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M00564	_ \$530.00

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John ...





Dick . . .

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Subscription Rates; United States subscribers, one year, \$11.20; two years, \$21.70. Single copy \$1.50. Other countries including Canada, Pan American countries and Spain (U.S. Currency only). \$5.75 per year additional for postage. Published monthly. Discontinuance: Subscription stopped on expiration. Change of Address: Give your old as well as the new and print the name to which the journal has heretofore been addressed. Remittance should be sent by post office money order, bank draft, express money order or check.

Articles are solicited. Stamps should be enclosed to insure return of manuscript to author if not printed.

Opinions expressed by the writers in these columns are not necessarily the opinions of the editors.

Microfilm copies available at University Microfilms, Inc., 300 North Zeeb Road, Ann Arbor, Michigan 48103.

Advertising rates and conditions will be sent on request.

Advertisers' Reliability: While the publishers do not guarantee advertisements in this journal, over the years very few complaints have been received.

Second Class Postage Paid at Medina, Ohio and additional offices.

Phone: (216) 725-6677

POSTMASTER: Send Form 3579 to: 623 West Liberty Street P.O. Box 706 Medina, Ohio 44258-0706

GLEANINGS IN AUG. '86 BEECULTURE

Since 1873

(ISSN 0017-114X)

Vol. 114, No. 8

Created To Help Beekeepers Succeed

113 Years Continuous Publication by the Same Organization

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COVER... The other side of this mellow marriage of honey bee and *Centaurea solstitialis* blossom is the dark side of agricultural weed control. These plants are becoming a nuisance to Southwest row crop farmers because of developing resistance to herbicides. Life is never simple. Larry Goltz submitted this provocative photo.

INSIDE IN AUGUST

School starts soon and we've got lots of information this month on the how, what and why of talking to school kids about bees, beekeeping and beekeepers. We've put together a pull-out feature article loaded with sources of information if you want to get even more material, and a true/false quiz that has proven a hit with everybody from 2nd graders to Legislators. It's yours to copy, use or expand.

But kids aren't the only people that can learn about bees, so our other feature article, "A Point of Reference" deals with one person's experience learning how bees orient themselves and communicate this information in the hive.

Of course, our columnists cover a variety of topics this month, including teaching and other subjects. Basic information is available about Wax Moth Control and Frame Construction, too. Research Review covers mites, pollen and honey plants. A real mixed bag — Inside in August.

Coming Next Month: With September comes thoughts of harvesting and all the tricks of fall management. Preparing for overwintering and hive ventilation are also two of the subjects covered. We'll look at a few fall honey plants and a little-looked at collectors item — Bee Stamps. Harvesting, Fall Management and the best from our regulars — next month in Gleanings.□

	"IT I	AVS TO I	BUY OUAT	ITY"	
		AID IUI	JUI QUAL		
	ITALIAN	N PACKAGI 1986 F	E BEES & C PRICES	DUEENS	
In Lots Of	Queens	2 Pound & Queen	3 Pound & Queen	4 Pound & Queen	5 Pound & Queer
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11-99	5.25	17.50	22.50	28.50	34.75
100-up	5.00	17.00	22.00	28.00	34.25
	Mark Qu	eens35	Clip Que	ens35	
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	PAR	CEL POST SH	IPPING CHAR	GES	
1-2 lb.	pkg\$4.24	2-2 lb, p	kg\$5.50	3-2 lb. pkg.	.\$7.48
1-3 lb.	pkg 4.70	2-3 lb. p	kg 6.96	3-3 lb. pkg.	. 8.10
1-4 lb.	pkg 6.14	2-4 lb. p	kg 7.68		
1-5 lb.	pkg 6.48	2-5 lb. p	kg 7.94		

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If you are moving, please fill in the form below so we can process the change without undue delay. *Also*, if you have 2 addresses during the year (i.e., winters in Florida and summers in Connecticut) let us know which months you spend where and we can pre-program your address change so you will find *us waiting* when *you move* — No Delays, No Fuss!

NAME				1								
OLD ADDRESS: Street												
City	Stat	te					0		Zip	,		
NEW ADDRESS: Street	1											1
City	Stat	te		_	_		_		Zip	,	_	_
FOR TEMPORARY CHANGE:	-											
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City	Sta	te	-						Zij	p		_
Circle Appropriate Months:	J	F	М	A	М	J	J	A	S	0	N	D

THE INNER COVER

Hallowed Halls — Part I. A few weeks ago I had the opportunity to spend a couple of very full days wandering around the Halls of Congress. There is no way I could squeeze all of that trip into a single column, so I'll share it a little at a time.

It started at the airport. I landed about 6 p.m. with nearly everybody else visiting D.C. that day, requiring a 25 minute wait for a cab. However, had I known what was in store, I would have gladly waited a few more minutes.

When the airport cop finally got me a cab, it looked driverless because I couldn't see anyone behind the wheel. I hopped in anyway and a squeaky voice from low in the front seat said "Where to, Mistah?" I peered over the top of the seat and sure enough, peering through the steering wheel was the driver. I gave him the name of the hotel and we were off like a shot. After about 3 blocks he turned, looked up and said "Where is hotel, please?" I told him I didn't know so he picked up a book and told me to find the address. I glanced at the speedometer about this time -62 mph through downtown D.C. I began to look for the address.

When I finally found it, he hissed something low under his breath, looked over his shoulder and did a u-turn at 57 mph across 6 lanes of rush-hour traffic. Great segments of my life passed before me for a moment, but soon the honking, screeching tires and cussing faded in the distance.

It was then I asked him how long he had been doing this for a living. His reply was "What time, please?". I changed the subject. So, "Where are you from?" I queried. "Cambodia," he said. "A-numba-one cab driver in Cambodia, too!" he added. After the u-turn incident our speed never went below 50 and he only ran 2 red lights - , "American drivers" he kept muttering.

We did make it to the hotel, probably

breaking all existing international records. I paid the man, but I gave a verbal tip to the couple waiting for my cab - take the next one, you'll live longer!

Welcome to Washington!!!

Duffer Update. When I last heard from Duffer he was busy feeding his 2 newly acquired colonies because the flow hadn't started yet. He tried all the usual syrup feeders — boardman, plastic pail, Miller and internal. He also tried several of the commercial protein



supplements. His greatest success feeding syrup was with the plastic pail placed above the active super, but this was closely followed by the Miller type. He said the pail & Miller were the easiest and most efficient to use because they took the least amount of time to check and refill. Like most of us, his time is limited and *easy* often takes precedence over *everything else*. As far as protein supplements were concerned, he was unable to determine the best for spring build-up, but he had some definite opinions as to which was consumed the fastest. He tried several types — Wheast, Beltsville, a new French diet and Touratine. His bees certainly liked the Wheast better than the rest when given a choice. But as he said, he couldn't say which provided the best build-up. He's skeptical of the available data, so he will experiment with these again next spring when he has more colonies to work with.

Duffer had also been building some equipment. Like all beekeepers, spring is the season of greatest optimism, and I think he went a little overboard in his preparations. He built a shed full of supers, all made from his scrap lumber pile. Actually, his woodworking skills are pretty good and he made brood, medium and shallows with equal dexterity.

Frames and foundation were a different story, though. After several attempts, he gave up trying to make frames on his equipment and decided to purchase some commercially available stock. Assembly wasn't difficult, but when faced with the different foundations available — it was back to the books. He made most of the right choices — cross wired for brood and unwired for the rest. He used a hand embedder for the unwired sheets and managed to not destroy most of what he bought.

He also purchased some plastic foundation, and to date, his bees seem to have accepted it with the same enthusiasm as the real stuff. He said time will tell, but he likes using it - again because of the time saved.

In his own way, Duffer has hit on one of the most common axioms in beekeeping. You do what you gotta do - any way you can. It may not be the most commonly advised method, but if it gets the job done to your satisfaction - its the best method there is.

And don't let anybody tell you different!

Monthly Honey Report

August 1, 1986

The following figures represent current prices reported by our contributors. 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

Containers Exchanged	1	2	3	4	5	6	7	8	R	A
			-			-		-		
60 lbs. (per can) White	43.00	36.70	-	30.60	50.00	36.00	37.25	45.00	30-50.00	38.62
60 lbs. (per can) Amber	40.00	32.83	-	25.20	41.45	33.00	36.00	42.00	25.20-47.50	35.88
55 gal. drum/lb. White	.57	.56	-	.52	.46	.59	.60	.58	.4866	.56
55 gal. drum/lb. Amber	.54	.52	-	.42	.59	.54	.55	.54	.4263	.53
Case lots - Wholesale						4				-
1 lb. jar (case of 24)	29.13	25.60	-	24.98	25.20	23.55	25.00	30.12	22.08-35.04	26.30
2 lb. jar (case of 12)	28.47	25.50	-	22.75	23.39	23.45	31.15	26.70	21-34.50	25.77
5 lb. jar (case of 6)	30.83	26.25	-	24.45	26.18	21.53	25.30	28.35	20.00-34.00	26.50
Retail Honey Prices										
1/2 lb	.97	.87	-	.78	.94	.89	.85	.96	.65-1.10	.89
12 oz. Squeeze Bottle	1.43	1.36	-	1.26	1.25	1.32	1.06	1.35	1.00-1.59	1.32
1 lb	1.59	1.57	-	1.51	1.41	1.49	1.55	1.44	1.29-1.79	1.52
2 lb	2.73	2.83	-	2.82	2.61	2.77	2.76	2.76	2.49-3.69	2.75
21/2 lb	3.53	3.81	-	-	3.15	3.22	3.41	3.56	3.19-4.50	3.50
3 lb	4.00	4.40	-	3.22	3.82	3.87	3.49	3.45	3.15-4.95	3.77
4 lb	5.15	4.90	-	5.89	4.98	4.55	4.75		4.75-5.89	4.99
5 lb	6.50	5.93	-	5.75	5.93	5.39	5.37	5.75	5.25-7.00	5.88
1 lb. Creamed	2.00	-		1.52	1.66	1.45	1.48	1.51	1.35-1.75	1.61
1 lb. Comb	-	-	-	+	-	-	-		1.75-2.52	2.21
Round Plastic Comb	2.13	1.99	-	1.85	1.50	1.87	1.63	1.65	1.50-2.50	1.85
Beeswax (Light)	1.18	1.15	-	1.18	1.00	1.00	1.10	1.30	.95-1.30	1.12
Beeswax (Dark)	1.05	1.04		1.00	.90	.95	1.00	1.15	.90-1.15	1.02
Pollination (Avg/Colony)	22.50	23.50	-	27.50	12.00	26.10	22.00	25.00	10.00-27.50	21.56

New Features on Honey Report Graph

We have rearranged the regional map used for our monthly report. There are now 8 regions instead of 9. We are trying to make these regions more uniform in nature, but as you are aware, conditions can vary across the street let alone over several states.

On the far right hand side you will see two new columns. The first, labled "R" is the range of prices reported from all contributors – lowest to highest. This will give you an idea where you stand nationally. The second column, labeled "A" is the average price of a particular commodity across all regions. Example: the range in price of a 1 pound jar of honey sold retail is 1.29 - 1.79 and the average price across the country is 1.52. In the comments section you will see a figure called the "Price Index". This figure is only a descriptive statistic that compares all regions to the highest region of the month.

Example: Region 1 has a price index of 1 this month and remaining regions are compared to that index.

Note: These figures are only as good as the data sent in by our reporters. If you believe the numbers here are not indicative of your area please contact us - we can use your imput.

Region 1

Price index 1.00. Sales steady to slow, with new crop demand increasing slightly. Moisture adequate for summer flow.

Region 2

Price index .90. Sales steady with prices mostly unchanged. Most colonies are strong but waiting for later flow. Moisture adequate to low.

Region 3

No Report.

Region 4

Price index .65. Sales steady to improving. Crop potential good, but uncertain due to uneven moisture.

Region 5

Price index .92. Sales steady, but slow in northern region. Production slow in all areas with feeding still required in many areas.

Region 6

Price index .81. Prices and sales increasing. Most areas reporting good production with good potential fall crops.

Region 7

Price index .88. Sales slow, but new crop expected to help. Excellent conditions for new crop production with good moisture and crop plants.

Region 8

Price index .93. Sales increasing with tourist season. Most areas in good shape with good production. Government giveaways hurt sales in some areas.





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Understand the seller's return and refund policy including the allowable return period and who pays the postage for returned merchandise.

> If you should have a problem with your order or merchandise, write a letter to the seller with all of the pertinent information. Telephone complaints should be followed up with a letter of confirmation. Keep copies of all correspondence.

If you have thoroughly followed up in writing with the seller on your problem and still are not satisfied, contact the consumer protection agency in the seller's state or your local U.S. Postal Service.

Dear Editor:

A good friend of mine recently asked if I could find for them a "swing door on an entrance bar". In 30 years of beekeeping I've never heard of it. Can anyone help me out?

> Sister Jane Patricia 9 Chestnut Street Amherst, MA 01002

Dear Editor:

Steve Taber's article, "The Queen Excluder", in the June issue is confusing. I would like to attribute my confusion to my inexperience in beekeeping, but I have read and reread this article and it still reads like a stream-of-consciousness novel.

For example, what does Mr. Taber mean when he says: "When putting on supers of foundation, always place them UNDER the excluder immediately above the brood"? He reemphasizes this for comb honey supers.

What, then, is the purpose of the excluder? Do I want brood in my comb honey? I think not. The technique he mentions involving allowing the queen to lay in the supers and then moving frames down into the brood nest obviously entails equaldepth hive bodies and supers, but also seems too labor-intensive for very many hives. The same goes for the so-called "Taber Technique", which does not seem to be wellexplained at all, much less justified.

I have read and enjoyed Mr. Taber's articles in the past, but this one seems to have little organization.

> Jeffrey S. Anderson Box 124 Hollytree, AL 35751

Dear Editor:

Higher Prices for Honey? If the demand for honey were increased, the price would rise in accordance with the immutable, natural law of supply and demand.

The demand for honey can be increased in several ways: 1) by suggestion, using the hypnotic powers of advertising through the various media of newspapers, radio, magazines, TV, etc.; 2) by using various marketing methods such as convenience of accessibility in stores, occasional sale price, sampling, etc. and 3) by education about honey's virtues as an economical and tasty food or it's use as a cooking and baking ingredient.

Unfortunately, the need to merchandise honey is constant because of many competing foods seeking the buyer's favor. The unique qualities of honey can be found partially and indirectly through the purchase of jams, jellies, syrups, spreads, etc. So selling must not stop. When we stop to rest from our promotion, the competition will pass us.

While centralized market promotion is an excellent idea, it shouldn't be the only effort. Every beekeeper should do his share of promotion. The total effort from many can add to a giant swell which could keep demand high, supplies low and prices high enough to reward the honey producers.

William A. Gant Richmond, Michigan 48062

Dear Editor:

In May, 1944, I was at Anzio Beach-head with the 1st Armored Division. I was dug in on an Italian farm. He wasn't there of course, as the area was a battle front. This Italian had six hives of bees in log hives. One day one of my buddies asked me if I didn't know something about bees? I said yes. One of the hives had swarmed and I put it in a 105 artillery shell box. The next day another one swarmed but this one was in a tree and I had to climb up and saw off a limb that they were on. I asked for a volunteer to take the bees as I handed them down. One boy finally agreed to take them if I would assure him they would not sting him. I told him if he would do as I said. they wouldn't sting. I assure you that, when he took that large swarm of bees, his face was as white as a

Continued on Next Page

MAILBOX... Continued from Page 381

sheet. Non-hiving bees isn't so unusual but right under the German guns it is. We attacked from where we were May 23rd, 1944 and three weeks later I made a trip back to our old area and those two hives were going like a house-a-fire.

> T. O. Deason 205 N. Louisville Ave. Sylacauga, AL 35150

Dear Editor:

The Southern States Beekeeper's Federation has been serving beekeepers for fifty-eight (58) years. Although, technically, the Southern States Beekeeper's Federation is comprised of 17 states, the SSBF, through its activities, has served all beekeepers in all states.

Most recently, the SSBF supported and lobbied for the honey loan program and lobbied for the honey promotion act. In fact, the fact that the promotion act is even being voted on this year is due in large part to SSBF efforts. The SSBF was responsible for the "Buzz the Schools" program which has been distributed nationwide and has been adopted as a part of the elementary school curriculum by a number of school systems. The "Save the Bees" program included a video tape which graphically demonstrated the importance of honey bees in the food chain and also included printed material for use by radio stations and newspapers which promoted correct and safe use of pesticides. This program, which was developed by the SSBF, was sent to TV and radio stations and newspapers all across the country. In fact, some TV stations are still running the video tape as public service announcements. The SSBF has also worked for the unification of the beekeeping industry by sponsoring for the past two years an industry wide meeting in Washington attended by representatives of every major bee and honey industry organization in the U.S. To the best of my knowledge, this was a first - a formal meeting where all industry leaders had an opportunity to sit down together and discuss industry problems and try to agree on mutually satisfactory ways to work toward solving them.

The above is but an example of what the SSBF has done most recently in service to the beekeeping industry. All of this has been accomplished without benefit of any regular income or outside financial support. The Board of Directors of the SSBF, at it's November, 1985 meeting, decided that the time had come when they needed to ask for help. The Board voted to ask each of the 17 member states to make a voluntary annual contribution of \$100.00 to the SSBF. It should be stressed that this is intended as voluntary and that neither payment nor non-payment would have any effect on membership in the SSBF.

The North Carolina State Beekeeper's Association Board of Directors voted at its January 1986 meeting, to pay \$100.00 to the SSBF immediately and to plan to make this an annual contribution. To date, to the best of my knowledge, North Carolina is the only state association to make this commitment. As president of the North Carolina State Beekeeper's Association, I would like to challenge each of the other 16 SSBF member states to make the same kind of commitment. The dollar amount is immaterial, be it \$10.00 or \$15.00 or \$100.00. The important thing is to make a continuing commitment. I would also suggest that states outside the SSBF area also consider making a contribution to the cause since many of the SSBF programs benefit beekeeping and beekeepers nationwide.

Those wishing to accept this challenge should make their checks payable to the SSBF and mail them to Dr. John T. Ambrose, Treas., SSBF, 1403 Varsity Drive, Raleigh, NC 27606.

Lawrence H. Bixby P.O. Box 348 Cullowhee, NC 28723

Dear Editor:

Historical Roots of the Killer Bee Scare: The Killer bee phenomenon is a logical product of basic American fears. Only from a historical perspective can beekeepers and those who love the art see this and realize that the bad press given honey bees during the last 10 years has little or nothing to do with the insects themselves. The larger picture is the growing awareness of Americans that the U.S. is being sucked into world politics. A unique quality of American culture until World War II was the belief America was isolated, geographica and morally, from the bloody European political battles. We had taken sides in World War I, but that was our decision, Americans could reason.

It was no mistake that the first sightings of flying saucers took place just two years after the end of World War II at a time when the Soviet Union was drawing the U.S. deeper and deeper into European and world politics.

Flying saucers and killer bees are much alike in that both represent unknown dangers with foreign overtones. The saucers come from alien territory in space and represent powers beyond the control of man. The killer bees are of this earth, but they come from foreign lands. They, too, are beyond the immediate control of man.

The foreign connection is important because a strong thread of American history has been that the English Puritans entered into a covenant with God to deliver them from Old World woes. The historian, David W. Nob (1965) said:

The concept of a Biblical commonwealth was replaced in the Eighteenth Century by the Englightenment's belief that the society of the English colonies rested on natural principles and that the new republic that emerged from the American Revolution had a covenant with nature which freed it from the burdens of European history as long as its citizens avoided the creation of complexity.

Of course, the U.S. in the 20th Century is nothing but complex. Somehow we sense that we have breached our covenant. Nuclear fallout, intercontinental missiles, worldwide military involvement and instant communications anywhere are symptoms of the increased involvement with the European political morass which our grandfathers sought to avoid.

This view is not likely to be found

Continued on Page 415 GLEANINGS IN BEE CULTURE

BOOK REVIEW

6

PLANTS AND BEEKEEPING

By F.N. Howes

IBRA has acquired from Faber & Faber the residual stock of the latest edition of PLANTS AND BEEKEEPING by the late F.N. Howes. Published in 1979, this edition has a foreward by Dr. Eva Crane and additional material by Dr. J.B. Free on oilseed rape, now an important crop for bees.

In her forward, Dr. Eva Crane writes:

"Many people will be pleased to have Dr. Howes's book in print again, and its reissue will enable beekeepers of a new generation to have copies of their own. If they know it at all, it is likely to be a copy from a library, or one lent unwillingly by its owner - it is such a useful book to refer to that no one would care to lend it for long. It is one of the very few books of which I need three copies . . .

"The idea of *growing* plants for bees is represented in nearly half of Dr. Howes's introductory sections, and this idea has taken on a new significance in the past few years, when the concept of selfsufficiency has become a popular aim ..."

The book contains three Sections: Section 1, 'Plants and the beekeeper', covers topics such as nectar secretion, honey, pollination, planting bee forage, apiary hedges and windbreaks, honeydew and propolis; Section 2 describes the major honey plants of Britain and Ireland; and Section 3 lists other plants visited by the honeybee.

PLANTS AND BEEKEEPING (paperback edition only) is available from its sole distributor, the International Bee Research Association, Hill House, Gerrards Cross, Bucks SL9 ONR, UK, price '9.00 U.S., post paid.□

NEW BEEKEEPING DICTIONARY

A new Dictionary has been added to the International Bee Research Association's Series DICTIONARY OF BEEKEEPING TERMS WITH ALLIED-SCIENTIFIC TERMS. It is Volume 9: English-French-Japanese, 187 pages, and it is available direct from IBRA, Hill House, Gerrards Cross, Bucks SL9 ONR, UK, price \$14.00 U.S., post paid.

This volume was published in 1985 by the Institute of Honey Bee Science, Tamagawa University, Japan, in collaboration with IBRA, and was available for use at the 30th International Apicultural Congress in Japan in October, 1985. The dictionary includes both Japanese characters and their transliteration into the Roman alphabet.

- Vol. 5 English-French-German-Spanish-Russian (1977)
- Vol. 6 English-Finnish-Hungarian (1978)
- Vol. 7 English-German-Dutch-Danish-Norwegian-Swedish (1978)
- Vol. 8 English-French-Italian-Spanish-Portuguese-Romanian (1979)

Dr. Eva Crane is the General Editor of this series of Dictionaries and the above volumes are available from the International Bee Research Association, price 10.00 U.S. each, post paid. The volumes can be used in conjunction with each other for greater flexibility in translation.





Maintaining Bee Escapes

Clean and unplugged is essential for easy and efficient bee removal during harvest. To clean escapes that have been propolized or otherwise blocked, soak them in rubbing alcohol overnight. Next day, (or as soon as you can get back to them) brush out the goo and debris with an old toothbrush and warm, soapy water. The alcohol can be reused by pouring it through a coffee filter to remove any accumulated debris.

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CARON TO PANAMA

Dewey M. Caron, Professor of Entomology, University of Delaware has been awarded a Fulbright grant to study Africanized bees in Panama, the Board of Foreign Scholarships and the United States Information Agency announced recently.

Dewey will leave shortly after EAS for 7 months of study. He will be associated with the Facultad de Agronomia of the University of Panama in David. David is in the westernmost Province of Panama adjacent to the Costa Rican border. It is the major agricultural area of Panama.

Africanized bees first appeared in Panama in early 1982 and spread quickly across the country. Dewey will coninue to monitor their progress and the nanges the bee has forced upon beekeepers in Panama. In addition he will study basic reproductive biology of Africanized bees.

Dewey is one of approximatley 2,500 Americans being sent abroad for the 1986-87 academic year under the Fulbright exchange program. Established in 1946 under Congressional legislation introduced by former Senator J. William Fulbright of Arkansas, the program is designed "to increase mutual understanding between the people of the United States and the people of other countries". Scholarships are awarded to American graduate students, teachers and professors to study, teach, lecture and conduct research abroad, and to foreign nationals to engage in similar activities in the United States. Individuals are selected on the basis of academic and professional qualifications, plus their ability and willingness to share ideas and experiences with people of diverse cultures.

Through the Fulbright Program,

scholarships have been awarded to American students, teachers and scholars to study, teach, lecture and conduct research abroad and to foreign nationals to engage in similar activities in the United States. More than 150,000 persons have participated in the Fulbright Program since it began 40 years ago, many of them rising to positions of leadership in government, academia, the media, and the arts.



The Fulbright Program is funded and administered by the U.S. Information Agency under policy guidelines established by the Board of Foreign Scholarships, a Presidentially appointed body. Financial support for the program comes from U.S. Congressional appropriations and from the governments of 27 other countries.

The University of Delaware has a cooperative agreement with the University of Panama. Several students have pursued graduate degrees in the U.S. and faculty from both countries have been exchanged over the past few years. \Box

REFERENDUM UPDATE

By now you are probably aware that the Honey Research, Promotion and Consumer Information Program referendum has been voted on and passed by a comfortable margin. Although there was some confusion over who should and shouldn't get ballots, those that were able to vote have begun the process of Industry Self-Support.

The next few weeks will be filled with organizational activities required to manage a program of this size, most of which is being handled by the American Beekeeping Federation.

We contacted Frank Robinson for his thoughts on what happens next. He reported that the 20 leading production states have appointed their representatives, along with 16 others. The remaining 14 states are in that process now. Once these people are able to meet (60-90 days from July 3) they will appoint a nominating committee who will then nominate the members of the National Honey Board. By the way, Board Members must undergo a security clearance by the FBI.

When the Board is formed, the first act will be to develop a budget which will be submitted to the Secretary of Agriculture. Once this has been done, the assessment program proper can begin.

During the interim, they are operating on funds donated by the Stoller Honey Co. in Latty, Ohio. Frank said that if you wish to contribute to this tax deductible fund, contact him at this address:

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Q. Is honey made darker by being stored in dark brood combs? Duane Waid, Interlaken, NY.

A. Mr. John D. Bacon, a beekeeper in Auburn, Michigan, arranged three different extracting supers so that each contained four old dark combs and five light combs, or vice versa, alternating the light and the dark combs in each super. After they had been filled by the bees he first extracted the honey from the light combs of each super, allowed the extractor to drain, then extracted the honey from the dark combs. This was done on two separate occasions, once in late summer and then again in the fall. There was no difference in the color. Mr. Allen Dixon, veteran beekeeper of Hannibal, NY, performed the same experient, bottling samples of honey from th dark and light combs in identical jars, and I could see no difference of color. The honey was in this case amber. Whether very light honey stored in dark brood combs would suffer no change of color has yet to be tested, however. - Richard Taylor

Editor's Note:

Prof. G. F. Townsend, in 1972, made the following statement:

Preparation of a quality product starts in the bee yard. Too often, in the hurry to facilitate the colony operation, the effect on the end product is neglected. Honey should, if at all possible, be produced in honey supers and not in brood combs. The use of brood combs for honey will increase pollen content of the honey, thus leading to problems when the honey is filtered. Honey stored in combs darkened by old pupa cases will tend to pick up some of the pigment and become darkened. The darkening takes place very rapidly when the moisture content of the honey is quite hight. This occurs with nectar which often has a moisture content of 60% or more when it is freshly brought in.

.....

August 1986

Q. Is there a good method of producing propolis? Walter Lubaczewski, Sellersville, PA.

A. There seems to be an increasing interest in propolis among people who suffer from hay fever and similar respiratory allergies. Some of my customers mix it with comb honey and claim great benefits. I know of no special way of producing it, although it is well known that Caucasian bees are heavy propolizers.

- Richard Taylor

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Q. How can honey and extracted honey be stored so that it doesn't granulate? Jonas Hershberger, Sullivan, OH.

A. Most honeys granulate fastest at about 57° F., less readily at temperatures above and below that. Extracted honey usually granulates more readily than comb honey. Granulation is retarded, but not prevented, by storing honey in a warm room. It should not be stored near a source of heat, as this will darken and degrade it. Comb honey, and sometimes extracted honey can usually be kept relatively free of granulation by storing it in a good freezer. — Richard Taylor

......

Q. Sometimes the bees, instead of drawing out the foundation, chew it up. How come? Bert Gildersleeve, Hector, NY.

A. Bees chew the foundation when there is a dearth of nectar. Even newly hived swarms, which normally draw foundation out beautifully, cannot do so when there is no incoming nectar. They are especially apt to attack the foundation where they detect embedded wires, and sometimes the entire sheet must be replaced. The problem can be avoided by feeding sugar syrup until a nectar flow resumes. — Richard Taylor

.......

Q. Is it okay to leave empty supers on the hives all winter, with a divider board and a few holes between the supers and the winter stores down below? Wayne Anderson, Dyersburg, TN.

A. This can be done if you leave just one small hole in the divider board, sufficient for the bees to pass through it one at a time, so they can go up and lick the combs dry. If you leave a larger hole, then the bees sometimes make their winter cluster in the supers, and starve. If you leave no hole at all to give the bees access to the supers, then you are apt to find ant nests in the supers or, worse, wax moths.

- Richard Taylor

.......

Q. Do I need two hive bodies for each colony for winter stores? Wayne Anderson, Dyersburg, TN.

A. I would think one and a half story hives would be sufficient for your latitude, but you should get the advice of experienced beekeepers there. What counts for winter stores is not so much the size of the hive as the amount of honey left in it in the fall. If the bees have stored the late honey in supers and these are all harvested, leaving little honey down below for the bees, then it will not do them any good to have a big hive. That holds, of course, no matter where one lives.

- Richard Taylor

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Q. I am an apiary officer in Belize and work closely with the local beekeeping Co-Op. A present concern of mine is honey quality. Someone in the past purchased a refractometer but lost the directions on using it and I fear it is being used incorrectly. It is an ATAGO brand where a small sample of honey is applied to a smooth glass, the lid is closed, held up to the light, and moisture content read off the scale. There is no use being made of the thermometer on the instrument. I would appreciate a prompt reply as we are in the midst of a honey flow here and are making deci-

Continued on Page 391

AMERICAN BEEKEEPING FEDERATION'S 1986 4-H ESSAY WINNING ENTRY

By FRANK ROBINSON

The judges have announced that the top three winners in the American Beekeeping Federation's 1986 4-H Club Essav Contest have been selected. Winner of the \$250.00 first prize was Lowell Jones of Dozier, AL, A winner for this district in the 1985 Essay Contest, fourteen year old Lowell's essay was selected as the top of the thirty-four entries received. Very active in 4-H Club projects, Lowell is the son of McNeil and Ivey Jones of Dozier, Al.

A WORLD WITHOUT HONEY BEES

Can you imagine a world without Coke or Pepsi? Perhaps not, but it is a fact that without honey bees there would be no kola nuts to flavor these products.

"Well," you might say, "we could drink orange juice or lemonade instead." Probably not, because without honey bees our supplies of these citrus fruits would be drastically cut. The object of this paper is to present a picture of the world without honey bees, and these are just a few of the important consequences that would result.

The world did not just recently acquire the services of the honey bee. For

many centuries it has been darting about, largely unnoticed, carrying out its purposes in the scheme of nature. It is believed that honey bees became a pollinating agent shortly after

flowers came into existence. History tells us that honey bees were cultivated by the Egyptians as early as 3000 B.C. The early settlers in each part of the New World carried bees with them, and for more than a hundred years honey bees have lived in all five continents.

These insects that have been performing vital services for mankind throughout most of the world now face 388

some threats to their existence. There are a number of diseases that can spread from hive to hive and destroy many colonies of bees. The flood of imported honey to this country is also forcing many domestic beekeepers out of business. This will hurt agriculture in general in this country, because there will not be as many bees available for pollination. However, overshadowing all other problems is the continuous

and intensive hazard of chemical poisoning. This has been brought about by the necessity of controlling pests in agricultural crops.

When honey bees collect nectar and pollen from flowers, they contact any pesticides deposited on the plants. Many of the pesticides used today are capable of killing the larvae at all stages and also the adult bee. In the worst cases of pesticide killing, the entire hive may be killed.

Honey bees are also threatened by lack of knowledge and understanding of their importance. To many people they are little more than pests that occasionally threaten to sting. Because of this many people are not careful in their use of pesticides to try to minimize the danger to honey bees.

Let's look into the future and pretend

that the worst possible fate has befallen the honey bee. It has become extinct. What changes do we see in the world?

We find a shortage of many of the agricultural crops that feed

the world; such as apples, pears, cherries, sunflowers, strawberries, citrus fruits. cranberries, cucumbers, watermelons, onions, beans and blueberries. Even the yield of such an important crop as soybeans has been affected. As a result of this decrease in production many jobs have been lost. This has affected the economy of the United States and other countries.

We no longer have honey to enjoy on our pancakes or biscuits for breakfast. The baking industry no longer has hong to add flavor, texture, and keeping qua. ty to their breads, cakes, cookies and pies.

The cosmetic companies have had to change their formulas, because there is no longer any beeswax to be used in cold creams, ointments, lotions, pomades, lipsticks and rouges. The beeswax candles that have been used for centuries in the services of the Roman Catholic Church are no longer available.

If we take a drive through the countryside we will not find nearly as many wild flowers blooming as we used to see. Since honey bees are essential to the survival of many of the 250,000 species of flowering plants in the world, many of

> these plants are facing possible extinction. This has also brought about a shortage of food for wild animals which depend on the edible seeds and fruits of wild plants. The world has lost much

of its beauty. At the same time, there is an ever increasing problem of food shortages for man and beast alike.

Perhaps you think that this descri tion of the world without honey bees an exaggeration. It may be that you think that the only worthwhile thing bees do is make honey. They are important for the honey and other products that they make, but they are much more important because of their part in the reproduction of plants. As they fly from flower to flower, pollen that sticks to their legs is carried from the male to the female plant. This enables the flower to produce seeds and fruit. Honey bees are the only manageable pollinators since they can be handled fairly easily. Many bees are transported from state to state like migrant workers to help improve the yield of crops.

It is time that we recognize the honey bee for its true worth. Some states, such as New Jersey, Maine, Arkansas and North Carolina, have already enacted legislation to make the honey bee their official state insect. It has been proposed by Dr. John T. Ambrose of the Department of Entomology at North Carolina State University that the honey bee be named the National Insect. He gives many reasons for this proposal i cluding the ecological and economic im-Continued on Page 420.





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HOLY SMOKE! A BEEHIVE IN THE CHURCH!

By KEN OLSON 87417 Halderson Road Eugene, Oregon 97402

The church kids in grades 1-5 wanted some stimulating, unusual lesson for a change. They'd studied Noah and Moses and the New Testament miracles, and now they wanted "real stuff".

The teacher asked if I could give a presentation on beekeeping. "Could you make it interesting, and make it last for an hour?" she asked. "You don't need to try making wine from water, though."

On the Wednesday night I was scheduled to speak, I wore my red flannel shirt, Levi jeans, and high-top farmer's shoes. Church dress codes don't normally encourage these garments for their services, but this was supposed to be an unusual lesson.

I brought my hive, my smoker, my fuel, veil, gloves, bee books, hive tool, and coveralls, and set them down on the table. I brought along my tape recorder and a tape of Strauss' waltzes to give us a little classical background music as I worked.

The fifteen youngsters kept asking me if the bees were still in the hive. I told them I wasn't sure, "I know they were in there earlier!" They sat on the edges of their chairs eyeing the distance to the door one moment and warily watching for bees the next.

They originally sat in a semicircle around the demonstration table,

but as the talk went along, the squirming kids backed further and further away.

I told them that to work with bees "You gotta get friendly with

them, kinda like these guys in these pictures." Then I passed around a few books containing pictures of men wearing sensational, long bee-beards.

"Did you ever do this?" a second grade girl wondered aloud. "No, not yet," I said.

My collection of bee books aroused their curiosity. I explained more books have been written about honey bees than any other insect. Books have been written on butterflies and on ants, but my collection of The ABC and XYZ of Beekeeping convinced them. "These books have come from clear across the nation," I explained. I held up one edition from 1885 which came from New York, and an 1899 edition which came from Ohio. A third, from Nebraska, is

dated 1910. "The authors of a book such as this," I said, "have spent most of their lives studying, experimenting, and investigating new ideas and new methods to combat disease, to prevent swarming, and to increase honey yields."

After discussing the books, I began to dress up in the standard beekeeper's outfit. First I tied my pantlegs with strips of black rubber from an inner tube. Then I stepped into the coveralls and zipped it to my throat and attached the velcro patches together.

"Listen! Do you hear the bees working?" The room became as quiet as a morgue.

When I zipped the veil to the coveralls around my neck, I told the listeners I was nearly ready for the bees to fly out of the hive — "I'm ready, and you're not!" The kids nearly froze in fear and

> bewilderment. They were unsure whether to be frightened or whether I was teasing ...

Next, as Strauss' "Emperor Waltz" began, I put on my gloves, and I rapped on the lid of

the hive. The kids backed away, but not one of them dared look aside.

I grabbed the smoker and a piece of paper, struck a match and began to light the paper. The kids gazed intently: would my gloves burn? Would the fire get out of hand? I quickly stuffed the burning paper into the can of the smoker and shut the lid. The smoke puffed out the spout beautifully. The kids watched in a gaze; no one had ever built a fire in the church before!

I puffed a few billows of smoke onto my Old Spice After Shave Lotion an coughed a bit, then puffed some smoke into the hive entrance. I explained how this helps quiet the bees and makes them easier to work with.

This was going to be a multi-sensory performance, and so far, my plans were going just right. We had music to hear, smoke to smell, a clownish person to see ...

Of course, no bees were inside, but two frames of foundation and two frames of drawn comb were there for the kids to examine. I explained how the foundation is purchased in a store and how it's installed with wires and how the bees build on it. I showed them sealed honey

> cells, pollen cells, and explained about the eggs — only one per cell.

The smoke kept gently escaping from the smoker, even though I had plugged the spout

with a cork. "I don't think this is good for my lungs!" a girl on the left end of the row of chairs whimpered. She rubbed her eyes and tried to hold her breath. I invited one of the older boys to tak the stinky smoker outside till after the show.

I was getting too warm, so I began to systematically remove the bee clothes, explaining why the bees go for the honey when they smell the smoke.

Then I talked about the labor unions in the beehive. "Every bee has a special job according to its labor contract. Water carriers don't stand guard, nectar gatherers don't nurse the babies, scouts don't remove debris from the floor, queen attendants don't build cells for storage ..."

The kids enjoyed learning about the queen. They couldn't believe the queen can lay 2,000 eggs in one day and that these weigh more than she herself weighs. It's really difficult to believe she can do this for several days in a row.

They also enjoyed learning how a worker bee can carry a dead comrade weighing as much as she herself does, and yet she can fly off with the corpse. They understood the strength of bees is similar to that of ants or grasshoppers

A dozen pictures of thousands of been Continued on Page 391

GLEANINGS IN BEE CULTURE



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HOLY SMOKE ... Continued from Page 390

clustered in masses amazed the kids. The swarm on the barbed-wire fence stimulated lots of comments. "How do ey hang so far down?" asked a frecklefaced boy with eyes as big as saucers.



When the time came to sample some honey, I distributed the toothpicks, then demonstrated how to load them with a good sample by dipping them in the honey, rolling them quickly between the thumb and fore-finger. They passed the ttle of honey down the line and each person tasted real Oregon honey.

After several questions and sharing experiences, Mrs. Wallick thanked me generously and the students hustled to meet their parents, bubbling about the bee-man.

Heck. A guy couldn't do better with a dog and a pony. \Box



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QUESTIONS... Continued from Page 387

sions on poor use of a fine piece of equipment. Lowell Baltz, PCV, Belize, Central America.

A. As you suspected, the temperature of the honey and/or the air around it can be extremely important when measuring with a refractometer. Depending upon the temperature reading on your refractometer's outside thermometer, you should adjust your percentage of water content by 0.00013 for each degree above or below 60° when measuring on the Fahrenheit Scale. Celsius scale, add or subtract 0.00023 for each degree above or below 20°C. I might also mention that due to such a small portion of the honey being measured in the refractometer, it is important for you to take a sample which is an accurate representation of the total amount being measured.

- Dick Kehl



Six-Legged Science Teacher

hat's what Les Crowder calls the honey bees he uses for teaching sixth-to eighth-grade science and eighth-grade carpentry classes in the Designs for Learning Differences school in Albuquerque, New Mexico. Les is also a beekeeper and part-time state apiary inspector for the New Mexico Department of Agriculture. One of his objectives in teaching is to give his students an understanding of the role of honey bees in the pollination of wild and cultivated plants.

The first project in the carpentry class was the construction of an observation beehive. Les took it home, stocked it with a small colony, and observed it carefully to see that it was bee tight no bees could "leak" out. This was important because the school principal and several students are allergic to bees. He planned to use the observation colony for about a week. Instead, it was kept for class use for nearly three months because the students enjoyed the bees so much. Even after that long period, many students were sad to see the bees leave.

Crowder and his students first used the observation hive to study the biology and activities of the bees. They put a dish of dry, pulverized pollen into a terrarium connected to the hive by a clear, flexible tube. When the bees collected the pollen, the students could see where they stored it in the brood comb. They saw the queen lay eggs and watched nurse bees care for the larvae and then cap the cells. When the bees "hatched", the students cheered.

The classes made four screened holes at the top of the terrarium to hold the 392

THE BEE SPECIALIST

By ELBERT R. JAYCOX 5775 Jornada Road North Las Cruces, NM 88001

feeder jars for liquid foods given to the observation colony. The students wanted to learn something about the bees' preferences for different soft drinks and other substances. Their tests showed that the

bees accepted new-formula Coca Cola, Classic or "old" Coca Cola, and Pepsi equally well. They could not be induced to drink cola drinks sweetened with Nutrasweet. Bees preferred honey to all soft drinks tested.

After the students fed the bees carbonated drinks, the death rate rose in the colony. They wondered if bees can burp. Soon they were studying population dynamics, estimating the population of the hive by counting the number of



bees per squarè inch, and the area occupied on the comb by the bees. They estimated the birth rate in the colony by comparing the growth rate and death rate.

Many of the experiments were designed, performed, and evaluated by the students. Teacher Crowder directed students in the use of logic and valid experimental design. The students often counted bees at the feeders or counted dead bees before turning to some other aspect of science during their classes.

When students found honey bees pollinating the asters in the school yard, they were directed to hand-pollinate all the florets in a single composite flower head. Les asked them to consider pollinating all the flowers in the field behind the school or all the flowers in New Mexico. The students concluded th such a task was complicated, boring, and better suited to bees than to middle school students. One boy wanted to know, "Who's going to pay me

\$6.00 per hour to tickle flowers?"

Students, parents, and other teachers have commented that they respect bees more and fear them less since their use in the science classes. Next year, Les Crowder plans to use a pair of observation hives of an improved design in his classroom. They will house about 2,000 very good six-legged science teachers, according to Les, and students are looking forward to learning from them.

My thanks go to Les for sharing his experience with me. If you would like to contact him, address your letter to Les Crowder, Designs for Learning Differences School, 8600 Academy NE, Albuquerque, New Mexico 87111. Please enclose a self-addressed, stamped envelope if you would like a reply.

Arthritis and Bee Stings

According to a recent advertisement by Pfizer Pharmaceuticals, arthritis is our number one crippling disease, striking one in every seven Americans. The word arthritis simply means inflammation of the joint. Over 100 forms of arthritis are known today, appearing in all age groups from children to the elderly. The two most common forms are osteoarthritis, usually associated with advanced age, and rheumatoid arthritis, often the most debilitating. Their causes, as well as cures, are presently unknown. We are making progress in medical therapy, however, and programs of exercise and rest can be used to advantage. Pfizer emphasizes that proper treatment starts with your doctor.

When I worked as a bee inspector I knew beekeepers who had crippling arthritis in their hands which was not helped by bee stings. Now I have arthritis in my knees and hands and can see no improvement, or even change, when I am stung regularly by bees, week after week. Many other people have reported improvement in their arthrit when they are stung. In my case, I me *Continued on Next Page*

BEE SPECIALIST... Continued from Page 392

have one of the 100 forms that does not respond to venom therapy. Or, I may reaire stings on the offending joint every day or at some regular interval.

I am lucky because the pain in my joints is not serious enough to require medication and it is helped by regular exercise. In an earlier note I mentioned that some beekeepers have reacted more strongly to bee stings when they are taking drugs to relieve the pain of arthritis. I have not been able to learn more about that problem.

Is Rape In Your Future?

The plants we know as rape, Brassica campestris and Brassica napus, produce an edible oil and large quantities of nectar. In Europe, beekeepers expect to produce an average of 44 pounds (20 kg) of honey from the early spring bloom of the bright yellow flowers. In Canada, plant breeders have selected improved varieties of rape, called Canola, which lack some of the "hot" flavor of the mustard family, and yield a somewhat better-tasting honey.

Incidentally, the name "rape" is derivd from the Latin word "rapum" meaning turnip, according to the late S.E. McGregor. The Canadian post office balked at allowing a Canadian town to use the postmark, "Rape Capitol of the World" on its letters. Some people prefer to call the crop rapeseed or oil seed rape (OSR). Because the plant blooms early in the year in Europe, beekeepers there have to have their bees ready early to benefit from it. In the January issue of The Wight Bee, newsletter of the Isle of Wight Beekeepers' Association, an article by "Rapist" was titled, "Are You Ready For Rape?" The author explained that on the island the rape begins to bloom in early April and many local beekeepers don't usually look at their bees until May. To produce a crop of honey from the rape, the bees need to fly early and work in cooler weather. Colonies suitable for the rape flow should have had a new queen the fall before, and have plenty of bees and stores.

Rape has not been grown extensively in the United States. With the present emphasis on new and different farm crops, we may see more of it. According to Laurie Madden in Ag Consultant and Fieldman for February, 1986, rapeseed looks promising for oil production in areas too cool for soybeans or for the production of large yields of forage for cattle and sheep. In trials at Moscow, Idaho and Ritzville, Washington, rape yielded 10.5 tons of dry matter per acre as a forage crop. That is a large amount of biomass. Rape yields more tons of forage per acre than alfalfa on dryland in the Pacific Northwest, but contains only 11 percent protein compared with alfalfa's 18 percent. The trial crop was seeded in August, harvested on June 14 the next year.

It is likely that when rape is grown in a "new" area, it will not be subject to insect problems right away. However, insecticides are used regularly where large acreages are grown every year.

Requeening As A Business

Requeening always seems to be the bugaboo of the amateur beekeeper. He can't find the old queen after many tries, and then attempts to introduce the new queen into the hive anyway. I have had students who did that and blamed my advice for their failure.

Our business life in the United States is becoming more and more service oriented. Why not more services in beekeeping, particularly in geographical areas with large numbers of beekeepers with limited experience and numbers of colonies? George Hawthorne, writing in Honeybee Times of the Wiltshire Beekeepers' Association in England, tells about a beekeeper in the Loddon Valley who kept 12 colonies of bees in his back garden. The surrounding area was a poor one for honey production so he concentrated his efforts on queen rearing. He offered an additional service of finding and killing the old queen and introducing the new one. He travelled to his customers' homes on a 125 cc B.S.A. "Bantam" motorbike. He could not satisfy the demand in his own association! "Better than honey production."

Bits and Pieces

In a strange movie titled **Bliss**, one of the main characters is Honey Barbara, "an aggressively free spirit who keeps bees and thrives on their honey."

A Dr. Hill in England says that analyses of bee samples for pesticide residues cost US\$450 per sample when a known chemical is involved, US\$1500 when the chemical is unknown. (From Bee Talk for Hampshire Beekeepers.)

There will be an International Fair of Agriculture, Cattle, Fish and Feed in Panama, September 18-24, 1986. Seminars include one on the African bee. For information write Centro de Soluciones, P.O. Box 5262, Panama, 5, Panama.□



BEEKEEPEDS LINE-UP

WHAT'S HAPPENING FROM WATERMELONS TO EXTENSION

By KIM FLOTTUM

The ramifications of tightening up pesticide regulations will surely be a boon to beekeepers in many areas. The fruit and vegetable industry will have some trouble, though, and will need to make some changes. But these same growers are facing similar problems in marketing and other areas that beekeepers face. This article is a roundup of News and Events that will have an impact on all of us. Further, it will serve as a sort of mirror on the similarities of two diverse but interrelated groups.

One of the most visible pesticide debacles was the tainted watermelon patch in California last year. The final chapter hasn't been written but the three California growers face civil charges for violating state law by applying Aldicarb (Temik[®]) to those watermelons. The charges were filed by the State Attorney General against 3 growers from Kern County. The suit seeks penalties in the neighborhood of \$200,000. Union Carbide (Temik[®] manufacturer) and Dept. of Food and Agriculture officials are working to tighten safeguards on its use.

Lets hope some good comes of this even though this particular product probably won't ever affect bees.



From Business Week comes this information. For seven years, environment activists have been unable to overcome industry opposition to strengthening the major pesticide law known as the Federal Insecticide, Fungicide & Rodenticide Act (FIFRA). An agreement between environmentalists and a major industry group may soon (if not already) break a dead-lock in Congress. A coalition of 41 environmental, labor and consumer groups is expected to ratify a compromise bill negotiated with the National Agricultural Chemicals Association. (NACA).

If Congress agrees to the deal, both sides will be able to claim victory. Environmentalists will gain new safeguards on the use of pesticides and industry, which has been stymied by a back-log of new product approvals at the EPA, will finally see the log-jam break.

Industry will pay dearly for this compromise though. Companies will pay fees up to \$150,000 per chemical to offset EPA's costs of reviewing these chemicals. Congress recently ordered EPA to review 600 chemicals for safety; to date only 6 have been tested. Farmers however are concerned about liability cases if these newly registered chemicals prove dangerous to ground water or cause other problems. Chemical companies may release chemicals before all testing is completed.

Long term health studies are what have been holding up the release of many chemicals by EPA. I guess I'd just as soon see them continue even if short term studies show these new chemicals safe for bees and other beneficial insects.

On the brighter side, Genetic Systems, a Belgian biotechnology company, has developed a strain of tobacco that kills insects that prey on it. Scientists at Genetic Systems removed a gene from the bacteria *Bacillus thuringiensis* and inserted it into cells of the tobacco plant. Bacillus thuringiensis (Bt) produces a toxin fatal to many insects but safe to most other animals. It is commonly used in vegetable gardens as a 'natural' pesticide. Studies are underway to pass this gene along to cabbage, cotton and broccoli — but marketing food crops carrying bacterial genes will fiformidable regulatory hurdles.

If smoking doesn't get you, perhaps this new product will. I wonder what kind of warning the Surgeon General will make them put on cigarette packages now.

The National Coalition for Fair Trade met recently to discuss the crisis facing the Agricultural Community with respect to imports. The problem is that many countries have been given unlimited access to American markets, usually on a unilateral basis. The President of the Coalition stated that the U.S. has set a double standard with respect to foreign and domestic growers. We set up tremendous trade barriers for our own farmers and ignore the obvious when foreigners dump their products into our country, denying us access to theirs.

We're not against free trade, but it ought to be a two-way street and we should be able to count on our own government to make it fair.

If this sounds like an old story, it a But this particular piece was written by and about vegetable growers in this country. I guess nobody gets a fair deal from Washington these days.

Finally, what started as one of the horror stories of '86 has calmed down to a mere ripple of discontent in the Agriculture industry in this country.

The administration's original budget called for a hefty 59% cut in Extension funding. Coupled with State Universities and Land Grant Colleges, the Extension Service has made significant contributions to American agriculture for decades. (This includes beekeeping.) Originally slated for complete removal were food and nutrition education, farm financial management, integrated pest management, farm safety, pesticide impact assessment, urban gardening and renewable resources.

Across the country the Extension Service consists of 11,000 professional workers in county positions, 5,000 State Specialists and almost 5,000 technicians and aides. Of these, about 7,500 stand 1 Continued on Page 401



good scientist is not just one who produces good answers but, equally important, comes up with good questions. For example, Karl von Frisch noticed that a bit of honey could stand outside exposed for some time before any bee found it, but then, once discovered, many bees would soon be there. He reasonably inferred that the first bee had some way of communicating its find to the others, and came up with a very good question: How? Thus was begun the observations d inquiries that brought Dr. von Frisch great and lasting fame. More recently, Tom Seeley noticed that bees shift their foraging areas from one day to the next so as always to be working on the most abundant sources, and he came up with a good question: How, if they do not go about sampling these areas, do they know where the best sources are? And, for the first time in the history of mankind, he conducted the observations and experiments necessary to answer that interesting question.

I am no scientist. I am just a backlot beekeeper. But I come up with lots of questions, probably most of them not very good ones in the eyes of a proper bee scientist. But here, anyway, is my latest one: How do the bees act in such unison in novel situations?

Here is the background of that question. Every beekeeper has noticed that a swarm, which has perhaps hung quietly clustered for a day or two, suddenly disintegrates, takes wing and flies off, as if at a signal. Where did the signal come from? Moreover, that swarm does not 1st fly around aimlessly. With singleness of purpose those thousands of bees fly unerringly, sometimes over

BEE TALK

By RICHARD TAYLOR R. D. 3 Trumansburg, NY 14886

miles, to some hollow which will be their new home, and a place that only a few of them have actually visited. What guides them to that spot?

It has been suggested that there are, in a colony of bees, a certain few who act as "control" bees, guiding the work and behavior of the colony as a whole. The late Allen Latham, a backlot beekeeper like myself, had this view. And I cannot help thinking that something of that sort must be true.

That idea was driven home to me again a few weeks ago when I was working in my apiary. I heard the sudden commotion of a swarm emerging from one of my hives. Bending over the entrance I waited for the queen to emerge and when she did, I caught her in my hand. (This, incidentally, is not as difficult as it sounds. I have done it before, and once, with considerable dexterity, I caught the queen in mid air after she had taken wing.) I ran this queen into an old queen mailing cage, plugged the end, fastened it to a piece of burlap smoker fuel, and hung this to a nearby branch, believing that the swarm would cluster around her. That had been my past experience. But this time was different. The swarm flew off, leaving their queen behind, and in searching the area I could not find their cluster. But then, after fifteen or twenty minutes, back they all came, all at once. Now, I was quite sure, they would cluster around their queen, still on the branch where I had put her. But no, they began to re-enter their hive, even though their queen was but a few feet away from it, where they could hardly miss her. So at this point I picked up their hive and moved it to another part of the apiary, replacing it with an old empty hive body. I contrived a cover for this and put the queen inside. And that, of course, is where the swarm now clustered, inside that old hive body with their queen. The next day I returned with my swarm cage and shook the clustered bees into this. Of course I didn't get every one. And then I noticed the final peculiarity in their behavior. Some of the bees from the swarm at that point found their original hive, now located at a new place since the day before, and sent up

the familiar signal to the rest to come over there.

It is not hard to see that throughout these several episodes the bees were responding to signals. And the signals were quite unambiguous. The entire swarm acted in unison, without hesitation or confusion. Moreover, while everything they did made sense, it was nevertheless not entirely predictable. The bees could have clustered around their queen in the first place, as had been my experience in such situations before, and that would have made sense. But this time they "decided" differently. Or, after I had gathered the swarm, the bees left behind could have stayed with the empty hive body, to which they had already become oriented, and which stood in the exact location of their original hive. But they chose a different course which, again, made sense.

Of course there are many other examples of purposeful and apparently guided behavior on the part of the entire colony - for example, the "decision" concerning when to build swarm cells, when to supercede, whether or not to allow a mother and daughter queen to have common run of the hive, when to begin expelling the drones, and so on. No doubt there are different explanations for all of these things. But some of the more dramatic examples of unified and concerted action, such as those I have cited, do suggest a kind of communication among the bees that has thus far not been analyzed and explained and it seems, moreover, to be a kind of communication from the few to the many in which the very destiny of the colony hangs in the balance. But how anyone is ever going to test this I do not know. If anyone can figure out a way, then I think he will be deserving of the fame he will undoubtedly win for himself.

Questions and comments are always welcomed. Please enclose a stamped envelope and use the Trumansburg address.

A POINT OF REFERENCE

By JERRY MCGAHAN Illustrations By JANET MCGAHAN

I discovered bees at college. The university may seem an odd place to find that bucolic livelihood, but in my case, the errant path often makes for a more solid arrival; the take for bees was stronger there on campus than if I'd had a pedigree of diehard beekeepers towering behind me. At any rate, I ran into myself on Bascom Hill where a group of undergraduates and I sat cross-legged, tallying the number of bees that hovered over two inverted jars of water.

Each jar stood up-side-down on a loosened lid. At the first station one jar rested on a piece of red construction paper, another on blue. At other stations spaced across the campus the bases for each pair offered other choices, other sets of color for the bees to choose between. There were also designs such as black triangles on white compared to white ones on black, squares, circles and plus signs, too. Others with scents - a jar at one station, for example, contained a drop of orange oil, in the other, a drop of clove oil. During the week preceding, one jar in each set held water whereas the other contained sugar syrup. The color, design or scent assigned the sugar syrup remained so all week even though the position of the two jars had been shifted regularly so as to keep the bees from learning the location of the syrup treasure simply on the basis of location. After a week's training, on the day of the lab experiment, all the jars were filled with water (in the event bees had some way of detecting the difference between sugar solution and water, other than tasting it). We went out to count how many bees lit upon each jar to see, then, if these insects would tell us which set of backdrops they had not only discriminated amongst but had committed to memory, as well.

Tell us, they did. Except for one set of colors (which pair I don't remember now), the majority of bees landed at the jar that once held syrup and now contained nothing but water, and so revealed the cue they had gained during the week. The jars with scents obtained the best results. A bee seldom lit at the jar containing a water-associated scent. For any of us that had ever wondered at the purpose of a flower's fragrance, the jars on Bascom Hill put that question to rest forever.



It was I who set out the stations, colored the designs, bought the scents, filed V-cuts into the lip of the canning jars, mixed syrup and undertook to coax the bees from the observation hive in the lab to the station locations on the Hill. A field exercise in bee behavior was the first assignment given this green teaching assistant. I was skeptical that any of it would ever succeed; few experiments in animal behavior ever do. According to a most respected law of biology, in the most rigidly designed environment and context where all variables are controlled or constant, an animal will always do what it damn well pleases. When von Frisch's Nobel-Prizewinning discoveries about the honeybee first made skeptics of everyone, he is

supposed to have said that everyone ought to be skeptical. It wasn't believable. Even if it was believable I had no illusions that it should work me and those very average looking bees. But I went through the motions. I can always go through the motions.

At the Bee Laboratory a man who looked like Gepetto put together an observation hive for me. He plopped a veil over his head, left the strings dragging behind him on the ground, and went into the hive bare-handed and barearmed. I saw one sting the back of his hand. He didn't seem to notice until after he cared for the queen. He found her, picked her up between his thumb and forefinger as if she were a berry or chocolate and secured her in the glass hive with a frame of worker brood and nurse bees. Then he scraped off the stinger with a wide spatulate thumbnail. He handed the observation hive to me. It made me uneasy. I could feel the electrical tingle of their humming. I watched the crowd of poison arrows swirl restlessly under my hands, an eighth of an inch away. It felt like a grenade.

"They're inside and you're outside," he chided. "You look like they're crawling up your shorts."

I glared at him. "Ever had a caged rattlesnake strike at your hand?" Here was an old playground challenge. It just popped out.

"No," he said.

"I know where there's a standing tendollar bet you'll yank your hand away from the glass."

"I don't care much for snakes," he allowed.

"Even if he's on the inside and you're on the outside?" The hive was heavy and it kept running like a motor.

"You don't care much for bees?" he compromised.

"I've never been asked to before."

"Well, I imagine they're nicer than rattlesnakes."

"That's your opinion."

He smiled. His cheeks squeezed his eyes shut. His lids looked like walnut shell. He hung his veil on a nail. The laces stretched to the floor, puddled there. "Son," he said, "I think you're g na manage this."

Continued on Next Page. GLEANINGS IN BEE CULTURE

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REFERENCE... Continued from Page 396.

Yes. The bees were remarkably forgiving. I connected the entrance, a clear plastic tube, into a hole bored through a lab window frame. Outside, I yanked out the cork plug and sprinted away several hundred yards. At length, a few bees emerged at the opening and monkeyed around there. They showed no apparent concern, much less any memory of revenge. I never did get trouble with the bees. It was the jars of syrup and water that made for the commotion. A squadron of campus police surrounded me; they demanded to know what was in the jars and "what the hell I was doing".

The year was 1970, the same year of the Kent State shootings, and the campus was under siege. A campus building next door had been bombed, leveled to a rubble heap of bricks and twisted steel. A young physicist was dead. Windows in offices down the hall from my own had been blown out. All authority was nervous; everyone was nervous. It was a time when even sugar syrup looked deadly. Several times that week a bomb scare sent crowds out onto Bascom Hill to mill around my stations. But the bees never seemed to notice.

The month was October, a full four weeks after the first hard frost had put away that summer's crop of nectar and the flowers that bore it. The bees, accomodating to a fault, suffered the gift of syrup oblivious to bombs and

loudspeakers, strikes, tentacled crowds and the hundreds of white crosses that sprouted on the Hill one morning. I touched drops of paint upon the thoraxes of feeding bees while police cleared a mob of students from

behind the statue of Lincoln. Tear-gas drifted over one station but I couldn't get clear enough to see how the bees reacted.

What was happening in the world then bothered me, too. I doubt if the little political energy I hold shall ever stir that much again. Still, the contrast between that wrenching turmoil — the necessity of turmoil, inside out — and the perfect dependability of bees, the simplicity of their unyielding dedication, affected me greatly. I was more than a little surprised that any insect could ever gain that hold on me, one beyond mere curiosity to a place of instruction and possession. After all, most insects

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never seemed that alive to me, real-alive like a bird or squirrel. An insect resembled a capsule with wings, a tiny plastic motor or rubber-band toy. This was before I watched bees dance.

The dancing bee. There can be no more perfect description. In the quavering mass of them one is suddenly unique, errant, crazy, possessed by some inside rhythm. the others crowd around, as if

watching a limbo contest. Indeed, one of the bees I painted was dancing when I returned. I saw her all the way across the room.

The class pushed up. Collectively, they hurried, pretended

to decode the message of her peculiar exhuberance. They were to determine at which station she had been marked. Bees dance to tell other bees of their discovery of nectar or pollen, or (if it be a homeless swarm) of a place they had just found where they might put out a doormat. They tell the others not just that they found these floweres in blossom or this hollow tree but where, and not just which direction, but right where it is, the very point of its location. This is all revealed in the dance step. Or so it had been claimed.

How does dancing give anyone directions? The first requirement, of course, is a point of reference, that is to say, take Highway 93 to the first traffic light and turn right ... And so for bees, all bees, which point of reference shall they collectively recognize? I put that question

> to my lab class. The hive one student suggested. Certainly. The arrow on every fixed map. You are here. And what else? What other point of reference that is as constant as the universe, that is the same for the swarm that



departs, as it is for the mother hive, that is something like the star of Bethlehem, the navigator's Polaris or Vega? Yes, another star, daylight itself. The point of reference then is a line from the hive to the sun, our own star that is, to say the flowers are somewhere is to say they are somewhere in reference to a line from the hive to the sun: they veer away from the line at a certain angle so far to

the right or to the left.

The next conumdrum here, though, is that there is no sunlight inside the hive where they dance. Normally, it is not done behind glass but rather in

absolute lightlessness. How does any dancing bee refer to the sun inside the sunlessness of a hive? Is there any dependable reference point in total darkness, any one given sense of direction dependable not just in one hive but in any hive or tree, or between the walls of any barn or house? Is there anything one knows about location in any darkness?

Not much, except to say one's feet are on the ground and the rest of one is somewhere above, which happens to be just enough for a point of reference. For bees, then, the direction of the sun on the side of that lightless comb is represented by the direction up. Up is sun. In the dark and humid, honey-smelling hive the bees dance out the direction of their nectar or pollen source or barn roof or whatever they proceed to tell the others by considering the direction straightaway from the earth's center as the position of the sun, where-ever the sun happens to be at that instant. Because a bee's eye can detect polarized light, those outside the hive need not even see the cloud-obscured sun to know where it is; any little patch of blue sky tells them just as well. When a bee, returning from some distant source of certain reward, does its jig, the path of its dance traces over and over again the figure of an eight. Throughout the extent of this wild little exercise, the orientation of the figure is preserved so that the axis between the two circles of the eight (the snowman's belt) never varies; this axis, its angle with the vertical, reveals for her sisters the direction to follow, so that if, for example, flowers are 90° to the right of a line drawn from the hive to the sun, the axis between the circles of the figure eight is correspondingly directed 90° to the right of the vertical on the Continued on Page 421.



n 65 years of beekeeping, I have seen many changes in the honey business. In the late 1920's and early 1930's, I was retailing honey for \$1.00 per 5 lb. pail. My wholesale price was \$.60 per pail. Honey in large lots in bulk sold between \$.06 and \$.08 per lb. Today, just the pail alone costs almost \$1.00.

WW II came along with its "sugar shortage" and the price of honey rose until it was "controlled" by Govt. Order. The greatest change in honey prices came in the 1960's with the growing interest in Natural Foods, Demand for honey was further increased with the book "Folk Medicine", by my friend, D.C. Jarvis, M.D., of Barre, Vermont. Folk Medicine was on the best seller list for 21/2 years and sold over 3 million copies. During this period of high honey prices, there was actually a shortage of honey due to the great demand. In part because of Dr. Jarvis' book, many large beekeepers "struck it rich".

Many honey producers believe the honey market is in a mess because of cheap foreign honey flooding our market. Now we are asked to write our congressmen to stop this importation of foreign honey. The "cure" being advocated is to restrict imports and to sell only US honey.

The honey support price program was not a bad law when the support price was below the world market price. Then some large producers began to agitate for higher support prices. When I called a large producer (where I bought many truckloads of beautiful clover honey) to ask for the price, he said, ".67 per lb., plus freight, plus cost of barrels". This was about .20 above the market

SIFTINGS

By CHARLES MRAZ Box 127 Middlebury, VT. 05753-0127

price. By the time I paid freight, cost of barrels, jars, bottling costs and shipping, the price would be so high it would never sell. Fortunately I was able to find a Canadian beekeeper where I could get

good Clover honey for .20 to .25 less per lb. Along with my own honey, I was able to stay in business.

I think this mess we now have was not caused by foreign honey but by the producers themselves. The customers just will not pay those high prices.

Now these same producers are pleading with us, "write to your congressman to protect the honey market from cheap imports". Those that believe the honey market can be saved by passing laws to restrict imports seem to forget the most important law of all, *The Law of Supply and Demand*. That is a Law of Nature that cannot be changed or violated. WE CAN ONLY IN-CREASE THE PRICE OF HONEY BY INCREASING THE DEMAND. To increase the demand for honey the public must WANT to buy it for a very good reason.

Until a few years ago, there was a good demand for honey because many people believed it was good for you. Now with all this adverse publicity implying that honey is bad, down goes the demand and the price. If we accept these unproven statements we are finished. Forget about the importance of bees for pollination, Africanized bees, varroa mite, etc. It won't make any difference if we have no market for our honey.

Several years ago the U.S. Dept. of Agriculture released a bulletin that never got publicity, even in beekeeping magazines. Basically it stated that the kind of sugar a person eats does make a difference. Sucrose, common sugar, a disacharide, caused conditions in the body of test animals that usually led to diabetes and heart disease. Simple sugars, monosacharides, such as dextrose and levulose, as in honey, would help prevent these conditions, leading t arterial schlorosis. Plainly speaking, the use of honey in the diet could help prevent heart disease. Why don't we beekeepers prove and

publicize this research?

Less than a thousand people a year die from botulism poisoning, yet every year half of all deaths in the U.S. are from heart and related arterial diseases. Can you imagine what would happen if we could prove honey would help prevent heart disease? All the honey in the world could not supply the demand.

Now that the honey promotion program has been approved, let us not waste this money on useless advertising. We must first prove, as King Solomon said in the Bible, "Eat thou honey, it is sweet to the taste and health to the bones."

We beekeepers need not wait for such proof. Eliminate all sugar in your diet and use only your own honey for all your sweetening. If every beekeeper and their families used only honey in their diet, there would be little honey left to sell to anyone else. There would be a drastic shortage of honey. It is most important to remember, we cannot get help from the Govt. or anyone else. We beekeepers must help ourselves, no one else will care more about our problems.











Mite Infestations Cause Complications with Other Disease

S tudies in West Germany show that when Varroa mites feed on bees the growth of a virus is stimulated. This, not necessarily the mite feeding, may cause the death of bees in a colony. The virus, called "acute paralysis virus" was discovered in bees by Dr. L. Bailey of the Rothamsted Experiment Station in England in the early 1960's. However, it has not been found to kill bees in that country. The virus is widespread in the world.

It is suggested that mites feeding on bees may release the virus from cells in the bee's body. Once released into the bee's blood the virus could migrate anywhere in the body. Secretions injected into bee's blood when the mites are feeding may also stimulate the growth of the virus.

This is a complicated subject. The substance of all this is that we need much more research on mites in Asia and South America. There is no question in my mind that *Varroa jacobsoni*¹ mites will arrive in the U.S. within the next ten years. We saw chalkbrood arrive in the early 1970's and tracheal mites were found in 1984. The bee disease situation is becoming increasingly complicated and we are not ahead of the problem.

Why Bees Eat Pollen

The chief problem we have had with pollen substitutes is that the bees don't want to eat them. For many years beekeepers feeding pollen substitutes to bees have added 10 - 20% pollen to the mixtures to make them sufficiently attractive that bees would consume them.

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RESEARCH REVIEW

By DR. ROGER A. MORSE Cornell University, Ithaca, NY 14853

Steve Taber showed many years ago that it was possible to extract a chemical from pollen that when put on sawdust made the sawdust attractive to bees. In other words bees don't eat pollen because it

is nutritious; they eat it because certain compounds in the pollen stimulate them to do so.

Dr. Justin Schmidt of the U.S.D.A.'s Carl Havden Bee Laboratory in Tucson, Arizona has just reported further research on the subject.² His studies show that there are "a variety of compounds" in pollen that stimulate bees to feed on it. Schmidt points out that because honey bees feed on so many different pollens it is logical that there should be many such substances. Schmidt's finding is good news. Hopefully, he and his colleagues may find among these many stimulants (phagostimulants) a simple chemical that could be easily synthesized and put to practical use. A more attractive pollen substitute would certainly be a great help to the industry.

Little Known Food Plants

There are more than 20,000 species of edible plants on earth but most of the world's food supply comes from about 20 of these. Throughout our history, only about 3000 plants have been used by one group of people or another; many potential food plants are un- or little-known.

The National Research Council has a 15 year old program to evaluate some of these under-utilized plants. Much of the emphasis in this program is on those that might grow in areas where people are underfed. This includes plants that might grow in drought areas. Many of the little known food plants are tropical.

A point that caught my attention in the article below³ is that a little exploited plant group is the legumes. There are over 18,000 species of legumes and it is in this group that we find the clovers and many of the major nectar producing plants. Interestingly, the grasses, including rice, wheat and corn are major food crops and are among the best known. Among the legumes only soybeans and peanuts have been studied extensively. In some parts of our

country soybeans are a major honey plant. Generally speaking the legumes are good sources of protein.

Tropical fruits are another large group of plants that are little used. Banana, pineapple, papaya and mango are well-known but there are another 3,000 tropical fruit plants that might be used.

Agriculture is changing constantly. While genetic engineering and gene splicing hold great promise insofar as improving our food supply is concerned, the thrust of the paper below is that we should not overlook that already available. Beekeepers do not grow plants for honey production; they move their bees to those areas where honey plants are abundant. In thinking about beekeeping long range, say a period of ten or twenty years, it is well to think about changes that will come about in the future. Here in New York State we have seen buckwheat and wild thyme almost disappear as major honey plants since the second World War. No doubt greater changes are in the works.

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Testing Your Beekeeping Knowledge

By CLARENCE H. COLLISON Extension Entomologist The Pennsylvania State University University Park, PA 16802

Honey is a unique natural product of the honey bee colony that is derived from the predominant floral sources found within the area of the hive. Large acreages of flowers are required to produce surplus honey and there are only a limited number of species that bees gather a surplus from. Most floral sources supply only limited quantities of nectar and pollen which are critical for colony development and maintenance throughout the season. The ideal situation for beekeeping is one where there are at least three plants which yield surplus honey in considerable quantity and which bloom at different periods of time.

Honeys are classified by the principal sources from which the bees gathered the nectar. Most honeys result from two or more sources blended by the bees king on more than one source at a time, or stored at different times before the honey is removed from the hive or mixed during the extracting process. In order to be classified or labeled from a definite plant source, a honey must have the predominant color and flavor of honey from the particular plant mentioned. Honeys from different plant sources vary in aroma, flavor, color, density, chemical composition and in granulation characteristics.

How well do you know the characteristics of various types of honeys? Take a few minutes and answer the following questions to see how well you understand this important topic. The first five questions are true and false. Place a T in front of the statement if entirely true and an F if any part of the statement is incorrect. (Each question is worth 1 point.)

1. ____ Dark honeys are richer in minerals than light honeys.

2. _____ Heather honey is unique since it is jelly-like prior to extraction and granulation.

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- 3. _____ Honeys produced from the same plant source are generally darker in color when produced during a fast and heavy honey flow than when they result from a slower honey flow.
- Basswood (also known as linden or lime) honey has a strong minty flavor.
- Floral honeys have lower quantities of fructose (levulose) and glucose (dextrose) than is normally found in honeydew.

Multiple Choice Questions (1 point)

- Honey from this floral source is distinctly bitter in taste:

 A) Sahuaro Cactus; B) Privet;
 C) Eucalyptus; D) California Sage;
 E) Mesquite
- 7. Listed below are several different types of honey that are known to either crystallize very rapidly or very slowly. Please indicate if they are fast or slow to granulate. (Question is worth 6 points.)
 - ____ Dandelion; ____ Alfalfa; ____ White Tupelo; ____ Aster;
 - ___ Oil-Seed Rape;
 - ___ California Sage
- 8. Honey classes are often based on color and are determined by a Pfund Color Grader or a USDA Honey Comparator. Listed below are several different types of honey; please indicate the correct color class. (Question is worth 8 points.)

A) Water White; B) White;C) Light Amber; D) Dark Amber

Buckwheat	Golden Rod
Gallberry	Sage
Black Locust	Clover
Basswood	Sourwood

Answers on Page 424

WATERMELONS .

Continued from Page 394 lose their jobs. I have a particular affinity for this group, since I worked my way through college as one of these aides.

But a grass roots movement by 4-H groups, county and state personnel, parents, farmers and small businesses has *decreased* the amount of the federal portion of this extreme cut. This was accomplished by the oft used campaign of inundating the USDA with VOLUMES of mail — more, in fact, than for any issue the USDA has ever been involved with.

We contacted two Extension Directors concerning this issue for some firsthand information. From Ohio, Director Mike Sprott said that his Extension programs will not be hurt too badly by the newly proposed cuts which amount to about a 4.3% reduction. State funding has picked up some of the deficit and streamlining and other efficiency moves will more than compensate for the rest. Concerning the program as a whole, Director Sprott said he was guardedly optimistic regarding the future of the Extension Services in his state.

From Wisconsin, Director Charles Kovel reported a similar situation but in his case the state had also reduced funding so there were initial concerns there. These reductions have been handled in similar ways and the outlook in Wisconsin is still optimistic.

Both Directors expressed concern that although the monies had been reinstated, the allocation of these funds was not yet set (late May). There could still be trouble for some Extension programs. Further, many states had cut their portion of funding so that even with Federal support their programs could be in jeopardy.

One of the primary reasons that the funding was re-established was the fact that for every dollar the Federal Government invests in Extension, there is a 300% return. I defy anybody to show me a better investment.

There is no doubt that we are all better equipped — beekeepers, farmers, 4-H members, home economists because of Extension. Be sure to let someone in Washington know how you feel.



TEACHING TEACHERS

If you have ever made a visit to a schoolroom to do a demonstration about bees and beekeeping, you may have noticed the teacher was as interested in your talk as were the kids. Generally, teachers can answer a few more of your questions than the youngsters, but unless you have a real science buff, even they can't answer them all. Let's face it - most people are not beekeepers. In fact, most people don't know enough about bees and beekeeping to fill a single comb in a shallow super.

So when you're done, what's the result? After an hour or so you've impressed upon them that you're a beekeeper, you have bees and the kids may have had some crackers and honey. Will the time you spent have impressed

upon them the importance of pollination, the lue of honey or the skills required to keep bees? Will they remember that workers and drones are different?

You have spent a lot of years learning your skills. Hours of reading, hundreds of meetings and months and months of field work. How on earth

can you expect to communicate even a fraction of that knowledge or enthusiasm in one hour to a classroom of children?

Occasionally you get lucky and you get through to a few of the kids. Or, if you're real lucky you may get a teacher who decides to go overboard on the subject. But this doesn't happen very often. So, is there a better way to reach these people? Is there some method to make this stick, to really grab the teacher and the class? The answer is yes — but you usually can't do it alone!

The soundest approach to this problem is through the teacher, or even better through the school system behind the acher. Generally, teachers know very nttle about our profession. This is the

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primary reason they are unable to give support or convey that extra bit of enthusiasm needed.

Teachers, like most of us, are usually pressed for time. With

few exceptions, classes are structured and well-defined. Your visit may be part of an ongoing science project, but probably you are a way to fill an unstructured hour. Regardless, seldom is there ample class preparation before you get there or an in-depth follow through after you leave.

Since teachers are busy people too, an excellent technique for you to use is to do their work for them. Of course, you do this when you give your demonstration, but if you want to add some punch to your talk, provide the teacher with some basic information on bees, beekeeping and beekeepers *before you get there*, and leave other information when you're done.

I hear, and I forget. I see, and I remember. I do, and I understand.

Chinese Proverb

This isn't as difficult as it sounds, and it accomplishes a lot of work with a minimum of effort. How many times have you answered these questions in a classroom: Don't you get bit a lot? What is honey? How long do bees live? Are bees and hornets the same thing?

These are good questions, but if you spend all your time answering basic questions — questions these kids should have asked the teacher *before* you got there — you don't get to spend much time on the beekeeping side of your talk.

The premise of all this is, of course, that a visit by a beekeeper should be the *culmination* of sections on a) entomology, covering basic insects including honey bees; b) flowers, covering basic types of flowers, flower morphology and pollination; and c) the role honey bees play in the scheme of things.

So, where do you get this pre- and post- class visit material? You can make it up yourself, of course. Spend time putting together a package with all this information included. Do you have that kind of time? You can recommend to the teacher that some background work is done before you visit, but does the teacher have time, and if so, where are the sources for their material?

Fortunately for most of us, some folks have considered this problem and have done something to help. I'd like to review 3 packages (available for free or next to free) that go a long way in meeting the requirements of good preand post- visit material.

LET'S BUZZ THE SCHOOLS. With few exceptions, this is probably the best package available. It is designed for children in grades K-5 and presents material for 13 continuous days. It contains beekeeping background material, reference and visual materials that a teacher would require to teach the lesson plan. The teacher doesn't need a

> background in beekeeping.

It was originally prepared by Claudia Lincous, 4th grade teacher in the Wake Co. School System in North Carolina and John Ambrose, Assoc. Professor of Entomology at NC State. They worked in cooperation with the Southern States Beekeepers on

preparation and distribution. The original program was re-packaged and revised by Loretta M. Surprenant, W.H. Miner Ag. Research Institute, Chazy, New York.

The strongest points of this package are the glossary and vocabulary of beekeeping and entomological terms and phrases. It also goes into fair detail on some of the lesser understood aspects of honey bees. For instance, diagrams of orientation and dance language are available, along with some fairly sophisticated morphological sections. Flowers, pollination and the role honey bees play in that scheme are explained rather well.

Continued on Page 405

HONEY BEE TRUE/FALSE QUIZ





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ANSWERS TO THE TRUE/FALSE QUIZ (Prepared by Hewitt Honey Bee Museum and Research Center, Litchfield, CT)

1. **TRUE** Bees (and all insects) have two large compound eyes on either side of their heads and three simple eyes on top of their head. With the compound eyes, bees see a mosaic picture; the simple eyes distinguish light from dark.

2. **TRUE** Bees and their relatives actually have four wings. Before a bee leaves the hive, she hooks her wings together so she has greater lift and strength while flying. When entering the hive again, she will unhook her wings so that they will not take up so much space.

3. FALSE Bees collect nectar (the sweet sugar sap flowers make) and pollen (the powder that pollinates flowers). Sugars in the nectar are converted into honey, and the protein-rich pollen, is mixed with honey and is made into bee bread.

4. **TRUE** Worker bees live only six weeks during the summer; they literally kill themselves with work. On old bees, the wings and other body parts become frayed and tattered as they wear out.

5. FALSE Bees, while related to wasps and hornets, are more gentle, live in tree hollows, make wax combs and gather only nectar and pollen. Wasps and hornets make their homes of paper, mud or live underground, make no honey or wax, sting more readily and prey on other insects.

6. TRUE Smoke causes bees to gorge honey, filling their stomachs and making them heavy. It also masks any of the alarm odor that the guard bees release when disturbed. Instead of exciting more bees with the release of this odor, smoke distracts potential stingers.

7. FALSE A close examination of the sting barb of a honey bee shows that it has tiny hooks on it. When stinging a person or animal, the hooks catch in the skin and as the bee tries to fly off, it pulls out its entire stinging organ, thus killing it. Wasps and hornets have smoother sting barbs which will not snag; they can therefore sting a person repeatedly.

8. **TRUE** Since flowers and bees evolved together 60 million years ago, each has developed special functions for their mutual benefits. For bees, one such special feature is their hind legs which serve as a press and basket to collect pollen grains.

9. **TRUE** Honey bees are not native to the New World. The first recorded introduction of bees was to Massachusetts by Puritan colonists in the 1630's. They were needed to pollinate the recently introduced apple trees.

10. **TRUE** Bees, unlike many insects, have refined color vision. Not only do they see blues and yellows but also the invisible ultra-violet light. They cannot, however, see red, which appears as black to them.

11. **TRUE** Research has shown that bees can distinguish one, two, three, four, five and many petals on flowers. They can also find their hive in a row of five or six. 12. FALSE One of the principal losses of bee hives worldwide, is the improper and careless use of insecticides toxic to honey bees. Please be considerate next time you use any of these products.

13. FALSE Bees and all insects have six legs and three body parts (head, thorax, abdomen). Spiders, mites and ticks, called Arachnids, have eight legs and two body parts (no thorax).

14. FALSE Honey comes from flower nectars. When a bee visits a flower, she sucks up the sweet sap with her long tongue into an inflatable sack, called a honey stomach. When it is full, the bee returns to the hive, regurgitates the drop of nectar into the honey comb, and evaporates out the water by fanning. Nectar is about 80% water while honey is only 17%.

15. **TRUE** Since honey bees and flowers coevolved (see #8), a special feature of many flowers to attract pollinating bees is to have markings invisible to all but bees. These marks, called nectar guides, position the bee so it will pollinate the flower, while rewarding the bee with sweet nectar and proteinrich pollen.

16. **TRUE** The heart of insects is a long artery which travels along the top of the abdomen. Openings in the artery allow the free-flowing blood to enter the heart and be pumped towards the wings and head.

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The program is designed so that something new happens every day, but completing each day's work depends on understanding the previous work. Yet, missing a day won't throw a pupil so far behind as to never catch up. The whole program is designed to be fun and produce a minimum of stress for both teacher and student. It is set up to cover 13 days which comes to 2 weeks and 3 days. Having a beekeeper visit is recommended but is not discussed in detail.

At the end of the program is a short list of references, most of which contributed to the development of the program.

Only 2 minor complaints have surfaced. The first is the quality of reproduction which is adequate but not exceptional. The second is a lack of outside preferences to examine these subjects in feater detail. Both problems are certainly outweighed by the program as a whole and it is highly recommended. To date about 200 of these booklets have been distributed both in this country and abroad.

HONEY BEE STUDY BOOK. A similar program is offered by the Hewitt Honey Bee Museum and Research Center Inc., in Litchfield, CT. The groundwork for this is again the Southern States program mentioned above, but it has been modified to a great extent.

Part one of this program, The Honey Bee Study Book, examines flowers and pollination in good detail, with games for spring and fall included and an excellent list of outside references. The second part of the Study Book looks at insect biology in general and honey bee anatomy in particular. Several quizzes and games are included. The exams are structured so that a teacher can use them for several grades. Part two is an in-depth look at the differences between wasps, bees and other insects and studies the art of insect collection. It has good illustrations, loads of information and a quiz included. I've seen college textbooks that didn't do as good a job, but it is aimed at elementary grades and doesn't go above this level.

Part three of the Hewitt package looks in great detail at observation hives. Although actual construction isn't covered, several references are given that explain the how's and when's of this.

This section does cover all other aspects of observation hives from location, starting and care. It also has information on foraging behavior, dance language, comb building and regional nectar and pollen plants. Again, it includes an excellent list of references for further study.

The last section of this program is a Continued on Page 406

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game. It is for children 4-12 and includes 10-50 kids — a good classroom game. It also is good for fairs and the like as a demonstration and teaching tool for the observers.

The strongest aspects of the Hewitt program is the natural flow of the information from simple to complex, and the variety of topics covered. Second, it has excellent reference lists so that interested teachers or students can persue any of the topics covered in far greater detail.

The only drawback to this program is the lack of a well defined schedule. The teacher is left to decide when to use these individual segments, and in what order to proceed. Although this is not a



major flaw, it may pose problems for a teacher with little background in the subject. The program does not presuppose a background in beekeeping or entomology, so that helps. To date, about 50 of these programs have been distributed, mostly in the northeastern part of the country.

HANDS ON CLASSROOM UNIT ON BEEKEEPING FOR GRADES 2 AND 3. This package was designed by Kathy Hultgren, an elementary teacher from Holden, Massachusetts. This unit is composed of 5 sections that can be spread out over several days or done in segments of 2 or 3. Basically, it is a book of projects that a teacher can use in a classroom setting. It gives excellent instructions on the why's and wherefore's of studying bees, and gives lists of materials each child will need for each project. The first project looks at identification of honey bees and compares them to wasps and other insects. The

second project has the class construct a model nuc to observe how and why moveable frame hives work. The third takes a close look at individual cells, with egg, larva and pupa stages discussed. The fourth project looks at various flowers and the pollen they produce. Finally, the last project has the class cook something made with honey and then incorporate that recipe into their own recipe book of foods cooked with honey.

The detail included in this small but thorough package is excellent. It is not pretentious in its presentation, but does exactly what is needed for those using it. It is highly recommended for use with 2nd, 3rd and even 4th graders.

As you can see, all three of these packages are just what the doctor ordered. They put the information in the teacher's hands so the class can study the basics both before you arrive and after you leave. This alone will allow you to focus your talk on the finer points of keeping bees, or allow you to expand on some particular point that you feel important. Moreover, when questions are asked, they will come from a better informed student (or teacher) and give you an opportunity to really dig into the skills of your craft.

The long term benefit of promoting these programs is, of course, a better informed public and ultimately a better informed consumer. You may not see sales or prices increase overnight, but by starting now, the beekeeping industry will be better off. You can put that in the bank.

To obtain these packages, contact the folks listed below:

- LET'S BUZZ THE SCHOOLS. Loretta M. Surprenant, W.H. Miner Agricultural Research Institute, Chazy, New York, 12921. Phone (518) 846-8020. Single copies are free. Multiples can be obtained if postage is covered.
- HONEY BEE STUDY BOOK. Philomen J. Hewitt, Jr., Honey Bee Museum and Research Center, 5¹/₂ Mile Road, Goshen, CT 06756. Phone (203) 491-2338. The Museum requires \$5.00 for a copy to cover reproduction and postage express.
- HANDS ON CLASSROOM UNIT. Ms. Kathy Hultgren, 155 Lovell Road, Holden, MA 01520. Single copies are free with SASE.□

FOR THE RECORD

Gleanings continually seeks accuracy in our publication. We recognize that errors do occur and use this space to correct them when discovered by staff or readers. Mistakes may occur in writing, editing or mechanical reproduction of the magazine. It is our policy to correct these mistakes. We encourage questions or comments from readers. Call (216) 725-6677 during business hours or write us at the address on the inside cover.

If you found the Answers to Testing Your Beekeeping Knowledge last month, give yourself an additional 5 points! They were printed on page 363, not 377. In the future, part of the test will not include finding the answers.



The A.I. Root Co. 623 W. Liberty St. P.O. Box 706, Dept. 8603 Medina, OH 44258

WAX MOTH CONTROL

By N. J. Gates Reprinted from Agriculture Newsletter, British Columbia

The lesser wax moth, Achroia grisella, is confined to most of the U.S., Vancouver Island and the south coast of B.C. The adults are 13 mm in length with a bright yellow head capsule, and silver grey to buff wings. The larvae are 15 -20 mm in length with white or grey bodies and dark brown heads.

The Bumble Bee Wax Moth, Vitula edmandsae, can be a problem for beekeepers throughout Western Canada. The adults are mottled grey in colour, approximately 20 mm or 3/4" in length with a slender triangular shape when at rest and ragged wing ends. Adults do not damage combs but larvae do. These larvae, upon hatching from the egg stage, are 15 mm or 1/2" in length and are white in colour with brown heads, but change to a deep pink as they mature. The larva and egg stages of the isect can over-winter in sub-freezing temperatures when protected within or between stored supers of comb.

Moth larvae feed on pollen residue, honey bee larval cocoons, debris on hive bottoms and possibly wax and honey. Dark combs are preferred, but light combs are at risk in extreme infestations. Lesser wax moth larvae tend to live singly in their own silken feeding tunnels close to the comb surface whereas in severe infestations, the Bum-

ble Bee Wax Moth will mass together in silken webs on the outside of stored supers between stacks as well as between and within combs in the supers. As they feed, these moths weaken the comb structure, eventually

causing it to crumble from the frames. In light infestations, damage will be minimal and can easily be repaired by honey bee colonies. Severely-damaged comb will be torn down by the bees and usually replaced with drone comb if placed within the brood nest.

These pests can usually be kept in peck if all supers (especially those conaining dark comb) are placed on August 1986 honeybee colonies each season. Although adult moths will lay eggs in cracks between supers and may actually enter colonies to lay eggs during the summer months, the population of larvae that hatch and survive in equipment when stored in an unheated building during the subsequent winter usually poses no problem for the beekeeper. However, populations will grow to epidemic levels

if the same equipment is left in storage for the next summer. Wax moths pose little problem for equipment occupied by strong colonies but can cause damage in equipment inhabited by very weak or diseased colonies.

Non-Chemical Control:

1. When weak colonies are attacked by wax moths, the beekeeper should remove as much of the webbing and as many moths as possible. The weak colony should then be united with a strong one.

2. Place all stored supers on strong colonies every season so that bees may clean out the moths. Lightly damaged comb will easily be repaired by bees. Heavily damaged comb should be placed in honey supers or in nucleus colonies where worker comb will likely be built to repair the damage.

> 3. Sort combs into light and dark before storage and store in separate stacks. This should avoid contamination of light comb. Maintain at least one inch of air space between stacks. Moth larvae will avoid well-

ventilated areas.

4. Store comb in an unheated building during the winter months.

5. Place a sheet of newspaper between each super to be stored. This prevents larvae from migrating throughout a stack of supers. Printer's Ink is repellent to the wax moth.

6. Bacillus thuringiensis (B.t.) is a

bacteria, several forms of which have been developed for pest control. This material is harmless to bees and man but deadly to wax moths. In the U.S., it is being marketed under the trade name, "Certan", but at present, is not registered for use in Canada.

Chemical Control:

1. Paradichlorobenzene (P.D.B.) is probably the safest and most readily available chemical fumigant for wax moth control. Most bee supply houses stock P.D.B. as do many drug stores. It is considered non-injurious to humans and animals. As P.D.B. vaporizes, a gas is formed which is heavier than air. Approximately four tablespoonsful of the crystal are placed on a small piece of newspaper or screen on the top bars of a stack of four or five deep supers of comb. The gas will flow down through



the stack. Care must be taken to prevent the gas from escaping through cracks on the sides or bottom of the stack by placing the supers on a solid base and taping all holes. A cover should be used to close off the top.

Do not use P.D.B. on combs containing honey intended for human consumption as the odour and taste of the gas is readily absorbed by honey. P.D.B. will not destroy moth eggs. Crystals should be replaced before they completely disappear if combs are to be protected in longterm storage. Continuous presence of crystals not only repels moths but will kill any moth larvae hatching after the initial application. If only a few supers are to be treated, they can be enclosed in a plastic bag with the P.D.B.

P.D.B. can kill bees so combs must be aired before being placed on hives. To be safe, air all combs in a warm environment for at least 24 hours. Forty-eight hours is recommended for combs gassed and stored at temperatures below freezing as gas residues are more persistent at cold temperatures. In general, combs are safe for use when you can no longer smell P.D.B. in them.

2. At one time, ethylene dibromide, methyl bromide and calcium cyanide were recommended as fumigants for beekeeping equipment. These materials are not registered for that purpose so should not be used. The use of ethylene dibromide is prohibited because it's residues will contaminate honey and pollen produced by hives using the fumigated equipment. Calcium cyanide and methyl bromide can be very dangerous if handled improperly.



TALKING TO SCHOOL KIDS ABOUT BEES

By STEVE TABER of Taber Apiaries 3639 Oak Canyon Lane • Vacaville, CA 95688

I have talked to lots of children in grade schools and high schools about bees. Also I have just realized that some beekeepers are nervous about doing that type of thing because they don't know what to say. The purpose of this article is to tell you how I tackle the problem. The formal presentation lasts about a half hour followed by discussion and questions that the students might ask. Teachers want me to bring an observation hive but I usually don't have one handy, and unless it has plexiglass sides instead of real glass it is dangerous. I also discourage groups of small children from visiting my apiaries since it is also dangerous. You should always have parental approval for children visiting an apiary because of bee stings. So here is my formal presentation which is divided into three parts.

The first part has to do with insects and how well the class teacher is doing his/her teaching. When the teacher asks me to visit the school I always ask whether the class has been studying in sects and studying bees in particular. I say to the class, "Let's test the teacher". I ask the children to tell me what a bee (or any insect) looks like and I will draw what they tell me on the blackboard. When the hands go up in the class, one child is selected to answer and usually the child will say "body" (interpret as thorax). I go to the blackblard and draw a big round circle.

What besides the body does a bee have? I get an answer such as, "stinger". So where on the body is the stinger? When there is no answer I go to the next hand in the air and the child will answer something like "stomach" (interpret as abdomen). So another elongated circle is drawn on the blackboard attached to the first circle. So what else does the bee have? Some child will say "legs". How many and where are they attached - on the body or on the stomach? Usually the first child will not be able to come up with the right answer and you may have to ask several children before you find out that one or two children who have



This is how I show what a bee or an insect looks like. Don't try to make it look artistic or better than the kids themselves can draw, just put all the parts in . You will be surprised at the favorable reaction.

been interested know almost all the right answers because they have done some prior reading and you find that the teacher has been doing their job.

I continue the line of questions trying f to call on all the students until I end up with a drawing such as the one in the illustration. Then I say that this bee which has a stinger, is like all ants, bees and wasps, but just females have stingers. None of the male ants, bees or wasps have stingers. All the rest of the female insects like flies, beetles and bugs, etc. have what is called an "ovipositor" which means a part of the abdomen or stomach that positions the egg when it is laid. But bees, ants and wasps have that part of their body modified into a sting.



Drawing by my son Brian of me lecturing to the children laying on my stomach on the schoolroom floor. If you want to get the kids' attention, lay down on the floor — try it, don't be dignified.

The second thing I ask the class is if they can think of an insect that doesn't have all the parts that are drawn on the board? Very few children (or adults either, for that matter) know that the only exception is the diptera (flies and mosquitoes) that have only two wings and not four. Remember you are really teaching the kids about nature and you know more than most of the teachers. In fact, I usually ask the teachers or mothers present if they can answer when no child can.

Then for the second part I ask the class to tell me what is the most important thing that bees do? Well, you get all kinds of answers and it's not unusual for some little tyke to come up with something like "the bee goes to one flower and picks up some pollen and takes it to another flower". So why is that important? Occasionally a child will *Continued on Next Page*

SCHOOL KIDS... Continued from Page 409.

give the correct answer that pollen transfer or pollination makes the flower produce a seed or fruit.

Then I get very dramatic and tell them pollination is so important that everything we wear and everything we eat has to be pollinated. After a long pause I ask if anyone can think of any exceptions? Someone will say "shoes" so I reply, "Shoes are made from leather, leather comes from a cow and the cow eats grass and the grass grows from a seed." Someone else will say "sugar" and I reply "Sugar comes from beets that grow from seed and sugar also comes from sugar cane that is a grass that grows from a seed." (Seed from sugarcane is produced for genetic and breeding studies.) Usually no one will come up with the exceptions of metal articles such as watches, belt buckles, etc., salt or cloth made from oil, like nylon.

Then to set the matter straight, and this is important to all of us, I say that bees do not pollinate all the plants that produce seed and fruit but that they are symbolic in representing all of pollination.

The third part is really the most fun because it really wakes up everybody in class, especially those blase mothers and teachers who may have thought that it was a waste of time being here. So I say to the children, "How many of you have seen ants all in a line, some going one way and some the other?" Most children will put up their hands indicating that they have seen columnms of ants. Then I say that bees "talk" to each other and ants "talk" to each other, that they "communicate". I tell them briefly about how bees dance. The problem for children is that there is no way they can see bee dances or other forms of bee communication without a great effort. Most of us can't take the time. So I come back to the ants, because ants are everywhere and make studying bee communication much easier.

"Do the ants have a teacher that tells them to stay in line?" A big chorus of "no" is heard. I lay down on my stomach in the middle of the classroom floor. I am very nonchalant as though this is the proper position to lecture from. At this point you have never seen so many little children or adults come to such complete attention! Try it — you can hear q^1 drop. After I have their attention, I magine right there in front of me a

column of ants. I have to be very careful, holding one hand over my mouth so that my breath doesn't disturb the ants and look carefully to see exactly what the ants are doing. Do they go straight ahead or side to side? (They go side to side a bit). I try to find a space between the ants of several inches and quickly, take my finger and rub across the path where the ants have been traveling. Then I sit back and see what happens. (The ants run around confused.) Next, I pick up an ant or two with my fingers and kill them by rubbing them hard between the fingers, smell my fingers and drop the ant remnants near the marching ants and watch what happens. (Alarm pheromone is released causing ants to open their mandibles ready to fight.) I hear a few "yucks", but keep going.

Then I stand up while all the kids and mothers return to their seats. I tell them that most ants lay a chemical trail by dragging the tip of the abdomen, the sting, on the ground and that other ant species lay a trail by stomping their hind legs. Yes, they do — its the truth (genus Crematogaster).

I tell them that some very smart professors at some of the greatest universities in the world have studied how ants lay trails, that they have extracted these chemicals and used them to make trails in the shape of a circle, or figure eight. When an ant is placed there it will follow a man-made trail. (E.O. Wilson at Harvard University and M.S. Blum at University of Georgia, and others.)

Even when talking to high school students, I lay down on the floor because you can't watch ants standing up and it is such a superb way of getting everyone's attention.

That concludes the formal (formal?) part. I then open it up for questions from the children limiting questions to one from each child. On closing, I tell them how to remove a bee sting by scraping it out and I leave some honey with the teacher. I ask the teacher if the children can have a taste of honey either now or at lunch. When I try to leave, the children follow me like I am the Pied Piper of Hamlin.

The next time you are asked to talk to kids of any age, don't hesitate. You might want to try some of the ideas I have presented here. Have as much fun as I do and good luck.□

BEEKEEPERS TALKING TO BEEKEEPERS

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August 1986



ABOUT FRAMES

By CHARLES J. KOOVER 1434 Punahou Street #709 Honolulu, Hawaii 96822

LANGSTROTH HIVES

In the year 1889 the A.I. Root Company of Medina, Ohio brought out the first dovetailed hive which they aptly named the Langstroth hive. For it embodied Langstroth dimensions and used ten frames. On his last visit to Medina in 1894 to see A. I. Root the Rev. L. L. Langstroth was photographed in the Root factory bee yard with this modern version of his hive which until today still carries his name. This hive embodied the Langstroth principle: "A top-opening movable-frame hive, in which the combs are attached to movable frames so suspended in the hives as to touch neither the top, bottom, nor sides; leaving, between the frames and the hive walls, a space of from one-fourth to three-eighths of an inch, called the bee space.'

In the early nineteen-twenties the original Langstroth hive started on the road to decline, for the Langstroth principle of the bee space was being gradually eliminated, until today there is but little of it left. Let's examine what happened.

First, the American lumber industry changed its standard for finished lumber from seven-eighths to twentyfive thirty-seconds of an inch in thickness. Hive manufacturers chose to manufacture their hives from this reduced thickness lumber and the results were that frames would no longer stay on the rabbets, even when end staples were used. Whereupon frame top bars were lengthened to the present 19 in. This eliminated the bee space between the ends of the top bars and the hive walls for bees would chink in propolis so frames could no longer slide on the supporting metal strips. Then came the worst fraud of them all, the Hoffman frame which closed the bee space between part of the frame endbars. And now to give it the final blow the Dadant and Sons hive manufacturing company of Hamilton, Illinois, has eliminated the frame end dlug supports altogether and the end lugs are resting on the rabbets.

August 1986

Thus the Langstroth hive is anything but a movable-frame hive any longer, as advertised. For it takes a great deal of prying to be able to remove a frame from the brood nest. And all this was brought about to cater to the large commercial producers in the mistaken idea that it would speed up their manipulation of brood frames for inspection.

That's what I wrote in an article published in the British bee magazine BEE CRAFT, March 1971. That was fifteen years ago and nothing has changed since to make me change my mind.

However, it would take but little effort to go back to the original Langstroth hive. Just 2 things at practically no expense. And since bee supply manufacturers will not make the change it is up to the beekeepers themselves to make the correction.²

Here is what you have to do. Go to a carpenter shop and ask for a scrap of 1/8 inch thick plywood. It will cost you practically nothing. With a pocket knife cut out a piece to fit each end-wall of your super. First take off the tin rabbet on which the frames rest. Now nail on this thin piece of plywood. This will restore the thickness of each end-wall to the original Langstroth thickness so you can shorten the top-bars of your frames to the original length of 18 ³/₄" instead of 19". That's all there is to it.

Next, get rid of the biggest problem of all — the Hoffman spacings on your frames. Plane them off. Now you are ready for PERFECT spacing. Buy 1" screw-eyes (what goads me is, that we have to import screw-eyes from Taiwan as if we don't know anymore how to manufacture those). Use 4 of them on each frame. Two of them in each top-bar and 2 at the bottom, at the end of each end-bar. When you lower a frame in the brood-nest you won't kill the queen for the staple will provide a bee-space when you ride that frame down against the wall of the end-wall. If you do just this, you will enjoy your bee-keeping like you never enjoyed it before. But read on, there's more

Reprint from BEE CRAFT: THE DR. MILLER FRAME

The other day I received a letter from Mr. D. H. Moore of Mineralwells, West Virginia. What he wrote is just the way I think, so I decided to let you share it with me. This is what he said:

"There is a large percentage of beekeepers who are not satisfied with self-spacing frames and narrow bottom-bars. But we have no other choice. Hive bodies can be made by the beekeeper if he has a power saw. But frames are hard to make without automatic equipment. Just because it was decided fifty years ago to make hives and frames by the dimensions they finally arrived at, it does not prove anything.

"We can learn more from the bees than from man if we will experiment a little bit. The reason bees build combs between frames, as anywhere else, is wide spacing. Hive bodies are made 9 9/16" - 9 5/8" deep. Frames are made 9 1/8" deep. When you place one hive body on top of the other you have a space between bottom-bars and top-bars 7/16"-1/2". Then with that 3/4" bottom-bar is it any wonder bees build comb between them? Where bees can't crawl through they will glue it up, and if the space is over 1/4" they will build comb in it. It's just that simple. Bees don't have to be crowded for room to build comb between bottom-bars and top-bars of frames. The reason for doing this is, that they feel restricted by the use of comb foundation with worker size cells.

"It is in the nature of bees to raise drones because they have got to have them. But between bottom-bars and top-bars is a poor place to let them do it. Here is how to stop it. Frames with top-bar, bottom-bar and end-bars all the same width. And staple spaced 1/4" between the frames, and 1/4" space between bottom-bars and top-bars.

"I want to make it clear right here that I am not against comb foundations. I have kept bees forty years and have always used factory equipment. But I have always had trouble removing frames from hives on account of burr combs, drone comb and propolis. Also mad bees, drowned bees, queens killed and a mad operator.

"The things that I have suggested will work if beekeepers will only try them. The only way we can get a change in equipment is to keep after the manufacturers."

Well, there you have it. It leaves me speechless. For everything he wrote is as true and clear as daylight on a bright sunny day. I can't add a single suggestion for he hit the nail smack on the head. When you get a letter like that there must be a thousand other beekeepers who don't write but must feel the

Continued on Page 415



B eekeeping seems to be in an unusual situation. I'm sure the situation has existed for years but its none-the-less different.

One doesn't have to be in beekeeping long before realizing that it's an old craft that has not exactly rushed into the forefront of modernization. That may sound bad and in some respects it may be - in other respects, maybe not.

For a long time I was (and to a lesser extent, still am) concerned because beekeeping seemed to attract so few young people. I realized beekeepers frequently take their kids to beekeeping functions, but I suspect many of those kids would not have been there if they were given their choice.

I've been able to justify that concern by admitting that beekeeping activities probably pale for younger people when compared to water sports, electronic games, computers and the opposite sex.

Now I don't have data to support this hypothesis, but I suspect that many people start beekeeping later in life after

they've "slowed" some. If this is true, then it supports one aspect of the conjecture offered above - "some people get involved in beekeeping because it is an old established and rewarding craft". We've all heard so many

times from non-beekeepers, "Yes, my grandfather (or some other appropriate relative) kept bees. He always had them just behind the barn". Beekeeping is a craft, or art in some cases, that has endured. Many people turn to such a stable venture for the secureness of an older day, using procedures that some preceding relative used and smelling the odors of days long past.

ELECTRONIC EDUCATION IN BEEKEEPING? By DR. JAMES TEW

The Agricultural Technical Institute Wooster, Ohio 44691

The strangeness of beekeeping is that the individual new to beekeeping watches cable television, has a microwave oven and maintains his personal records on his home computer. The question becomes how to

use current technology to transfer information about an old craft without damaging the "aura" of the craft. Secondly, another major area is what new concepts, techniques, or devices should be incorporated into the craft that would be viewed by most established beekeepers as an improvement to the industry.

Beekeeping is certainly not alone in this dilemma. I own an excellent hunting knife (that I use for fishing). It has a plastic handle instead of bone. Bone has class and character. Even with plastic's ruggedness and endurance, somehow something seems to be missing. Does one build a vintage model wooden boat and use the finish of the period or use today's durable polyurethane varnishes. In most instances the latter. If money were no object, would one purchase an old style 35mm camera with which the photographer makes all the calculations or today's electronic whizzes that do everything automatically. Potential examples are innumerable, but in each case



the improvement seemed to take something from the original concept. Maybe that's how progress works. I expect 25 years from now one could say the same about today's automatic cameras as they are replaced by laser disc

videos in which the photographer selects a print from great numbers of "proofs". I don't know.

Video tapes have been well received by the beekeeping community. The demand for high quality material is great. At the Ohio State University, Dr. Robert Page and I have experimented with the College of Agriculture's microwave telecommunications system. With this .75 million dollar system, J can present lectures from Wooster to Page's class in Columbus (100 miles away) and vice versa.

In the near future, the potential of satellite uplink systems offers the possibility of broad-

casting information literally all over the world. And computers — beekeeping has not even scratched the surface. An entirely new frontier is only now beginning to be explored by some.

All this technology to transmit information about a craft that has changed very little in 75 years. One of beekeeping's many challenges is to modernize and stay productive, but to protect its charisma. It is somewhat

of an unusual situation.



fully, to get trees into the ground in September.

BEE TREES



By ARNOLD and CONNIE KROCHMAL 119 Bell Road • Asheville, NC 28805

For the hobby or sideline beekeeper a dependable source of nectar and pollen can help assure a good honey harvest. We use ornamental plants around our place in western North Carolina as a means of providing nectar and pollen, with the additional advantage that we do not use chemical sprays. In past years we have suffered losses because neighbors have used chemicals. Our ornamentals help keep our bees closer to home.

We select trees for our landscape and property line plantings with an eye for their usefulness in the artistic sense, as well as their value to our bees.

Each spring a very warming sound is the enthusiastic buzzing of our bees in April on our several redbud trees, attractive to bumble bees as well. This species blooms early enough to provide nectar before most plants are ready.



d If you decide to plant "bee-trees", be sure you get the variety size appropriate for your needs. Sometimes some grow too tall, so ask your nurseryman about the variety chosen.

Important is a good planting hole with adequate drainage at the bottom. We place the top soil in the bottom, mixed with about $1\frac{1}{2}$ #10 cans of peat moss. A good mulch of pine bark, pine needles, or, if available, cypress mulch is suggested.

We prune back any broken branches, but no more than that. We feel that cutting back the top to balance possible root damage removes growth hormones often produced in growing tips of the top.



The following list of bee trees is not meant to be complete, but includes many of those used in landscaping and in various zones of the United States which are sources of nectar and pollen. If you have one in mind that isn't on the list, send its name to us with a stamped return envelope we will try to help.



Fall planting when the plants are close to going into dormancy is a common practice. There are less problems due to water loss as the cooler air helps minimize transpiration.

Fall plantings are a good idea if you live in a region without extremely cold or severe winters, and should receive a little extra care in the form of site preparation, as well as the use of a mulch, just to be on the safe side. For best results, most needle and broadleaf evergreens seem to prefer fall planting.

The use of container-produced trees from nurseries simplifies fall planting, although we try, not always success-



(All drawings are courtesy U.S.D.A.)

Continued on Page 414.

BEE TREES . . . Continued from Page 413.

alder (p) ash (n) Australian bush cherry (Eugenia) (n) bayberry (p) birch (p) black gum (n) black locust (n,p) bottlebrush Brazilian pepper tree (n) buckthorn (n) caesalpina laurel (n) cajeput (n) California laurel (n) carob cassia yellow, golden shower (n) catclaw (n) chaste tree (n) chinaberry (n) Chinese tallow tree (n) cork tree (n)

crape myrtle (n) dogwood, flowering (Cornus) (n) dogwood, Jamaica or Florida (Piscidia) (n) dombeya or pink ball (n) elderberry (n) elm (n) guava (n) hawthorn (n) holly (n) honey locust (n) hoptree (n) ironwood (n) Jerusalem thorn (n) lychee (n) madrone (n) magnolia, southern (n) maple (n,p) mesquite (n) mountain mahogany (Cercocarpus) (n) mulberry (n)

osage orange (n,p) pepperbush (n) persimmon (n) poinciana (n) raintree (n) red bay (n) red bud (n,p) Russian olive (n) seagrape (n) silk oak (Grevillea) (n) sourwood (n) sweet gum trifoliate orange (n) titi (n) willow (Salix) (n,p) willow button (Cephalanthus) (n) yellowwood (n)

> n - nectar p - pollen



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ABOUT FRAMES... Continued from Page 411.

same way as he does. But you don't have to take it lying down. When Dr. Miller designed his frame there was no electricity and no power-saws. Today it is no trick at all to make your own frames like he made them almost a hundred years ago. And they won't cost you one red penny except for the time you put in making them. I'll tell you how. If there is a woodworking mill in your town or a furniture factory or any other outfit that makes things from wood you will find they have scrap bins out in back full of nice clear pine they can't. use. It's yours for the hauling it away. And the largest mail-order house in the world has just reduced their table bench saw with 1 h.p. motor and a 71/2" blade that cuts through wood up to 1 7/8" thick. It tilts to 45°. Blade guard and permanently lubricated ball bearings. All for \$49.99. What more do you need to make your own hives and frames? You can rip your top-bars and end-bars and bottombars on this saw. Here are the dimensions as Dr. Miller gave them in his book Fifty years among the bees. This is what he wrote on page 76. "Miller frame. The frame is of course the regular Langstroth size, 17 5/8" x 9 1/8". Topbar, bottom-bar, and end-bars are uniform in width, 1 1/8" throughout their whole dimensions. The top-bar is 7/8" thick, with the usual saw-kerf to receive foundation. The length of the top-bar is 18 5/8", and 7/8" x 9/16" is rabbeted out of each end to receive the end-bar. The end-bar is 8 9/16" x 1 1/8" x 3/8". The bottom-bar consists of two pieces, each 17 5/8" x 1/2" x 1/4". This allows 1/8" between the two parts to receive the foundation, making the bottom-bar 1 1/8" wide when nailed."

Later on he thought a one piece bottom-bar might perhaps have been better. If the good Doctor were alive today would he have a good time with all those modern shop tools?

He made a better frame than you can buy today, for the simple reason that the bees like his frame best.

Don't get me wrong, I am not trying to put the hive manufacturers out of business. They are cramming the Hoffman frame down our necks and I don't like that frame. So we have no choice but to make our own.

EDITOR'S NOTE:

It is my contention that frames can still be moved with a 19" top bar. There is an end staple available that is a great improvement on the standard staple. It's advantage was that it makes the 18 3/4" top bar frame practical in that it does not crush into the end bar and let the frame fall into the super. Gradually, however, "long top" sales exceeded "short top" sales and "long top" frames were considered standard. Migratory beekeeping has also helped standardize the "long top" as it helps hold all frames in place better during the rigors of movement.

²Supply manufacturers did not make the change from short to long top frames. Beekeepers selected long frames about 2 to 1 at first, then 10 to 1 when both were offered.



MAILBOX... Continued from Page 382

expressed as concisely in any general history book. But the concept is one the average American soaks up daily in school work as a child, in church, in the pages of favorite newspapers and on television.

The Africanized bees which developed in Brazil were a dynamic, natural punishment for our complexities. Newspapers, steeped as they are in the culture they report, could not help but to herald their coming.

The Africanized bees had qualitiies which represented existing struggles already taking place within the fabric of American society. First, they were of African descent. The racial overtones are obvious, as are their Old World roots. Second, they were said to be a product of scientific error. Americans are skeptical of science even as they turn to it to provide a solution to killer bees. An analogy can be found in our opinion of nuclear energy. We fear it and at the same time we depend on it. Third, the bees represented a physical invasion of our country, something we fear the Soviets or the Chinese actually will do. A parallel also can be seen with the invasions which take place each day by illegal aliens from Mexico.

These qualities make it clear that the fact the invaders were bees clearly was secondary. Although there were some local actions against existing U.S. beekeepers, deep down in their hearts the bulk of the American public knew that what was being discussed here was much greater than mere insects.

The newspapers and electronic outlets continued to stoke these fears because news decision-makers sensed the deep meanings tapped by the killer bees. Reports are legion of facts distorted and omitted in the pursuit of a killer bee story.

The killer bee myth has given way to Acquired Immunity Deficiency Syndrome (AIDS) as the media's scare story of choice in much the same way that flying saucers and Bigfoot gave way to killer bees. AIDS, too, has a foreign origin and represents a natural invasion of the U.S. territory. In fact, a whole article could be written on the similarities of the AIDS scare with that of the killer bees. Both, for example, can be quantified: X number of AIDS victims die; the bees are moving at a rate of 200 miles a year.

Taken in this light, beekeepers can see that to treat the killer bee issue with public relations maneuvers is not enough because the fears engendered go to the heart of American psychology. Fortunately for beekeepers, the killer bee scare really has very little to do with honey bees.

> James J. Brodell School of Journalism Southern Illinois University Carbondale, Ill. 62901

Dear Editor:

Series of Events Brings Speaking Honor: The Stonleigh Spring Convention of the British Beekeepers Ass'n. was held April 19, 1986 at the Agriculture Center outside Leamington Spa, England. Darl Stoller of Latty, Ohio was invited to be guest speaker from the U.S.; however, at the last minute, circumstances prevented Mr. and Mrs. Stoller from attending.

This meeting is a one day affair, with planning that draws 2000 plus people from all over England and foreign countries. It is billed as the largest one day beekeepers meeting in the world and I would concur. The lecture hall seats 230. Tickets are sold in advance, and were sold out two weeks before the meeting.

The commercial hall was filled with 67 commercial booths. I was impressed by the amount of woodware, foundation, extracting equipment, and other supplies available for sale. One could observe this material being carried to the cars by the armload. Apparently this is the time and place many purchase their supplies rather than by mail order or local suppliers as we do in the States.

I would be remiss if I didn't express my very special "Thanks" to Mr. and Mrs. Karl Showler, Administrative Officer, IBRA, for their hospitality and their efficiency in handling details. I am very grateful for the hospitality shown me by the entire BBKA.

I had the honor of attending the Convention Dinner on Friday even-





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Use it to keep brood out of honey supers. This will also keep your extracting combs light in color (dark combs darken honey).

An excluder may be used as an aid in finding the queen. Place an excluder between two hive bodies. Return in a few days to determine which part has the queen. You can tell without actually seeing the queen. Find the eggs and will you know which hive body has the queen.

Use an excluder and a honey super to separate a queenright colony from a nuc placed on the top of the hive for raising your own queens.

Double excluders will keep two queens safely apart in a two queen system.

Excluders are useful for emergency swarm prevention. An excluder placed on the bottom of the hive just might keep the bees from swarming until you can hurry back with another hive to put them in, but don't delay.

If there is more than one way to use a piece of equipment you will double your investment. When purchasing your excluders be sure to ask for Root! Quality counts!

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VARROASIS OF BEES

Tobacco smoke detection

By Ministry of Agriculture, Fisheries and Food (Publications) Lion House, Alnwick, Northumberland NE66 2PF BL 5282

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Varroasis is the parasitisation of adult and larval honey bees by the mite Varroa jacobsoni.

It is established throughout continental Europe, and there is always the threat of its introduction into Britain and elsewhere in the world.

The mite could be brought in accidentally in ship- or vehicle-borne swarms or by feral colonies. Two colonies have already been discovered on ships from abroad — fortunately without varroasis. However, the disease may have come in undetected. It might have been brought in illegally with queen bees and their escorts, or even in bee colonies. Varroasis could be here now. (Holland)

To develop effective controls, we must discover as soon as possible if it is preent. We must also guard against future introduction.

VARROASIS DETECTION

Quick knock-down detection techniques, involving the use of acaricidal fumigants, are now employed in many infested countries. Of the methods available, the tobacco smoke detection technique as developed by Dr. A de Ruijter of the Netherlands Ministry of Agriculture is simple, cheap, quick and effective.

Tobacco

Ordinary pipe tobacco has been used with success.

Dose per colony

The smoke from only 3 g is used for normal-sized colonies; that from 2 g is sufficient for small colonies. Fig. 1 shows 3 g held in the palm of a man's hand.

It is important *not to overdose* a colony or bees may be killed. A simple method of obtaining the correct amounts without the aid of special scales is to divide a 25 g packet of pipe tobacco into eight or twelve equal portions.



How and when to use

The method should be used only when colonies have little or no brood. This ensures that all mites present are exposed to the smoke, and not protected inside sealed brood cells. To minimize any risk of contaminating honey with nicotine, tobacco smoke should *not* be used during a honey flow.

In Holland the use of tobacco smoke has proved to be most effective in October. However, it can also be used in March, and in broodless colonies and artificial swarms during the active season, but *only* outside honey flow periods and when the minimum night temperature is forecast to be not less than 10° C.

THE 12 STEPS TO TAKE

- 1. Wait until the bees have stopped flying in the evening.
- 2. Hive floor boards must be free of wax, propolis and debris.
- 3. Remove the entrance block.
- 4. A flat sheet of light-coloured paper ('the insert') cut to a size to cover the floor area should be slid into the hive entrance (Fig. 2). Decorator's lining paper is suitable, but any reasonably robust paper or soft corrugated cardboard may be used. *Note:* The hive in the illustration is a single-walled Smith type. All types of single-walled hives can be treated in the same way.



1g. 2

- Close the hive entrance with newspaper.
- 6. Push a lightly compacted piece of newspaper about 16 x 12 inches into the bottom of the smoker and get it well lit. Wait until the paper has almost burned and compress it lightly with a hive tool to ensure the smouldering remains cover the mesh bottom of the smoker.
- 7. Quickly add the pipe tobacco, close the smoker lid and gently work the bellows until tobacco smoke is produced from the smoker nozzle.
- 8. Make a small gap at one side of the hive entrance and insert the smoker nozzle (Fig. 3). Then introduce the smoke smoothly with slow, regular and full squeezes of the bellows. In this way cool smoke is produced and all the tobacco burns in two to three minutes.



Fig. 3

- 9. Close the hive entrance with the newspaper.
- 10. Early the next morning, before the bees are ready to fly, take out the newspaper blocking the entrance, remove the insert and replace the entrance block.
- 11. Since varroa has not been found in the United States yet, you should not find any debris on the insert in the morning.
- But it never hurts to be prepared.□



y knowledge of how Washington really works is increased with each trip to the "hill". This last was no exception (June 16-21). I will share some of the fine points of working the halls of Congress.

Before meeting with a member, I feel it is best to become acquainted with the Legislative Assistant who handles our line. If he has received mail from a constituent beekeeper, he will certainly go beyond the informal courtesy line. Also, it is good business to learn the staffer's and member's background (Is he a free trader? Is he critical of the Administration? etc.).

A sound basic rule is to be kind to staff members. They are human like us and appreciate being treated as such. Beyond a courteous conversation we sometimes express our pleasure with a gift of honey for everybody in the Member's office and lunch with the key staffer at his/her choice of restaurant. If by chance we have discussed our problem with the Member without the key staffer's knowledge, we feel that we must update this aide so that a record will be made and he can refresh the boss's memory.

Visits with staffers of the Member should last no longer than ten minutes at most unless we are asked to stay longer. It is always fruitful to leave some information — preferably a page.

In the past, several of our fruitful contacts have been made walking with the Member down the hall (obviously this is not possible unless one is well acquainted). If we do not have a good rapport with the Member, I hesitate to do any button-holing at chance meetings.

WASHINGTON SCENE: THE "INS" AND "OUTS" OF COMMONSENSE LOBBYING By GLENN GIBSON Minco, Oklahoma 73059

The first order of business at chance meetings is to identify yourself as quickly as possible so that no time is wasted nor embarrassment caused while the Member gropes to remember you.

Follow up "thank yous" are a must, but this is seldom done. Later visits following an effort by the member finds us expressing thanks at the beginning and end of the interview. Constituent beekeepers need to write a short note expressing thanks. Over the years we have been neglectful in telling our grassroots membership about what our friends in Congress have done for us. I remember Senator Bob Dole's words very well when he said: "I saved your honey program, please tell the Kansas beekeepers".

Other "do's" and "don'ts" include such things as keeping feet on the floor, not on the desk, and using the pay phone down the hall. Never use the association's clout as a threat. Always the approach must be positive. In no case will we let our contacts forget us. It is like working a sales territory. Stops with our regular contacts are made periodically. At all costs we will avoid the "fox-hole prayer approach" where you only go to see the member at the last minute to try to get help on a problem that had gradually gotten worse during the preceding months. If we did wait, I would expect the member to say, "Why didn't you explain this to me last year?"

Effective lobbying calls for concerted action of two groups. They are: Beekeeper members in the state and congressional districts; and A Washington representative or lobbyist.

The first — activity by members in the state — is our weakest point. Over the years I feel that we have done a creditable job in the halls of Congress where members have a fair rapport with their congressional delegations, but good member contact is the exception rather than the rule. In all instances, the beekeeper constituent contact counts more than a Washington representative. Not only is constituent contact necessary, but it is equally important that the contact be kept alive by regular con-

tacts so that we will not be guilty of asking for help at the 11th hour when very little can be done for us.

It is our job as the Washington rep to keep the membership fully advised about any and all developments that affect our line. We must send them a consistent message as follows:

The degree of our success in the halls of Congress is in direct relation to the volume of propaganda going to Washington from constituent beekeepers. Also, we must be active well before the debate becomes heated.

Beekeepers, we hope you will be a part of the action. \Box

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SUPPORT PROGRAM TAKES OFF!

The following is a news release, dated July 10, 1986 issued by the USDA News Service.

Beekeepers, who have pledged 1986-crop honey as collateral for loans under the U.S. Department of Agriculture's honey price support and loan program, will be able to repay their loans at a level lower than the original loan rate.

Milton J. Hertz, acting executive vicepresident of USDA's Commodity Credit Corporation, said loan repayment levels will be set to induce beekeepers to repay the loans, and that the lower repayment levels will help minimize loan forfeitures, reduce excessive stocks of honey, reduce costs incurred by the Federal government in storing honey and maintain the competitiveness of honey in domestic and export markets.

Hertz also said beekeepers will be forgiven loan interest when they repay their loans at the announced repayment level. The CCC will announce the repayment level weekly for each color and class of honey. The repayment levels will be based primarily on the market price of honey.

Beekeepers who buy back their honey under the program may not repledge the same honey as collateral for another loan, Hertz said. These changes are scheduled to be published in the Federal Register.

The first prices to be published are \$.52 white, \$.46 extra light amber, \$.40 light amber and \$.375 for amber*.

The announcement of these prices will make available the new crop of US honey and give American producers some breathing room for the coming year.

We will have more information about the Support Program and it's effect on the industry next month.

*Repayment levels will be announced weekly. Information can be obtained m your county ASCS office or contact dur state ASCS office.□



SET OF TEN

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4-H ESSAY ... Continued from Page 388.

portance of the honey bee. Just as we work to insure the survival of the bald eagle, we must also work to preserve the honey bee through education, research and better management practices. The honey bee must continue to do its part to insure the future success of the world agriculture.

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Winner of the \$100.00 second prize was Kelli Bounds from Coushatta, LA. Ten years old, Kelli is an honor student in the 5th grade at Hall Summit High School and in addition to her 4-H Club activities, Kelli is involved in Girl Scout Troop #422.

The third place winner, Karen Koloshinsky, and recipient of the \$50.00 award, is from Latrobe, PA. Ten years old, Karen attends the Greater Latrobe High School and has been an active member of the Cloverleaf 4-H Horse Club for the past four years.

In addition to these cash prize winners, we also want to recognize the other state winners for their efforts. As winner in their state, the American Beekeeping Federation will present them with a suitable beekeeping textbook.

AMERICAN BEEKEEPING FEDERATION, INC. 1986 4-H ESSAY CONTEST WINNERS

- 1st Place Winner (\$250 cash prize)
- 1. Lowell Jones Rt. 1, Box 57 Dozier, AL 36028

2nd Place Winner (\$100.00 cash prize)

2. Kelli Bounds Rt. 1, Box 99-A Coushatta, LA 71019

3rd Place Winner (\$50.00 cash prize)

- 3. Karen Koloshinsky R. D. #3, Box 462 Latrobe, PA 15650
- 4. Aaron Morse P. O. Box 2813 Kenai, Alaska 99611
- 5. Regina Stewart Rt. 1, Box 127 Vilonia, Arkansas 72173
- 6. Peter Cousins 3865 Roeding Ceres, CA 95307
- 7. James Shahrigian 28 Gulf Road Stafford Springs, CT 06076
- Anabelle Reed
 P. O. Box 267
 Howey-in-the-Hills, FL 32737
- 9. Lee Webb 210 East Greenwood Dr. Carrollton, GA 30117
- 10. Christine Sherbert Box 258 Notus, ID 83656
- 11. Cameron Parrott R.R. 1, Box 18 Lovington, IL 61937

- 12. Angela L. McDonald 713 S. 9th St. Petersburg, IN 47567
- 13. Billi Jean Hunt Rt. 1, Box 17A Diagonal, IA 50845
- Keith Landgraf Imperial Rt. Garden City, KA 67846
- Wesley A. Waddle Rt. 2, Box 50 Munfordville, KY 42765
- 16. April Beal Beals, ME 04611
- 17. Joe Roland Rt. 2, Box 10 White Plains, MD 20695
- 18. Tim Hanna 533 Hill Road Boxborough, MA 01719
- 19. Brenda Gassman Rt. 1, Box 317 New Prague, MN 56071
- 20. Kelly Wade Black R.R. 1 Center, MO 63436
- 21. Rian Meguire R.R. 4358 Great Falls, MT 59401
- Sharon Dobesh
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- 23. Melanie Brady P. O. Box 96 Meriden, N.H. 03770

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- 25. Liana Bertoli Joe Bost Road Rt. 4, Box 339 Concord, NC 28025
- 26. Kelly Jean Chase P. O. Box 406 Plainfield, OH 43836
- 27. Amber Morrow 3738 Garden Valley Roseburg, OR 97470
- 28. Tom McNeely Rt. 8, Box 394 Easley, SC 29640
- 29. Tracey Scheich R.R. 5, Box 459 Mitchell, SD 57301
- 30. Leann McDaniel Rt. 1, Box 2 Washburn, TN 37888
- Denton French 1521 E. Industry Giddings, TX 78942
- 32. Donna Mae Jewell Rt. 2, Box 246-A Honaker, VA 24260
- 33. Karen Baird Rt. 1, Box 44 Gerrardstown, WV 25420
- 34. Bekki Jones Rt. 1, Box 309 Bedford, WY 83112

REFERENCE... Continued from Page 397.

comb. In this instance the figure eight, the snowman, would be upright with the insect turning to the right every time she traces out the snowman's belt. That's the azimuth.

Next then, one must know how far out upon that azimuth or line does the treasure wait? This is easier. She waggles her abdomen (as in any dance) with the measure of her enthusiasm relating a measure of the distance so, as the beat

of that unknown song grows more frenzied, the locus described is ever nearer the hive; the gentler beat represents farther points with intervening distances accurate in corresponding degrees of the rhythm.

I was as skeptical as the students, the doubt enduring even as the fine results of the discrimination tests began coming in. Even though I had marked bees at different stations, a certain color for each location, we all viewed the emergence of the painted bees from the pipe entrance at the window as more of a curiosity than as any prelude to a real test of von Frisch's wonderful discovery. We didn't want to test it, threaten the fragility of uch a fine story. Most of the bees behind the glass loitered at the edges anyway, seemingly indifferent to the location of a sugar source that had been there all week. We stood idly, marveling at the untested beauty of one dancing bee when suddenly, inexplicably, from the dark recesses at the edge of the glass a bee appeared, its pollen baskets loaded to overflowing with creamcolored pollen. As I have said, it was October, late October, well past the season of any flowers. This bee went straightaway out onto the comb and danced and danced, danced long and well enough for one of us to count waggles, another to time the duration, and another to record the angle of the supposed aximuth. At length, she ceased, expertly removed the loads of pollen, abandoned them at the edge of a cell, and wandered aimlessly into the moil of other bees.

Two lumps of pollen made unavoidable the challenge to our innocent praise of bee language. We retrieved the other students from the stations and together plotted the waggle frediency on a graph to get a calculation for distance. Then we went outside and found the sun, estimated the azimuth and began pacing it out, all simplicity and speed suddenly foreshortened when part of Birge Hall loomed square in the path. After some calculating and arguing and plenty of additional pacing, we began anew on the far side of Birge, having compensated for it, which is to say having done away with it altogether. (Did that bee do away with it?) We went along the original azimuth. Ultimately we found ourselves at the corner of Bascom Hall amidst a blossomless hedge of wahoo rimming the stone foundation.

There were no flowers anywhere. It was a quiet Saturday morning.

"We knew there wouldn't be any," one of the students said. "It's almost November for God's" sake."

"Right, so where'd she get it?" another asked.

They looked at me. I shrugged. It looked like pollen to me.

"Look," one shouted. She pointed straight up. Two stories above, a red flower peered over the window ledge.

We streamed into the Hall, raced up the stairs and into a secretary's office. The flower was her potted geranium. We requested to see it. Perplexed, she brought it in as she had been doing every night. We crowded at the surprised woman - there was even a little shoving - to inspect the tiny florets, the stamens of which bore the smallest cream-colored quantity of reall beevisited pollen. The student who had seen the flower stood back and shook her head increduously. Another leaned over the secretary-s shoulder and pushed his face into hers. He asked significantly, "Did you know there was a honeybee on that flower just " he examined his watch, his voice bubbly rich with certainty, "just . . . just 23 minutes ago? Did you know that?" He straightened and nodded his best now-how-about-that nod at her. She looked at me and I gave her the same nod.



MAILBOX... Continued from Page 415

ing, meeting the guests that shared the podium. Present were: Prof. J.B. Free, retired from the Rothamsted Researach Station, Margaret Thomas, Essex, who holds a National Diploma in Apiculture, the highest honor bestowed upon a non-graduate. Also, Prof. Charles Dublon of Wales Howell College and a member of the Welsh Beekeeping Advisary Committee. Other guests included, John Guilfoyle of Australia, Johanna VanHeest of the Netherlands, Cecil Tonsley of England, Vice Pres. of Apimondia, also the Pres. of the BBKA, and the Pres. of the Scottish Beekeepers Ass'n.

Plans are in the talking stage of the possibility of a Beekeepers tour of England for next year. Tentative plans would be a weeks tour terminating at the Convention site. If plans materialize, details will appear in this publication.

We tend to think that many of the basic problems and concerns of beekeeping are ours alone but it was interesting to hear the presentation of speakers from other countries plus the conversation of informal groups. Language may differ, methods of operation may differ because of weather and geography, but beekeepers everywhere share a common bond and share many of the same concerns that revolve around the Honey Bee.

> Charles B. Fischer 4001 Springfield Rd. Vandalia, Ohio 45377

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LANDSCAPING FOR HOME AND HIVE

By Diana Sammataro

Here is another garden for bees, this time one that contains mostly herbs. Most herb plants are perennials, that is they return year after year from underground root stock, not from reseeding themselves. Annuals, or those that bloom only for one growing season and are killed by the first hard frost, can be used as understory or filler plants. Their position in the garden can be changed from year to year to give it a fresh look.

As before, the specific plants listed can be replaced by those that are known bee plants in your area, or as available. The paving is not limited to brick but can also be of stone, gravel, woodchips or grass. For easy maintenance, edge the beds with bricks, wood or commercially available edging. Where applicable, under some numbers are listed alternative plants. Remember, tall plants to the rear, short in front. Have fun and happy gardening.

PERENNIAL PLANTS

No.	Names	Hl.
1	Salix caprea (French Pussy Willow)	20'
2	Cotoneaster multiflora (Cotoneaster)	
7	(or use annuals)	4'
3	Nepeta mussinii (x faasseniil (Cat Mint)	2'
	Allium schoenoprasum (Chives)	2'
4	Fragaria vesca 'Fraises de Bois'	
	(Alpine Starwbry)	8"
	Aster alpinus (Alpine Aster)	10"
5	Thymus spp. (Thyme)	2-8"
6	Baptisia australis (Blue Wild Indigo)	3-4'
7	Amelanchier spp.	
	(Shad blow, Serviceberry)	25-60'
	Cercis canadensis (Judas Tree,	
	Redbud)	36'
8	Malus coronaria 'Nieuwlandiana'	
	(Crabapple)	20'
	M. floribunda (Japanese Crabapple)	30'
	M. X zumi callicarpa (Redbud Crab)	20'
9	Hydrophyllum virginianum	
	(Va. Waterleaf)	1-2'
	Pulmonaria spp. (Lungwort)	1'
10	Symphytum officinale (Comfrey)	3'
11	Pycnanthemum pliocum	
	(Mt. or Downy Mint)	3'
12	Agastache spp. (Giant Hyssop)	3'
13	Sedum spectabile (Sedum)	2'
14	Lespedeza spp. (Bush Clover)	5'
15	Origanum vulgare (Wild Marjoram)	2'
16	Polemonium caeruleum (Jacob's	-
	Ladder)	3'
17	Marrubium vulgare (Horehound)	3,

		~
18	Campanula rapunculoides (Beliflower) .	3.
19	Papaver nudicaule (Iceland Poppy)	1.2'
	P. orientale (Oriental Poppy)	2.4'
20	Helianthus tuberosa	
	(Jerusalem Artichoke)	6'
	Silphium perfoliatum	
	(Cup Rosinweed)	4-8'
21	Aster spp	2-3'
22	Lavendula angustifolia	
	(English Lavender)	2'
23	Echium vulgare (Vipers Bugloss)	2.3'
24	Heuchera sanguinea (Coral Bells)	1.2'
25	Mentha spp (Mints)	2-3'
26	Chrysanthemum parthenium	
	(Feverfew)	1-3'
	Chrysanthemum spp. (Garden Mum)	1-3'
27	Echinops spp. (Globe Thistle)	3.5'

28 ANNUALS

Here is a list of some annuals bees will visit and can be used as fillers:

Bachelor's Buttons, Basil, Borage, California Poppy, Celosia or Cock's Comb, Cleome or Spider Plant, Coleus, Cosmos, Dahlia, French Marigolds, Nigella (Love in the Mist), Portulaca (Moss Rose), Shirly Poppy, Rosemary, Blue Salvia and Zinnia.□

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TABER

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ALTERNATE POLLINATORS Report on an Ontario Short Course

By HAROLD C. KILLINS 163 Trowbridge Avenue London, Ontario, Canada N6J-3M2

Dr. Peter Kevan was co-ordinator of this program at the Arboretum Centre, University of Guelph, Guelph, Ontario on April 12th. Mr. Bryan Goutouski of Bertland Farms Ltd., Vienna, Ontario was largely responsible for staging this event. He has extensive acreage of apple and elderberries.

The discussions centered around solitary bees. They differ considerably from hive bees in that their pupae live through the winter, while all adults die in the fall. They produce no honey, but live quite royally on summer blooms, pollinating as they go.

Of the ten speakers at the course, Dr. R. Boyle-Makowski, Canada Agriculture and Dr. P. Torchio, U.S.D.A., Logan, Utah, presented the most helpful inforation. Dr. Boyle-Makowski told of a collination insect survey she had conducted at the Vineland Research Station in the Niagara Peninsula over a three year period. Two colonies of hive bees were provided per acre in a clean cultivated apple orchard. 50-80% of the insects pollinating were hive bees, and most of the other effective pollinators were Andrenid and Halictid bees. These generally live in burrows in the ground. Most species in these groups require old sod as a place to make their homes.

These bees visited the blooms in fair-

ly constant numbers, whereas hive bees visitation varied considerably, with small numbers present under cool or cloudy conditions. Even though the hive bees outnumbered all other

types, they proved *less* efficient at pollination than bees of the other two genera. When there was warm sunny weather, the hive bees pollinated well, but in cool, cloudy weather the Andrenids and Halictids proved most valuable.

My own experience with these two families of bees in the London, Ontario area is quite different from that reported by Dr. Boyle-Makowski. In a sod pear orchard, I have large numbers of Andrenids and a few Halictid bees about every fourth year. In those years they outnumber the hive bees roughly ten to one, when two strong colonies of hive bees are used per acre. Other years their numbers are very small, and the hive bees do most of the pollinating. However, the hive bees work the blooms

quite poorly, probably because of the low sugar content of pear nectar and perhaps because of the smell of the pear bloom.

Becauses the winters are milder in the Niagara Peninsula than at London, I take it that Andrenid and Halictid prosper more there than in our area. At the moment I am unable to find any research people who have raised species of these bees in a manner that would make it practical to breed them for pollination of farm crops.

Two other types of bees considered were the Leaf Cutter Bees and Blue Orchard Bees. Both of these types in the wild rear their young in hollow reeds. Like Andrenids and Halictids, they produce no honey but work the blooms of orchard trees or forage crops in the summer doing excellent pollinating if on the proper crop. The adults die in the fall leaving many pupae in reeds or, under controlled conditions, in some form of

tube hive provided by those who use them.

The importance of Leaf Cutter Bees in pollinating alfalfa was emphasized by speakers from

New Liskeard College of Agriculture and from Ridgetown College of Agriculture. As few as 500 Leaf Cutter Bees apparently will pollinate an acre of alfalfa more efficiently than two colonies of hive bees. It seems that Canadian alfalfa seed producers are giving up on hive bees in increasing numbers and turning to Leaf Cutter Bees. One breeder of Leaf Cutter Bees in the Province of Alberta produced and sold seventy million Leaf Cutter Pupae last season. In orchards it has been determined that Leaf Cutter Bees are of little value in pollination, because they require a temperature of 70°F before they will fly. Strong colonies of hive bees send out many pollinators at temperatures 5°F to 10°F lower.

Dr. P. Torchio, U.S.D.A., Logan, Utah has studied Blue Orchard Bees, which are better pollinators in orchards than hive bees. There was great interest in his experimental work with these bees.

Dr. Torchio finds that they pollinate fruit bloom at temperatures about 4°C below those at which strong colonies of hive bees work. This should be a real advantage when cool weather prevails during orchard bloom. I was very pleased to hear that they work well in pear orchards.

A young man who produces Blue Orchard Bees in Indiana and supplies them



to orchards spoke and offered bees of this type for sale. Because of the fact that our climatic conditions are similar to those in Indiana and further, that we have species of Blue Orchard Bees that are indigenous to this

area, I feel that there are real possibilities for this type of bee in Ontario. \Box



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Answers To Testing Your Beekeeping Knowledge

- 1. True Studies analyzing the chemical composition of American honeys have shown that, generally dark honeys are richer in minerals than light honeys.
- 2. True Heather honey exhibits a distinctive property known as thixotropy. This honey is normally in the form of a gel. Upon being agitated or disturbed, the honey will become a liquid and pourable, but after allowing it to settle for several hours, it will revert to its jelly-like form. Therefore, special extraction techniques are needed to remove it from a comb.
- 3. False Honeys from the same plant source are generally lighter in color when produced during a fast and heavy honey flow than when they result from a slower honey flow. Orange blossom honey is one that shows great variation in this regard.

- 4. True Basswood honey is white in color with a rather strong minty flavor. In the northeastern United States packers may avoid buying basswood honey for fear the average consumer may not be familiar with it or find the minty flavor objectionable.
- 5. False The average composition of honeydew is different than floral honeys. Honeydew is normally lower in fructose and glucose in comparison to honey.
- 6. B) Privet
- Floral honeys that granulate rapidly; Alfalfa, Aster, Dandelion, Oil-Seed Rape.

Floral honeys that granulat slowly: California Sage, White Tupelo.

 D - Buckwheat, C - Gallberry, A - Black Locust, B - Basswood, C - Sourwood, C - Golden Rod, A,B - Sage, B,C - Clover

There were a possible 20 points in this month's test. 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.





Mead — The Nectar of the Gods. Look for more next month in Gleanings in BEE CULTURE.

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News & Events

* ALABAMA *

1986 Annual State Beekeepers Assn. Convention

The 1986 Annual Convention of the Alabama State Beekeepers Association is sponsored this year by the Beekeepers Associations of Mobile and Baldwin Counties, and will be held Friday and Saturday, August 1st and 2nd at:

> Riverview Plaza Hotel 64 So. Water St. Mobile, AL 36602 Ph.: (205) 438-4000

Rooms are \$50.00 per night for you and up to three additional persons in your party. Bring the family.

For more information and advance registration fees of \$35.00, mail to or contact:

Bill Wiesand, Secretary Mobile County Beekeepers Assn. 8101 Quimby Drive Mobile, AL 36619 Ph.: (205) 661-0842

Late registration fees of \$40.00 may be made between 8:00 and 10:00 a.m. at the Hotel on Friday, August 1st.

All Southeastern Beekeepers are invited to attend this entertaining and informative get-together.

★ ALBERTA ★

Beekeeper Technician Program Offered

Fairview College, in Alberta, Canada, offers one of the world's most unique opportunities to study beekeeping.

The Beekeeper Technician Program starts in January and runs for eleven months. The course is designed to train people to work with commercial beekeeping operations and prepare for careers as independent beekeepers.

The course is offered in three sessions. Session 1: theory of apiculture and honey production, including a one-month field trip to California.

August 1986

Session 2: work with the College's 300-hive apiary or established beekeepers. Session 3: learn business and management aspects of running a beekeeping operation.

For more information write to: Registrar, Box 3000, Fairview, Alberta, Canada TOH 1LO.

* CALIFORNIA *

UC Offers Public Access To Pest Management Data Base

DAVIS. California farmers can now access computerized weather and pest management data compiled over the last six years by the University of California Integrated Pest Management (IPM) Program.

The only costs are an initial \$13 for a system manual and phone line charges to link users with the computer at UC Davis. There is no charge for use of the system. The only obligation a user has is to complete an occasional questionnaire about the system.

According to UC Cooperative Extension IPM specialist Frank Zalom, here's what growers, pest control advisors, educators and others tapping into the IMPACT data bank can receive on their home or business terminals:

- Pest management guidelines that can be retrieved by specifying either a crop, a pest, a control (chemical or nonchemical), a publication number, or any combination of these factors. For example, for control of lygus on cotton, the computer would list several controls recommended by UC, the publication from which the information was gathered, application rates, cautions and other pertinent information.

- Meteorological data that includes daily temperature and rainfall records for 120 locations in California since 1951, current weather data, 3-day weather forecasts and a statewide weather summary. - A degree-day program that allows users to monitor the development of organisms and determine when or if control measures are needed.

- Pest and plant models for demonstration and educational uses.

 A state legislation tracking service that provides up-to-date reports of pending bills affecting agriculture.

- Electronic mail that allows system users to communicate among themselves.

- A calendar of events that includes the master calendar for UC Cooperative Extension, professional society meetings, commodity group meetings, and information from the Farm Bureau, Western Growers Association and other groups.

A CRT with modem or almost any microcomputer with a CRT, modem and communications software can be used to access IMPACT. To establish an account and obtain the users' manual, contact IPM Computer System Manager, IPM Implementaion Group, UC, Davis, CA 95616.

"This is an experimental phase of our operation to determine the usefulness of the IMPACT information to agriculture and related industries," explained system manager Joyce Fox.

Editor's Note:

Although this system was initially for growers, beekeepers in the are could certainly make use of this opportunity. If you have the required equipment, consider joining. The bees you save may be your own.

* FLORIDA *

American Beekeeping Federation Announces:

1987 4-H ESSAY CONTEST

The topic for the 1987 Essay Contest is "PRODUCTS OF THE HIVE AND THEIR USES".

In addition to honey, many other useful products come from the beehive. Some of these are regularly harvested by the beekeepers, while others are not. Study the biology of a beehive and identify as many of these products as possible and how, or for what, they are used.

Rules:

1. Essays will be judged on (a) accuracy, (2) creativity and (3) conciseness and logical development of the argument.

Continued on Next Page

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2. All factual statements must be referenced; failure to do so will result in disqualification.

3. Contest is open to ACTIVE 4-H members only.

4. Essays must be 750 to 1000 words long on the designated subject only. (This limit does not include the references.)

5. Essays may be typed or handwritten and MUST include a BRIEF BIOGRAPHICAL SKETCH of the writer, including COMPLETE MAIL-ING ADDRESS AND TELEPHONE NUMBER. (This information is not included in the 750 to 1000 word limits.)

6. Essayists should NOT FORWARD THEIR ESSAY DIRECTLY TO THE AMERICAN BEEKEEPING FEDERA-TION OFFICE. Each STATE 4-H Club Office is responsible for selecting that state's winner and may set their own deadline so judging can be completed at the state level in time for the winning state essay to be mailed to the ABF office BEFORE May 1, 1987.

7. EACH STATE MAY SUBMIT ON-LY ONE ENTRY.

8. Final judging and selection of the National Winner will be made by the American Beekeeping Federation's Essay Committee.

9. All entries become the property of the American Beekeeping Federation and may be published or used as it sees fit. NO ESSAY WILL BE RETURNED.

10. The winner will be announced by June 1, 1987.

AWARDS:

\$250.00 cash prize to the winning essayist.

\$100.00 cash prize to the 2nd Place winner.

\$50.00 cash prize to the 3rd Place winner.

A copy of an appropriate book about honey bees and/or beekeeping will be presented to the other state winners.

For more information contact:

The American Beekeeping Federation, Inc., 13637 N. W. 39th Avenue, Gainesville, Florida 32606.

Beekeepers Institute 4-H Camp Ocala PROGRAM

August 15

1:00 p.m. Check in at Camp Ocala
2:00 p.m. Beginner's Hive Demonstration
5:00 p.m. Dinner (Cafeteria)
7:30 p.m. Equipment Assembly, Jerry Latner, Dadant & Sons, and "Show and Tell," informal exchange of ideas about bees and beekeeping. Bring your gadgets and ideas!

"Bees and Honey," the first three of six half-hour video tape programs on beginning beekeeping

August 16

7:30 a.m.	Breakfast, Cafeteria
8:50 a.m.	Welcome - Terry Courneya,
	Extension Director, Lake
	County
8:55 a.m.	Introduction and Remarks -
	Tom Sanford, Extension
	Apiculturist, U of Florida
9:05 a.m.	Florida's New Bee Law -
	Laurence Cutts, Chief Apiarist
9:20 a.m.	Activities of The Florida State
	Beekeepers Association
9:35 a.m.	Bee Research Perspectives -
	Glenn Hall, Honey Bee
	Research Geneticist, Dept. of
(m)	Ent., U. of Florida
10:30 a.m.	Honey Bee Behavior - Alan
10.00 0.00.	Bolten Dent of Zoo. U. of
	Florida
11-15 a m	Long Range Planning in Exten-
11.10 4.111.	sion Apiculture - Tom San-
	ford Ext Aniculturist II of
	Florida
19-00 noon	Lunch
1:00 nm	Open-hive demonstration
5.00 p.m.	Dinner (Cafeteria)
7:30 p.m.	Honey and its Uses - Tom
1.50 p.m.	Sanford and Clinds Burnett
	Dent of Ent II of Florida
	Dept. of Ent., O. of Florida
	or
	Presting Queen Penning
	Alan Baltan
	Alan Bolten
	or
	"Rees and Honey" concluding
	set of half-hour programs on
	beginning beekeening
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August 17

7:30 a.m. Breakfast (Cafeteria)
9:30 a.m. The Information Age and Beekeeping — Tom Sanford

Concurrent session outside

- 11:00 a.m. Evaluation
- 12:00 noon Lunch and adjourn

Registration for the Beekeepers Institute is \$55.00 per person. This includes two nights lodging and six meals (dinner on Friday through lunch on Sunday). Those registering for one day will be charged \$30.00 to cover insurance and meals only. PREREGISTRATION IS A MUST TO RESERVE SPACE; A LATE CHARGE OF \$15.00 PER PERSON WILL BE ASSESSED AFTER AUGUST 1, 1986.

For more information and registration, contact:

Dr. M. Tom Sanford University of Florida Dept. of Entom. and Nematology 202 Newell Hall Gainesville, Florida 32611.

\star LOUISIANA \star

The 1986 American Bee Research Conference

All research scientists are invited to attend the first American Bee Research Conference to be held at the Agricultural Center on the campus of Louisiana State University at Baton Rouge on October 7 & 8, 1986. Scientists from all countries are invited to attend and present papers.

Procedures for submitting titles and abstracts:

1. Presentations and abstracts are restricted to research work involving the genus *Apis*. Previously published work is not acceptable. Presentations of current research and of articles submitted for publication are encourage Abstracts will be published (typeset, not camera ready) as the "Proceedings of the 1986 American Bee Research Conference" in the December issue of the *American Bee Journal*. Publication of an abstract does not preclude later publication in a journal requiring unpublished work.

2. Titles must be received by September 15, 1986 by John Harbo, Honey-Bee Breeding, Genetics and Physiology Laboratory, 1157 Ben Hur Rd., Baton Rouge, LA 70820.

3. Abstracts must be received by the Program Chairman by October 8. However, authors are encouraged to mail their abstracts to John Harbo, Local Arrangements Chairman, or to Joseph O. Moffett, Program Chairman, before the meeting.

4. The maximum length of an abstract will be two, double-spaced, typewritten pages. The title and any table or figure are included in this space limitation. Figures and photographs with captions count as one complete page.

5. Graphs and photographs will be

Continued on Next Page GLEANINGS IN BEE CULTURE

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reduced to 3¹/4" (8¹/2 cm) in width and should be submitted as glossy photographs.

6. Each speaker will be allotted 15 minutes for a presentation. The actual talk should be 12 minutes to allow time for discussion.

Registration and Lodging:

The registration fee for the conference will be \$15, and there will be an additional charge of \$40 per abstract to cover printing costs. Reprints will be available.

A single occupancy room at the LSU hotel on campus will cot \$29 per night; double occupancy will be \$35.50. Reservations for room should be made with John Harbo at 504-766-6064 or at the address given above.

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★ MISCELLANEOUS ★

Western Apicultural Society Holds Annual Meeting

The Western Apicultural Society of North America will hold it's annual meeting on August 18-22, 1986, at the University of Victoria, Victoria, British Columbia, Canada.

A one day short course will be offered on Monday, August 18th. The short course will take an in-depth look at the preparation and judging of liquid and creamed honey and candles. There is room for only 35 participants so early registration is recommended. To obtain registration materials, schedules, etc. contact: WAS 86, 749 Haliburton Road, Victoria, B.C., V8Y 1H7 Canada.

* MONTANA *

Honey Show

A special open honey show will be held to honor American Honey Queen De Ann Rahija, August 9-16, 1986, Billings, Montana. FAIRTIME Yellowstone Exhibition and Eastern Montana Beekeepers Association will sponsor the honey show. Entries can be sent to FAIRTIME Yellowstone Exhibition, Department L-Culinary, P.O. Box 2514, Billings, Montana 59103. Entries are to arrive prior to August 7, 1986. The fairgrounds will also be open for reception of exhibits. Return postage must be sent with exhibits.

Honey Queen De Ann Rahija will judge the entries. Entries that are sent by mail or UPS must have the name of the exhibitor together with a list of entries and lot numbers enclosed in the package.

Those who want a complete 1986 premium and honey show catalog list can request it from FAIRTIME Yellowstone Exhibition, P.O. Box 2514, Billings, Montana, 59103 or contact: Albert G. Bell, 2857 Colton Blvd., Billings, Montana 59102. (406) a656-4806.

* OHIO *

Summer Seminars at ATI in Wooster Comb Honey Production

August 18-19. Covers all aspects of producing comb honey.

All seminars originate from the new fully equipped facility. For more information on this or any Beekeeping Seminar, contact Dr. James E. Tew, The Ohio State University, Agricultural Technical Institute, Wooster, Ohio 44691, Phone (216) 264-3911.

★ VERMONT **★**

The Vermont Beekeeper's Association will be holding its annual summer meeting on August 2, 9:30 a.m. to 3:00 p.m. at Knight Point State Park, North Hero Island.

Featured speakers are Prof. V. R. Vickery from McGill Univeristy, who will speak on his work with outdoor wintering of hives and nucs in Quebec; Kirk Webster from Middlebury will speak on raising queen cells the easy way; Charles Andros from Walpole, NH, will speak on trapping pollen for health and profit. All are welcome. For more information call Frank Heyburn at (802) 849-6067.

★ FOREIGN ★

The Seventh National Brazilian Congress of Apiculture will be held from October 7 to 11, 1986 in the city of Salvador, Bahia. This will be a good opportunity to see what successful beekeeping with the Africanized bee is all about. Well over a thousand beekeepers and bee scientists are expected from all over Brazil, as well as most of the other South American countries. The official language is Portuguese, though part of the organizing committee, many of the students and most of the professors speak English. The talks will be given in Portuguese, though anyone who understands Spanish will be able to keep up with what is happening.

There will be sessions with oral communications and poster sessions concerning the following general themes:

- 1. Bee Pathology including Varroa
- 2. Management techniques for Africanized bees
- 3. Meliponids (stingless bess)
- 4. Genetic improvement
- 5. Honey plants
- 6. Pollination
- 7. Queen and royal jelly production
- 8. Honey handling technology
- 9. Honey analysis
- 10. Beekeeping equipment

There will also be open sessions for participation by beekeepers, film sessions, demonstrations of beekeeping techniques and equipment, a honey competition, a photo and slide competition, visits to the various beekeeping institutions in the region, etc. A proceedings will be published with abstracts in English.

Information about registration and accommodations can be obtained by writing to:

Blandina F. Viana Apicultural Contress Secretary Rua Marechal Andrea, 20 - Pituba 40.000 Salvador - Bahia Brasil Tele. 071-248-8300

ACID RAIN AND HONEY BEES

By MATHEW SCOTT

Some months ago, I was asked if "Acid Rain" could be affecting honey bees and nectar flows in Maine? The simple answer to this question is that we do not know. However, a proper response requires some detail and thus the purpose of this article. If nothing more, it should prove worthwhile as an educational review of the subject, "Acid Rain".

Most scientists correctly call this phenomenon "acid precipitation or acid deposition". This fact has been recognized since 1950 and during this decade has become a world wide concern. When we speak of acid deposition we have to consider both wet and dry periods. Most of you are very familiar with the wet forms; ice, snow, rain and fog. However, dry deposition in the form of particulates, dust and aerosols are happening on sunny days. In the U.S. we emit into our atmosphere 24.1 million tons of sulfur dioxide (SO2) each year and 20 million tons of nitrogen oxides (NO_x) each year. Thus a total deposition of 44.1 million tons go into the air and return somewhere on earth in a changed form due to chemical and physical reactions. When SO₂ and NO₂ combine with water we find weak solutions of sulfuric and nitric acid being formed.

We emit 44.1 million tons of air pollution each year, or a little less than one million tons per state. For Maine that comes to less than one pound of air pollution per person per year. However, these emissions are not spread around evenly and Maine happens to be on the receiving end of the so-called exhaust pipe. We are downwind of all the emissions generated in the U.S., due to climate and meterological factors of the prevailing winds. The air masses move from west to east, therefore, the air emissions in the midwest move over 1000 miles toward the East.

Logic now dictates that we may theorize that "Acid Rain" could affect honey bees.

Let's now talk about some of the facts we know about "Acid Rain" and the environmental impact it has had on ecosystems. When we talk about acids or bases we should understand pH. Most of us are gardeners, therefore, we know that soil pH is important to plants. As beekeepers, we know that honey has a pH value which varies from 3.42 - 6.10 with an average of 3.91¹. Please keep these pH values in mind as will be using others to give you a better feeling for the "Acid Rain" phenomenon. Let me now define what pH is. Some call it the potential hydrogen ion concentration of a substance. It has been expressed as: pH = $\log (H +)^2$. The pH scale is expressed as follows: a pH of 7 is neutral and any value below it is acid and any value above 7 alkaline (basic). As a gardener again, we know that some plants like lime or CaCO₃ which sweetens the soil and makes it neutral. Again, many plants vary in pH requirements but that is why we do a soil test before adding lime and fertilizer.

Honey, on the average, is quite acidic with a pH of 3.91. Most rainfall not impacted by air pollution is slightly acidic with a pH of 5.6 and any precipitation below 5.6 is considered abnormal. Lake and river pH values in Maine will not support certain fish and other aquatic life when pH values are below 5.0.

Let's go back to the pH scale to further explain the significance of a change from a pH of 7 to 6. This is a 10-fold change in the acid concentration. When you go from 7 to 5 it is a 100 fold change. Remember to multiply each change by a factor of 10. You should now conclude that honey is very acidic. Beekeepers know this and we also know that combined with the low moisture content of honey, less than 18%, bacteria, yeast or fungi will not survive.

I have added a pH scale for Maine on "Acid Rain" and have inserted honey along with other household items.



In Maine, the average pH of wet deposition (rain, snow) is 4.3. A few high elevation lakes in Maine have a pH of 4.0 which is considered to be highly acidic. Most fish, especially brook trout, cannot reproduce there. Acid lakes usually contain higher concentrations of metals than non-acid lakes. Aluminum is common in Maine soils and bedrock, and is dissolved easily at a pH of 4.0 and 5.0. As the pH becomes lower, the toxicity from aluminum becomes greater³.

Maine has not experienced the same impact to its lakes as New York has in the Adirondack mountains. In addition to strong acids, other pollutants are transported in the atmosphere and deposited in areas distant from any known source. Heavy metals such as mercury and selenium and toxic organic compounds such as polychlorinated biphenyls (PCB's) also exist. Also polynuclear aromatic hydrocarbons (PAH's) are emitted into the atmosphere by fossil fuel combustion and industrial processes and have been detected in "Acid Rain." Just think of the possibilities of how these organic and inorganic compounds may interact with each other in our environment. We understand some of what is taking place in our aquatic systems but little do we understand the aquatic-terrestrial ecosystem linkeages. This is why the phenomenon is so complicated - we do not have all the answers.

So how does this all relate to the honey bee and nectar sources? Again, we don't know but it does allow for a great deal of speculation. Most bee forage or plant nectar sources are annuals or trees with deciduous leaves. Many of the trees grow in acid soils while many of the annual clovers require a pH close to 7. A more recent piece of research by Canadian scientistis in Quebec shows a decline in sugar maple sap production. If indeed a reduction in sugar content and volume of sap produced by suga Continued on Page 43.

☆ Classified Corner ☆

Classified rates: 49¢ 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) counts as one word. Not less than 10 words accepted. Copy or cancellation orders MUST be in by the 1st of the month preceding publication. Blind Ads \$6.50 additional charge per month. Send classified ads to: The A.I. Root Co., Advertising Dept., *Gleanings in Bee Culture*, Box 706, Medina, Ohio 44258-0706.

Seven Steps To More Sales From Your Classified Ads

"Classified advertising is a powerful sales tool, and it's probably the most cost-effective way to generate inquiries."

Whether you have never placed an ad before, or whether you have been using classified advertising for years, you can generate more sales by following these seven simple steps:

1) Follow the AIDA principle. Classified advertising must follow the rules of all good advertising. The AIDA principle is one way to sum it up: Attention, draw Interest, create Desire and cause Action.

2) Put "U" Before "I". It doesn't work that way in the alphabet, of course, but in advertising "you" comes before "i". It's another way of saying that when you are selling put the emphasis on the reader. Your ad should tell the reader what your service or product will do for the reader!

3) Be aware of the classified ad's limitations. You can sell directly from a classified ad only if you ask for a small sum for a catalog, sample or modest product. Leave your full sales message for display ads and direct mail; the classified's job is to entice prospects to write or call for more information.

4) Use power-packed sales words. There are certain words and phrases that are generally successful in all advertisements. The favorite six are FREE, NEW, AMAZING, HOW TO, NOW and EASY.

5) Do not worry about the word count. Your first job is to get all the benefits and selling words about your product or service on paper. Then comes the rougher job of editing and polishing!

6) Say more in fewer words. The average classified is 20 to 25 words. Generally, if you can't state your proposition in 35 words or less, go back and analyze your offer.

Find brief ways to say the same thing: use "100" rather than "10 cents"; write "Satisfaction guaranteed" instead of "Money back if not satisfied"; say "Details free" or "Free Information" rather than "Write for free details".

7) Key your ad. A "key" is a device to code an ad so that you can tell where an inquiry or purchase came from. It should always be used when you advertise in more than one publication.

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

What do you know about the INTERNA-TIONAL BEE RESEARCH ASSO-CIATION? The many books and other publications available from IBRA will deepen your understanding of bees and beekeeping: and IBRA membership subscription - inclusive of Bee World, a truly international magazine published quarterly in the English language will broaden your beekeeping horizons. Details from IBRA voluntary representative H. Kolb, P.O. Box 183, 737 West Main, Edmond, OK 73034 (phone 405-341-0984); or from IBRA, Hill House, Gerrards Cross, Bucks SL9 ONR, UK. 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

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 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

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).

WANTED

Western Commerce needs honey under the buyback program — any type, any flavor, any quantity — anywhere. Also have new, used or reconditioned drums for sale. Call (818) 333-5225, indicate honey for sale or drums to buy. 9/86

HELP WANTED

Beekeepers & Helpers wanted for migratory Texas operation. Resume to: 17307 Windypoint Dr., Spring, TX 77379 TF

FOR SALE

Kelley Hive Loader, on or off truck. Alba, MI, (616) 584-2982 8/86

Complete 700 hive operation in south western Manitoba including buildings, house, trucks and all related equipment. Write to:

> Gleanings In Bee Culture P.O. Box 97 Medina, OH 44256

TF

Complete Honey Processing Equipment. part or all. Good condition. \$2000. Other equipment avail. Will deal. (216) 425-4830. Twinsburg, OH 8/86

50 colonies and equipment for 100 morehives. Also complete stainless extractingoperation. Call Tom Weber (216)488-07288/86

Complete Manufacturing Operation for Bee Supply Woodenware. Box and frame making machine plus other woodworking equipment. Call Lester Haines (512) 251-3823 or (512) 836-1675. 8/86

Have 1 to 2 thousand colonies of bees for sale, warehouse with living quarters, three trucks, wax shop, locations. Owner old, retiring. Have pollination for 1,000 colonies. Call 801-798-3921. TF

21 two story and 35 single story colonies all for \$2500. 1-214-835-5221 in Naples, TX 11/86

120 strong 10-frame, 3-story colonies, \$70 each plus extracting equipment in excellent condition. 1979 GMC 1-ton Flatbed truck with bee boom also available. Ed Guthrey, 2209 Fillmore Court, Antioch, California (415) 754-8432 9/86

Woodman 50 frame extractor \$325.00 or B.O. Also quantity of honey supers with drawn comb. (517) 655-3792 after 6 p.m. 8/86

Bee supers ready to assemble. 2000 deep supers, 4000 3/4 deep supers and 6000 shallows. Francis L. Jones, 7558 Martin Bay Dr., Sandpoint, Idaho 83864 9/86 Honey pots, send one dollar for a large price list to J. Steed, P.O. Box 115, Richmond, KY 40475 1/87

1 ton truck \$1000, 325 supers of comb \$10 each. (219) 856-4688 or (219) 856-4601 8/86

20 colonies. All 2&3 deep. Most with 2&3 supers full of honey. Most equipment new. Priced to sell. Midwest Indiana. (317) 245-2155. Keep trying. 8/86

Complete 350 hive operation in Northeastern Wisconsin. Includes honey house, 1¹/₂ ton truck with boom loader, extracting equipment. Asking \$37,000. Tom Steeno, Rt. 1, Maribel, WI 54227, (414) 863-8032 8/86

50 colonies. 200 supers, lots of extras. \$3,500. Phone: (303) 440-3884. 9/86

SMALL BEE BUSINESS in Oakland County, Michigan. 275 hives on Starthistle locations, all equipment, markets, with or without honey on hives. (313) 363-6591. 8/86

30 hives, tall, strong, heavy, huge stacks extra equipment. Must take all, in Hammond, Louisiana area. \$1,500. Robert (602) 282-1804, ext. 2006. 8/86

SELLING OUT COMPLETE OPERA-TION. Large extractors, tanks, wax equipment, several hundred supers, hive bodies, all miscellaneous equipment. Also 20 strong colonies in central Michigan. (517) 875-2496 or (517) 875-4726. 8/86

BEES & QUEENS FOR SALE

WE USE ALL POSSIBLE CARE in accepting advertisements but we cannot be held responsible in case disease occurs among bees sold or if dissatisfaction occurs. We suggest that prospective buyers ask for a certificate of inspection as a matter of precaution. 3-Frame Italian Nucs, \$35.00 each or 3 for \$100.00 POSTPAID. Queens 1-10 \$6.00, 11-25 \$5.25, 26-up \$4.75. Box's Better Bees, 410 N. Lide, Mt. Pleasant, TX 75455. Phone 214-572-0428.

20 select colonies Italian Bees. 10 deep frames in your hive \$50.00. 10 deep frames in my hive \$75.00. Ken Parish, 108 Jane Drive, Syracuse, NY 13219, (315) 488-2944. 8/86

BEE SUPPLIES FOR SALE

FOR TOP QUALITY BEE SUPPLIES and advice on beekeeping problems, visit your nearest Root dealer and send for your FREE Root catalog. Satisfaction guaranteed. The A.I. Root Co., P.O. Box 706, Medina, OH 44258. TF

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

RADIAL HONEY EXTRACTORS, stainleses, 5 and 10 frames, patented. Also complete line of equipment. Write or call GAMBLE's Bee Supply & Candle Co., (919) 299-3973 after 5 PM weekdays, anytime Sat., P.O. Box 7997, Greensbor NC 27417.

EXTRACTING EQUIPMENT. Two Hubbard 24/44 Radials - \$1,000 each; Cowen Uncapper - \$1,150; large wax melter - \$300; 1½" pump - \$100; 150 gal s/s tank - \$100; scales - \$100. Michigan, (616) 269-3316 8/86

HONEYSTRAINER - Approx. 18" x 20" 100 mesh nylon bag. Use with bucket. Easy. Practical. Convenient. Ppd. \$3.50 each, 2-up \$3.00 each. Instructions. Beckman G, Box 633, Stuart, Fla. 33495 TF

MISCELLANEOUS

KING SIZE "Eddy Bears". 1½ # plastic Bear Bottle. No drip. Econo-table use. Inquire: Ed Broff, Honey Products, 106 Forest St., Middleton, MA 01949. (617) 774-3035 8/86

NO HEAT OR ELECTRICITY USED. Uncapping fork (not just a scratcher). No flavor loss and better flavor retention. No burnt fingers or shocks. Honey from dark comb not discolored as with horknife. \$11.00 ea. pp.. Biossomtime. P.O. Box 101 Tempe. Arizona 85281. Ti

MEADMAKERS, WINEMAKERS, BEERMAKERS

Fresh stocks, Fast Service, Free Catalog. O'Brien's, Box 284M, Wayne, IL 60103. 8/86

Dealership Territories available in some areas. Please contact The A. I. Root Co., P.O. Box 706, Medina, OH 44258 TF

BEESWAX

BEESWAX WANTED – Highest prices paid in cash or trade for bee supplies. The A.I. Root Co., Medina, OH 44258. TF

POLLEN

Pure Fresh Bee Pollen in 1 lb. jars \$3.60. In 50 lb. bulk - \$5.00 per lb. Prairie View Honey Co., 12303 12th St., Detroit, Mich. 48206. TF

CLEAN FRESH FROZEN AMERICAN BEE POLLEN, give us your needs and we will quote prices. Howard Weaver & Sons, Rt. 1, Box 24, Navasota, Texas, 77868, or phone: 409-825-7714. TF

SPANISH POLLEN — NEW PRICES. Excellent taste and quality. 6 lbs \$25, 10 lbs \$35, 20 lbs \$65. Free UPS Shipping. Blossomtime, P.O. Box 1015, Tempe, AZ 85281 TF

BEST, PURE, CLEAN BEE POLLEN \$3.50/lb. PREPAID. Min. 5 lb. FREE UPS SHIPPING. Stakich Bros., Inc. 4128 W. Orchard Hill, Bloomfield Hills, MI. 48013. (313) 642-7023. 11/86

BEE HEALTHY & ENJOY Canada's Best Bee Pollen. Air dried at 110°F. from the pure north of British Columbia. Excellent flavor, superior quality and guaranteed pesticide free. 3 lbs. \$20.00; 6 lbs. \$39.00; 10 lbs. \$54.00; 20 lbs. \$100.00. Free UPS shipping. BLOSSOM-TIME, P.O. Box 1015 Tempe, AZ 85281 TF

ROYAL JELLY

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August 1986

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ACID RAIN... Continued from Page 428

maples can be related to "Acid Rain" then we as beekeepers should be concerned about this phenomenon with its continued impact on our total environment. Barry Commenor said that the first law of ecology is that everything in nature is related to everything else. Acid deposition may very well have an effect on nectar sources and yields and therefore is an area where some agricultural research should be directed.

I realize that there are other matters of priority in the beekeeping industry, but I hope that this article better informs the reader about "Acid Rain". In conclusion, I still have not fully answered your question but it is one I feel needs to be addressed. Hopefully, this article will stimulate some researchers to do some science in this area.

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Matt Scott is Chief Biologist for the Maine Dept. of Environmental Protection, Maine DEP Station #17, Augusta, ME 04333. He will speak on this subject at the 1986 EAS Convention in Delaware.





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