usually has a good flow. More beekeepers intending to put honey on government loan. Wisconsin hives reported good to extremely good. Plants O.K. with adequate rain. Indiana honey sales slow with lower prices. Pollination contracts on the up side, though.

REGION FOUR

Hot and dry in many parts of MO. Harvest good on early flow. Honey sales slow. North Dakota reports white sweet clover on time. Great fears about the Acarine situation. Many farmers using Pydrin on sunflowers and it is hoped this will help beekeepers. Moisture erratic but adequate. Second hay crop uncertain, but could be good if there is a late rain.

REGION FIVE

Local N.C. honey selling well at farmers markets. Sourwood flow has started. Many rain showers. May be short flow due to weather.

REGION SIX

KY honey crop especially good in central part of state where average will approach 100 pounds per colony. Precipitation below normal. Light honey flow still on. Honey sales far below normal. Sizeable portion of honey is dark.

Continued on page 477

Bee Talk

By RICHARD TAYLOR
Route 3
Trumansburg, N.Y. 14886

Many beekeepers wait until September to harvest the honey crop. That's what I used to do. It seemed simpler to do it all at once. But with comb honey, which is all I raise now, it is simpler to start early, a few supers at a time, since there is not extracting equipment standing around, sticky and unused, waiting for the next batch of supers. As I began ths year, in July, I did some thinking about the harvesting procedure, and decided it might be worthwhile to pass along a few of the things I've learned.

Escape screen, with two-way escapes fitted in two of the corners.

I've used every method of clearing supers except fume boards, which seem to me to be a bad idea. The bee blower was rather fun, but it made a lot of noise and smoke, and cost too much. I finally sold it. Simplicity is a good idea here, as everywhere. I finally settled on the two-way bee escape. It is simple, cheap, doesn't break down, and it works. My great improvement here is to use a screen, rather than an ordinary inner cover. The bees vacate the supers twice as fast if you use an escape screen. No one knows why, but it obviously has something to do with the contact the bees make, through the screen, with the bees in the hive below. The other advantage is that the honey in the supers will be kept ventilated and dry, even if it rains before you get the supers off.

I go from hive to hive, raising the supers up from behind, two or three at a time, without lifting them from the hive, slip the escape screen under them, let them back down again, then slide supers and screen back into place. It requires very little strength or skill. The supers are pretty well empty of bees the next day, or at least by the day after that. I don't want to leave the supers on the hives any longer than necessary after the escape screens go under them— 48 hours at most.

There are two mistakes that inexperienced beekeepers are apt to make when using two-way bee escapes. One is to leave the hole in the escape device obstructed by the comb above it. For example, if an ordinary inner cover is used upside down, so that there is no rim on the top side, the escape device is fitted into this, and then a super set on it, then the combs are likely to be resting right on the inner cover, and the center one will be smack up against the two-way escape device, obstructing it and trapping all the bees in the supers. It is surprising how often beginners do this.

The second mistake is to leave a crack or opening of some sort above the escape, so that bees can re-enter the supers and rob them out. Not much, if any, robbing will take place if you get the supers off the next day, but it doesn't take long for the damage to get done once a single bee has been able to find her way back in and then spread the word to others. The best single precaution against this is to leave the inner cover in place, stuck down good, then check, after the escape screen has been inserted under the supers, to make sure you have not overlooked any point of possible re-entry.

It is exceedingly simple to make escape screens. Anyone can make a dozen in only an hour or so with no special tools besides saw, hammer, and nails, perhaps some small tin snips or strong shears. The escape screen consists simply of a sheet of wire screen, framed, with a rim on both sides. Use, in other words, eight strips of wood, and nail these together with the screen between. The dimensions are those of a standard hive. Use eight-mesh screen, that is, eight wires per inch. This is more expensive than fly screen, which has 16 wires per inch, but it is much stronger and worth the extra.

Having done that, you cut a notch from the bottom rim of the frame in each of two corners, and tack a little strip of tin or aluminum across that underneath. Now press a two-way escape device into those corners, on the underside of the screen, such that the rim of the escape is shoved in between the two wood strips, holding the device in place. Finally, cut holes in the screen corresponding to the holes in the two escape devices.

That simple device affords the bees four paths of escape from the supers. Two of these lead to the hive below, and the other two lead right outside the hive, into the open air.

There is the very paradigm of simplicity, a device that is simple to assemble, simple to use, cheap and efficient.

Corner of the escape screen from underside, showing how the two-way escape device is held in place.

The underside of the screen will, over the years, become more or less covered with burr comb, but this doesn't matter. The amount of burr comb will be minimized by not leaving the screens on the hives more than a day or two. The springs in the two-way escapes can also get stuck from propolizing, but that too can be minimized that same way, by not leaving them long in contact with the bees. If they do get stuck, it is easy to free them with a small nail or toothpick.

Escape screens identical to the one just described can be purchased, and any readers wanting to know where, perhaps to buy one to use as a pattern, can send me a self-addressed post card.

Preferred Methods of Removing Bees from Supers by New York State Commercial Beekeepers

By CAROL E. HENDERSON/Graduate Research Assistant
Department of Entomology, Cornell University, Ithaca, NY 14850

It's fall and time to extract honey, but many beekeepers still have doubts as to the most efficient method of removing bees from the combs. Doubts such as these always recur: "The repellent works fine, but today it's awfully cold; the blower is good, but it's so noisy; the escape is easy, but requires two trips to the apiary". This article reviews the available methods for removing bees from frames prior to extraction, and surveys the methods preferred by New York state beekeepers.

Brushing Bees

Smoking and brushing bees from frames was a common method of removal. Combs are removed one at a time, brushed, and quickly taken to the honey house for extraction. This method is slow and messy, as bees tend to become very aggressive after being brushed and the air is soon filled with angry bees. A soft-bristle nylon brush may be used, or, when dealing with a few colonies, a brush of long grass works just as well. The results of the survey show that only six percent of the beekeepers use this method today, and at a reduced efficiency. It takes them almost double the time to remove bees from one super as it does by any other methods (Fig. 1)

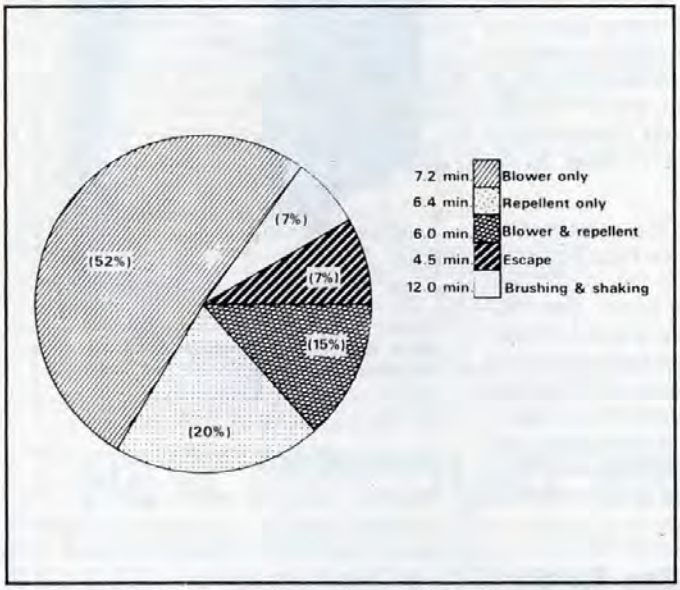

FIG. 1. Preferred methods of removing bees from frames by New York State beekeepers. The numbers by the key refer to the time spent on each hive.

Bee Escape

The Porter bee escape was introduced in the early 1890's and offers a simple method of bee removal. It is a metal or plastic device inserted in the hole of an inner cover, and designed to permit the passage of bees in one direction only. Most commercially manufactured inner covers have a hole which allows the Porter bee escape to be properly inserted. The inner cover and escape are then placed below the supers which are to be extracted, permitting the bees to descend to lower supers but not return to the honey. Usually all the bees will have descended in 24 to 48 hours. Although this is a "neat and tidy" method of removing bees, it, too, has disadvantages. It requries two trips to the apiary, while in other methods honey can be removed in one trip. Also, placing the inner cover plus escape is not an easy task, for it requires lifting the heavy honey supers, and inserting the escape board. This requires more than one person in order to be done efficiently.

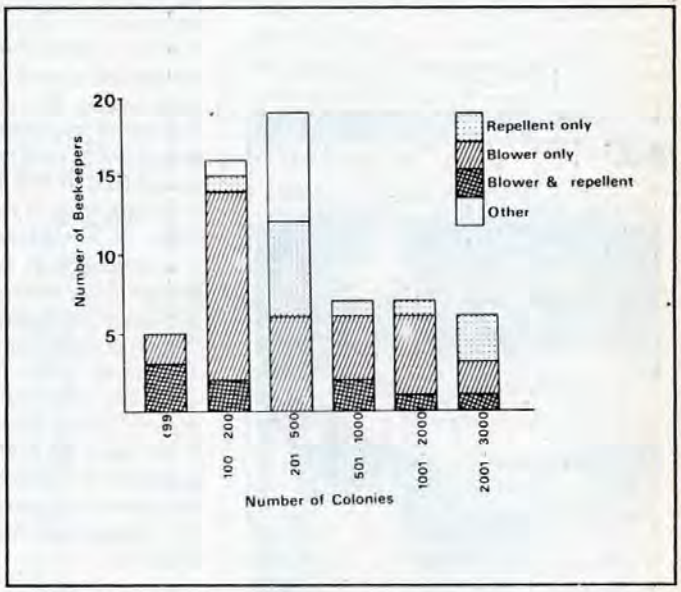

FIG. 2. Comparison of bee removal methods based upon the number of colonies in the beekeepers operation.

Some extra precautions must be taken when using this method. One must be certain there are no holes in the equipment above the escape, for robbing will most certainly occur. It is also important to remember that the honey is no longer tended by the bees, so on hot days the honey may overheat and the wax may melt. The wax moth, too, may take advantage of the unattended supers.

The survey showed that seven percent of the beekeepers prefer this method (Fig. 1). Some beekeepers pointed out that they would rather make two trips to the apiary, and avoid the noise of the blower and stench of the Bee Go repellent. It is interesting to note that in this survey however, no beekeeper with more than 500 colonies uses this method (Fig. 2). The average time taken by those which use this method was 4.5 minutes, but this of course was only the initial part of the operation, before the actual removal of the honey, 24 hours later (Fig. 1).

Continued on next page

Repellents

Repellents have been used since the 1800's. It is a relatively simple manner of removing bees, by applying a chemical which chases the bees from the supers which are to be extracted. Two commonly used repellents today are **benzaldehyde** and **Bee Go.**

Benzaldehyde

In 1963, benzaldehyde, commonly known as oil of bitter almonds, was recommended in Canada for the removal of bees from frames. It was originally obtained from bitter almonds, but is now made synthetically, reducing its cost. It is a light-colored liquid, with a strong almond odor. It oxidizes to benzoic acid when exposed to air, so the bottle of chemical should be

FIG. 3 Fume board placed slightly diagonally on the hive, permitting some ventilation to the bees.

kept tightly sealed and protected from the light.

Chemical repellents are used with a fume board, a wooden frame, two inches deep and of the same dimensions as a super, covered with cloth or burlap. One side of the frame is then covered with metal, wood or tarpaper to drive the fumes downward. Enough of the product is added to make the entire burlap moist, and then the fume board is ready to be placed over the honey supers. The application may have to be repeated every two hours while working the hives.

On very warm, sunny days, it is preferable to place the fume board on the supers at an angle, permitting ventilation, for the product evaporates rapidly (Fig. 3). An excessive amount of the product will only confuse the bees and will not drive them to the lower supers. Bees may also show signs of aggressiveness, as they are disturbed by the odor.

Benzaldehyde is considered safe to use because of its low toxicity; nevertheless it is advisable to keep it away from direct contact with the hands as it may cause skin irritation.

This repellent is widely used today by New York state beekeepers. Twenty percent of the beekeepers report using repellents, and of those, 38 percenty prefer benzaldehyde.

Bee Go (*butyric anhydride*)

Bee Go is the trade name for a product which is 88 percent butyric anhydride. In the U.S. it is patented (Patent No. 3456056), and in Canada it is protected by trademark. It was developed by the Reich Brothers, in Illinois and was put on the market in 1964. It replaced carbolic acid, the chemical used previously, which never obtained an official approval because of the fear of its possible toxicity to the user, and ability to taint honey. Bee Go was first advertisied in *The American Bee Journal* and *Gleanings In Bee Culture* in October, 1964. Its first advertisement claimed that it is harmless to bees and honey, and chases bees at any temperature. Butyric anhydride has a strong objectionable odor, reason enough for some beekeepers not to want to use it. It is nevertheless very quick and effective in repelling bees from supers. The method of applying Bee Go is the same as that of other repellents. It is used on a burlap board, and placed over the supers to be extracted, though less of the product is needed in order to be effective.

The survey indicates that this repellent is a popular one among the New York state beekeepers (Fig. 1). Of those who use repellents, 62 percent prefer Bee Go, although many state that it is not efficient in cool weather. The odor seems to be the reason for many of the non-users to choose other methods such as the bee blower. It is interestng to note that no beekeeper with more than 1,000 colonies uses repellents exclusively; they all have a bee blower as well.

Forced Air — Bee Blower

The idea of using forced air to remove bees from supers dates back to 1881, when bellows were used (White, 1881). This method has become increasingly popular in the last several years. Today, a small gas powered air blower is used to blow bees from the supers without causing them injury. The method seems to confuse the bees, and they do not show signs of aggressiveness, as when chemicals are used. The outstanding advantages of this method is that it will completely removes bees from supers on cold, cloudy days when repellents are not effective, and the possibility of chemical contamination of the honey is avoided. Even on a warm day it does a more thorough job than any of the chemicals. Each super must be lifted and placed on its end, and positioned so that the forced air may be blown across the frames (Fig 4). This involves more maneuvering of supers than simply placing a repellent on the top of the hive. The results of the survey indicate that this is the preferred method of most beekeepers, regardless of the size of the apiary (Fig. 1). The major drawback of this method is the noise it creates. One beekeeper wrote: "If I wanted to have the noise of a factory around me, I would be working in one!" We also had many beekeepers stating that their preferred method of removal was an association of both the repellent and the blower. Some mentioned that if the blower followed the repellent, there would surely be no bees left in the supers to be extracted. Others use the blower as a last

FIG. 4 Bee blower forcing air through the supers, parallel to the frames.

resort, using it on days that are too cold for the repellents to work efficiently.

Discussion:

There does not seem to be an ideal method of removing bees from frames before extracting. The results of the survey demonstrate the variety in the methods used by New York state beekeepers. There are many factors affecting the choice of the best method of bee removal: the number of colonies, weather conditions, amount of extra help used, cost and time available to spend on the whole operation. The bee blower was the preferred method of bee removal, but it is clear from the survey that most beekeepers would prefer a repellent which worked well under all weather conditions. The application of a chemcial is easier than lifting supers and blowing the bees out. When asked if they would like a better way for removing bees, the beekeeper's answer was a unanimous yes.

REFERENCE: White, F.C. 1881. Blowing Bees out of the Honey-Boxes. p. 27.

Acknowledgements. I thank all the beekeepers who patiently answered by survey, and Scott Camazine and P. Kirk who reviewed the manuscript.

How Lesser Wax Moths Find Their Mates

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ABSTRACT

Lesser wax moth males attract females by producing both pheromone and high-frequency sound pulses. Some females can be captured in traps baited only with synthetically produced sound, but more of them can be captured if pheromone is also released near the sound. Although the pheromone alone may stimulate females to search, they are unlikely to find males emitting pheromone unless sound is also present. This information makes it possible to locate and monitor infestations of these moths.

Two species of wax moths invade bee colonies and stored comb to cause extensive damage. The greater wax moth, *Galleria mellonella L.*, is the more serious pest of bees in the United States. It occurs in most areas at lower elevations except, perhaps, in the extreme Pacific Northwest. The lesser wax moth, *Achroia grisella F.*, also widespread across the United States, is generally of minor importance except in the Pacific Northwest and at higher elevations throughout the mountainous West. In these areas the lesser wax moth can be very destructive. The lesser wax moth may become a serious pest in other areas where the greater wax moth is not present and thriving, since both moth species compete for the same food resource. Therefore, any studies aimed at alleviating wax moth problems should logically be aimed at both species of moths. Significant progress has been made in clarifying the meaning of communication in lesser wax moth behavior. This article reports a newly discovered acousitic component of lesser wax moth mating communication. Similar work to probe the role of communication in the behavior of the greater wax moth is underway.

Discovery Of The Lesser Wax Moths' Mate-Calling System

The mating behavior of the lesser wax moth is both unusual and complex. In most moth species females signal to males by releasing a pheromone (a chemical communicator between individuals of the same species). In contrast, the lesser wax moth employs a system in which the males produce a pheromone plus a high frequency sound to attract females. The male-released pheromone consists of two components, n-undecanal and n-11-*cis*-octadecenal, both of which are released form wing glands (Finn, 1967, Dahm et al., 1971). Although resting males release some pheromone, males wing fanning from stationary positions release 10 times as much pheromone (Greenfield and Coffelt, 1983).

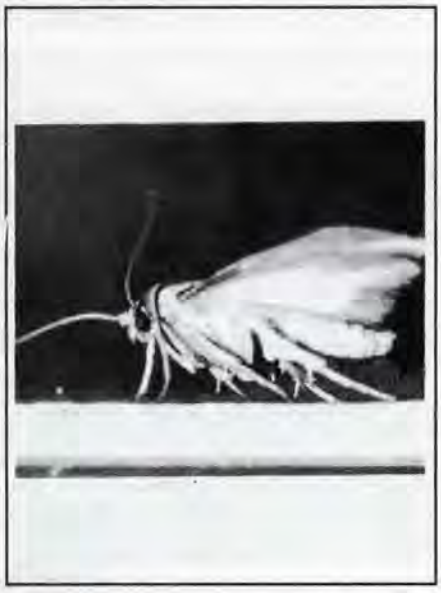

Figure 1. A calling male lesser wax moth. While wing fanning, he produces both a pheromone and ultrasonic pulses.

My recent work in cooperation with Dr. Michael D. Greenfield of the University of California at Los Angeles has demonstrated that although female lesser wax moths do recognize male pheromone and respond by searching, they are unlikely to find males unless they come within range of the high-frequency sound that the males produce. Although Dahm et al. (1971) suggested that the lesser wax moth mating call might have an acoustical component, it was not until our work at the Carl Hayden Bee Research Center that we were able to discover and analyze the sound and then reproduce a similar sound artificially. Producing the sound artificially allowed us to test male attractiveness to females both with and without the pheromonal component. By being able to separate the two major systems in wax moth mate calling we were able to describe a new and complex insect mate-calling system (Spangler et al., 1984). In this report the research process is described which led to this discovery as well as its significance and importance in finding methods that will assist in wax moth control.

History Of The Research Process

Effects of Ultrasound On Insects

Wax moths, like many night flying insects, are able to hear the sound of approaching, echolocating, insectvorous bats, then drop to the ground or fly evasively to avoid being captured and eaten by the attacking bat. I wanted to determine whether producing bat sounds or similar sounds artificially in the vicinity of apiaries or stored bee comb would prevent or reduce attack by greater wax moths. In my initial experiments, these sounds kept up to 72% of the expected moths from reaching "protected" hives inside of greenhouses; but in the field only 22.5% of the moths were prevented from reaching hives. I then decided to include lesser wax moths in subsequent experiments, since it is also a significant pest of honey bees. Initially, I observed that wax moths respond defensively to many patterns and frequencies of ultrasound. At night, in a greenhouse containing heavily infested hives, many moths could be seen flying about under dim light. Virtually all of these moths would dive to the floor in response to loud sounds of various frequencies up to 250 kHz (1 kHz = 1000 cycles per second). Even rattling a ring of keys caused wax moths to drop, while low intensity sounds caused them to loop, spiral or sometimes fly away from the sound source.

Since wax moths could obviously hear and respond to ultrasound, I decided to study the wax moths' sense of hearing more carefully. This study revealed that both species had an exceptionally wide hearing range for moths as well as good sensitivity from 20 kHz to 200 Khz. Although they could hear sound as low as 10 kHz and higher than 300 kHz, the moths could hear only high intensity

Continued on next page

sound at the extremes. Peak sensitivity of the ears of both species seemed to be between 30 and 40 kHz, although the tympanic membrane or eardrum of the moths could be made to vibrate most easily between about 50 and 90 kHz (Spangler and Takessian, 1983).

About this same time Dr. Greenfield had been studying sexual communication by pheromone of lesser wax moths. He had noticed that males not wing fanning appeared unattractive to unmated females even though the males produced some pheromone while resting. Only when they fanned their wings while in a stationary position did they attract the females (Fig. 1) (Greenfield and Coffelt, 1983). Our discussions about this led to my search for an acoustical component of the mating call.

Analysis of Lesser Wax Moth Sound Production

With the help of Mr. Alex Takessian, a graduate student in electrical engineering, I examined the broad spectrum of sound coming from male lesser wax moths in the act of wing fanning and releasing pheromone. We quickly discovered that the wing-fanning males were emitting short, highly-damped ultrasonic pulses in addition to low-frequency sound at wing beat frequency. Analysis of these pulses showed that most of the sound energy was within 17 kHz of 100 kHz (Fig. 2). The pulses were occuring once per upstroke of the wings and once per downstroke, or twice per complete wing beat. Thus, the repetition rate of the pulses was generally between 80 and 95 per second. The precise rate was influenced by temperature.

By use of a stroboscope I was able to determine that the sound was produced by a membrane called a tymbal on the front of a structure called the tegula (Fig. 3, 4). One tegula covers the attachment of each forewing to the mesothorax. A structure called the striker on the front of each forewing strikes an opposing structure under each tegula about midway through the upstroke and downstroke. This collision causes the tymbal to snap out during the wing upstroke and snap back in during the downstroke. Each time the tymbal snaps, a pulse of ultrasound is produced. The ultrasound radiates from the moth at an average intensity of 93 dB at 1 cm (0 dB = 20 Pa) (Spangler et al., 1984).

Artificial Duplication Of Lesser Wax Moth Sound

As soon as the sound was analyzed, we devised methods to duplicate the sound as closely as possible. The closest duplicaton was achieved by feeding fast voltage

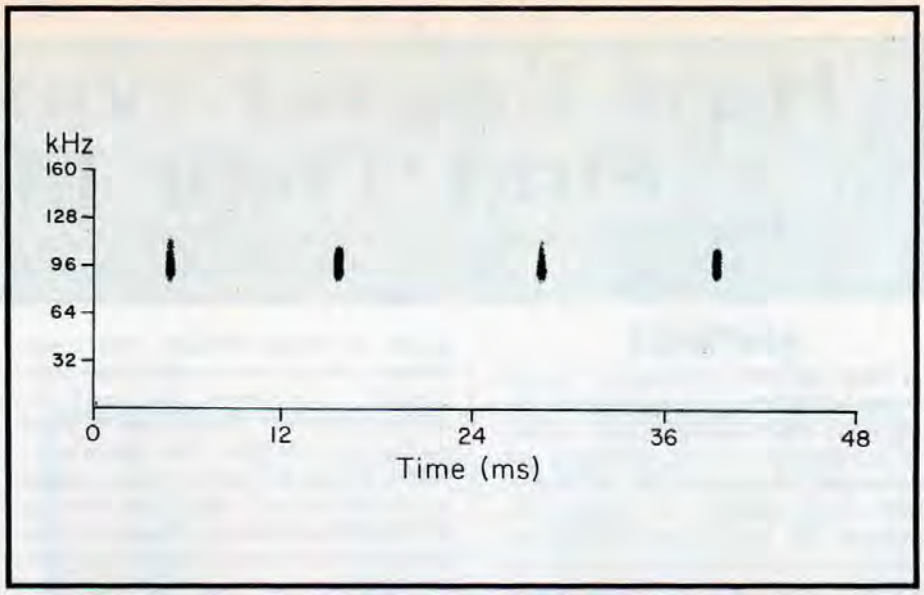

Figure 2. A sonagram showing the pulses of sound produced by a calling lesser wax moth male to be at about 100 kHz and about 12 msec apart.

spikes to piezoelectric transducers at the repetition rate at which males produced sound pulses. The tranducers rang at their resonant frequencies and produced sound pulses similar in intensity and length to the pulses produced by male moths. Although the frequency of the sound could not be duplicated exactly, female moths seemed to respond identically to sound pulses over a wide frequency range as long as the intensity, length and repetition rates were correct. One of the two transducer types — an omnidirectional transducer that resonated at 72 kHz or a directional transducer that resonated at 40 kHz was used for most tests.

Relative Roles Of Male Sound And Pheromone As Attractants For Females

Male moths were "muted" by entirely removing both of their tegulae. The "detegulated" male moths readily fanned their wings and released the normal amount of pheromone but did not produce ultrasound. Therefore, we were able to test female response to sound plus pheromone (intact males), pheromone alone (detegulated/muted males) and sound alone (simulated male sound from a transducer). We then designed several experiments to find out the relative roles of pheromone and sound for attracting virgin females.

Experiment 1:

Artificial 40 kHz Sound vs. Muted Males (Pheromone Source)

The first set of experiments used 40 kHz transducers and a tubular arena 15 cm in diameter and 91 cm in length. Transducers were mounted in the apices of screen cones about 22 cm beyond the end of the tube. Sound could be directed from either of the transducers or from small cages of moths (muted or intact) suspended by rubber bands from the point where each cone met the end of the tube. Unmated female moths were released into the tubular arena through a hole in the top center. Released females were free to circle or move toward either end. By alternating the stimuli presented at each end we eliminated any bias from lights, etc. All experiments testing moth responses were conducted under dim red light because moths may not respond accurately under brighter light of other wavelengths.

We soon discovered that the short simulated sound pulses were powerful attractants for the females. Females were unlikely to locate pheromone sources (muted males) and most would run directly to the sound. Many females, upon reaching either the transducer or sound-producing males, would fan their wings vigorously. Although females occasionally moved toward the muted males, they never fanned their wings upon arrival.

Experiment 2:

72 kHz Sound vs. Muted Males

A second, smaller arena (15 cm x 40 cm) was constructed in which we tested the transducers producing the 72 kHz sound, a signal much closer to the male moth's frequency. The smaller 40 cm length was necessary because higher frequencies attenuate

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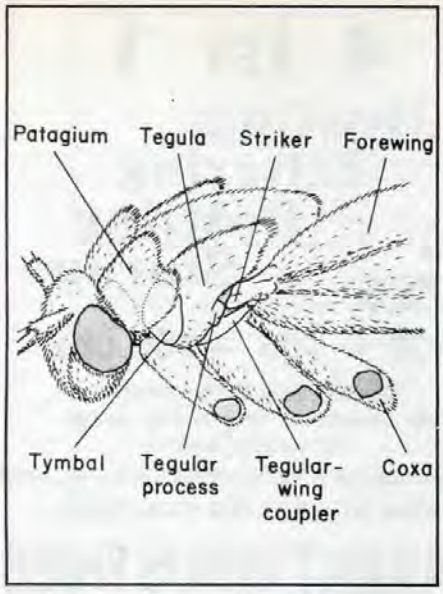

Figure 3. The structures related to sound production by the male lesser wax moth.

more rapidly in the air. Results using 72 kHz sound were equally convincing. For example, with a test group of 21 unmated female moths, 15 ran to the transducer alone while 13 of these fanned their wings upon arrival. No moths moved toward the muted, pheromone-producing males at the opposite end of the arena. In a test comparing sound plus females to muted male moths plus a non-functioning transducer, 16 of the 20 test female moths arrived at the sound source, while only one arrived at the muted males plus silent transducer. However, when we compared sound plus females to sound plus muted males, 9 of 20 unmated females went to the sound plus females and 11 to the sound plus muted males; thus no significant difference was evident. Nineteen of the test females fanned their wings upon arrival. These tests demonstrated conclusively that pheromone released by calling males caused unmated females to search, but only after stimulated by the ultrasound were they likely to orient toward a male (Spangler et al., 1984).

Experiment 3:
Recapturing Unmated Females In A Greenhouse

Once we had firmly established that the ultrasonic pulses of the calling males were responsible for guiding unmated females to the males for mating and that the sound could be produced artificially, a set of experiments were conducted within greenhouses to determine if unmated females could be released in a larger area and then be recaptured. The two greenhouses, 9.3 m x 7.3 m x 3 m high, were made of a double-layer of polyethylene. Vials, each containing one unmated female, were opened at the center of a 7 m-long table within each greenhouse; Zoecon Pherocon 1 C sticky traps were placed at opposite ends. Cylindrical screen cages, 6 cm high x 6 cm in diameter, were suspended over the sticky traps and baited with combinations of males with functioning sound-producing organs, muted males, 72 kHz transducers or left empty. Eight to 15 females were released per night (10 nights per test); moths caught in the sticky traps were counted the following morning (Fig. 5). The results of this test showed that intact males (sound + pheromone) attracted 78% of the females, while sound from the transducer plus muted males (sound + pheromone), synthesized sound attracted 66%. When paired against an empty cage (blank) or muted males (pheromone), synthesized sound attracted 31 or 32% of the virgin females. Six percent or less of the virgin females were trapped near muted males alone (Spangler, 1984).

Figure 4. Electronmicrograph of the tymbal of a lesser wax moth male (by Dr. Stephen L. Buchmann).

Importance Of Male Lesser Wax Moth Sound In Mating Communication

Clearly these tests have demonstrated that the ultrasonic pulses produced by male lesser wax moths are important for mating. Typically the males of this moth species assume calling positions near the food resource (beehive or stored bee comb) where emerging females are expected to arrive. They will stay near the culture if no bees or only a few bees are present. However, if the bee colony is strong, both sexes of the moths will run from the hive immediately after emerging and before expanding their wings. Then the males will call from positions on the hive or on nearby vegetation (Greenfield and Coffelt, 1983). From either of these locations, females, activated by the pheromone, search until they are able to locate the sound coming from a male and orient directly toward him.

Figure 5. Virgin female lesser wax moths caught in a sticky trap baited with muted males plus a transducer simulating male sound. Equipment used to send electric spikes to the transducer is shown at left.

While females ran to the males in most of our tests, I observed females flying directly toward sound-producing males as well as to simulated male sound during the greenhouse tests.

Conclusions

The results of this study suggest several techniques that may help reduce comb destruction from lesser wax moths. One technique would be to maintain traps in apiaries or comb storage facilities to monitor populations of these moths. In addition, another technique utilizing electronic devices designed to detect the male sound would allow quick inspection of storage facilities for the presence of adult moths. Once located, populations of moths could be controlled by other means. With such electronic devices, I have been able to detect calling males at distances up to about 4 m. By scanning equipment storage facilities, infestations can be found well before they otherwise become apparent. Another interesting possibility would be to develop a technique to produce a more powerful sound that accurately duplicates the important attractive features of male sound. The maximum distance at which females seemed to be able to locate calling males ranged between 0.5 and 1 m. An improved sound might out-compete males from further distances to attract and capture sufficient unmated females to reduce population levels.

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In summary, the research has shown that lesser wax moths communicate at higher sound frequencies than any other insect. Females have a sophisticated system for determining the pulse repetition rate of incoming sound to distinguish male moths from bats so that they may either seek a calling male or escape a hunting bat. While pheromone released from wing glands by calling males may cause females to search, they are unlikely to find males without the acoustical signals. Since developing better methods to reduce wax moth damage to bee comb is of major concern to beekeepers, studies on the acoustical communication system of both lesser and greater wax moths are continuing.□

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Footnotes

1. Lepidoptera: Pyralidae: Galleriinae.

2. Mention of a trademark, proprietary product or vendor does not constitute a guarantee or warranty by the U.S.D.A. and does not imply its approval to the exclusion of other products or vendors that may also be suitable.

QUESTIONS & ANSWERS

Q. Has anyone ever tried to prevent swarming by putting the queen excluder between the hive and bottom board to prevent the queen from leaving? Would it work? Could it be left there? **Albert Kozak, Puryear, Tenn.**

A. This has occured to many beekeepers, but it doesn't work. After the first attempt to swarm, the bees try again, a day or two later, this time with one or more of the virgin queens which have emerged, and these are able to squeeze through the excluder without much trouble. If an excluder is left under the hive that way it soon becomes plastered with dead drones, which the bees cover with propolis, clogging the excluder. Bee supply companies used to sell a device called the "queen and drone trap," which fit over the entrance and caught the drones or any queen that flew out. The bees however, disliked it.
— Richard Taylor

Q. I have only one hive, and here are three questions:

I use a bee escape in my inner cover to harvest the honey. This works with one super but is less effective with two or three. What do you suggest?

Two, what is the recommended way or having the bees clean these supers in preparation for storage?

And three, what is the significance of the ball of bees that sometimes gathers underneath the bottom board? **Margaret G. Hill, Black Mtn., N.C.**

A. An escape screen works much faster than an escape board; that is, an inner cover fitted with a bee escape. An escape screen is like an escape board, except that most of its surface is screen rather than wood. Otherwise one can harvest supers by brushing the bees from the combs, one comb at a time, putting them in a clean empty super covered with a cloth. One must work quickly, so the bees do not become over-excited by the exposed honey, but it is probably the best method for someone with only one hive. As for getting the extracted combs cleaned out, just stack them out in the yard. Soon there will be a great cloud of bees licking the combs dry, and when the bees are through with them, you can store them away. And with respect to the bees clustering at and under the entrance, this is normal when there is no honeyflow in progress. The bees don't have much to do, so they just hang out on the porch. This may also help in ventilating properly.
— Richard Taylor

An escape screen.

Q. I hived a prime swarm in a shallow super for comb honey production, but found no queen laying eggs even after two weeks. The parent colony has only a small amount of sealed brood, and no eggs. What is the best method of introducing new queens in situations like this? **Bruce Patterson, Attica, MI.**

A. It normally takes two weeks or more for eggs and new brood to appear in a colony that has swarmed, because it takes that long for the new virgin queen to get mated and start laying. As for the swarm that was hived, it would not have stayed put without a queen, unless there was brood in that super. So I suspect you have queens in both hives. To check, give the colony brood, with eggs, from another colony. If they don't start queen cells, they've got a queen. The only surefire way to requeen a colony is to first introduce the new queen to a nucleus colony of young bees, then combine the nuc with the queenless colony.
— Richard Taylor

Q. In his July "Bee Talk" Dr. Taylor refers to a "simple precautionary measure" for controlling swarms. I am a small hobby beekeeper and wish to stay small, without increase. Is there any "simple measure" for controlling swarms? **Ernest W. Bemis, West Bridgewater, MA**

A. Essentially the same question has come in from several writers. My simple method of swarm control is described in the May 1983 issue of *Gleanings.* **It consists of splitting a three-comb nuc out of each colony I think might swarm. The nucs are then requeened and sold to people wanting to begin beekeeping or to beekeepers wanting to make increase. There is, in my opinion, no way to control swarming without in some way dividing the colony.**
— Richard Taylor

Q. I have several pecan trees, and I notice the bees licking the upper surfaces of the leaves, which have small shiny spots on them. What is the explanation of this? **W.R. Kreitzer, Lexington Park, MD**

A. The bees are gathering honey dew, which is the general name for the sweet exudations that sometimes appear on the leaves of various trees. Sometimes fairly large flows result from honey dew, the bees filling entire supers with it. Honey dew is not, strictly speaking, honey, is invariably dark and usually inferior to most honey. There are some types of honey dew, on the other hand, that are delicious and much sought after, as in the case of that obtained in the Black Forest region of Germany. It is very common to find honey dew mingled with honey. It is not a problem except when there is lots of it and it is of poor quality.
— Richard Taylor

Testing Your Beekeeping Knowledge

The first line of defense in protecting honey bee colonies from bee diseases is the beekeeper's ability to detect and recognize early disease symptoms. Failure to identify even the minor diseases can lead to lower production and weakened colonies. Second, it is important to understand the general characteristics of each disease, in particular its method of spread and control.

Colonies should be inspected frequently for disease symptoms. These inspections are most critical early in the spring before honey supers are added, prior to removing honey from the colonies in late summer or early fall and during the final fall examination.

How well do you know and understand your bee diseases? Answer the following questions to find out how well you understand this important topic.

1. _____ Terramycin® (oxtetracycline HCL) kills the spores of American fouldbrood.

2. _____ Italian bees were originally resistant to European foulbrood.

3. _____ Honeybees infected with Nosema disease live shorter lives and their hypopharyngeal glands (brood-food glands) are not fully developed.

4. _____ Larvae die of chalkbrood after their cells have been capped.

5. _____ Honeybee resistance to American Foulbrood is primarily related to differences in hygienic behavior.

Multiple Choice Questions (1 point each)

6. _____ If a colony is exposed to American foulbrood, what is the shortest possible time before a colony will show recognizable symptoms?

A) 5.5 days
B) 10.5 days
C) 12.5 days
D) 21.5 days
E) 35.5 days

7. _____ Fumagillin (Fumidil B, Nosema-X) treatments are most effective when the drug is:

A) mixed in powdered sugar
B) mixed in pollen cakes
C) fed in sugar syrup
D) dispensed in sugar cakes
E) fed in antibiotic extender patties

Honeybee diseases are caused by various types of pathogens such as: viruses, fungi, bacteria and protozoa. Listed below are several different bee diseases. Please give the causative agent for each one. (Each correct answer is worth 1 point.)

8. _____ European foulbrood.
9. _____ Nosema disease.
10. _____ Chalkbrood.
11. _____ Paralysis.
12. _____ American foulbrood.
13. _____ Stonebrood.
14. _____ Septicemia.

15. In addition to American foulbrood, name two bee diseases in which spores are produced. **(2 points)**

16. Purple brood is malady of bees in the southeastern United States. What is the cause of this disorder? **(1 point)**

17. Name three ways in which American foulbrood is spread between colonies within an apiary or operation. **(3 points)**

ANSWERS TO TESTING YOUR BEEKEEPING KNOWLEDGE

1. False Terramycin is the only drug approved for use as a preventative treatment against American foulbrood. This antibiotic does not kill *Bacillus larvae* spores, but prevents or delays their growth when present in low concentrations in the food fed by workers to susceptible larvae. While this treatment allows individual larvae to survive, it does absolutely nothing about the virulent spores in the contaminated equipment.

2. True The first honey bees introduced into the United States were black German bees. This race tended to be very nervous, irritable and highly susceptible to European foulbrood. The first known successful imports of Italian queens was made in 1860. With extensive imports, queen rearing and requeening, beekeepers by 1920 largely replaced the black bees with less nervous Italians that resisted European foulbrood.

3. True Honeybees infected with Nosema show no outward signs fo disease. Damage to the digestive tract may produce dysentery and weaken the bees. As a result, the productive life of workers is shortened by 10 to 50 percent and its ability to produce brood food decreases since their brood-food glands are not fully developed.

4. True Spores of *Ascosphaera apis*, the fungus that causes chalkbrood are ingested with larval food. The spores germinate in the hind gut, but mycelial (vegetative) growth is arrested until the larva is sealed in its cell. Infected larvae usually die within the first two days after they have been sealed in their cells.

5. True Research has shown that some strains of honey bees are more resistant to American foulbrood than others. Differences in hygenic behavior are usually related to these strain differences. Two distinct but related behaviors are involved: prompt uncapping of cells containing infected larvae and efficient removal of them.

6. C
7. C
8. Bacterium
9. Protozoan
10. Fungus
11. Virus
12. Bacterium
13. Fungus
14. Bacterium
15. Chalkbrood, Nosema, Stonebrood

Continued on page 483

Research Review

By DR. ROGER A. MORSE
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Kiwifruit Pollination

Studies on Hayward variety kiwifruit in New Zealand showed honeybees were by far the most important pollinators. Solitary bee and bumble bee populations varied too much to be of value.

There have been a number of pollination studies on kiwifruit recently in New Zealand that will be of interest to those who wish to grow the fruit in this country; these are found in the paper cited below.

Kiwifruit have male and female vines that, of course, produce male and female flowers. There is a correlation between seed number and the weight of the fruit and pollination is required for seed development. Pollination is a problem because kiwifruit flowers produce no nectar, only a dry, apparently unattractive pollen. In New Zealand, citrus and white clover flower at about the same time as kiwifruit and these flowers are far more attractive to honeybees. For these reasons it is recommended, at least in New Zealand, that colonies be used at a rate of nearly four per acre.

References

Kiwifruit pollination by honey bees. *New Zealand Journal of Experimental Agriculture* 12:29-38. 1984.

Inseminated Versus Naturally Mated Queens

Naturally mated queens lived longer, produced more brood, and as a result their colonies gathered more honey, when compared with instrumentally inseminated queens. The tests were conducted over a period of 12 months in Louisiana and Alberta. Earlier tests by other researchers and conducted over a shorter period of time, showed there was no difference.

The authors ruled out nosema and poor brood viability as causes of the difference. They suggested there were two reasons the naturally mated queens fared better. One was that there may be some physical damage, unknown disease or adverse effects from the anesthesia. A second possibility is that an unknown "essential ingredient" such as flight activity might be lacking in instrumentally inseminated queens.

Instrumental insemination of queen honey bees has been an important laboratory tool since it was shown to be possible in 1927. It has likewise been invaluable in developing hybrid breeding stock. However, outside of the laboratory it has not proven to be a consistent, practical method of treating queens used to head producing colonies. The authors of the paper below hint that research is underway to improve insemination techniques.

References

A comparison of instrumentally inseminated and naturally mated queens. *Journal of Apicultural Research* 23:31-36. 1984.

How Far Will Bees Fly?

To determine how far bees will fly to gather food the late Dr. J.E. Eckert placed three groups of colonies in the desert at varying distances from irrigated fields of flowering sweet clover and alfalfa. The results of these studies are found in what I call a classical paper in beekeeping. Even though the experiments were conducted from 1927 through 1930 the results are just as valid as today.

The colonies used were equalized prior to the experiments. It is never possible to make colonies exactly the same but by measuring the number of square inches of brood and the weight of the worker bees one can make them reasonably so. The area in northwestern Wyoming where the bees were foraging was known as "good beekeeping territory, and a number of commercial apiaries were located there."

Below I have summarized one of Eckert's tables for studies made in August, 1927. The results varied from year to year but were consistent and what is seen here is typical. The bees used in 1927 were of Italian origin but Caucasian bees were used in other tests; Eckert does not report any differences between the two races.

A curious part of Eckert's research is that the colonies half a mile from the edge of the irrigated area gathered more honey than did those at its edge. This same thing happened another year but Eckert offers no explanation.

The substance of this study is that colonies closer to a food source will do better than colonies located further away. However, when necessary, bees will forage over though it may not be profitable for them to do so.

References

The flight range of the honeybee. *Journal of Agricultural Research* 47:257-285. 1933.

TABLE 1. Distances Honey Bees will Forage (after Eckert's Table 3. 1933.)

Distance from Sweet Clover and Alfalfa Fields (in miles)	Average Changes in Hive Weight Over an 18-Day Period (in pounds)[1]
0	25.3
0.5	31.6
1	23.3
1.5	21.3
2	18.1
3	13.8
4	5.1
5	-3.0
6	-6.2
7	-8.6

[1] Positive values indicate increases in honey stores while negative values indicate losses of stored honey.

Raising Comb Honey In The Sage Region

By PETER VAN BORST 635 Fresca St. Solana Beach, CA 92075

As every beekeeper knows, it takes just the right combination of sun, rain, and luck to produce a honey crop, but here in southern California, we pray mostly for rain. In the winter of 1983, we got it. It was a mild, wet winter created by an unusual ocean current called "El Nino." The honey and pollen plants grew luxuriantly and the stage seemed set for a real humdinger. To keep the story short, things didn't go too well from there. The damp, cool weather wouldn't let up. It was no blockbuster year, but in most cases beekeepers got an average crop.

For me, though, it was a great year. Having gotten the same signals as everyone else, I anticipated the sages coming into bloom profusely, which means comb honey, par excellence. We had produced a little comb honey before— you know, a frame here and there— but this year I wanted to do it right. We sent away for enough round section equipment to fill 50 supers, and I started hunting for a sage location (we usually keep our bees on eucalyptus because it is more reliable than sage). Naturally, the sight of all those new rings, covers, and labels made me wonder if they would ever be filled. But we gave it a try!

We also reasoned that 1983 would be a good year to increase our number of hives (that's another story . . .), so we were buying up hives. I purchased one group of seventeen strong hives, and once we had them in our apiary, I took the second stories off of the best of them and gave each a round section super. A few days later, we requeened the whole bunch with queens that we had raised ourselves for spring requeening. Requeening strong colonies early in the year can be difficult; some we had to requeen twice, and some superceded the new queens. But we accomplished our goal, which was to eliminate all queens from the previous year. You need young queens to produce comb honey.

I located a place for the hives in the sage country. It is not ideal, down a precipitously steep dirt road with no turn-around at the bottom, but it is too good a honey area to pass up. It's against my better judgement to move newly requeened hives, but in the spring you have to act fast. So we moved into the sage. As luck would have it, as soon as we did, the weather turned cool and the poor bees sat there for a couple of weeks doing nothing.

When the weather warmed up, the sections started to fill. As far as management was concerned, we did nothing after requeening the hives except to add supers as needed. A few hives refused to work in the round sections — for this reason I would always recommend starting a large number of hives on the sections and weed out the ones that won't cooperate.

The weather played games all spring, but we got about 600 beautiful round sections filled with the water white honey of black-button sage (*Salvia mellifera*). In San Diego, this is the one that honey connoisseurs rave about. It's thick, mild and colorless. I took the supers off before the end of the flow because right after the sage, blooms a plant called tarweed. It yields a dark yellow honey with a rather unpleasant, pungent taste. We didn't want any of that in our sections! I think I could have gotten another 200 sections there, because the sage continued to bloom longer than I've ever seen it do.

Well, that just whetted our appetite for comb honey! We moved about 20 hives into the mountains of central San Diego County, where the slopes were covered with new growth and big clusters of buds on the white sage (*Salvia apiana*). Soon the sections were filling again, and we had another 600 sections or so. After the white sage, wild buckwheat (*Eriogonum fasciculatum*) comes into bloom, and usually produces the most honey of any of the wild plants. So, we almost got three crops of honey, but alas, for some inexplicable reason, the buckwheat flopped. We ended up with about 400 unfinished and poorly filled sections which I crushed to extract the thick, delicious white sage honey. This honey has a little more color and flavor than black sage, and I prefer it.

Just about the time we got the first sections off and packaged, I got a visit from a gentleman who runs a store called the Cider Mill. At the store there is an old cider press and they sell cider, honey, nuts and so on. They always have a good assortment of the best types of honey. He heard I had sage comb honey and made a special trip to see me about it.

"I have several hundred," I said, "and I'm selling them for two dollars each, wholesale."

"We've never had to pay that much before," he replied, obviously surprised.

"That's the price, and I'll sit on them til Christmas, if I have to. We've got the best honeycomb in the country, and it will sell itself."

Before the summer was over, they had bought almost all of it. Round comb sections are by far the most attractive product to come out of the beehive and they sell easily at roadside markets. The packaging is ideal too, because the consumer can handle it without damaging the comb, so you don't have a leaky mess. I heartily recommend producing honey this way. It is a little more bother than putting honey into barrels, but it is certainly worth it. And don't go selling them too cheaply, either!□

Monthly HONEY Report

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REGION SEVEN

Almost complete failure of crop in S.E. Oklahoma. Probebly less than 10 pounds per colony. 8 -10 inches short on rainfall. Spring was cold then turned hot and dry. Sales slow. Stores loaded with imported honey. Texas reports extremely dry now for approx. 90 days. Some beekeepers leaving honey supers on for fear of starvation without. Honey sales average but some areas hard hit. Acarine mite infestation near Weslaco confirmed. Effect unknown yet.

REGION EIGHT

Colorado colonies full of bees but dry conditions make for very small flow. Grasshoppers very bad. Retail sales normal. In Utah the yellow clover flow has just ended and bee populations are strong. Alfalfa will still produce on irrigted land. Early monsoons in Arizona made up for dry spring. Late prospects look promising. Montana suffers from unseasonably hot and dry weather which has dried honey plants. Crops expected to be below average.

REGION NINE

California reports pepper trees starting on central coast, which helps but does not produce much excess due to shortage of trees. Disease problems in same area. Some reports of 20 percent disease loss even after terramycin feedings. Good alfalfa and clover flows in Washington. Thistle bloom beginning and looks good. Ideal weather. Blackberry and fireweed producing well. Honey sales good.

Gleanings Mail Box

"Mixed Emotions"

Dear Editor:

The complexities of the Government Honey Support Program over import honey and tariffs — versus beekeeping problems. That is not a simple matter and will not disappear overnight. These are problems for the whole beekeeping industry and the Government as well. It's always easy to put the blame on the next party in line.

We are third and fourth generation beekeepers, who are producers and honey packers. We always believed in giving quality for price (we still do) and always bought and paid top price for honey from other producers. Now marketing is beginning to change our mind. Do we or should we bottle for price alone and join the majority or bottle quality and loose our shirt? Quality is not what the majority of honey consumers are looking for; the bottom price seems to prevail. (So enters the Government price support program.)

I do not disagree with the whole program, for it does have its merits — "The problem is how the program is handled."

At the present time, 42 million dollars is spent at taxpayer's cost. I would assume it is likely more than double that figure, when you add the base support price at 62.5 cent/lb. (which is high), plus storage charges, in handling charges, out handling charges, inspection costs, administrative costs, charges for bottling and shipping for the honey give-away program, $$$? All at taxpayers expense. This results in a loss of sales to packers. Potential honey buyers (consumers) are getting inferior quality, as non-table and quality honey is blended. All the honey that is given away is lost sales to all stores and packers and some producers.

The packer. To compete with the honey give-away, packers must buy import honey for cost savings. Honey is blended again, thus putting more non-table honey on the market (geographic taste). The results — not what the public (consumers) should be getting taste-wise, but the price is right. Thus the reason for more and more imports (100 million pounds, 1983). The results are a lot of import and Government blended honey. But how many potential honey consumers are going to be lost forever, due to the give-away program? The whole industry needs more consumers and should be striving for only quality.

The producer. He's human and likes the Government support price. He will give all he has and work harder to produce more. This results in more cost to the taxpayer (present). The Government in time, will cancel support prices and the producers will have more honey on hand and the honey price will lower more due to the loss of potential buyers of our product. Why? Because we gave them price honey and not quality honey.

I'm not saying that import honey is bad or that the Government blend is bad, but people are used to the taste of honey from their own geographical regions, not a mixmash of honey bottled for color.

Back to the problem — Whose is it?

Proposal. Let the Government buy the honey at 62.5 cent/lb. and sell it to the packers at a more realistic price (say 53-56 cent/lb.), and to the geographic region where it originated. Results, we would not have to import 100 million pounds. The savings could run to ¼ of the cost to the taxpayer. The consumer would be getting the taste they are used to, resulting in more sales and potential buyers, instead of decline in sales like it is at the present time. No give-away honey (lost sales). The producers would still have a market and we, the industry, all would benefit to some extent.

Could this be a start to solve our problems? **William E. Balke, Sr., Rt. 2, County 'E', Plymouth, WI 53073.**

"Sounding" Off

Dear Editor:

Your recent article (Bees & Project ELF. *Gleanings In Bee Culture*, May '84, pp. 273) about Michigan State University's attempt to quantify any effects of extremely low frequency (ELF) radio communications facility in Michigan is quite timely. Data on the parameters of ELF effects upon bees should be interesting. Perhaps those MSU scientists could give us some specific information for sounds in the area around 25 hertz. Twenty-five hertz is the approximate frequency of sounds produced by the muscles in a human body. These are the sounds that your doctor sometimes hears as background noises through his stethoscope as he listens to your heart beat. The muscles in your body are constantly contracting and relaxing and producing these noises. For all we know a beekeeper may sound to his bees like a D9 bulldozer moving about the apiary.

I wonder if the so-called "Africanized" honeybees would be more easily disturbed by such low frequency sounds than might be the types of honeybees used in most apiaries. If so, then perhaps that quirk might help to explain their attacks upon people and animals. Maybe humming a little of Beethoven would help when working with them. **Louis E. Hitchcock, P.O. Box 161, Walk Island, HI 96898.**

On Africanized Bees

Dear Editor:

I take this opportunity for asking you what do you mean by "Africanized bees" used many times in *Gleanings*.

I have been in Pretoria, Republic of South Africa, at the Bee Research Laboratory of the University. They told me they never succeed crossing the Adansonii bee with other bees, for example, Gallica *(Germanica)* or Ligurian bee.

The *Adansonii* bee is so prolific that other populations are pretty soon invaded and replaced by Adansonii Swarms.

I send you two photographs my son took in this occasion. These bees seemed to me not more aggressive than our European black or yellow bees. I did not even put a veil on and the smoker stayed on the ground for the most time.

Naturally the engineers of the Laboratory are very keen and careful with their bees.

My wish is to be of some help to you in this too much stingful question. My best

Continued on next page

greetings. **Aime Tilliere, 28, rue Henri Bles, B-5000 NAMUR BELGIUM.**

How To Have A Successful Local Honey Promotional Program

Dear Editor:

Have you ever wondered why some local beekeeping associations seem to be more successful than others? In the ensuing article it is hoped that readers and members of local beekeeping associations will glean ideas that will make them aware that the success of honey promotion and the beekeeping industry stems on what people do on a local bee level. The old saying of "Home is where the heart is," can be said for the beekeeping industry as well.

There are three major aspects in making a honey promotional program work and the author will try to give helpful guidelines to each.

The first is a Queen Committee, generally made up of a chairperson, two assistants, and, of course, a queen, a young, single lady, who has been selected by the membership from the association. The chairperson oversees the queen's activities in regard to honey promotion. The committee develops procedures for school, parade, social club, fair, supermarket, television, radio and County Homemakers' Extension nutrition class appearances. A beekeeping 4-H Club promotes the industry as seen through the eyes of children. The chairperson and her committee also groom the queen in the knowledge of the many aspects of beekeeping, so that the queen will be well versed on her subject when she is given the opportunity to speak. With the committee's leadership, the queen can use her writing skills to produce her own newsletter for the association she represents. The queen can be given a live hive to manage and to gain experience. Equipment is part of the gift. The queen should use the money from the sale of honey for the benefit of promotional items, such as honey buttons, balloons and honey candy. The mainstream of the funds available for the queen committee should come from the association's treasury, members to the queen committee and sale of the honey would go back into the committee's fund. Producing a recipe leaflet describing the queen on the front and containing her choice of recipes is a marvelous tool in promotion. The membership should be urged to contact the chairperson for any upcoming events of interest that would benefit the industry and that the queen could attend.

The second aspect of local promotion is through the industriousness of a publicity committee. The chairperson works with the queen committee and oversees all publicity of all engagements of the queen via radio, television and local periodicals. A monthly article in newspapers is less expensive and less demanding than a weekly one. A tie-in with the County Farm Bureau newspaper is a must. Small local newspapers and talk shows on the radio welcome those with something "different" to talk about. The funds for the publicity committee come from the budget of the local association and can be modified to suit the needs of the local publicity committee.

The third aspect of a good promotional program is that of the membership and the cooperation it extends. When the members know and understand that the queen and publicity committees are working not only for the benefit of the individual, but for that of the whole group, the members should give of their time in chaperoning the queen; they can donate honey for her to sell; they may wish to collect newspaper articles for her, or donate equipment for the management of her own or the beehives of the committee. The membership can also share in the development and production of a honey cookbook, which boosts honey sales at fairs and supermarkets, especially. The membership can participate in the local county or state fair and tell the story of the honeybee by using an observation hive, or it may wish to purchase slides with an accompanying presentation to tell its story to other groups.

The potential of a membership that works together is vast. When an association works as a team there is a strong bond which develops and nothing can undermine the goal, which is to promote honey and the beekeeping industry. The cost factor may appear to be way above that of some associations' possibilities, but the benefits far outweigh the cost in dues and sales. One of the ways that an association can benefit is to have an apiary of its own from donated hives of its members. When just a little bit of money, a little bit of effort and a little bit of time is given by each member, a little bit can go a long way. What's a sweeter and healthier subject to talk about then that of nature's perfect sweetener? HONEY! And you'd be surprised at how children love it and adults can acquire a taste for it.

For further information as to how one association has perfected the challenging demands of honey promotion and sales, contact Mrs. Marie Blanchet, 10002 Ida Street, Riverview, Florida 33569 (Queen Committee—Tampa Bay Beekeepers' Association)

Diane B. Cornwell
P.O. Box 13535
Tampa, FL 33681

Wintering The Honey Bee Colony With Application Of Insulating Frames

By I. FRYC 41½ George St. St. Catharines, Ontario L2R 5N7

Assume that our typical stock occupy 20 brood frames, standard size (17¼" x 9 1/8") in two brood supers.

1. SUMMER PREPARATION

When you revise brood nest cull frames which are not useful because they have too many drone cells, are damaged or too old. These frames we put as an outside frame in the nest.

2. FALL PREPARATION

When the last crop of honey is removed, replace these outside frames for insulating frames — two in the bottom super and two in the upper super. Therefore, we have inside insulation and avoid mouldy outside combs. In addition in the spring the brood will be up to the last outside frame.

3. SPRING MANAGEMENT

When fruit trees start to bloom, approximately 10-16 of May, we should replace the insulating frames as follows:

a.) From the bottom super, remove two insulating frames, spread the frames from the center to make room for two frames in the middle of the super. Now remove two combs from the middle of the upper super and put them in the empty space in the bottom super.

b.) From the upper super remove also two insulating frames, spread the remaining frames to the side. Now we have room for four frames. Next fill the empty space with four frames with starters i.e. with strips of foundation 1" x 1½" wide.

c.) Close the hive if weather is cool or rainy, feed the bees with sugar syrup.

Bees do not like empty space in the center of the hive. They start building combs very fast--drone size cells only.

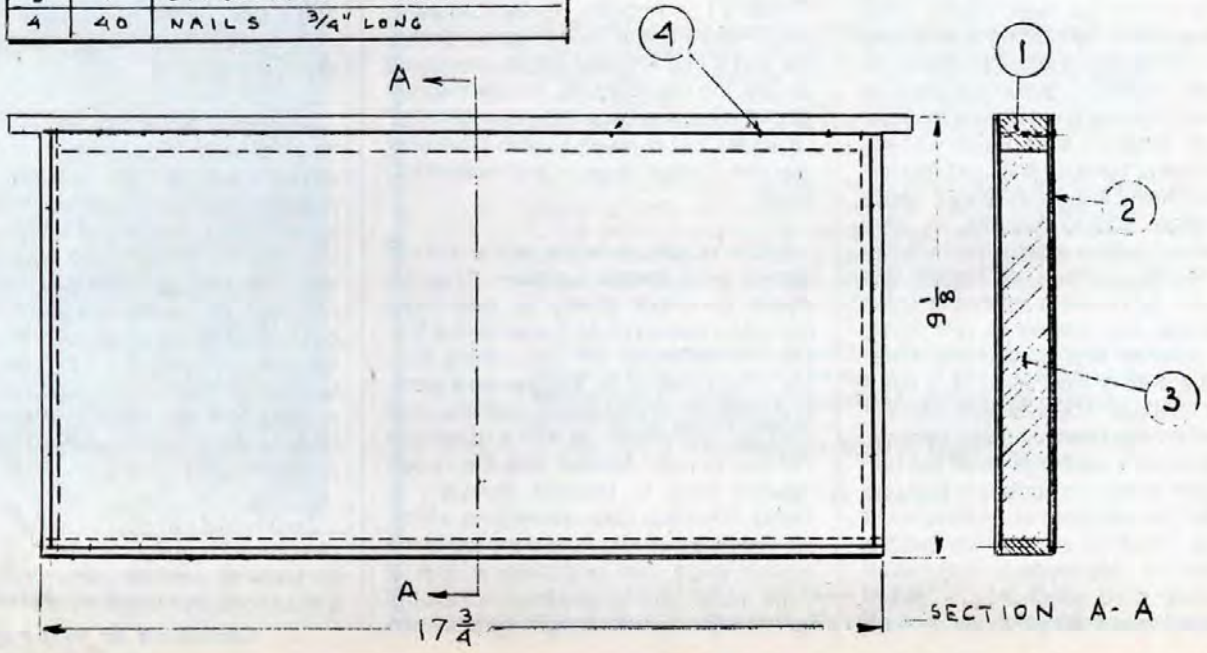
When honeyflow is good, after three or four days, open the hive and replace frames with partially built combs with full foundation frames, if weather is inclement, postpone this operation another two or three days. Applying this method we postpone or even avoid swarming and we get additionally nice virgin beeswax.

This method has been applied by me for the past five years with positive results.

HOW TO MAKE INSULATING FRAME

To make insulating frames use non-spacing frames, fill inside with 1" thick styrofoam and cover both sides with waterproof 1/8" plywood by gluing and nailing.

DET	QTY	MATERIAL
1	1	STD FRAM NON-SPACING
2	2	PLYWOOD WATERPROOF 1/8 THICK
3	1	STYROFOAM 1" THICK
4	40	NAILS 3/4" LONG



IT PAYS TO KNOW

How to . . .

By P.F. THURBER
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Kirkland, WA 98033

Other Introduction Cages

I will admit that purposefully I put the cart before the horse when I submitted the article on the long cages I make to use when introducing queens or storing mated queens. I felt and still feel that if I tell you how to make something or how to do something, you might just go ahead and copy the equipment technique. On the other hand if I tell you, say, a half a dozen ways to do something or make something, you may be undecided about which to do or use and will just give up and do nothing.

With the April 1984 article I hope firmly in your little hot hand, if not in your head, let me now try to briefly cover the introduction cages.

Cardboard cages have a lot going for them, and yes, people have been using them for at least 50 years. All you do is go to a dequeened hive and put the queen in a well aired light weight cardboard match box and put it in the hive. The bees, you already know, do not like paper and so chew up the cage. That lets the queen out, and later they chew up the paper to a near powder and chuck it out. When a queen is imprisoned even briefly, bees generally respond by building queen cells. If a virgin emerges, she will probably kill your newly introduced queen just because a virgin is quicker and more agile thus can fight better than a mated queen with abdomen bloated because she has been laying. Incidentally, the use of paper cages is worldwide, and to illustrate: in 1968 Louise and I took a month trip of Scandinavia, the low countries and France. Outside Amsterdam there is an area in which town people are allowed to rent family garden patches and many have bees. Really, the area is fascinating. It is like a museum because beekeepers are encouraged to keep bees in ancient designs. At one location a gentleman was just putting his gear away in a cupboard built into and under his hive stand which held about four hives. I went up and showed him my Puget Sound Beekeepers Association membership card which has a queen printed on it. The man and I were instant friends, and when I looked into his cupboard, I saw a small stack of apparently empty paper match boxes. I picked up one. Shook it. Yes, it was empty. I winked. He grinned. We understood each other perfectly. He then brought out other gadgets. A tobacco pipe bee smoker, etc., then several hive tool and frame lifter designs. In turn I drew a British J type hive tool like Maxant sells in the United States. Hey, I had a ball while Louise looked at the flowers and vegetables. Now a caution. Light cardboard boxes that contained matches need long airing in the sun to get the phosphorous fumes out. Probably two $^{1}/_{16}$" inch holes drilled at each end of the box so the bees can feed the queen while they are gnawing her out will be sufficient. Secondly, you have got to be careful. Squeeze the box and either you squeeze an opening or you squash the queen.

You want a possibly better cardboard introduction cage? The Ashway cage was listed in the Diamond International Apiary Division catalog up until recently. Diamond's apiary division was sold to Chase Walker's Los Angeles Honey Company, 1559 Fishburn Ave., Los Angeles, California and if Los Angeles Honey can come up with the manufacturer, I hope they will stock the Ashway cage but remember CUT QUEEN CELLS seven to nine days after you use a paper cage or any introduction cage!

Push-in cages drive me up the wall yet I guess some people love them. As an example Dr. Tibor Szabo at Agriculture Canada's Beaverlodge Experimental Station, I understand, will use nothing else. Me, I have tried to lay a queen on a patch of emerging brood and then push the cage over her and ended up with a queen cut into two pieces. Another time the queen headed back to Howard Weaver's in Texas. Then Bob Clark showed me a trick. He makes a $^{3}/_{8}$" inch hole in the top of the push-in cage, and pop rivets a strip of metal which can be pivoted to close the hole. He pushes the cage in place then

Photo 1. Matchbox releasing cage. Note holes so queen can be fed. (Did you know Root's sell matches?)

runs the queen out of a hole in the three hole Benton shipping cage into the push-in cage. When she is in the push-in cage, he pivots the strip of metal, and she is able to take off and fly away. Real neat!

To build a push-in cage many people take a piece of scrap wood about four by six inches and ¾ inches thick. They lay a piece of $^{1}/_{8}$ inch mesh galvanized after weaving hardware cloth on top of the block with an overlap of maybe one inch all the way around. Then they bend the hardware cloth over the block to make a box with no lid. Turned bottom side up, perhaps with the pivot closed opening mentioned above, the cage is pushed down to the mid rib to cage a queen. You should be careful to push the cage down to the mid rib of the comb, but not cut through it, and should also remove the cage at the end of a week and again cut any queen cells they bees may have made while the queen is imprisoned.

A variation of the basic push-in cage incorporates a hole and a $^{3}/_{8}$" inside diameter tube of metal or plastic which is apparently glued of soldered in place. The tube is filled with queen candy and the bees eat the candy so the queen can exit the cage. Well, she may and she may not I am told. At any rate you must make the push-in cage deep enough to not only touch the mid rib but also to provide space for the queen and emerging brood to walk around inside the cage. You may have to remove a frame to provide space for a push-in cage.

Twin tunnel introduction cages in various designs and configurations, I understand, go back at least 75 years. They are extremely effective because after the candy

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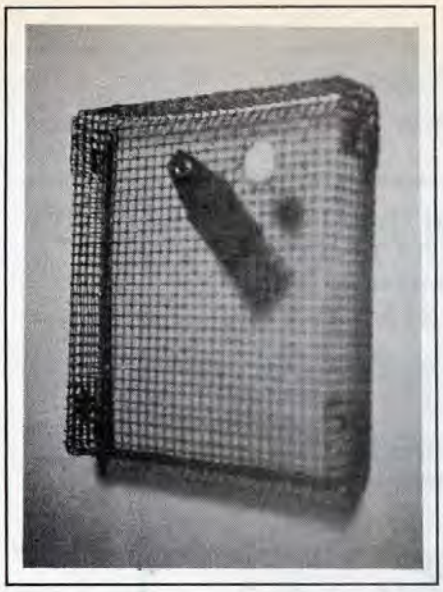


Photo 2. Push-in queen releasing cage with queen port and pivot closure.

in the short tunnel is eaten by the bees, they can enter one at a time through an excluder slot into the space containing the queen. After they lick and groom and feed the queen, they leave her space and walk around in the hive spreading the queen's pheromones (scent) throughout the hive. The queen in the meantime is still imprisoned because the short tunnel has a queen excluder built into it. The result is that when the bees finally eat the candy out of the long tunnel and release the queen, a period of 36 to 48 hours has elapsed since the first worker went into the queen's space and literally hundreds of bees have gone into the space and picked up the queen pheromones. It is odd that hundreds go in and none hassle the queen because if you have queen whose attendants have nearly all died and decide to fill a cage with attendants and then push the queen in, she will often end up dead. Conversely if you run a queen into a cage first and then put attendants in one at a time, only rarely is the queen attacked. Bees are weird! (But people say beekeepers are too!)

Photo 3. Benton Cage modified to chantry principle with excluder strip.

The most simple way to create a twin tunnel cage is to adapt a three hole Benton shipping cage. All you do is staple a piece of zinc queen excluder over the hole from which you remove the attendants. Of course you need a supply of queen candy (see my April 1984 article) and after you remove the queen, you push a ¼" long plug of candy in the hole and then staple the piece of excluder in place (see photo). When you put the cage in the hive obviously the bees eat the quarter inch plug faster than they eat through the candy at the other end so the bees get in to groom the queen and then spread her pheromones for a day or two before she is released when the bees eat the candy from the other end of the cage. Incidentally, I first saw a Benton cage modified as I have described in a hive I bought. At the time I thought that someone was crazy to take the trouble to put the excluder strip on, etc., then at the Boise ABF Convention about 12 years ago, a commercial beekeeper from, I think, Wisconsin, said he has been using excluder-added Benton cages for many years and would use no other introduction cage. As I remember he said he had used them for more than 25 years!

(To Be Continued Next Month)

TESTING YOUR BEEKEEPING KNOWLEDGE

Continued from page 473

16. Purple brood is caused by the shrub summer titi or southern weatherwood *(Cyrilla racemiflora)*. It occurs in swampy areas of the southeastern United States. The disorder gets its name from the fact that affected larvae turn a purple or blue-like color. Dead larvae are found soon after bees start gathering nectar or pollen from the blossoms and the death rate continues until the blooming period is over.

17. American foulbrood is spread from colony to colony by: **1)** robber bees removing spore-contaminated honey from infected colonies that can no longer defend themselves; **2)** interchanging brood combs and equipment between colonies while making management manipulations and extracting the honey crop; **3)** bees drifting between colonies; and **4)** the beekeeper's hive tool and gloves.

There were a possible 20 points in the test today. Check the table below to determine how well you did. If you scored less than 12 points, do not be discouraged. Keep reading and studying — you will do better in the future.

NUMBER OF POINTS CORRECT

20 - 18 Excellent

17 — 15 Good

14 — 12 Fair

Honey Plants Some People Dislike

By Grant D. Morse, Ph.D. Saugerties, N.Y.

This is a competitive world: What one person wants, another may be inclined to want to avoid.

This is true in the world of flowers. Most blooms that yield nectar or pollen for bees are pleasing to beekeepers. Most such flowers are acceptable to the majority of other people, too, but a few are disliked by non-beekeepers for a variety of reasons.

Among the honey plants that are currently controversial are: purple loosestrife, dandelion, rhododendron, burdock, mellaleucca, Brazilian pepper plant, wild thyme and others.

Purple Loosestrife

This wetlands plant will take root wherever there is enough moisture to encourage its growth. Even after the spring moisture has disappeared it will contintue to thrive and bloom. In my area (100 miles north of New York City) it begins to bloom about July 15th--a period when most nectar producing plants are no longer available to the bees.

Purple loosestrife does not yield lavishly in my area, though rare seasons see the bees storing small surplus, perhaps as much as thirty pounds maximum. I am told it does yield better in some other areas. The honey is quite markedly green in color but not unpleasant in flavor. It should probably not be marketed for table use, but be blended with some other flavor and used in the bakery trade.

Although the flowers of the loosestrife plants do not yield very liberally, honeybees will work it when better nectar yielding blooms are available. I have concluded that this tendency on the part of the honeybees is traceable, in part, to its being so prevalent. Because of its abundance, the scout bees experience no difficulty in locating it early in the morning, so they advertise it through their communication system. Many gatherers, once at work on it, do not change their allegiance.

Lately, this wetlands plant, purple loosestrife, has aroused controversy. Even such a newspaper as *The New York Times* carried an article on June 13, 1982 with the tile, SPREAD OF THE WILDFLOWER SAID TO PERIL PLANTS IN THE NORTHEAST'S WETLANDS. The article was referring to purple loosestrife.

The writeup quotes Dr. Richard A. Maleci of Cornell University, Ithaca, New York as saying : "Unlike other wildflowers that grace the countryside briefly and then die, purple loosestrife, an import from Europe, is extremely hardy, prolific and aggressive. It crowds out native wild plants such as cattails, smartweeds, rushes, and sedges that provide cover for birds and other wildlife."

Purple Loosestrife

Dr. Maleci goes on to say: "Purple loosestrife forms clumps of semi-woody stalks that are resistant to decay, producing a gradual elevation of the ground level because of debris in a tangle of roots and stems. That blocks sunlight to other plants attempting to grow beneath, reducing or excluding moisture-loving plant species."

The professor continues: "Although newly established stands of loosestrife may provide cover for spring-feeding ducks and shore birds, the usefulness and availability of this cover is often of short duration because the developing clumps become rank and impenetrable to these birds after two or three years. As a result, the wetlands become less suitable for waterfowl, and other marsh inhabitants, such as songbirds, fur-bearing animals, reptiles and amphibians."

The plant is now found in much of the Northeast, including New Jersey, Massachusetts, Rhode Island, Vermont and Pennsylvania, as well as New York. It has also reached north into Quebec and Ontario, and is spreading rapidly to the Middle West as far as Minnesota and Wisconsin.

The Cornell Professor continues: "So far, according to a Cornell report, control measures such as pulling up individual plants, mowing, burning or applying chemical weed killers have not proven effective."

Northern beekeepers like purple loosestrife because it provides some yield of nectar at a time of year when other blooms are scarce or almost non-existent. From July 15th on, my honeybees would be largely destitute of nectar sources were it not for the loosestrife. It does have plenty of blooms to keep the bees occupied and to furnish at least a modicum of nectar.

Beekeepers hope that the claims of the biologists against this plant are a bit exaggerated. In the swamp that spreads over 75 acres in front of my apiary, there are plenty of areas where the plant does not penetrate. This is especially true of the wetter portions. Wildlife, particularly wild ducks and geese, either breed here or stop in their southern or northern flights. Unfortunately for them, the area is intensely hunted.

Dandelion

This plant thrives over most of the United States and Canada. It was brought here from Europe, possibly, it is believed, by the Pilgrims. As most of us know, it offers an attractive yellow flower slightly more than an inch in diameter that yields both nectar and pollen rather lavishly.

In my area it blooms plentifully beginning not later than the first of May and continues for at least a two week period. The beekeeper knows it is in bloom (if he hadn't previously noted) from seeing the bountiful loads of bright yellow pollen being brought in at the entrance. It is a rich source of brood nest food, though the analysts assert that it lacks one essential food ingredient — *L arginine*. Doubtless this deficiency is made up from pollen from other plants since no one has ever reported a cessa-

Continued on next page

tion of successful brood rearing at the time the dandelion pollen is most abundant. In fact, bees forage on so many plants for pollen we do not worry that one of them may be deficient in some detail.

But some non-beekeepers regard the dandelion as a pest. Orchardists who are desirous of having their fruit blossoms pollinated, often find the bees working instead on the dandelions. Often, the fruit flowers, such as the apple and pear, are not able to compete on an even basis because the dandelion is more liberal in supplying both nectar and pollen, particularly pollen which is in such great demand at the time.

Dandelion

Also, many tenders of attractive lawns find the presence of the dandelion not to their taste. The plant puts its central tap root down for a distance of as much as a foot and spreads its leaves out over a diameter of perhaps 2½ inches or more, crowding out all grass in the immediate vicinity. Further, it is very difficult ot root out the plant by hand. If the tap root is cut off or broken, the part that remains in the ground grows a callus tissue to close the wound and eventually two to five new plants arise from this callus tissue. Grazing animals that crop the plant cause a similar result. Dandelions can often be seen growing in rings in a lawn -- a sign that an original plant there was damaged and the remaining root produced a series of new plants. Herbicides, even, are not too often totally successful in eradicating it. The dandelion is especially adept at establishing itself in newly disturbed ground.

Rhododendron

Perhaps it should be noted that it is the beekeper who does not too enthusiastically welcome the blooming of this bush that flowers so beautifully in springtime.

In the U.S. and Canada it is the species, mountain laurel (*Kalma latifolia*), that is most prevalent. The chief objection to this plant is that honey produced from its flowers may be poisonous to some humans when they consume it.

This does not often happen, however, since the mountain laurel yields nectar at the time of year when surplus honey is seldom being stored. In fact, we do not recall having heard of a case of poisoning from this source in forty years. Most of this honey is consumed by the bees which evidently are immune to its deleterious effects. One small contingent of people, the deer hunters, deplore the existence of mountain laurel. This is because the bush or shrub produces tangles of close growing plants approximately 4½ feet or more in height and spreading over a mountainous area of an acre or more. There an elusive buck deer can conceal himself and be relatively free from danger since the density of growth makes penetration by a human hunter relatively impossible.

Burdock

Some beekeepers, even, may be almost totally unaware of the existence of this plant. It grows widespread over the U.S. and Canada, however, and is a good source of nectar in the late summer and fall when its clusters of flowers are gathered in a tight head about a ½ inch or more in diameter. The color of the flowers varies from dark to very light purple.

The bees seek out the flowers chiefly for nectar. They find the plants growing mostly in waste places, or on the borders of grain or hay fields and pastures. It is despised by nearly all people who are aware of its existence since, when through blooming, its ripened seeds cling to almost any object that touches them— particularly little boys' clothing, and the wood of grazing sheep, also horses' tails.

As a boy, I personally found the wearing of wool clothing distasteful because it caused my skin to itch. The irritation was caused by the presence in the wool cloth of an occasional barbed tentacle of burdock. I believe that today most wool is relatively free from this irritation because herders take care to see that burdock is not present on the feeding grounds of their herds.

In my youth we used to gather the brightly colored blossoms in their clusters and make blankets of them, employing the different hues to produce vari-colored patterns.

Melaleuca

The melaleuca flower of Florida is a bushy one, giving off a strong aroma which to me, smells like vanilla. The melaleuca comes to Florida from Australia. The bees visit it eagerly and usually make a surplus from its nectar. The honey is a bit dark and somewhat strong in flavor. Nevertheless, some consumers of honey prefer it, just as others prefer buckwheat honey, and still others favor wild thyme honey. It is appreciated by beekeepers because it blooms when few other flowers are available to the bees—in October and on through the winter months.

The melaleuca tree grows to a height of 40-50 feet. It is conspicuous for its rather white bark, the bark being very deciduous. The melaleuca tree is used for ornamental purposes and for lumber, chiefly the

Burdock

former. A Florida friend of mine who owns an estate on the St. Lucie River has a lane some 175 yards long leading into his place from the highway. The lane is lined on both sides with sturdy melaleuca trees whose light colored bark makes them an attractive and imposing hedge.

Why, you might ask, could anyone dislike a tree of this quality? The answer is that the melaleuca gives off liberal quantities of pollen into the air which irritates the breathing apparatus of some vulnerable people. These people object to the tree so much that in some areas they strongly advocate the eradication of all melaleuca trees.

The Brazilian Pepper

This import into Florida from South America is conspicuous for the red berries which it produces at Christmas time. Some people use branches of Brazilian pepper for decorative purposes in place of holly.

I have seen honeybees eagerly visiting its flowers in October. Occasionally it is seen in seaside gardens. Beekeepers ap-

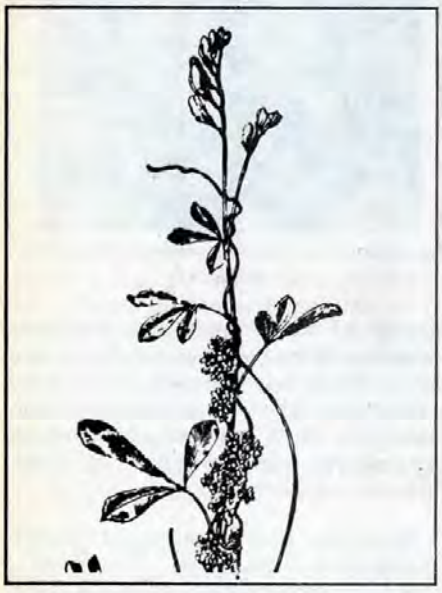
Continued on next page

preciate it as a nectar source. But I suspect that beekeepers are the only folks that have even a moderately good word for the Brazilian pepper.

On my place in Florida this tree is a definite nuisance. It grows anywhere and everywhere—and always where it is not wanted. It specializes in joining a hedge of Surinam cherry, pushing up its unwelcome shoots, undetected at first. It comes forth at the edge of the foundation of the house. It is almost impossible to eradicate it, for it puts on new growth not matter what point it is cut off.

Wild Thyme

Wild thyme as we know it in the U.S. was brought to this country probably from Greece, either as a garden plant, or accidently in the wool of an imported sheep. It thrives on mountain sides, as for example, on slopes of the Catskill Mountains of New York State and the Berkshire Mountains of western Massachusetts. Some is found in the northernmost tips of New York, perhaps brought there by a beekeeper.



Thyme

Beekeepers generally enthuse over its presence since its low-lying plants with their purple flowers yeild nectar liberally. It is common to secure 200 pounds of wild thyme honey over its blooming period beginning about July 15 and lasting up to frost in September or October. It does not make the best of wintering food for bees, but they nevertheless get by on it. Likewise, it is not the most pleasant in flavor for human consumption, but it is reasonably acceptable, and some consumers even prefer it— as tends to be true of almost all honey flavors of a strong or distinctive nature. Beekeepers operating where it prevails often use it largely for wintering purposes, and sell their milder honeys without being compelled to leave a surplus of them for the bees.

Farmers tend to dislike this plant because it overcomes most other plants.

Thus we see that in the case of some honey plants, what is one man's delight may be another's rejection.□

Beekeeping Folk Arts

By AMOS ARBEE

Let us stray just momentarily at least from past cliches and perhaps dream or simply allow our imagination to run at will. Let's just suppose for one day only that we got up and went to read our daily newspaper as usual. But instead of the headlines and the sensationalized articles, the paper printed: sorry but there is absolutely no bad news to report today--no crimes, robberies, fires and so forth.

We read on: Although one thing did pop-up by chance that may be better than printing nothing at all today. It seems some real clever scientist has found that the honeybee possesses an unusual substance in her body that may aid in stopping the growth of certain cancer cells within the human body.

Now most all beekeepers knew right along that the honeybee gathered the "nectar of the gods" and was an extremely skilled craftsman when it came to making a perfect wax cell--using no drafting tools or specialized equipment whatsoever. Also, she is capable of secreting beeswax from her body that has untold of uses. But, who among us would have ever thought for one moment that she also possessed the mystery to one of man's most undesirable and most misunderstood diseases? Especially when most of us only think of the honeybee in terms of the painful sting acquired now and then.

"LO and behold, if ONLY THIS HAD NOT BEEN JUST A DREAM"

"Honeyed Applesauce"

4 pounds good cooking apples

1 cup mild flavored honey

¼ cup water

Wash apples. Without peeling or coring, cut into quarters. Put them in large saucepan. Add water, cover and cook on medium heat about 20 minutes or until apples are rather soft. Stir once or twice. Strain though colander. Add honey and stir well. Makes about 6 cups.

"Warm Cabbage Slaw Dressing"

Fry bacon, then add 1 teaspoon flour, 1 cup vinegar (not too sour), 1 egg, salt and honey to taste, and 1½ cups condensed milk. Mix and cook over low heat until thick. An old Penna. Dutch Goodie.

"Huckleberry Breakfast Cake"

2 cups flour

2 teaspoons baking powder

Dash of salt

½ teaspoon nutmeg

½ teaspoon cinnamon

½ cup shortening

1 cup honey

2 eggs

1 scant cup milk

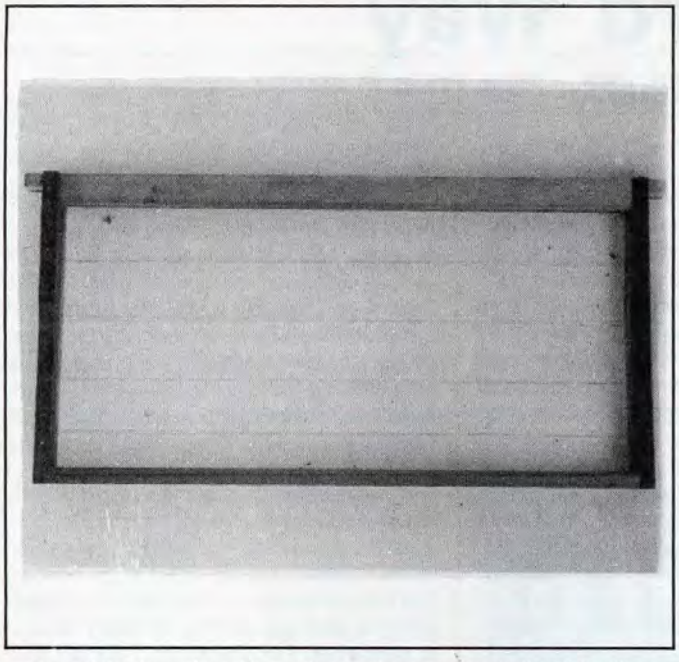
2 cuips huckleberries

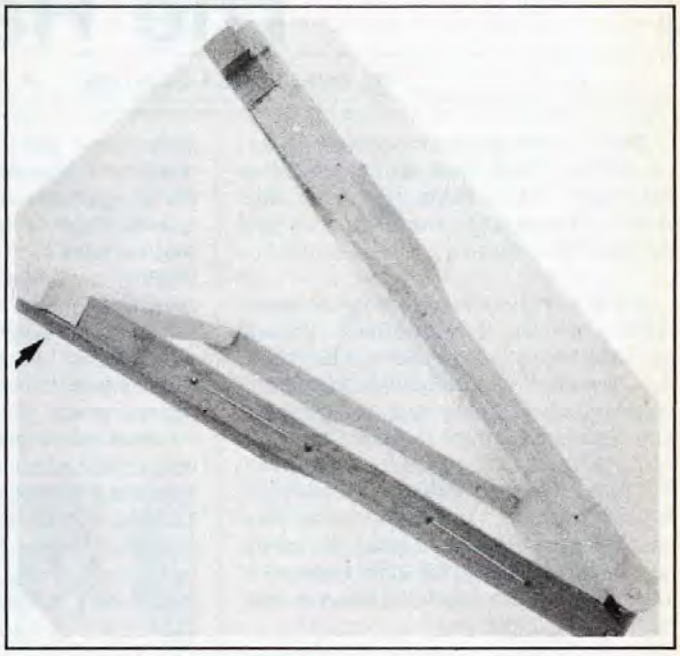
Sift together flour, baking powder, salt, nutmeg and cinnamon, cream shortening and honey well and until light. Add beaten eggs, mix well. Add sifted dry ingredients alternately with milk, stir just enough to moisten dry ingredients. Stir in berries. Put in greased pan 9 x 9 x 2 inches. Bake in moderate oven 350 degrees for about 40-45 minutes.

*Serve warm with orange blossom honey drizzled over it. Yum, Yum.

Split Frames For Comb Transfers

By DR. DAVID DE JONG[1] Dept. of Genetics University of Sao Paulo, 14.100 Ribeirao Preto, SP Brazil





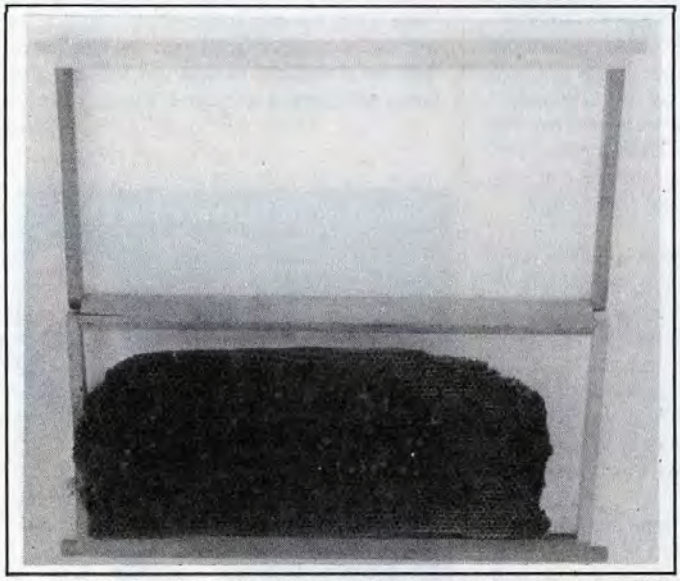
One of the benefits of living in another country is that it facilitates the exchange of ideas. I am often asked by beekeepers to explain management techniques used in the U.S. and in turn I have learned about methods Brazilians have devised for working with Africanized bees.

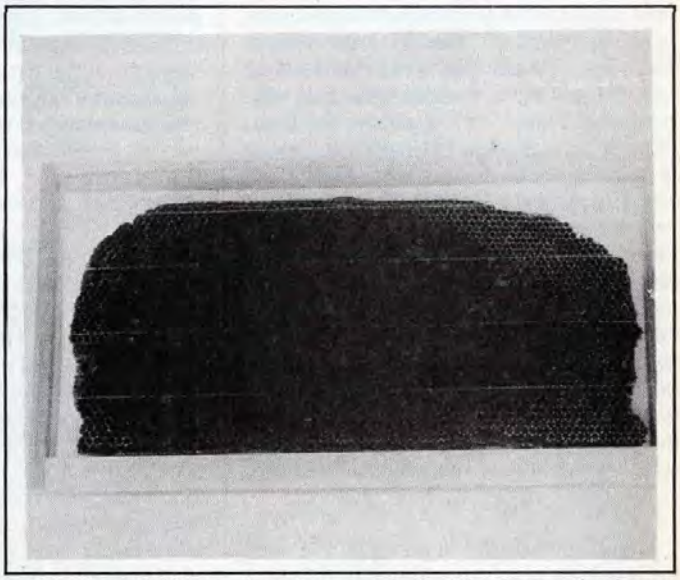
One such technology, which I explain here, has recently appeared more or less simultaneously in several areas of Brazil, though its origin is unknown to me. It is, moreover, appropriate for use with any race of honey bees.

What To Do With Those Loose Combs?

"Loose" brood combs, that are built outside a frame, in wild colonies, box hives, or a forgotten space in a regular hive are difficult to handle. Normally we would like to save these combs. This is especially important for colony transfers to help hold the bees and to get them off to a good start. Beekeepers usually cut combs to size and tie them into the frames. However, the "tying" technique has several disadvantages: it is time consuming, and a bit tricky at times when angry or disoriented bees may be stinging. Combs easily fall out of place in the hive, making future hive manipulations difficult. And, small or irregular pieces are difficult to hold in place.

The split frame used in Brazil is a very handy solution for loose brood combs. It consists of a normal deep Langstroth frame with a wide solid bottom bar. The top and end bars are split. Two sets of four wires are placed in the normal position, except that each pair is seperated horizontally by 1.3 to 1.5 cm (see figures). The frame opens, hinged on the solid bottom bar by nails driven into the end bars. The bottom of each half of the end bar is rounded to allow free articulation.





Brood comb(s) are placed on one half of the frame, the frame is then closed and the combs held in place by the wires. It is not necessary to clip the frame shut as the weight of the comb and

Continued on page 502

Learning About Robbing The Hard Way

By MRS. VELMA CLINTON P.O. Box 1098 Hope Valley, RI 02832

With only three year's beekeeping experience under my belt, and those with a maximum of four hives, I was still very much a novice when I ran into a serious problem with robbing.

There being not natural body of water within a half-mile of my bee yard, I provided water for my bees by using a birdbath, with stones in it to help keep them from drowning. I generally kept the birdbath about 40 feet from the hives but this particular year I thought I'd save them even that flying time and moved it right between two of my hives. Those two were very weak, one because it had been formed by two after-swarms and the other because it was the hive from which the swarms had come.

It wasn't long after moving the birdbath that I noticed it was being frequented by bees other than those from my hives. Whereas I had Caucasian, Italians and Starlines I thought of these strangers as "Halloween" bees because of their orange and black coloring. Well, I figured, I've plenty of water so what difference does it make if some else's bees want some. As it turned out, though, the Halloween bees were not content with taking my water, they also wanted my honey. I found this out one day when I noticed what looked like a tremendous play flight in front of one of my weak hives. I was glad to see such a strong turnout since the hive really needed new bees. As I watched, though, I discovered that it wasn't a play flight; that multitude of bees in front of the hive was intent on robbing. They were landing all over the hive, looking for openings between the supers or cracks in the boards and were marching, practically unchallenged, into the hive entrance. The hive was too weak to defend itself. As soon as I realized what was going on, I grabbed an entrance reducer and pushed it into position, with the larger opening in place, thinking the hive would be able to protect that much space, but it couldn't. The robbers continued to enter en masse so I changed the reducer to the smaller opening, and still the robbers had almost free access. The bees in the hive seemed to have given up.

That hive had a lot of honey in it; it was the one from which the swarms had issued and had been a very strong hive not so long ago. I didn't want to lose the honey and I knew that if the robbing went unchecked I'd probably lose not only the honey, but the hive itself since robbers frequently kill a hive's queen and, sometimes, the hive bees even join the robbers, deserting their own weak hive in favor of the robbers' strong one. There was nothing for it but to completely seal off the entrance, which I did by removing the entrance reducer and thoroughly stuffing the opening with grass. No bees could get in and no bees could get out. I didn't have to worry much about the hive getting too hot because there weren't enough bees in it to create a lot of heat. I stood there, worrying about the weakness of the hive, and came to the conclusion that just keeping the robbers out would not solve the problem; the hive had to be strengthened.

As I had two strong hives, I thought I'd take some of those bees to strengthen this one. I found a cardboard box, with about a 8″ x 2″ diameter circular opening in the top, and taking a piece of light cardboard formed it into a funnel which I placed with the small end projecting down into the box. I proceeded to shake some of the bees from a super from one of the strong hives into the funnel, but it proved to be too small; it got jammed up with bees and very few were going into the box. I enlarged the opening in the box and the funnel, and shook some more frames of bees into the box. I don't suppose I got more than a pound of bees, if that, through this method, but I felt there were enough to improve the strength of the weak hive. I took the hive cover and inner cover off, put a sheet of newspaper with some slits cut in it over the frames, placed a shallow super on top, with the cardboard box sitting on the newspaper, and replaced the covers.

The next day I checked to see if the bees from the box had joined the rest of the hive but quite a few hadn't; the newspaper had one large tear in it but otherwise was pretty much as I'd left it and some of the bees from the box were wandering around rather disconsolately inside the super. I reasoned that there probably wouldn't be any trouble if I removed the newspaper since the bees I was trying to add to the hive were mostly young bees and the holes in the paper had permitted some mingling of smells. I therefore took off the newspaper, shook the few bees remaining in the box into the hive and, leaving the empty super in place, closed the hive.

I had sealed off the entrance so effectively that there were still no bees coming or going, although robbers were persistent in their efforts to make their way into the hive. The next day it was the same, but there were a lot fewer robbers and the next day there were none. Figuring that it was now safe, I removed the grass and replaced the entrance reducer, using the smallest opening.

A quick inspection of the bottom board, which had very few dead bees on it, proved that the hive had not suffered excessively from being shut up and I soon noticed that the entrance was now being guarded, with any attempts at robbing being severely punished. The bees that I added had evidently raised the morale as well as the strength of the hive and it was now willing to defend itself. An interesting side note was that those robbers who had been sealed into the hive when I closed off the entrance, instead of returning to their old hive when the entrance was opened, remained to work for and help defend their new home. Their coloring was so different from my bees that I could readily tell them apart and it was a real pleasure to see one of them tackle an intruder from the old hive and rudely eject her from the entrance.

Needless to say, before reopening the hive, I had moved the birdbath back to its old location, having learned the hard way that the presence of strange bees in the bee yard should not be encouraged.□

Nectar Collecting — Part III

By J. IANNUZZI RFD 4 Ellicott City, MD 21043

I finally realized that in order to complete my 50-state collection I had to get off my keister and do something differently.

The Secrets of Collecting

In the more than five years consumed in gathering 67 nectars from 50 states and 33 foreign countries, I developed a philosophy that can be summarized in seven words: Broadcast, meet, travel, pay, read, exchange and charge, expressed in the following Seven Commandments.

I. Let people know.

II. Go to meetings.

III. Travel widely.

IV. Don't balk at price.

V. Read apian.

VI. Trade.

VII. Be bold.

I. Letting People Know

One gets nowhere smoothly by not greasing his own wheels or by hiding his light beneath the biblical bushel. Don't be afraid to tell everybody whom you meet what your project is, especially other bee people, all potential benefactors.

In addition to speech, try formalizing that by recording your experiences, both locally and nationally. As editor of *The Nectar Collector*, the bi-monthly newsletter of the Howard County (Maryland) Beekeepers Association (HCBA), I had ample opportunity to crow about my hobby. Early on, *Gleanings In Bee Culture*, the monthly *Apismellifera* journal established by the Root Company before the turn of the century, published in November 1980, my initial article on my domestic and transnational honey hunt. It carried this concluding plea as an afterthought: "Today I find myself 33 states short. Can you add to my collection? Will you?" Five contributions, consisting of nine additions, cascaded through the mails. Obviously, it pays to advertise.

II. Attend Meetings

Mingling with fellow apiarists and aficionados on the local, regional and even international level is rewarding in many ways. To a collector, more especially so. Superior to mere attendance is to become a dues-paying regular. In my own case, I am a chartered member and co-founding president (1976) of HCBA. Exchanges with, or outright gifts from, fellow members (DONALD P. KOLPACK, Columbia; JOHN ROMANIK, Ellicott City; JOHN HERDER, Glenwood; JAMES TOWNSEND, Halethorpe; FRANK "SKIP" McCULLOUGH, Ellicott City; PAUL R. KAPP JR., Laurel; CORALE TUCK, Sykesville; and STEPHEN McDANIEL, Baltimore) have vastly fortified my holdings and has rewarded me with fine fellowship and other people's ideas on bee culture.

The author admiring clover from Idaho, the 50th state in his collection, received on February 16, 1984 and mailed by Robert E. Saunders, state apiarist, Boise, after a direct appeal.

Likewise I belong to the Maryland State Beekeepers Association (MSBA), having attended my initial meeting on September 29, 1962 at the University of Maryland, College Park, when GEORGE JENVEY ABRAMS, the secretary-treasurer, was the eminence of the group. Several years later, I finally joined as a paying member, winding up as one of the three directors under president L. ANDREW HAUCK, as well as principal editor of its *Beeline* for 16 months, now one of the finest publications of its kind, thanks to GORDON DAVIS, editor. Observant members will recall seeing my display mounted at several meetings, entitled: MARYLAND NECTARS: IS **YOUR** HONEY HERE? JIM WESTON, Waldorf, must have because at a later get-together he gifted me with southern Maryland holly—a new one in my collection. Later freewill contributions came pouring in from members JOHN VINCENT LINDNER, Cumberland (basswood) and THOMAS SISLER, Oldtown (buckwheat and knapwood—from his own very miniscule holdings). It was at such a gathering that I first met ARTHUR GODON STRANG, Boyds, the 28th MSBA prexy (1970-1970—LINDNER was one of his illustrious predecessors), from whom I was more than happy to purchase my first alfalfa, blackberry, blueberry, sage and thistle. Nor did member PAUL R. KAPP JR., the former MSBA treasurer, forget his friend when vacationing out west, as his Utah clover in my collection will testify to. Nor did HAROLD LIEBERMAN, Upper Marlboro, who led a group of bee ranchers on a China tour, summer of 1983. And finally, MSBA was the locus of my first meeting with DEWEY MAURICE CARON, now of the University of Delaware, from whom I now have clover although my plea for purchasing a bottle of his Arizona mesquite collected on his sabbatical there failed to succeed.

The Eastern Apicultural Society (EAS), the regional grouping that includes 17 eastern states and five eastern Canadian provinces, also counts me as a member, as it convenes once annually. At my first such gathering in 1978, Wooster, Ohio, when JOHN ROOT was president, I made my premier purchase from the Root store in Medina, being waited on by Brad, the boss's son himself, who sold me buckwheat, clover and orange at $1.55 each and also made my first exchange, locust for wildflower, with Ark II Apiaries, operated by B. TEK? NICKESSON?, 180 Cat Rock Road, Cos Cob, Conneticut (only now, after 66 months, is that honey starting to form crystals, a single layer on the very bottom). My last EAS convention in West Virginia, 1982, resulted in collections of Virginia copperleaf from STEPHEN H. DILLEY (as well as more genuine sourwood at $2.25 a pound) who tends his bees in Nashville; dandelion from RAYMOND CHURCHILL, Watertown, New York; and sumac from FERN WILSON, Oldtown, Maryland.

Between my first and last EAS celebrations, there three more successes: 1979 Ottawa permitted me to make roadside purchases of clover and goldenrod while the meeting the next year in Burlington, Vermont yielded R.B. SWANN'S wild

Continued on next page

raspberry from Brewer, Maine; J. HENDRY'S mimosa from Jamestown, Rhode Island; and ALBERT N. DELICATA'S linden from Newtown, Massachusetts. The 1981 Rutgers New Jersey confab had a magnificent display of local honeys sponsored by BOB HARVEY, Elmer. From him we purchased apple blossom, Spanish needles and wildflower and enroute back to Maryland we stopped at his home, at his invitation, to be regaled with gifts of melaleuca and willow that he had harvested in Florida, the latter from floating his hives in the Everglades. This same EAS get-together produced genuine sourwood put up by STEPHEN H. DILLEY, Nashville.

My local and regional bee meetings have been supplemented by international ones, as represented by Apimondia, sponsored biannually by the world organization of apiarist organizations and opened to anybody who can afford it. At such a meeting, Athens, 1979, I garnered genuine wild thyme (The Greeks call it *meli*) in a can, costing at least three times more than similar imported honey purchased from Little Greece, Eastern Avenue, Baltimore, earlier that year; while the return trip home, via Italia, yielded wildflower which the Italians call *miele*. Apimondia, Acapulco, 1981 added more Mexican *miele* to join the Yucatan sold by Dutch Gold of Lancaster, Pennsylvania as well as both golden and amber *hachimitsu* delivered from Nippon by KOICHI OTA whom I had first met at Apimondia, Athens. His buckwheat and tree of paradise now repose in my collection.

III. Travel Widely

When I journey, at home or abroad, I always keep my eyes open for missing nectars while an index card, which I always carry, keeps my memory fresh. Side trips, from the interstates, are a necessity even though time-consuming and often exasperating, adding many more hours for the traveler, always in a hurry. One such yielded my first Georgian sweet stuff. My greatest and most expensive kill was pausing at a place just south of Ft. Myers, advertising on giant billboards "honeies" misspelled (why are painters the world's worst spellers?) and elsewhere "the largest bee observatory in the world," which turned out to be eight observation hives, each four deep frames high, set up in the back room behind the extensive display out front, in which I invested more than $50 for 18 pounds of the golden sweet. Nine were from stateside sources and the rest were packed by England's Crabtree & Evelyn—originating in Australia (two), Chile, England (two), Hungary, Mexico, Rumania and Spain.

IV. Don't Balk At Prices

The price tags attached to the Crabtree bottles taught me another lesson: do not kick at prices, for one never knows if he is passing up a good deal and will live to regret it. For example, the $4.25 per "net wt. 454 g 16 Oz. (1 lb.) 341 ml 12 Oz. fl" (so each jar is marked) I was hesitant to part with in Florida reminded me of the $7.25 I had to surrender for a Crabtree one-pound Israeli orange blossom (a new country) in my own backyard, Baltimore, a few years later!

V. Read Apian

The fifth bee commandment is to peruse because, as Bacon says, "reading maketh a full man." At one time, I was checking regularly newsletters from Georgia, Michigan, Minnesota, Oregon, Pennsylvania and Washington as well a subscribing to *Speedy Bee* (often not so speedy), *Gleanings In Bee Culture* (now billed as "the most popular") and *The American Bee Journal* (The oldest such in the Western hemisphere, having been founded when the Sage of Salem slept in the White House). Discoveries just might be made. For example, recently ARNOLD KROCHMAL, Asheville, North Carolina wrote (*ABJ*, November 1983) about "Coffee Honey"—a floral source absent from my shelves. Needless to say, it no longer is.

Incidentally, even if an apiarian (Lorenzo Langstroth's favorite term) is not engaged

The Honey Factory (notice glaring misspelling), south of Ft. Myers, Fla. where the author purchased 18 pounds of "honeies" (nine of which were foreign) for more than $50 in July 1980.

in squirreling, I advocate whole-heartedly subscribing to at least one national bee journal if one wishes to expand his horizons and improve his techniques. In the early days, when only one used to cross my portals, I made it a point to exchange with friends for the other two. After several years of reading in this mode, one can decide for himself whether or not it is worth the effort and the expenditure. For one who wishes to know it all, write and/or perfect his bee skills, I find that subscribing is a *sine qua non*.

VI. Trade

The sixth commandment is to exchange with anybody willing. And don't be afraid to ask. When I go any place where such possibilities exist, especially apian meetings, I am always prepared. Bartering has taken place at my HCBA, MSBA, EAS and Apimondia meetings. People are often more than willing to help out, only if one will broach the subject.

VII. Be Bold

My final commandment is to be bold. I finally realized that in order to complete my goal of 50 states, I had to get off my keister and do something differently. One goes nowhere by sitting on his hands. Between January 1, 1981 and the following New Year's Day, I had picked up only **one new state,** Alaska by mail, with a big 11 to go. By November 1983, my national collection was still several states short, mostly western which I could not travel easily (being unemployed for 24 months did not help either). To cap

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the project begun in earnest in 1978, I had to change my tactics. This is what I did.

From the March 1983 issue of "the world's most popular journal," I extracted the names and addresses of the most likely prospects (usually the secretary of the state bee association), made my request and enclosed a blank check to cover the cost of a one-pound labeled jar, to include shipping "and what not." Between December 5, 1983 when the first letter hit the mails and the ides of February, **I had collected all the missing states,** an effort that had eluded me for many months. For this, I must publicly thank CURTIS D. MAYNARD, Kansas City, Kansas; M/M GARY L. SCHMIDT, Martin, South Dakota; ELBERT R. JAYCOX, Las Cruces, New Mexico; JACK TUCKER, Tulsa, Oklahoma; BILL GOFF, Reno, Nevada; RAY & SUSAN LANDRY, Breaux Bridge, Louisiana; MARION ELLIS, Lincoln, Nebraska; and ROBERT C. SAUNDERS, Boise, Idaho. Now one should not expect total success immediately from this shot-in-the-dark method. Three of the above shots did not hit the target (I hope the blank checks were destroyed), forcing me to send follow-up letters which were likewise ignored. After a lapse of 60 days, I got the message and tried three new sources in the same states with virtually instant responses. Nothing ventured, nothing gained?

I hope that my seven apian commandments to the secrets of successful squirreling may be of assistance to some neophytes out there?□

[Next month — The nature of my holdings (container types, packaging, labeling, prices, the funny honeys, the sourwoods, and the mail experts.]

PHOTOGRAPH OF RAY ARNDT, TAKEN BY HIS DAUGHTER, LISA ARNDT OF FREMONT, OHIO. LISA IS A SOPHMORE AT OHIO STATE UNIVERSITY AND TOOK THIS PHOTO AS PART OF HER WORK TOWARD A DEGREE IN PHOTO-JOURNALISM. WE HAVE ALWAYS BELIEVED THAT PART OF BEEKEEPING'S STRENGTH HAS BEEN ITS CLOSE FAMILY NATURE, ONE EXAMPLE OF WHICH IS PRESENTED HERE.

Beekeeping Technology

By DR. JAMES TEW
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Six Types of Frames Used To Store Queen Honey Bees

Figure 1. Frame designed by Harp, 1969.

Some beekeepers attending queen production courses at the Agricultural Technical Institute have expressed an interest in equipment and techniques that one could use to hold queens either temporarily or long-term (through the winter). It would indeed appear to be an ideal situation if an interested beekeeper with surplus queens could overwinter the same queens and use them for splits the following spring.

Unfortunately there is no perfect technique as of yet. The beekeeper has two brood choices: queen storage in incubators and queen storage in special equipment inside hives. This discussion will be confined to queens held in special frames and stored in colonies.

Harp (1969) devised a special frame to hold 54 mated queens in a frame having 27 compartments per frame side. Compartments measured 1½″ x 1½″ x $^{7}/_{8}$″ (3.8 cm 3.8 cm x 2.2 cm) and contained worker comb. Mated queens were confined behind a queen excluder in individual compartments. Harp reported that on the day the queen storage frame was inserted in the colony, the queen was caged and the bees in colony were gorged on honey. I assume the colony queen was later released. Forty of the forty-two queens were accepted and were successfully kept in confinement from October, 1967 — May, 1968. The stored queens were introduced into colonies and performed well throughout the summer of 1968. A slightly modified version of Harp's frame is shown in Figure 1.

In an earlier study (Harp, 1967), Harp confined queens in communal cages that held five queens. The queen holding cage was a ½″ x 1¼″ x 5¼″ (1.3 cm x 3.2 cm x 13.3 cm) wooden block. The block had five ¾″ (1.9 cm) holes that were covered on one side with pieces of zinc queen excluder. Queens were put into the cage compartments through a small hole cut into each plastic coated foundation separating the two block cages. In this fashion, ten queens were housed per unit — five on either side. Once again, the colony queen was caged while the stored queens were being introduced.

In both studies, it was stressed that that fumagillin syrup should be fed to the colony and confined queens. Cage blocks similar to those used by Harp are shown in Figure 2. Cages pictured hold four queens each.

If techniques could be developed throughout the winter months, then the problem of storing queens temporarily during warmer months would be a much easier situation. Figure 3 demonstrates an old style frame with cages used to hold cells, virgins, or mated queens, whichever the beekeeper deemed necessary. Individual cages are patterned after those of Alley (1883). Possibly such cages could be used to store queens for long periods of time in warmer climates. However, queens that are separated from workers by wire gauze do not seem to live as long in cages as those that are allowed to mingle with workers inside the cages, (Reid, 1975). Consequently, the Alley cages and others to be discussed below will probably be less successful than direct contact cages.

Individual cages measure (approximately) 1¾″ x 1¾″ x $^{7}/_{8}$″ (4.4 cm x 4.4 cm x 2.2 cm). The large hole measures 1¼″ (3.2 cm). One side of the cage has a hole bored to $^{5}/_{8}$″ (1.9 cm) that would allow for the introduction of a queen cell. The opposite side of the cage has a hole bored to $^{3}/_{8}$″ (.95 cm) to allow for a candy plug to be inserted. Supposedly, virgin queens could be introduced with such a cage.

If one wishes to maintain queens in mailing cages, a suggestion is offered in Fig. 4. The frame is simple to construct. Fifty-two queens can be confined (26 on each side). If such a frame is introduced between two frames of brood in a strong queenless hive, a high percentage of caged queens can be held for several months. As cluster formation begins, the beekeeper can expect the outermost queens to become chilled and die.

A modification of a modification is offered in Figure 5. Mr. Richard Allain of Indiana presented me with the idea that he in turn was given from a commercial beekeeper. Individual cages consist of slightly less than half of a common three-hole cage (Benton Mailing Cage). The screen gauze that once covered the three-hole cage is subsequently wrapped around the smaller cage where it is stapled in place. Such cages make

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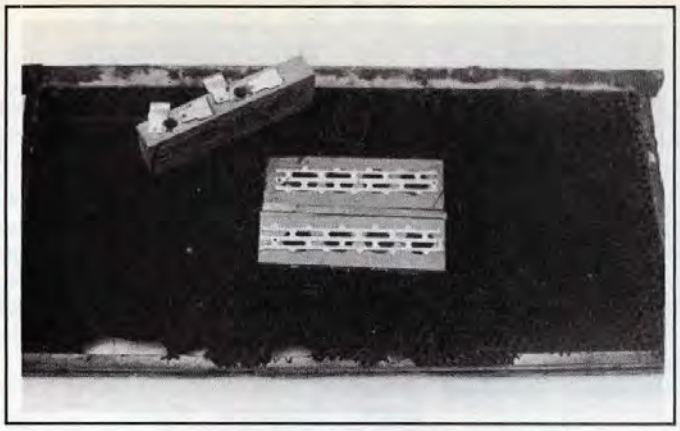

Figure 2. Frame similar to one used by Harp, 1967.

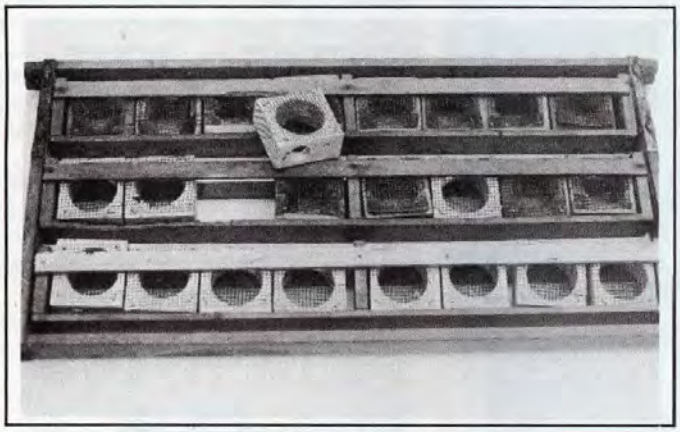

Figure 3. Frame used to hole Alley Cages.

small efficient cages and are easy modifications of the common three-hole cage. I took the liberty of adding the top bar and end bars simply to get bees to cluster completely around the cages. We have not experienced any serious problems holding queens for a short time in this device.

Cages comprised entirely of wire gauze measuring 2″ (5.6 cm) x $^{5}/_{8}$″ (1.6 cm) are used quite commonly by many beekeepers (Fig. 6). Such cages are not only used to hold mated queens temporarily but are also used to hold virgin queens as they emerge from their cells. They can be used to protect the remaining cells if one queen should emerge early. They also work well as queen

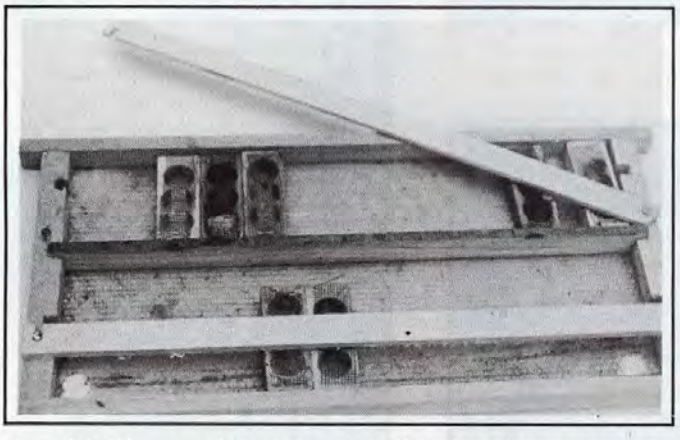

Figure 4. Half frame used to hold 26 queens. When frame halves are combined, 52 queens can be stored.

introduction cages. Their small size and accessibility to the worker bees allow for a quicker acceptance of the queen being intro-

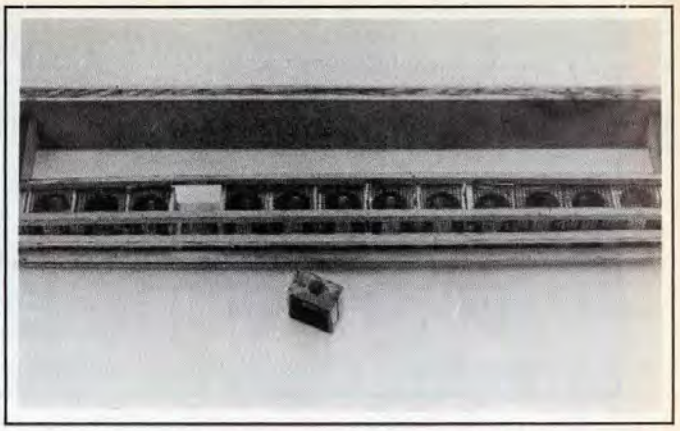

Figure 5. A frame used to temporarily hold queen in ⅓ of a common three-hole cage.

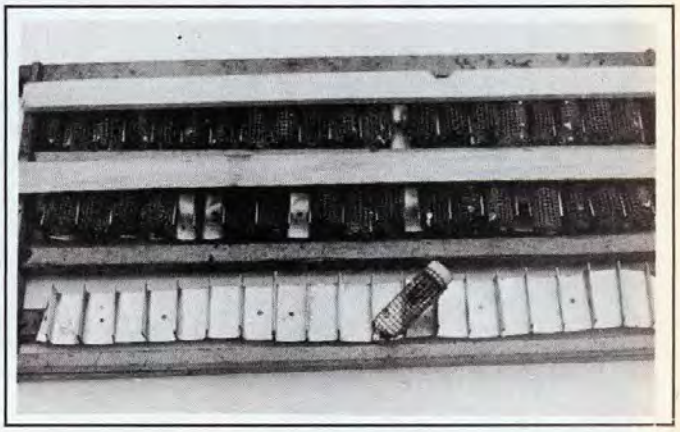

Figure 6. Frame used to hold wire cages.

duced. Such cages may be constructed by forming them around a steel axle shaft of the correct dimension and soldering ends to hold the wire in place. Such cages have a long useful life and can be sterilized.

In retrospect, a beekeeper that wishes to hold queens should remember:

1. Use a strong colony that initially has the colony queen caged. Researchers differ as to whether or not the colony should be released a few days later.

2. For the best long-term results, current work seems to indicate the use of cages that allow bees to mingle with caged queens. However, queens confined behind excluding devices may be endangered during the introduction process.

3. Regardless of the system used, expect to lose some queens.

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MORRISTOWN BEEKEEPERS SCHEDULE MEETING

The fall meeting of the Morristown, New Jersey Beekeepers' Association is scheduled to be held on Sunday, September 23, 1984. The meeting will start at 1:30 p.m. and will be held at the Mendham Foster Field Historic Farm located on route 24.

The guest speaker will be Dr. Bob Berthold, Deleware Valley College, Doylestown, PA's beekeeping specialist. Dr. Berthold will be discussing the timely topic of "Preparing Your Bees For Winter." In fact, many beekeepers consider the fall of the year to be the "beekeeper's New Year" in that the success of the bees the following spring is often determined by how they are managed in the preceding fall.

The meeting will be held rain or shine. It is open with no charge to anyone interested in attending. Additional information is available by contacting Mrs. Irene Joyce at 201-895-3240.

Beekeeping In Egypt

By ROGER A. MORSE Dept. of Entomology Cornell University Ithaca, N.Y. 14853

The art of keeping honey bees in hives was first developed in Egypt. When the first pyramids were built 5000 years ago, beekeeping was already in an advanced stage. Today, if one drives through the Egyptian countryside, traditional long, cylindrical mud hives may be seen, similar to those pictured in ancient tombs. Some apiaries consist of 100 to 200 mud hives.

The Egyptian Ministry of Agriculture estimates that 400,000 colonies are still kept in mud hives, while twice that number are kept in Langstroth hives. Mud hives are gradually disappearing since the movable frame hives are more profitable.

Mud Hives

I visited two mud hive apiaries and one beekeeper who owned about 5000 mud hives in several apiaries. Beekeeping with mud hives is not haphazard. The hives owned by this beekeeper were about four feet long with an interior diameter of about six inches. Each comb is nearly six inches in diameter and is placed in the hive perpendicular to its walls. The diameter and length of mud hives vary greatly throughout Egypt. A paper on the construction of mud hives, using sticks, straw, and mud was written by Page and Laidlaw (1981).

I observed strong colonies being divided to make increase. The beekeeper selected a colony with ripe queen cells. This is determined by listening to the queens pipe. The beekeeper called into the rear of the colonies with half a dozen cires of, "kak, kak." He then put his ear to the hive opening and listened for piping, which would be heard if ripe cells were present. The sounds were distinct and I heard them myself. I have heard piping before, but forcing bees to respond in this way is a phenomenon that is new to me.

When I returned home I found an excellent article by Mellor (1928) on Egyptian mud hive beekeeping. He describeds the way in which a beekeeper applies his mouth to the colony entrance, cries "kak, kak", and then listens. If ripe queen cells are present, or a newly emerged queen is within, she or the old queen responds. I also reread the paper by Hansson (1945) in which he was able to stimulate both muted piping (piping by queens in their cells) and open piping (by free queens) playing sounds into the hive. An interesting feature of Hansson's work is that he found that queens will respond to a wide range of frequencies. The function of queen piping is not clear, but it has been suggested that queens that hear the piping remain in their cells where they will be protected by workers that will use them to head secondary or tertiary swarms. If the queens emerged, fighting among them would occur.

When a colony with ripe cells is found, the dish-like mud covering over the end of the hive with the entrance hole is removed. The colony is smoked with a large, cigar shaped piece of dried dung that is lit and glowing at one end. The smoke is strong and pungent, and the bees respond slowly retreating to the opposite end of the hive. As each comb is removed and examined, the smoldering dung smoker is laid in the open end of the cylinder and continues to calm the bees.

Photo 1. An Egyptian apiary equipped for overhead shading during hot weather. The colonies are typically kept in single story colonies following the honey flow. Burlap is used in place of an inner cover.

A rod approximately two feet long, sharpened at one end, is used to cut the round combs free and to help pull them out of the hive. Since each comb has crawl spaces around its edges for the bees to move from comb to comb, it is easy to cut the wax at the points where it is joined to the hive and thus to free the comb.

To stock an empty hive with bees, "Y" shaped sticks equal in length to the diameter of the hives are used. One fork of the Y is inserted through a comb. Two combs are placed into each empty hive a bee space apart. The sticks are wedged into place to support the comb. One comb contains brood (including eggs) and a ripe queen cell. The second comb contains mostly honey and some pollen. The beekeeper next moves to the rear of the stack of mud hives. He uses an approximately two-inch in diameter, two-inch deep ladle with a long handle and takes five or six scoopful of bees and places them into the new hive. These bees are from the hive that was smoked and from which the combs had been removed. As I watched, eight combs were removed from the smoked hive and the bees were driven off them to the rear of the empty hive; it was not difficult to scoop up the clustered bees. I estimated that about 2000 bees, perhaps half a pound, were moved to the new hive.

I observed this process in early March. The climate was much like that in southern Florida, except that Egypt does not suffer from frost as Florida sometimes does. Wild mustard was the chief source of pollen and nectar, though field beans and a few wild flowers provided some pollen. Colonies were rearing a great deal of brood, and queen cells were being started in the small-diameter mud hives. Queen cells were not yet being built in

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the larger Langstroth hives, which testifies to their greater value in building larger colony populations.

Harvesting Honey From Mud Hives

It should be emphasized that at this time of year the beekeepers were taking combs from the front of the hives. In a natural nest, bees keep their brood close to the entrance. Honey is naturally stored above or behind the brood. Later in the year, when the orange and clover honey is harvested, beekeepers work from the rear of the hives where they will find the full combs of honey.

Langstroth Hives

As one drives along Egyptian roads, large apiaries of Lanstroth hives with closely crowded colonies are a common sight. Land is valuable and the hives are often only a few inches apart in the rows. Drifting, the movement of bees from one hive to another nearby, is common. Beekeepers in Egypt do not paint their hives different colors or use designs to aid the field bees in finding their own hives. Drifting does no real harm unless one is trying to select queens for honey production or to prevent the spread of disease.

Photo 2. An apiary in the reclaimed desert area. The colonies are close together in most Egyptian apiaries because the land is valuable. Drifting is probably common under these conditions.

The equipment I saw in Egypt was in good condition. Because termites and ants are not a problem, as they are in much of the world, hives are often placed on the ground. While the hives were 10-frame Langstroth size, some beekeepers were more careful than others in following standard dimensions. The bees now in Egypt are a mixture of the native Egyptian race and other races, especially Italian honey bees. I did not find much propolis in colonies as I do in U.S. colonies, but Egyptians have not used the great numbers of caucasian bees that we have, and I believe this is to their benefit.

Migratory Beekeeping

Some migratory beekeeping is practiced in Egypt. Beekeepers today do not move their bees on barges as ancient Egyptians are believed to have done. However, beekeepers do carry their bees on trucks to the citrus areas, especially the Delta. After citrus is pollinated, the colonies are moved to clover honey-producing areas.

Pesticides

In almost every cotton producing area, great quantities of insecticides are used to control noxious insects. Even in the United States, half of the insecticides used are applied to cotton. In Egypt I have been told that at least four sprays are applied to each crop. Egyptian fields are small and dotted with trees. The insecticides are applied aerially, and obviously much drift occurs. Beekeepers told me they no longer make cotton honey and that they suffer greatly from pesticide use. The government has expressed little concern over this and oother forms of environmental pollution. The public must press for alternatives to the widespread use of insecticides if it is to be decreased. Cotton is a major export and the government requires a certain amount to be grown.

Egyptian Agriculture

The combination of abundant water from the Nile, rich soil, and a full day's sunshine nearly every day makes Egypt a farmer's paradise. Three annual crops are routine. Most of Egypt receives about an inch of rainfall per year, so maximum plant growth per day is rarely hindered. A wide variety of crops is grown, many of which are cleanly cultivated to avoid weed plants that provided nectar and pollen for bees. Still, flowering plants are abundant. I saw willow along some of the canals, and several fields of flowering seed onions. Many Eucalyptus trees have been imported from Australia. The lush fields of green clover were being cut for feed for goats, sheep, donkeys, cattle, horses, water buffalo and camel, which were seen everywhere. Later in the year the clover would be allowed to go to seed; honey would then be harvested.

Egypt's population is around 40,000,000 and still growing. This is forcing the country to develop and irrigate more land. However, Egypt could obviously become Europe's winter garden. I was told that the strawberry-growing area near the Suez canal had grown from a small number of demonstration plots a few years ago to more than 4000 acres today. There is room for much growth in agriculture.

Diseases

American and European foulbrood are not found in Egypt. Varroa disease exists in neighboring Libya, but a great desert seperates the two nations and it should be possible to keep the disease out of Egypt. *Braula coeca*, the small wingless flies, are found in almost every colony, especially on the queens. These flies are about the size of a pinhead and can be easily confused with varroa mites, which are nearly the same color and size. Nosema is found in Egypt as it is everywhere honey bees are kept, but it is not a serious problem.

Acarine disease was introduced into Egypt in about 1977 and is now widespread but not ubiquitous. The mites that cause the disease invade the large breathing tubes in bees and reduce the ox-

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Photo 3. The average rainfall in much of Egypt is about an inch a year. The Nile River has an abundant supply of water but it must be lifted from the river to the fields. Here the work is being done by a blind-folded cow.

ygen supply. They feed on the bee's blood, which causes a bacterial infection that shortens the bee's life. Acarine disease usually does not destroy a colony but it can weaken it and cause beekeepers to modify their management programs.

The introduction of acarine disease was unfortunate. It probably occurred when a person illegally carried in a queen or queens from Europe in a pocket. Several fumigants are used to reduce the number of acarine mites in a colony but none is really effective. Almost every year I hear that another country is infested because of the illegal and unnecessary movement of bees and queens.

I visited one apiary where the beekeeper had divided his colonies in January before an abundance of nectar and pollen plants was available. This put considerable stress on the colonies, and the beekeeper complained that acarine was unusually severe in his apiary. Before the introduction of acarine, colonies in Egypt or any other northern subtropical country could usually be divided successfully at this time of year, but with acarine present this is not a good management practice.

Bee Breeding Program

Because so many queens from Europe have been broght into Egypt in recent years, the bees there vary considerably. This is particularly evident in their color, which is highly variable and can be noticed as one walks through an apiary. Egypt is fortunate in this regard, since an abundance of breeding stock is available. The government has already selected one strain for propagation and has distributed some queens to beekeepers. A queen rearing program in the private sector is greatly needed, and the opportunity to develop one exists.

The FAO Program

The Food and Agriculture Organization of the United Nations has an extensive program in Egypt. I was there for five weeks to determine if any serious constraints existed on beekeeping in the country; I found none. Plans are being made to train more people, especially young people, abroad. Several study tours are being planned by apiculturists.

Honey Consumption

Egypt can do much to improve honey packing and to stimulate internal consumption of honey. Because of the long tradition of beekeeping in Egypt, honey has a good image in the eyes of the consumer. Honey was available in small packages for breakfast in two of the hotels I stayed at. The quality of one sample was very good, but the packaging could be improved.

Summary

Beekeeping in Egypt has flourished for thousands of years and will continue to do so. I met one beekeeper who owned more than 1,000 colonies in Langstroth type hives and managed several thousand more. In the future, more holdings will probably be consolidated, making beekeeping even more profitable. The need for bees to pollinate many crops is widely understood. The pesticide problem is one of the most serious facing Egypt. Only a small amount of pressure is being put on the government to change this.

A major concern of beekeepers everywhere is the spread of new bee diseases. We do not have simple control methods for many of these diseases, so it is important that we work together closely to slow their spread. The introduction of acarine disease into Egypt is an event that did not need to occur and is an example of human carelessness.

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Georgia Beekeepers Association

The annual meeting of the Georgia Beekeepers Association will be September 21 and 22 and the Rural Development Center in Tifton, Georgia. The meeting will get underway at 1 p.m. on Friday and adjourn by noon on Saturday. A program to bring beekeepers up to date on the acarine mite and other topics of current interest is being finalized. For more information, contact GBA Secretary Cecil Sheppard, 3204 Westmart Lane, GA 30340.

Honey Bee Pollinators

By DR. MARK E. HEADINGS
Entomologist, The Ohio State Univiversity Agricultural Technical Institute, Wooster, OH 44691

It is difficult to fully appreciate or even determine the monetary value of insect pollination as it pertains to food production in the world or even just in the United States. It is more complex than simply considering the crops grown as food for man. One must also consider meat, milk and eggs and the insect pollinated crops grown to support the animals involved. A number of crops such as cucumbers are known to be almost entirely dependent upon insects (especially bees) to transport pollen from the male (stamens) to the female (pistil) parts of the flower. Certain other plants are not solely dependent upon bees but are benefited by them. Consequently, crop production and/or quality is enhanced. There is also the aesthetic aspect of many domestic and wild flower species which adorn our homes, gardens, communities and the countryside. The enjoyment we derive from these flowers is difficult to translate into monetary terms. If one takes the time to make some realistic estimates concerning the value of honey bee pollination, it readily becomes apparent that the crops and other plants involved are monetarily worth far more than the products of the hive (honey, beeswax and propolis).

POLLINATION — Pollen needs to be transported by some means from the male to the female elements of the flower. This transfer is called **pollination.** The actual union of the germ cell of a pollen grain with the female reproductive cell in the ovary of the pistil is called **fertilization.** Both pollination and fertilization may take place within the same flower or between different flowers of the same plant or between flowers of different plants of the same species. Once fertilization has occured,t he plant is able to produce viable seed and thereby propagate the species.

POLLINATING AGENTS — There are both non-living and living pollinating agents. Wind, for example is the non-living agent which is responsible for pollinating many kinds of plants. Wind pollinated plants such as corn or pine trees produce large quantities of dry pollen which is disseminated by the wind. This is a "shotgun" method of pollination whereby most of the pollen misses the target and only a very small percent is involved in plant fertilization. If you have ever walked through a corn field or pine plantation during the time pollen is being released, you will have noticed the yellow "dust" (pollen) on your clothing.

Live pollinating agents include animals such as birds and bats; however, more important are certain insects, especially bees. Insect pollinated plants such as apples and clover produce small quantities of sticky pollen. Since there is a small amount of pollen to begin with, the plant needs a more efficient system of pollen transfer which is, in fact, accomplished by certain insects. It is interesting to note that while certain insects injure and even destroy

given plants, other insects may assure the propagation of the same plant species by their pollination services. Insects such as certain butterflies, moths, wasps, ants, beetles and flies contribute to plant pollination; however, the bees (both wild and domestic) are among the most efficient. Two important species of wild bees which are cultured only for pollination purposes, especially for alfalfa seed production in the western United States, are the alkali bee *Nomia melanderi* Ckll. and the alfalfa leafcutter bee *Megachile pacifica* panzer. Another useful group of wild bees are bumble bees. It has been shown, for example, that bumble bees are more efficient pollinators of red clover than honey bees due to their longer tongue which enables them to more easily reach the nectar in the flower.

CHARACTERISTICS OF HONEY BEE POLLINATORS — Honey bees are generally considered very good pollinators and pollen collectors, but the question is why. The reasons are because they have some very important physical and behavioral characteristics which enable them to be such. Some specific characteristics are as follows: (1) **Forked or plumose body hair —** If one looks at the hairs on the body of a honey bee through a microscope, it becomes apparent that they are branched. This enables pollen to stick to the body better than if the hairs were unbranched or if there were no hairs. As the bee enters and leaves a flower in search of nectar, some of the pollen is rubbed onto the stigma of the pistil in the flower.(2) **Pollen baskets** *(corbicula)* — Each of the hind legs of the honey bee are especially designed with long curved spine-like hairs to accomodate a ball of pollen grains. In this way, pollen is carried from flower to flower and back to the colony. (3) **Antenna cleaner —** This structure consists of a notch and clasp on each of the front legs and is used by the bee to clean pollen and other materials from the antennae. (4) **Chewing-lapping mouthparts —** A versatile mouth such as this is well suited for collecting nectar from flowers. One of the primary reasons bees visit flowers is in search of nectar, which consequently may also result in pollen collection and pollination. Bees may also visit flowers at times for the sole purpose of collecting pollen. The chewing mouth (mandibles) can be used to bite and scrape the pollen-producing structures (anthers) of the flower. The pollen is then moistened with some nectar or honey from the honey stomach and returned to the hive in the pollen baskets of the hind legs. (5) **Colony as a social unit —** There is a division of labor in the colony; consequently, there are large numbers of worker bees available to do the work of collecting nectar and pollen. This intense effort in working toward

Continued on next page

a common cause to provision the colony results in plant pollination. (6) **Communication between bees** — Scout bees can transfer information about new nectar and pollen sources to other worker bees by dances and other specialized methods of communications. This results in placing bees in many flowers in a short time, thereby facilitating efficient plant pollination. (7) **Ability to manage and move honey bee colonies** — The honey bee *Apis mellifera L.* can be managed to maximize honey production and can also be transported to those areas with crops requiring bee pollination. (8) **Honey bees are polytrophic but practice flower fidelity** — This is to say that a honey bee will collect nectar and pollen from many plant species and over a large area but will limit its visits to flowers of one species in a given area until the nectar pollen supply is depleted or is no longer available or a preferred source becomes available. This behavior consequently facilitates plant pollination without wasting pollen on flowers of other plant species where fertilization could not occur. For example, if a bee were to visit a dandelion flower, then a strawberry flower and then a cucumber flower all on the same foraging trip, pollination may occur but there would be no fertilization and the pollen would be wasted on those plants.

In summary, honey bees are well suited, both from a structural and a behavioral standpoint, to collect pollen and to efficiently pollinate a large number of domestic and wild plants. An excellent and comprehensive book concerning crops pollinated by insects (especially bees) is entitled "Insect Pollination of Cultivated Crop Plants" (Agriculture Handbook No. 496) by S.E. McGregor. This 411 page book is very economical and may be purchased from the Superintendent of Documents, U.S. Printing Office, Washington, D.C. 20402. Another economical book I would recommend on basic beekeeping is entitled "Beekeeping in the United States" (Agriculture Handbook No. 335). This 193-page book may also be purchased from the Superintendent of Documents at the address mentioned above. A course on crop pollination is offered each year at The Ohio State University Agricultural Technical Institute. Anyone desiring a copy of the outline (syllabus) used for this course may obtain one free by writing to the author of this article.□

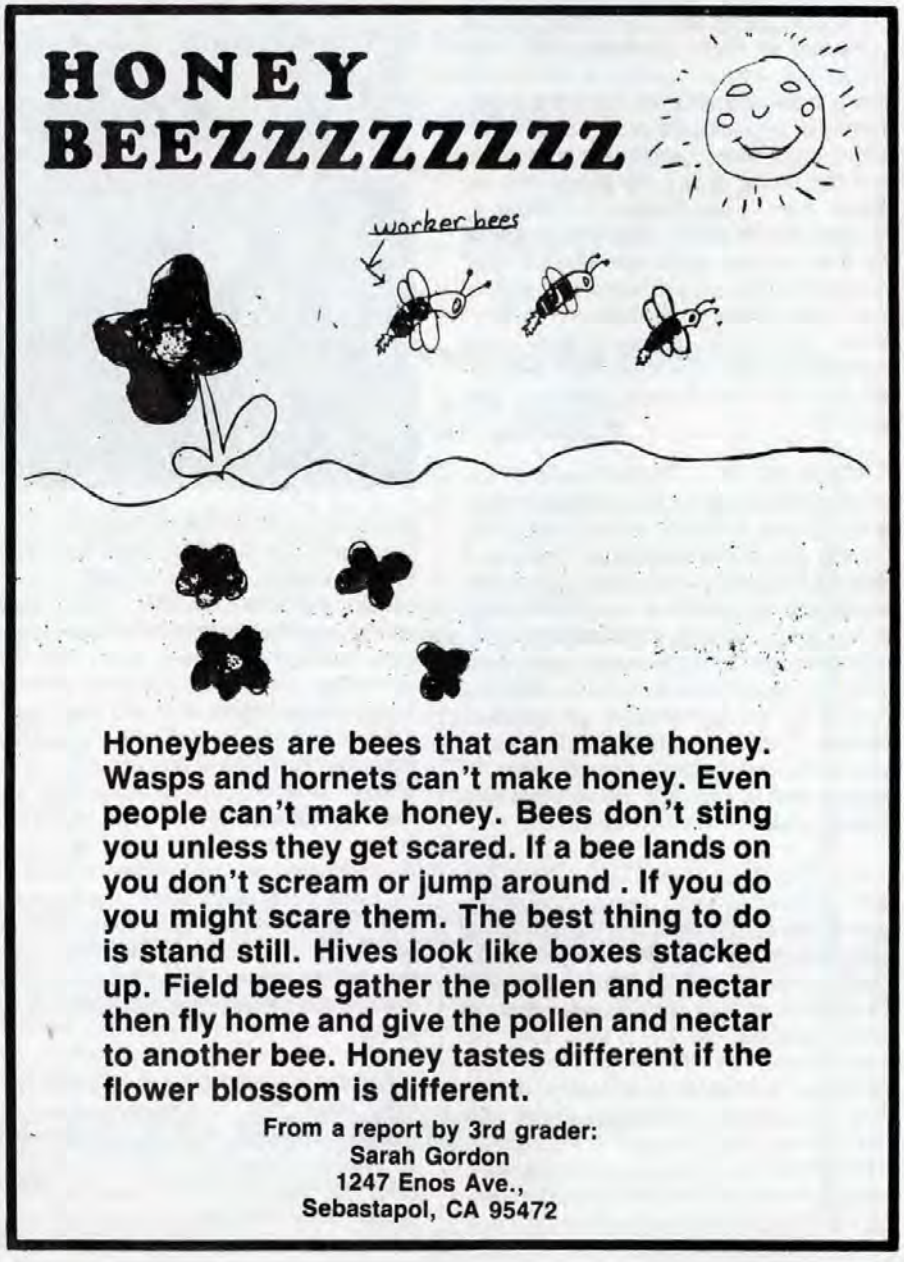
SPLIT FRAMES

Continued from page 489

pressure from other frames will keep its position. Normally only the brood combs are saved. Honey combs can be pressed and rendered.

Ideally, after several weeks, one should gradually move these frames to the side of the brood nest, or place them above a queen excluder, allow the brood to hatch, render the wax and save the frames for reuse. However, many beekeepers keep these frames in their hives more or less permanently.□

Dr. De Jong is currently working in Brazil on the honey bee mite *Varroa Jacobsoni* under grants to Cornell University from the National Science Foundation and the U.S. Department of Agriculture.



Honeybees are bees that can make honey. Wasps and hornets can't make honey. Even people can't make honey. Bees don't sting you unless they get scared. If a bee lands on you don't scream or jump around . If you do you might scare them. The best thing to do is stand still. Hives look like boxes stacked up. Field bees gather the pollen and nectar then fly home and give the pollen and nectar to another bee. Honey tastes different if the flower blossom is different.

From a report by 3rd grader:
Sarah Gordon
1247 Enos Ave.,
Sebastapol, CA 95472

NEWS and EVENTS

NEW YORK

On Saturday, September 15, 1984 the William H. Miner Agricultural Research Institute, the Champlain Valley Beekeepers' Association and Cornell University will be sponsoring a meeting from 9:00 a.m. until 3:00 p.m. at the Miner Center auditorium in Chazy, New York.

Dr. Roger Morse from Cornell University will be conducting the meeting. Dr. Morse will be stressing fall management and winter packing.

There will be a honey show and all beekeepers are invited to participate. There will be ribbons for each of the eight classes as well as one for the Best of Show.

Listed below are the different classes and their requirements:

There will be four classes of liquid honey: light, light amber, amber and dark. The color class will be determined by the judges. For each class of liquid honey a contestant wishes to enter, there must be three samples in one-pound, queenline jars.

The three comb honey classes will be rectangular or square sections, round sections, and cut comb sections. Three samples for each class are required. The comb honey samples should be submitted in a container suitable for market.

The eighth class will be beeswax. A single sample weighing not less than one pound is required.

There will be no labels or identifying marks on any of the samples. Products entered in the show must be produced during the 1984 season.

Anyone wishing to enter the show, but unable to attend the meeting, may forward his or her samples with a friend.

All entries will be judged on a numerical basis and judges' score cards will be made available to all entrants.

For more information, please contact Loretta Surprenant at (518) 846-8020. Preregistration would be appreciated.

Buzzing Bakery Bees

by ROLLIN MOSELY

Every afternoon in Germany, two or three hours after lunch, a coffee and cake hour is held. Hosts of hostesses at restaurants and hotels or someone in the office goes to the local bakery to buy cakes and sweet rolls.

And how do the Germans select the best bakery? Simple. They believe that the better the bakery the more bees it will have contently buzzing around the sweet items. It is not unusual to see a group of bees following a customer out the bakery door. In fact, bakers encourage the bees to build their nests in the rafters and let them fly among the food and customers. Surprisingly, no one seems to mind the bees, only a few tourists who get upset at "such things."

Of course in this country, the FDA inspectors would quickly close such a bakery down.

GEORGIA

The Hahira Honey Bee Festival will be held again this year in Hahira, Georgia, October 4 thru 6.

Some of the events taking place will be the annual Beauty Pageant, October 4th at 7:30 p.m. October 5th there will be Arts and Crafts all day with a Gospel Sing at 7:30 p.m. On Saturday, Ocotber 6th, festivities will abound all day with Arts and Crafts, a Log Show, a Wheelbarrow Race, a Greased Pole Climb, all sorts of entertainment all day, and a parade at 2:00 p.m. Bringing the festival to a grand climax on Saturday night will be a street dance at 8:00 p.m. featuring Jeff Willis and his band "Georgia"

Carol Tschida, the American Honey Queen, will be with us throughout the festival and we are looking forward to her visit. Also in attendance will be the Florida Honey Queen, Crystal Jones, and the Tupelo Honey Queen, Alicia Watson.

Camping space will be available, also booth space for your arts and crafts, plenty to see and eat and fun for everyone!

For more information call Mamie Sorrell, Festival Chairperson at 912-794-2778 or Louise Passmore, Beekeeper Information at 912-794-2785.

Leon A. Winegar 66 Years Of Beekeeping

Leon A. Winegar was born at Howell, Michigan July 16, 1903.

As a boy, he was always interested in watching the ant hills and how they worked. So at a winter sale when he was about 15 years of age, his father purchased six colonies of bees. When spring came, there were only three good hives of live bees. However, he worked diligently and eventually built them up to 60 colonies; which he moved to Flint in 1926, as he came to work in the auto plants and care for his bees, which he kept in Flint Township where he purchased a few acres of land outside the city.

At this time they were using large Jumbo hives of which he later changed to the standard ten frame hives.

When World War II came, he purchased several hundred more colonies and quit working in the auto plant. This was at the request of the U.S. Governemnt because they needed the beeswax in the war work.

For many years he raised his own queens and he was always so happy and content when he was caring for his approximately 600 colonies of honey bees. He has always used the A.I. Root bee equipment and to this day has some of the original Root equipment.

When the Lansing office closed or went of business; Leon purchased it and moved to his home at 2100 LaVelle Rd., Flint, MI. This was known as the Michigan Bee Supply and had formerly been Mr. Hunt's, in Lansing, Michigan. Mr. Winegar's name last appeared in Roots' Catalogue in 1965 as he had handled Root Supplies for many years, until "older age" began to catch up and prevented the extra work. However, he continued to sell Roots a couple years after the 1965 catalogue until he sold out his new stock.

He and his family bottled their own honey for the local market for many years, until 1974 when he began to "slow down" and sell all of his bees, but 150 colonies, which he still operates as he approaches his 81st birthday on July 16th.

Besides his beekeeping he found time to be with his two sons in their boy scouts and he serves as the scout commissioner for their troup which was Herbert Hoover High School Troup. He and Mrs. Winegar were very active in the affairs of their sons in school, in the P.T.A. and School Board at Hoover High School. Leon served as president of the P.T.A. and served three terms on Hoover's Board of Education and its office as President of the Board. One of their sons graduated from Michigan State University, (where Leon had attended to learn about his bees) and the other son from Wayne State University in Detroit.

Continued on next page

The family attended the Oak Park United Methodist Church in Flint, Leon having met Mrs. Winegar there and married her there April 13, 1933 and at the Golden Anniversary, they walked down the same aisle in that church and had a renewal of their marriage vows, together with the organ and soloist. We have furnished this church with Root Beeswax Candles for more than forty years.

HAPPY BIRTHDAY Leon and many many more years among the Bees!

PUERTO RICO
A Bee Festival

By Lewis Medina
Apdo. 872
Lares, P.R. 00669

After spending three days in the First Puerto Rican Bee Festival, we got a fair idea of the potential and problems of the beekeeping industry in Puerto Rico.

At present beekeepers are producing about eight percent of the total honey consumption in Puerto Rico, so there is room to grow.

Puerto Rico imports two million pounds of honey each year. Imports are from United States, Central America, Israel and Dominican Republic. Under current laws Puerto Rico could prohibit import honey from foreign countries excepting the United States.

Tito Nieves, organizer of the Bee Festival and member of Puerto Rico's Beekeepers' Association (PRBKA) says that imported honey has a lower price than the locally produced, so that it creates a marketing problem.

Candido Sepulveda, Public Relations official in the PRBKA says that deforestation in the area could cause some problems to them. Farmers are cutting the flower-trees to crop another kind of coffee.

The Festival

The Festival was held for an entire weekend (March 30-31 and April 1st) in the mountainous town of Lares. Why didn't they choose that small town? First, most of the beekeepers are from the municipality.

Second, Mr. Roberto Vazquez Romero, the Secretary of the Department of Agriculture of the Commonwealth of Puerto Rico is also from Lares.

Third, Honorable Justo A. Mendez, Chairman of the Agricultural Commission of the Senate of Puerto Rico is also a Lares native.

The Festival was aimed to educate the people — especially Junior and High School students to get involved in beekeeping. They tried to create or gave attention toward beekeeping and in that they succeed. Every Puerto Rican newspaper in the Spanish language gave ample coverage of the Festival. Attendance however was small, estimated in a couple of thousands only.

Government Help

Senator Justo A. Mendez said beekeeping in Puerto Rico has certain advantages. Since the Caribbean nation is an archipelago it is free from diseases from other countries. The only foreign bees entering the Commonwealth of the United States are the queens from the United States, but those are disease-free. Another advantage quoted is that Puerto Rico is a tropical nation and as such it has the flowers 12 months a year.

Senator Mendez said the Commonwealth of Puerto Rico is granting $100,000 each year to beekeepers to help them to buy equipment and supplies but not queens. The government pays 50 percent of those expenses.

Emiliano Feliciano, a beekeeper from the municipality of Arecibo, says that currently they are using only $25,000 of the government's money — so they had to return $75,000 unused each year. That means there is not too much interest in beekeeping so the PRBKA has a lot of work to convince people about the virtues and advantages of beekeeping.

As a matter of fact the PRBKA has only 300 members. In the 18th and 19th centuries, Puerto Rico was a net honeybee exporter and had thousands of beekeepers.

Senator Mendez says he will introduce legislation so the Bee Festival will be celebrated each year in Lares.

Supplier Exhibition

Ms. Doris J. Pharris, vice-president of Walter T. Kelly Company of Clarkson, Kentucky, was in Puerto Rico attending the Festival.

She told us that her company will establish a terminal in San Juan (Puerto Rico) for faster delivering orders to Puerto Rico, Dominican Republic and the Caribbean nations.

Ms. Pharris left Puerto Rico to give a quick visit to her customers. Angel Fabian a representative of the beekeepers from Dominican Republic was also present in the Festival.

Angel Santiago, chairman of the PRBKA says that all the wax produced in Puerto Rico is being sold to the Walter T. Kelly Company.

The A.I. Root Company sent free catalogs and materials but no representatives. The company has stores in Ohio, Iowa, Texas, Georgia and Pennsylvania.

Book companies sent materials but no representatives, either. Publishing houses in Spanish language were from Costa Rica (Central America), Spain (Europe) and Uruguay (South America).

The only Puerto Rican company with industrial equipment displays was Sanders Company from Aguadilla. The company is a retailer of equipment manufactured in the United States and other nations. The Sanders had been doing business with coffee farmers for nearly 150 years, so they are well acquainted.

Department Of Health's Regulations

We talked to Angel Luis Santiago, chairman of the Puerto Rican Beekeepers' Association. He lives in the municipality of Barceloneta, a sugar cane and pineapple crop area.

He explains that the Department of Health of the Commonwealth of Puerto Rico grants licenses to operate, bottle and sell honey.

The license is free and has to be renewed every two years. Among the requirements to get one, the operator needs a health certificate, a special room for processing honey, equipment made of nonferrous metals to do the job and a place that is clean and hygienic.

Record Bee Hive

Surcos Larenos newspaper (it means in Spanish "Lares' Furrows") showed a photo of professor Tito Nieves taking out a wild honeybee hive in Eastern Puerto Rico that produced 16 gallons of honey.

Bee Queen

Finally on Sunday, April 1st, the beekeepers choose a queen among three beautiful young ladies.

Ms. Milagros Irizarry, a legal secretary from the municipality of Adjuntas became the Bee Queen 1984-85.

Ms. Sandra Torres a student in Lares High School became First Princess and Ms. Sandra Rodriguez a student in Ponce's High School became Second Princess.

EAS-84 Names James I. Hambleton Memorial Award Winner

Charles McKellar, President of the Eastern Apicultural Society, today announced that Dr. Roger A. Morse has been selected to receive the 1984 James I. Hambleton Memorial Award.

The award is presented annually to a research scientist who has accomplished

Continued on next page

outstanding research directly related to apiculture.

Dr. Morse is Professor of Apiculture at Cornell University where he has been a member of the faculty since 1957. His most current research has included projects involving the natural nest, reproduction in honey bees and the spread of Varroa mites in Brazil.

Dr. Morse, who is the author of eight books on beekeeping, will speak and conduct a workshop on judging honey in addition to reviewing his research which led to his receiving the James I. Hambleton Award.

Explaining the honey making process is Lynn Lees of Lexington, Massachusetts (right). Massachusetts Federation of Beekeepers, in conjunction with the Massachusetts Department of Food and Agriculture, exhibited bees, beekeeping equipment and honey products at this year's Boston Common June Dairy Festival sponsored by the dairy farmers of New England. *Photo by:* Diane Baedeker, Massachusetts Department of Food and Agriculture, 100 Cambridge Street, Boston, Massachusetts 02202. (617) 727-3018.

NEW YORK

On Saturday, September 15, 1984 the William H. Miner Agricultural Research Institute in cooperation with Cornell University will be holding a meeting from 9:00 a.m. until 3:00 p.m. at the Miner Center Auditorium in Chazy, New York. Dr. Roger A. Morse from Cornell University will be stressing fall management and winter packing. A honey show is planned so be sure to save some of your honey products for the honey show.

Illinois, Indiana Joint Convention

Paris, Illinois will be the site of a joint convention between the Indiana State Beekeepers Association and the Illinois State Beekeepers Association on September 29, 1984. The meeting will be coincide with the Paris Homecoming and Honeybee Festival and will recess at midday for the annual parade. American Honey Princess, Rebecca Vollmer and Indiana Honey Queen Diana Hainje will be among the celebrities riding in the parade.

The convention and banquet will be held in the First United Methodist Church, which is located two blocks west of the Courthouse Square where most of the festivities will be staged.

The Convention Agenda includes:

10:00 — Dr. Erik Erikson, U.S.D.A. Beelab, Madison, Wisconsin - "Honeybees and Soybeans.

1:00 — Mrs. Christina Mosher Wilson, assistant to U.S.D.A. Secretary, Washington, D.C. — "Honey Promotion and Marketing"

1:30 — Dr. Orley Taylor, University of Kansas — "The Africanized Bee

3:00 — Dr. Jim Tew, Agricultural Technical Institute, Wooster, Ohio — "A.T.I. Programs"

3:30 — Mr. Chuck Dadant, Dadant & Sons, Hamilton, Illinois — "The State of the Industry"

For more information call Gene Killion at 217-463-6270.

FLORIDA Beekeeping Course

A Beekeeping Course is to be held at Hillsborough Community College, Dale Mabry Campus, Tampa, Florida, beginning September 22 through October 27, 1984. Saturdays from 9 until 1 o'clock.

This course is designed to introduce the beginner to the basic principles and procedures of handling the honeybee colony. Topics will include: installing package bees; management for honey production; dividing colonies; pollen trapping; queen rearing for the hobbiest; bee diseases and honey extraction.

An enrollment fee of $13 per person is charged.

For further information, contact Hillsborough Community College, P.O. Box 22127; Tampa, Florida 33622.

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Classified rates: 49 cents per word, each insertion, payable in cash in advance. Each initial, each word in names and addresses, the shortest word such as "a" and the longest word possible for the advertiser to use, as well as any number (regardless of how many figures in it) count as one word. Not less than 10 words accepted. Copy or cancellation orders MUST be in by the 1st of the month preceding publication. Send classified ads to the A.I. Root Company, Advertising Dept., GLEANINGS IN BEE CULTURE. Box 706, Medina, Ohio 44258-0706 **Note: BLIND ADS: Any ad sent in that does not contain the seller's Name and Address within the ad, will be charged an additional $6.50 per month.**

MAGAZINES

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

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

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

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

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

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

BEE CRAFT — Official (monthly) magazine of the British Beekeepers Association. Contains interesting and informative articles. Annual Subscription $5.10 (Surface mail) and $7.10 (Airmail). The Secretary, 15 West Way, Copthorne Bank, Crawley, Sussex, RH10 3DS. TF

INDIAN BEE JOURNAL Official organ of the All India Beekeepers' Association, 817, Sadashiv Peth, Poona 411030. The only bee journal of India Published in English, issued quarterly. Furnishes information on Indian bees and articles of interest to beekeepers and bee scientists.

Annual subscription postpaid in foreign countries: For individuals US $7.00 for institutions, companies and corporate bodies US $10.00 or it's equivilent, to be received in advance by IMO or bank draft, payable in Poona (India). TF

WANTED

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

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

Wanted: Hardworking Full-time professional queen breeder. Must have many years experience in all phases of queen production as well as other general apiary work. South Atlantic state location. Salary negotiable. Contact: Huck Babcock, P.O. Box 2685, West Columbia, SC 29171. Phone: 803-256-2046.TF

WANTED: Honey and Wax exchanged for bee supplies and cash or workeys. Hubbard Honey 904-245-1106. 9/84

FOR SALE

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

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

For Sale: clean, fresh, dry, Bee Pollen. $6.50/pound. You pay shipping. Honeycomb Apiaries, R.R. 3, Box 74, Wrightstown (Kaukauna), Wi. 54130. Ph: (414) 532-4314. TF

FOR SALE: Bee Operation on 15 acres. 14' x 60; wood frame building on cement. Also 20' x 30' storage shed. Excellent line of equipment plus 500 hives. 25 yard sites available mostly on Sweet Clover. Call 873-5900, Renaud Realty, Box 416, Tisdale, Sask. SOE ITOTF

FOR SALE: 200 Colonies in 1½ stories after Sept. 1st. Located in South Central PA. NO JUNK. Pollination Accounts Available. Max Griffie 717-776-5797. 9/84

FOR SALE — 50 copies of American Bee Journal and Gleanings In Bee Culture from the last 24 years. Call 714-723-4521. AB 9/84

Granulated sugar for your bees. 25¢ per pound. 5,000 pounds or more 20¢ per pound. Al Dixon. Phone 315-592-9581. 11/84

BRAND NEW JARS

Beekeepers I have 2 semi-loads of 2½lb. and 1½ lb. glass jars left to sell. These are excellent for honey. These jars look like quart jars and pint jars in shape. Local Amish are using them to can with. They are a heavy-duty jar. They all have plastic lids with them.

Prices

1-50 Cases	**Truck Prices**
2½ lb. $2.25 per doz.	**2½ lb. $1.85**
1½ lb. $2.00 per doz.	**1½ lb. $1.65**

ZONE #3 ADD POSTAGE

DEALERS WELCOME

WILLIAM WILSON
Rt. 1, Fredericktown, OH 43019
Ph: 614-694-2318

9/84

For Sale: 300 two story colonies, Queen rearing outfit, 69 two ton truck, Kelly loader, good honey outlets. Best offer. Andrew Hutchison, P.O. Box 6993, Boise, ID 87707 TF

FOR SALE OR TRADE 500(s) colonies of bees at $55.00 each. Will trade for honey or beeswax. Phone (512) 251-3823 or 836-1675.
PLHH 10/84

Business For Sale: 130 2-story colonies, Cowen Silver Queen Uncapper, Hubbar 24 Frame Extractor, 100 drawn deep supers, 40 deep supers with foundations, $9,000. Paul Miller, Adrian, MI 49221. Ph: 517-265-5410 or 517-265-6395. 9/84

SALE — 140 deep super 4 box hives. 30 frame extractor, pump, clarifier, wax melter, frame building equipment. J. Hayworth, Box 526, Palisade, Colo. Phone: 303-464-5388. 9/84

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

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

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Mr. Jerry Hayes, Manager of the Dadant Branch in Wayland, Michigan is shown presenting Ward Nichols' Bee Yard to Dr. Dan Garrison, Director of the Agricultural Technical Institute, Wooster, Ohio and Dr. James E. Tew, coordinator of the Apiculture Program. The printing will be exhibited in A.T.I.'s new beekeeing facility to be constructed at Wooster, Ohio.

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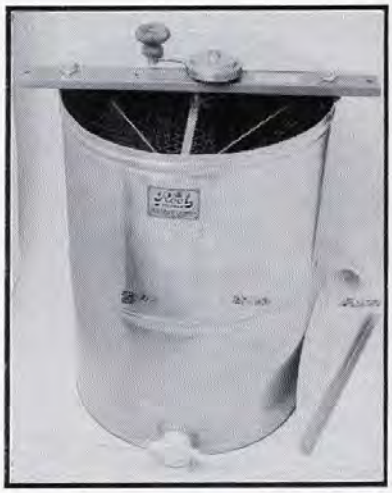

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