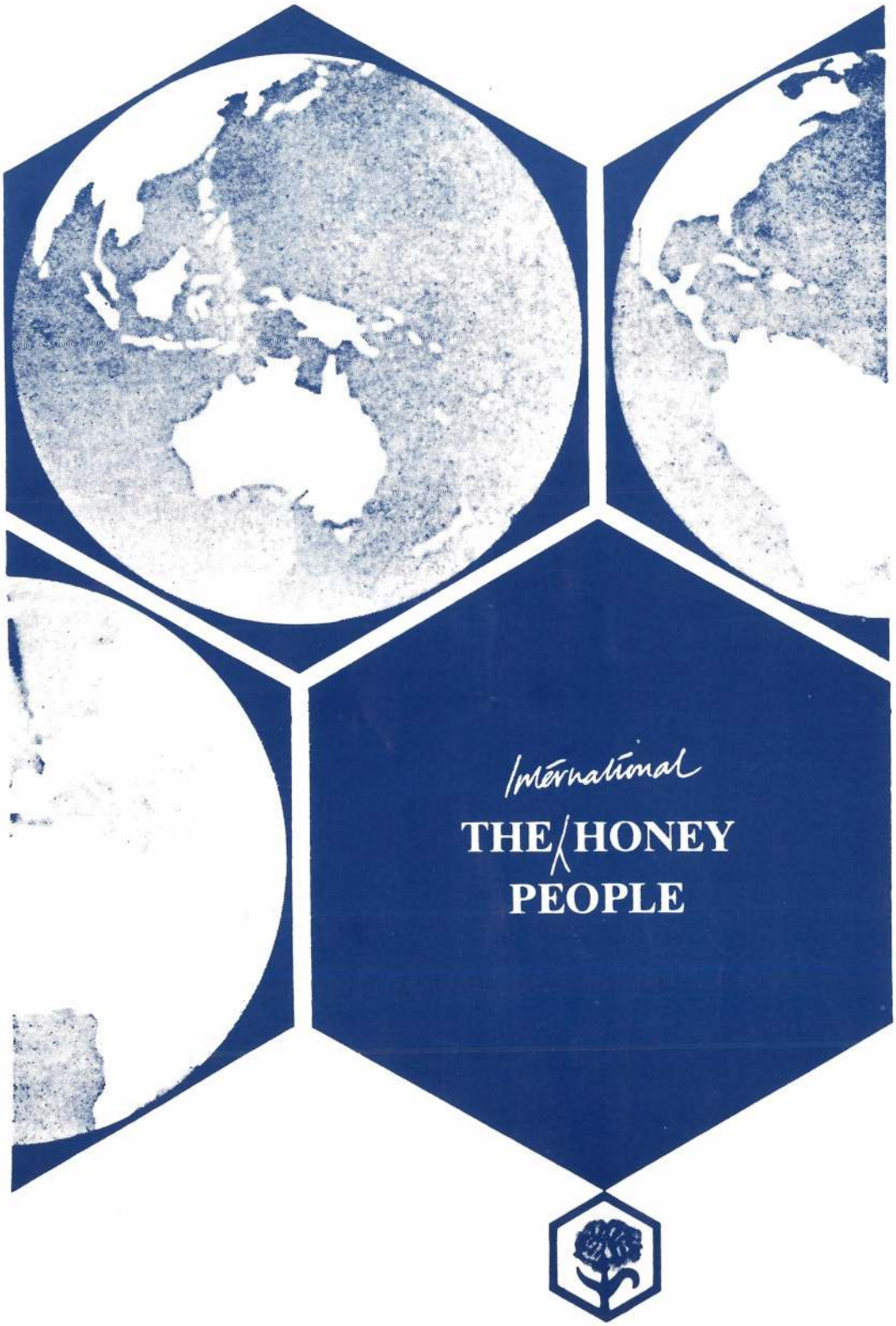
THE NEW ZEALAND beekeeper

MARCH 1983



International

THE HONEY PEOPLE

KIMPTON BROTHERS LIMITED

Honey and beeswax specialists

ESTABLISHED 1882

BERKSHIRE HOUSE, 168/173 HIGH HOLBORN, LONDON WCIV7AF

ISSN 0110 – 6325

THE NEW ZEALAND BEEKEEPER

Registered for transmission by post as a magazine.

March 1983
No. 177

(See page 11 for explanation of numbering system).

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Publishers
The NZ Beekeeper is published by Agricultural Press Co. Ltd., Box 594, Masterton, on behalf of the National Beekeepers' Association of NZ (Inc.), Box 4048, Wellington, in the first week of March, June, September and December each year.

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Second Monday of the month preceding publication.

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Printer
Printcraft '81 Ltd., Masterton.

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(per insertion)

Full page $255 (4 insertions $205), Half page $130 (4 insertions $105), Quarter page $70 (4 insertions $65), 1/8 page $40. Special locations $30 extra. Spot colour $80 extra.

Production charges
Advertisements should be provided in a camera-ready form or as photolitho negatives. Where copy has to be typeset, or where film work or bromides are required, these will be charged to the advertiser on a time and cost basis. Minimum charge $10.

Beekeeper rates
Registered beekeepers selling queen bees, used hives, used plant and other used apiary equipment are eligible for an advertising discount of 20 per cent of the appropriate commercial rate. The same concession applies to situations vacant and situations wanted advertisements. Where the appropriate rate is in doubt, the editor's decision will be final.

Production charges only apply to single insertion beekeeper advertisements or where special artwork, filmwork or bromides are required.

Classifieds
Available only to registered beekeepers and those seeking work in the industry. $5 a column cm. No discounts apply. No production charge. Maximum size: 1/6 page.

SUBSCRIPTIONS

Commercial beekeepers: The NZ Beekeeper is distributed free-of-charge to beekeepers with 50 or more hives, subject to payment of hive levy.

Others: Beekeepers with fewer than 50 hives and other subscribers: $12.50 a year. This includes (for New Zealand subscribers only) membership of National Beekeepers Association of New Zealand (Inc).

KING BEE

(WHERE THE NBA HAS ITS STING)

Clinched by kiwifruit

The NBA executive is concerned that New Zealand's only bee scientist, Pat Clinch, has been directed by MAF head office to devote all his efforts toward kiwifruit pollination research. However, a letter sent to the ministry before Christmas has not yet received a reply.

The NBA executive has been concerned for a long time that all the industry's research and diagnostic work should have been in the hands of only one researcher. That this one man should now have been directed to kiwifruit research because of a "potential loss in exports of $225 million" if kiwifruit pollination problems are not resolved, has cut little ice with beekeepers requiring research backing for a wide range of problems of which kiwifruit pollination is but one.

Telford Training Unit supported

The establishment of a commercial beekeeping unit at Telford Farm Training Institute has the wholehearted support of the NBA executive. The institute, the main location for beekeeping courses held in the South Island, believes the acquisition of a commercial-sized unit will enable it to provide a better base for the courses held there.

The NBA has told Telford it is willing to co-operate with them and has asked to be kept informed of further developments.

Legal crunch

The non-payers of hive levy have recently had legal action taken by the NBA to ensure payment. The NBA is also concerned about possible understating of hive numbers by beekeepers making their hive returns. A new system for detecting those with understated hive numbers is hoped to be introduced next year.

CONFERENCE PLANNING WELL UNDERWAY

Competition drawcard

Don't forget the photo competitions! Categories: Humour, Bees and flowers, Beekeeping activities. See details, page 11, Dec 82 NZ Beekeeper.

Also the Honeymead competition – to be judged by popular acclaim at the conference social.

Concession travel

Before making your travel bookings (the conference goes from July 26 to July 28 inclusive), make sure you get to Nelson by the cheapest route. There is a 2 for 1 discount applying on Air New Zealand, Epic Fares give a 35 per cent discount and there's also a standard air, rail, bus discount.

North Islanders' Mainland Tour

How about travelling from Nelson to the West Coast and home via Christchurch and Picton – straight after the conference? The bus fare is about $45, plus accommodation. A fun, economy trip with other beekeepers. If interested, write to Box 879, Nelson for further details.

Pollen theme

The MAF seminar on July 26 will feature top line speakers talking on pollination and pollen production. Full details June issue.

New law for agricultural chemicals

Beekeepers should note changes which affect them

by Ian Berry

THE PESTICIDES ACT 1979 is an act "to make better provision for the regulation and control of the sale and use of pesticides and to consolidate and amend the Agricultural Chemicals Act 1959 and its amendments." Under the provisions of this Act the Pesticides Board was established, the first official meeting being held in Wellington on February 9, 1983. The final meeting of the Agricultural Chemicals Board will be held on March 10, 1983.

The constitution

The Pesticides Board is made up of 12 representatives: The chairman is appointed by the minister of agriculture, the registrar an officer of the department appointed by the Director-General. The remaining 10 board members are nominated by the ministers of science, health and environment respectively, the Agricultural Chemical and Animal Remedies Manufacturers' Federation, the New Zealand Fruitgrowers' Federation, the New Zealand Vegetable and Produce Growers' Federation, the New Zealand Agricultural Merchants' Federation, the Wine Institute and Federated Farmers.

The members of the board are appointed by the Governor-General on the recommendation of the minister.

At the board's February 9 meeting, draft copies of 'The Pesticides Regulations 1983' and 'The Pesticides (vertebrate pest control) Regulations 1983' were discussed, and it appears that these new regulations will come into force on March 11, 1983.

From the discussions it seems the introduction of these new regulations will affect beekeepers as follows:

- Cyanogas – the use of hydrogen cyanide to destroy bees in hives will not be restricted to operators holding a certificate of competence.
- Methyl bromide – the need for beekeepers using methyl bromide for fumigating to hold a certificate of competence, as already required in some parts of New Zealand, is expected to apply to the whole country in future.
- Use of pesticides toxic to bees – there has been a major change in the law which protects (in theory) bees from the use of pesticides in a manner which can lead to bee mortality. At present the position is covered under the 1969 Apiaries Act:

Restrictions on spraying of trees and plants – (1) No person shall spray or dust with any preparation containing any substance toxic to bees –

(a) Any fruit trees during the period within which those trees are in bloom unless almost all the blossoms have fallen from the trees:

(b) Any strawberry, raspberry, boysenberry, or loganberry plants, or any other cultivated plants of the same species, during the period when those plants are in bloom.

> **"By giving such specific instructions on each type of pesticide label, bees should have maximum protection, with no unnecessary restrictions on the use of the product."**

(2) Except pursuant to a permit from the Director-General and in accordance with the conditions specified in the permit, no person shall, during the period commencing on the 1st day of September in any year and ending with the next 31st day of March, apply any spray or dust which is toxic to bees to any cruciferous or leguminous field crop while it is in flower or at any time when flowering plants which attract bees are present in such quantities within these crops that any such application would be likely to damage or destroy foraging bees.

Under the 1980 Apiaries Amendment No. 61, Section 35 of the Apiaries Act was repealed. The Governor General, by order in council, is to appoint the official date of appeal, March 11, 1983 being the date muted.

While the restrictions of spraying under the Apiaries Act, has no doubt, served a useful purpose over the years, it was felt by the Ministry of Agriculture and Fisheries that there was room for improvement. After consultation with and agreement by the National Beekeepers Association, it was decided to remove the issue of spray damage to bees from the Apiaries Act, and use a different approach altogether for the protection of bees.

Two of the main weaknesses were that people using pesticides were unlikely to have knowledge of the Apiaries Act, and also while there was provision to prevent spraying of trees in blossom, the big problem of spray drift on to non-target crops such as clover in flower under fruit trees, was not covered.

The new protection for bees will come under the Pesticides Regulations 1983. Provision is made for labels on pesticides toxic to bees to bear the words "Toxic to bees", followed by specific instructions such as "Do not apply or allow to drift onto plants in flower which may be visited by bees", or "May be applied to plants in flower only in the early morning or evening when bees are not flying."

By giving such specific instructions on each type of pesticide label, bees should have maximum protection, with no unnecessary restrictions on the use of the product.

Any person applying pesticides contrary to the instructions on the label under the heading "Toxic to bees", unless in accordance with a permit issued by the Director-General, will be liable on summary conviction to a fine not exceeding $1000. Presumably, people so convicted could then face civil court action resulting in them having to pay the beekeeper for the damage to bees.

It has taken several years for the above changes to be made, but there is now better protection under the law for the prevention of spray poisoning of bees. Two important points, however, are will the correct warnings be put on the labels, and will the Ministry of Agriculture and Fisheries pursue a vigorous policy of bringing to count those who spray contrary to the instructions on the labels. The situation is a positive one, the beekeepers' representative's job on the Pesticides Board being, in part, to see that these new laws are used to save bees from spray damage.

Horticulture boom putting pesticide pressure on expanding apiaries

by Ian Berry

HOPES THAT beekeepers would enjoy a spring free from spray damage to their bees proved to be in vain, with serious damage being reported from Otaki and Hawkes Bay.

In the berryfruit areas of Otaki one beekeeper reported 200 hives with significant damage, plus another 60 hives badly damaged. It is hard to place a figure on the number of hives with significant damage in Hawkes Bay during the spring and early summer of 1982, but I would estimate the number at about 300 hives.

In Hawkes Bay, only a small percentage of the bees moved into the stone and pip fruit orchards by commercial beekeepers were badly poisoned – mainly because they were shifted out before the trouble started. But from October 22, 1982 onwards there was widespread poisoning of bees in apiaries that were within flying distance of orchard or berryfruit areas.

Some of these hives belonged to hobbyist and part-time beekeepers who do not normally move their hives out of the orchard areas; and most commercial beekeepers suffered some poisoning in apiaries which, while not in orchard areas, were close enough for the bees to fly to the orchards.

In some apiaries there was at least 50 per cent of the bees dead in front of the hives. Fortunately there appears to have been only minor damage to hives moved into Hawkes Bay kiwifruit orchards.

The question arises as to what can be done to reduce or eliminate these spray poisoning losses in future. In an attempt to provide some of the answers to this question I put forward the following six suggestions:

- The complete answer would be to ensure no hives were placed within 4 kilometres of orchards. This is becoming increasingly impractical because of rapid expansion of the orchard areas at a time when hive numbers are also rapidly increasing.
- When hives are moved into the orchards for pollination, see that they are in the orchards for as short a time as possible. Don't move the hives in unnecessarily early, and don't leave the hives in the orchards until the last few flowers have dropped off.

If you feel the time has come to move the hives out and you haven't been advised by the orchardist to do so, contact him and in most cases you will find the bees could have been moved earlier but the orchardist hadn't got around to phoning. Problems occur when the beekeepers are physically unable to move the hives out as fast as the orchardists want them moved, and beekeepers should bear in mind that orchardists also have problems.

It is important that beekeepers who move hives in for pollination plan their work and vehicles so as to be able to remove hives from the orchards at reasonably short notice.

- Remember that spray damage to hives moved in for pollination work is a cost of producing fruit, not honey, and adjust your prices accordingly for the next season. Point out to the orchardist that the additional charge is for spray damage and that it is in their interests to do what they can to reduce spray damage to bees. Also make the point that beekeepers expect a reasonable return for their work and expense in moving hives into orchards for pollination, and in the event of serious spray poisoning problems they may lose their pollination service altogether for future years.
- The Bay of Plenty kiwifruit growers and beekeepers have proved spray poisoning problems can be solved by the growers and beekeepers and MAF getting together and working out a solution to the problem. While different areas have different problems, Hawkes Bay for example, has such a wide range of crops which need insecticide sprays at different times, more dialogue between beekeepers, growers and MAF should be a step in the right direction.
- Publicity about poisoning of bees in local newspapers and on TV helps keep the public and particularly those applying insecticides aware of the problem. Beekeepers should enlist the help of their local MAF and press to see any serious spray damage gets plenty of coverage.
- Any person who applies insecticide contrary to the law (at present the relevant legislation is still the Apiaries Act – but this will change to the Pesticides Regulations when the complete Pesticides Act is brought into operation, hopefully about March 1983) and can be proved in a court of law to have done so, is liable to be fined and could be up for a claim for damages by the beekeeper who suffered the loss. While I feel this should be a last resort it could be done, and it could bring home to the few uncooperative orchardists that it would pay them to mend their ways and join the ranks of the majority of growers who are generally careful and considerate and keep the bees in mind when applying pesticides.

To my knowledge there have been some losses of bees through spray poisoning from time to time since the 1940s, but the potential for more widespread damage must be increasing with the present boom in horticulture. Beekeepers should keep this potential problem in mind and do what they can to ensure that the horticultural boom benefits everyone including beekeepers.

Bees are an essential link in the chain for producing many export quality horticultural crops. Beekeepers losses, while possibly disastrous to the beekeepers concerned, would be small compared to the losses to the New Zealand economy if these export crops were not produced because the bees had been killed by the careless use of pesticides.

Mr Albert Raisey scoops up some of the thousands of dead bees in front of his eight Meeanee hives.
—Daily Telegraph photo

Low crops and frozen prices

ONE OF THE North Island packers who was caught with his prices down when the price freeze started has had permission to raise his price by 2½ per cent. Small consolation when other packers moved up about 8 per cent during March, April and May of 1982, but it does indicate it is possible to get permission to lift prices a little if you can put up a convincing case of hardship.

With the low crops about this season, some beekeepers will have little difficulty in proving they have fallen on hard times, but a price increase isn't going to help those who have no honey to extract. While it is a little early to predict what the final New Zealand crop will be, from reports to hand, it will obviously be well down in many areas.

Because of the likely supply position it would appear at this point of time it will be unnecessary for anybody to sell honey at below the maximum legal price they can charge during the coming year.

We will await with interest what moves the government makes in June when the freeze is due to end.

MAF PREDICTIONS FOR 1983 HONEY CROP

As at January 31, 1983

		Tonnes	Last season	6 year average
Northland	Slightly below average	**496**	630	600
Auckland-Hauraki Plains	33% below average	**200**	300	300
Bay of Plenty	20 kg/hive	**380**	470	472
Waikato	Weak hives, bad weather	**900**	1465	1346
Lower North Island	Below average	**810**	1020	1136
Nelson-Marl-West Coast	Disappointing	**300**	325	424
Canterbury	0 to 50 kg per hive	**750**	1150	1258
South Canterbury-Otago	Wide variations	**900**	550	938
Southland	5 to 15 kg per hive	**200**	975	995
New Zealand		**4936**	6885	7469

Varroa – is there a cure in sight?

by C.B. Dennis, British Beekeeping Journal.

AS VARROA mite has spread from the far East through Europe it has wiped out thousands of colonies of bees. British beekeeping authorities are worried lest it arrives here before any cure or control can be achieved other than the destruction of all colonies in an area round any colony found to be affected.

The westward march of the disease has invaded Germany and possibly eastern France. Holland and Belgium and other small countries are worried and watchful. In Britain, the British Beekeepers Association, in co-operation with the Ministry of Agriculture, is arranging training of volunteers to search in each county in case it has already arrived. From the first arrival of the mites in a colony nothing is likely to be noticed by the beekeeper for at least two to three years, but after the third year the colony is doomed and is unlikely to survive the fifth year.

On the continent, the search for a cure or acaricide to control the mite in colonies of bees goes on. So far the Ciba-Geigy firm claims that a new version of Folbex which they call Folbex V will give control. Unfortunately, the risk to humans from possible contamination of honey has not been cleared and the effectiveness of the treatment completely established.

The trouble with any chemical treatment is that it is likely to be effective against the adult stages of a parasite but relatively harmless to the larval stages. This is why such treatments must be repeated several times allowing intervals for the larval stages to develop into adults, unless it is feasible to treat at a time when there are no larvae present. This can happen during the winter, but then a smoke treatment is risky because of possible balling of queens.

In the Dutch beekeeping journal, "Bijenteelt" for July-August 1982, there is an article by Dr A. de Ruijter which suggests that another means of killing adult mites is possible. He went to Greece to study Varroa there and found that the common smoker fuel was pine needles. In Holland it has been common practice for very many years to use tobacco smoke for subduing bees, and when he used this and closed the entrance of a hive for four minutes he found on a sheet of paper on the floor of the hive the next day 88 dead Varroa mites and 13 Braula. Using the pine needle fuel similarly on another colony only 11 dead mites were found after 24 hours. (No dead mites were found after five minutes).

When the same colony was smoked with tobacco smoke on the next day three mites were dead after five minutes, 29 after 30 minutes, 36 after 60 minutes and 95 after 24 hours. Further tests have been made under laboratory conditions and it seems that almost total kill of adult mites is possible using tobacco smoke. No evidence of harm to bees was observed. Of course further investigations have to be made and checks on possible contamination of honey. Again, it may take a year or two to assess the value and risks of the treatment, but this report offers hope of a cheaper and possibly safer treatment.

It must be realised that the Dutch use a special smoker for use with tobacco. Perhaps we should do as they often do and grow our own tobacco specially for subduing bees!

Education Department asking for bee education finance

Course to be set up at Bay of Plenty Community College.

FOR SOME time the National Beekeepers' Association executive has been exploring ways to set some form of education system for those interested in learning more about beekeeping. It is felt that better education and training in beekeeping will lead to a better utilisation of the beekeeping potential in New Zealand for the ultimate benefit of all New Zealanders.

On September 21 a meeting was held at the NBA national office to sort out the most practical course to follow from the many possibilities which have become apparent; bearing in mind the needs of beekeepers, others directly involved with beekeeping, the general public, finance and the various resources available.

The meeting decided an education and training programme should be set up to cater for the needs of the following five groups of people:

Commercial beekeepers. Increased production of bee products at an economic cost will mean increased exports – an essential factor in the future prosperity of New Zealand.

MAF has an important role to play here with block courses such as have been run at Flock House and Telford, seminars, discussion groups, field days and the NZ Beekeeper. The NBA Technical Library is also a useful resource.

Part-time beekeepers. Not only to assist them to increase their present contribution of bee products, but to assist some of them to step up to full-time beekeeping.

It was agreed that part-timers should be encouraged to join the NBA and to make contact with the MAF apicultural advisory service. There is also need for community college and technical institute courses.

Horticulturists and farming. A better understanding of that part of beekeeping in relation to pollination (beekeeping's biggest contribution by far to the NZ economy) and such matters as spray damage to bees. Nectar sources for bees could also be of importance in this area.

Hobbyist beekeepers. Better knowledge of beekeeping for hobbyist beekeepers, particularly in the area of disease control, would be of benefit to the whole industry. This can be encouraged through NBA membership and field days, the NZ Beekeeper and community college and technical institute courses.

General public. A better knowledge of bees in general and particular aspects such as the benefits of pollination – what to do in cases of allergic reaction to beestings – how to destroy wasps nests – arousing an interest in the various types of honey and other bee products, could all benefit beekeeping.

High school talks by beekeepers; written material; Country Calendar; visits to beekeepers by groups such as school parties etc, were all suggested as suitable methods of public education.

The meeting discussed the various education and training systems that are currently in place.

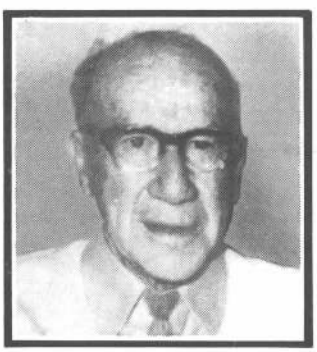
Mr Mead of the Bay of Plenty Community College had put forward a proposal to the NBA at the Waitangi Conference in which he offered to provide a comprehensive education and training resource centre based at the college. In view of the fact that the college has already been running beekeeping courses for some time, it was decided to follow up their offer.

For the community college to provide this service, they would need additional finance from the Education Department to pay the extra staff. Mr Robertson of the Department of Education agreed to ask for this finance provided the written material prepared by the college was available and suitable for the following categories:

- ☐ Community Colleges – Technical Institutes – Farm Training Institutes.
- ☐ Self teaching by individuals.
- ☐ Bee Clubs.
- ☐ Secondary Schools.

OBITUARY

Albert Pearson



ON NOVEMBER 12, 1982, Waikato's oldest branch life member, Albert Pearson, died in his 91st year.

His association with the South Auckland Branch and the Waikato Branch extended over a period of 60 years during which he served on the branch executive and assisted in honey displays, field days, etc.

Albert's father was one of New Zealands first commercial honey producers, establishing apiaries in Hamilton in 1888.

In 1912 Albert joined forces with his brother Tom, a life member of the NBA, operating some 300 hives. Their initial mode of transport was by horse and wagon, but Albert found he had to blindfold the horses prior to the apiary coming into view – many an exciting episode happened when the bees were stroppy.

The Pearson Bros acquired a Model T ½ ton truck, the third vehicle in Hamilton, enabling honey to be extracted in their central honey house in Claudelands.

During the first world war Albert worked with Bert Davies of Hillcrest while his brother Tom was overseas. The Pearson Bros and Davies manufactured foundation during the winter months for some 20 years.

Albert was of a quiet disposition, possessing a ready smile, generous and ever willing to help his fellow man.

Had his son Bert's health enabled him to carry on, there would have been an unbroken service to the beekeeping industry by the Pearsons of Hamilton.

But we do have a fourth generation Pearson, Albert's grandson Warrick in his third year as a budding commercial honey producer.

The ABC of beekeeping

by Nick Wallingford

THE FRIENDLY librarians at the Rotorua Public Library have come to my aid again. Recently, they showed me an old edition of the "ABC and XYZ of Beekeeping" that had been in their stack room for ages as its binding was broken and pages were missing. Since the first few pages missing included the title page and copyright, I can only guess at its publication date but I believe it is the 1910 edition.

I will admit that many old books on beekeeping leave me cold, but the abundance of fine line drawings and photographs of this one keep my attention well. There is a world of information in such an old book, and it is filled with drawings and descriptions of various gadgets and tools used by the beekeepers of this early era.

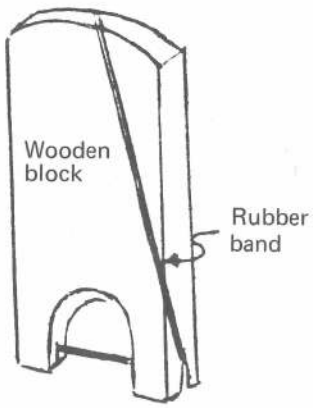
One drawing that caught my eye was of a queen holding device. It is a simple little tool, nothing more than a piece of wood and a rubber band, and it serves well to safely and securely hold a queen down onto the comb while she is marked or her wing clipped. I've never actually clipped a queen's wing, relying on less drastic methods of swarm prevention.

I do mark queens in my hives whenever I happen to see them in the routine of working. Though fairly co-ordinated I will admit to "decorating" several of them with ill-placed dabs of typist's correction fluid on their wings or abdomen. (I find the fluid, available in a variety of colours, ideal for queen marking – tightly closing cap, built in brush, and quick evaporating solvent).

The device caught my eye because it was already familiar to me and I dug through my files and came up with it in a more recent form. It was in a 1974 American Bee Journal and described the same device and gave the impression that it was a recent innovation.

These "re-discovered" items in beekeeping keep turning up all the time and sure confuse the issue when trying to decide who originally developed a gadget. It certainly makes me see the value of carefully going through some of these "outdated" books about beekeeping for some useful, present day ideas.

After describing the story of "tanging the swarm" in the last issue, I have come across two more fine drawings of



Queen holding device.

the same subject, both in John B. Free's new book "Bees and Mankind". One from the 16th century and one from the 17th, they show people banging on pots to either make the swarms settle or show ownership. Free doesn't clear the issue any apart from saying the tanging settled the swarm.

Another method I've always heard about but never tried, is to flash the reflection of the sun onto the swarm as it is flying. I've been told it will cause the swarm to immediately land and form a cluster. My guess is that it must cause them to lose their equilibrium, as it were, as they depend upon the position of the sun for their navigation. I keep telling myself that I must try it out sometime, but short of tearing off the rear vision mirror on the truck, I haven't been equipped when I've seen a swarm in the air to try this old method.

I'll finish this column off with a clipping from the NZ Herald from 100 years ago. Some of the issues such as size of brood nest and the economics of migratory beekeeping are still being asked. I wonder if we'll have any of it settled 100 years from now?

Housing New Migrant

FEBRUARY 1, 1883

Sir, will some of your readers kindly tell me through your columns what size of beehive (inside measure) that they have proved to be the best for use in New Zealand.

I have read that in Poland they use hives three to four feet high, broad at the base, running up to eight or nine inches at the top, and that these hives give enormous swarms.

When a bee-keeper is commencing an apiary, climate and locality ought to be considered. But through various circumstances it is often neglected, as some places will yield little food and others a rich harvest.

The cold winters and short summers of America and England seem to me very different to the winter and summer of New Zealand. Hence the thought, do we consider the habits and wants of bees sufficiently by giving them the same size of hive here that we did at Home?

Two years ago I bought two stocks with this place. They were in small, common boxes, totally unfit to keep bees in. Last year we took about 70lb of honey, and last winter I lost five stocks by mice. Now I have 16 strong stocks, all in bar and frame hives.

In Scotland, Egypt and other places they remove beehives from one district to another as the bee food becomes more plentiful, but the price obtained for honey would not pay the bee-keeper for that extra labour in New Zealand.

I saw in a late issue, Mr T. Murray's remarks as to bees being as prejudicial to the country as the introduction of small birds. I can only say that I have kept bees over 30 years, and this is the first complaint I ever heard of their being injurious to the farming interests. As to their being wild in myriad, it is well known that they are so now in some parts of New Zealand.

CORRESPONDENTS

NOSEMA WARNING

Dear Sir,

" 'Methiolate' or 'Nosemack' definitely suppresses infection, but shortens the lives of bees when fed at the necessary concentrations".

The above quote has been taken from the chemotherapy notes on the treatment of Nosema disease, "Notes on bees and bee diseases", Department of Agriculture and Fisheries, South Australia, Bulletin No. 22/77, p 25.

As this product is being advertised in The NZ Beekeeper for Nosema control, would you please let people know what they are buying.

Yours,
R. Hargreaves,
Palmerston North.

On asking Ceracell Foundation Ltd to comment on the Nosemack claims we received the following reply:

Research done on Nosema apis shows some doubt as to the effectiveness of Nosemack at dosage rates recommended by the manufacturers. Because of this, we are no longer supplying Nosemack – please note the Nosemack deletion in our advertisement.

A LOW FORM OF WIT

Dear Sir,

It was not my intention to take any further part in the discussion on the wax recovery units but unfortunately, as it was seen fit to use sarcasm, a low form of wit, as counter criticism I must reply.

To those who endeavoured to defend themselves may I say, I criticised written articles, not people.

I quoted results known to be correct and obtained from a properly operated manually operated press; a press well within the purchasing ability of any commercial beekeeper not an expensive air operated press.

I am not concerned with results obtained from presses I know nothing about nor about how they were operated.

The criticism of the two units was based on my own experience. No matter the size, shape or the angle the unit lies at, no steam box will efficiently recover wax from frames of old combs. If it did, why do all commercial wax recoverers I know of use presses?

A calculation of the results obtained from the "Tweeddale" unit would show after rendering the wax from the 60 000 frames of combs at the rate quoted, 9 600 kg of wax would be recovered. If put through the Steve Robins press 12 240 kg would have been recovered; 2 640 kg more. In terms of money at present day values as quoted $5.64 for 1.2 kg of wax, then someone has lost out on the equivalent of $12 408, and as the years pass on this amount grows larger, according to the number of combs melted down.

Let us all hope that in future when pieces of equipment are written about the efficiency of that unit is included.

Yours,
Harry Cloake,
Timaru.

This correspondence is now closed – Editor.

BIBLIO BUNGLE

Dear Sir,

While doing some bibliographic work with the "NZ Beekeeper" recently, I came across the following oddity. Probably you have noticed it, but maybe you haven't.

The issues are numbered as follows:

1975	vol 37, nos 1 – 4
1976	vol 38, nos 1 – 4
1977	March 39 (1)
	June 39 (2)
	Sept. no number
	Dec. 38 (4)
1978	vol 39, nos 1 – 4
1979	vol 40, nos 1 – 4
	and so on.

The "NZ Farmer" recently had a lot of explaining to do when they published vol 103 in their centennial year. Perhaps you're trying to go the other way and have vol 99 in the hundredth year!

Bibliographic work is made a little confusing – e.g. 39 (2) could be June 1977 or June 1978. Any ideas on how to resolve that?

Yours,
Andrew Matheson,
Nelson.

Our errors return to haunt us! Perhaps since Andrew is the first to notice, we should just start numbering issues in order of publication. Readers, let us know your objections, if any – Editor.

WILD BEAUTY

Dear Sir,

Re Highway Beautification Bees – NZ Beekeeper December.

If this beautification bee food planting really gets underway, isn't it going to improve living conditions for the feral bees to the possible detriment to that of our bees, who unlike the ferals, have to work for their keep?

If this is the case, one can only hope for hard winters to take the sting out of the beeggars and keep profits capped.

Yours,
Victoria Whittle,
Napier.

NODDING THISTLES DYING

Dear Sir,

Recently, while camping in the Hakataramea Valley, I noted that a large percentage of the nodding thistle flowers were dying and, on investigation, found them heavily infested with a "bug" – in some cases as many as 15 to 20 a flower. The heavily infested ones appear to die before they reach the nectar secreting stage. For the beekeeper who relies on them for his crop (and at a guess there would be many hundreds of tonnes of honey produced from them) it will spell disaster.

I understand this "bug" or parasite in the form of a beetle was released by the DSIR a few years ago and is spreading rapidly at over 20 kilometres a year.

Could we be informed whether the National Beekeepers' Association was consulted and was an economic survey made before its release?

Would the DSIR care to comment?

Yours,

J.K. Bray,
Airborne Honey Ltd,
Leeston.

Mr Bray's letter was referred to entomology division, DSIR, for comment as follows:

The crux of the matter is that nodding thistle is a gazetted Noxious Plant and the relevant legislation *requires* that ▶

▶ plants should be eradicated by one means or another.

For a number of years, many thousands of litres of chemical herbicides have been spread over agricultural land annually in attempts to minimise the loss in agricultural production caused by this weed. In some areas, especially on pumice soils for example, the costs to agriculture resulting from nodding thistle are high. Chemical herbicides affect a wide range of flowering plants including white clover, and thus their effect on nectar production extends beyond nodding thistle.

Biological control, by contrast, is usually highly specific in its action, and in the situation we are considering here would protect and increase availability of nectar from other sources. Entomology division, DSIR, has biocontrol of weeds as one of its areas of responsibility and over the period 1966 – 1972 received requests from Federated Farmers, the NZ Association of Inspectors of Noxious Weeds, and various local bodies, that biocontrol of nodding thistle be given attention.

In 1973 entomology division introduced the seed-feeding weevil *Rhinocyllus conicus* via a period of quarantine and safety screening at our Lincoln Station. At that time and since, Mr Tom Jessep has been responsible for this programme. The weevil has been multiplied and distributed widely in cooperation with noxious weeds inspectors, and the Ministry of Agriculture has been fully aware of the programme since its inception.

"The crux of the matter is that nodding thistle is a gazetted Noxious Plant and the relevant legislation requires that plants should be eradicated by one means or another."

The operation has been widely publicised in the national press, in the agricultural media and at scientific gatherings and field days, and there has been enthusiastic cooperation from the farming community. Entomology division has no record of communications either to or from the National Beekeepers Association during this period.

There has not been a detailed cost/benefit study relating the loss of revenue from reduced honey production against general losses from reduced agricultural production caused by the weed. There is no doubt, however, that the economic losses from the weed, which justify its Noxious Plant status, substantially outweigh its value as a nectar source.

The value that the agricultural community has placed on the weed is indicated by the fact that up to $1.5 million a year was previously spent as a 50 per cent government subsidy for cost of herbicide alone to control the weed; this represents only one quarter of the total cost of application. The total cost to agriculture of course is far greater than this. I estimate that this Division's costs on this programme have totalled approximately $250 000 over the past 10 years.

In summary, entomology division has undertaken a comprehensive effort on biocontrol of a major Noxious Plant, nodding thistle, using a highly selective and specific insect. Mr Bray's description of the affected plants at Hakataramea is one of many observations we have heard and made showing that the effort is not unsuccessful.

In conclusion, the division's research programme has biocontrol of ragwort, gorse and broom as high priorities and I would be pleased to inform your readers of these programmes if you wish.

J.F. Longworth,
Director,
Entomology Division,
DSIR.

In our last two editions we have looked at different aspects of the need for beehives for kiwifruit pollination. In this issue we summarise some excellent papers presented at three MAF seminars held at Ruakura, Tauranga and Gisborne late last year.

The seminars attracted more than 650 people — orchardists and beekeepers.

MAF apicultural advisers Murray Reid and Trevor Bryant organised the seminars to inform those attending of the complex factors involved in achieving successful kiwifruit pollination, and to bring them up to date with latest research into honeybee activity and the effect of male spacings on fruit size.

They also wished to "soften impressions being created" that the kiwifruit industry would become hamstrung by shortage of beehives after 1985.

The beekeeping industry can meet pollination needs

However, there is a lot of research to be completed and much experience to be shared.

DEVELOPMENT FINANCE Corporation predictions that the beekeeping industry will be unable to keep up with the demand for hives for kiwifruit pollination have been scotched by apicultural advisory officer Trevor Bryant. Speaking at a series of pollination seminars held at Ruakura, Tauranga and Gisborne in late 1982, he said there could be a surplus of about 10 000 hives in 1990 if the current rate of hive expansion continues.

"This indicates to me," said Mr Bryant, "that the beekeeping industry can cope, and is in fact expanding to meet the challenge."

To meet this challenge, however, a host of problems require urgent debate and solution. On the basis of Mr Bryant's calculations, by 1990 there could be 230 000 hives in the North Island of which 50 per cent would be available for pollination.

This number of hives would put immense pressure on apiary sites in the more traditional beekeeping areas and many beekeepers would be faced with finding alternatives to honey production. Mr Bryant suggests pollination will be the main source of income for many, with supplementation from sales of package bees, queens for export, propolis, beeswax and possibly pollen.

The precise number of hives required to meet the demands of the kiwifruit industry will depend greatly on the number of hives recognised as being necessary to pollinate a hectare of kiwifruit. Though MAF recommends that some eight hives per hectare are needed in mature blocks to guarantee a good crop, in reality most growers place only four to six hives per hectare and some place even fewer.

It is hoped that research being conducted this year under the guidance of Dr Cameron Jay of Canada and Pat Clinch of Wallaceville will go a long way toward giving the industry a clear cut answer. Preliminary results of a survey indicate that those growers who have eight or more hives per hectare would regularly average more production than those using fewer hives.

Murray Reid, MAF senior apicultural advisory officer, described the dependance on bee pollination as the Archilles heel of the kiwifruit industry; "In short, kiwifruit growers need beekeepers or bees, but beekeepers can exist without kiwifruit."

Nevertheless the rapid growth of horticulture is encroaching on many areas formally considered prime sites for honey production. As a result, beekeepers are becoming more dependent on pollination fees as a major part ▶

of their income, and the beekeeping and kiwifruit industries are being forced together whether they like it or not.

"This arrangement can be and should be mutually beneficial provided we look after each others interests and communicate," said Mr Reid. "There is no room for "get rich quick" beekeepers or for orchardists who are not careful with their spray programmes."

Mr Reid advised kiwkfruit growers that the time to book hives for pollination was around Christmas time when the beekeeper was taking hives out of the orchard. This is because the ideal time to create hives for pollination is in January to March.

Any old hive cannot be used for pollination; it must be the right strength and have good food reserves, a young queen and be housed in very good equipment.

"There are over 40 000 hives in the greater Waikato area, but at the end of November (kiwifruit pollination time) only about one third would meet all the criteria mentioned. Most would in fact be too strong to shift into kiwifruit orchards," said Mr Reid.

Pollination fees

Mr Reid said pollination fees were usually set by a group of co-operating beekeepers who provide a pollination service, and presented to a combined meeting of orchardists and beekeepers in Tauranga in October each year. The pollination fee, he said, may seem high related to other crops but is justified because of the problems faced by the beekeeper in supplying hives for kiwifruit in mid November to early December.

Once the hives are brought into the orchard and a price has been negotiated, the beekeeper is providing a service and should be expected to meet the requirements of the orchardist. Nevertheless, close liaison with the beekeeper is essential as what may seem to be perfectly reasonable to one party may, in the absence of discussion, seem totally unreasonable to the other.

Before the bees are moved into an orchard, Mr Reid advised that the grass sward should be first mowed to reduce competition for the bees. Second, the last azinphos-methyl spray should be done at least seven days before bees are due. If male vines are in flower at this stage, then further delays should be made before bringing the bees in as bee mortality has been caused by orchardists spraying early male flowers.

Third, in major kiwifruit growing areas, neighbours and the local fruitgrowers federation office should be

notified when bees are brought in and when they go out. Similarly the Fruitgrowers Federation and neighbours should be checked with before applying post blossom sprays.

Fourth, captan fungicide is applied during blossom, but should only be sprayed in early morning or late afternoon when bees are not flying. Foraging bees get damaged and chilled by being sprayed on blossoms.

For their part, Mr Reid advised beekeepers not to get involved in pollination services if they were not geared up to providing a professional service. "This means not only supplying proper strength hives when requested, but equally important, you must remove the bees when asked to. It is not fair to your grower, or his neighbours when you cause delays to their spray programmes because you can't or won't shift your bees out on time."

A difficult flower

Kiwifruit are dioecious plants with male and female flowers being borne on separate vines. Male vines do not bear fruit.

The female flower can easily be recognised by the swollen ovary below the base of the petals. Several stigma and styles are present. These are surrounded by numerous stamens that produce no viable pollen. The male flower has a small non-functional ovary surrounded by numerous stamens.

Kiwifruit is recognised as being a difficult crop to pollinate and if a minimum export fruit of 72 grams is to be achieved, a fruit with over 750 seeds is required. This means that more than 3000 viable pollen grains need to be transferred to the stigma during pollination.

To achieve this pollen transfer, we require a honey bee to visit a flower, which although bearing the showy attributes of an insect-pollinated flower, produces no nectar and a dry pollen which is difficult for the bee to manipulate.

Some fertilisation, and hence developing seeds, are essential for a fruit to develop. It is not necessary for all the ovules to be fertilised. Fruit which develop with only a few seeds however, are normally either misshapened as in apples and peaches or smaller, as in kiwifruit.

Ian Stevens and Michelle Forsyth, MAF horticultural advisers, told the meetings that female flowers can be pollinated and set to produce full-sized fruits up to seven days after opening. This is despite the fact that within two to three days petals and anthers have browned and started to wither.

Unfortunately because of this petal change, flowers become unattractive to bees so that the extended receptivity of the flower is of no practical meaning where pollination is dependent on insects. In contrast to pollinated flowers, unpollinated flowers retain a markedly white unchanged stigma. After four to five days the stigma of pollinated flowers brown and wither. Appearance of the stigma of flowers may thus serve as a good index of effectiveness of pollination in an orchard.

Most of the effective viable pollen from male flowers is produced within two to three days after opening. Although very small amounts of pollen can be obtained after this period, it has a poor germination rate. The "effective life" of a male flower is therefore apparently only two to three days.

Male vine distribution has commonly been achieved by planting one male vine to every eight female vines, the 1:8 ratio, where every third plant in every third row is a male. Hence every female is adjacent to a male, and the male vine occupies about 10 per cent of the orchard canopy.

With this layout, yields in excess of 7500 trays/hectare are achieved, but some blocks have experienced pollination problems in some years. Although this layout is still popular today, there has been a move towards systems involving a greater number of male vines in the orchard. This provides a better distribution of male plants.

Two examples of this better distri-

▶ bution of male vines are the 1:6 (every third plant in every second row) and the 1:5 systems (every second plant in every second row). Here the male vines are reduced in size to about half the size of the females in the 1:5 system.

Linda Hawes and Trevor Lupton, MAF horticultural advisers, said the choice of a male ratio is often made for reasons not totally due to what seems appropriate for pollination purposes. "You may realise that a 1:8 ratio fits into blocks containing rows in multiples of three, while 1:6 and 1:5 ratios fit blocks containing an odd number of rows. With the move to seven row blocks the systems involving higher numbers of male plants suit the block widths better."

Hawes and Lupton advised of two practices which are less common but which might become more popular as growers attempted to improve the pollination of the crop by making the bees' job easier. The placement of male vines on the edge of blocks has not really caught on, although this would mean that bees collect male pollen on entering the block. The other method which again is seldom seen is the grafting of a piece of male wood on the end of the leader of the female vine. This would require some change in vine management, but could be one means of overcoming a pollination problem.

"In summary," said Hawes and Lupton, "it would appear from what we know at present that approximately 10 per cent of the orchard canopy needs to be male vine. This can be achieved by the traditional 1:8 spacing arrangement with male vines the same size as female vines, or with higher numbers of male vines pruned to occupy a smaller space than their adjacent females. The move to higher numbers of male vines within the orchards means the male vine distribution is improved."

Trick of the trade

Dr Cameron Jay, visiting New Zealand from Canada's University of Manitoba, explained to the meetings about the mechanics and motivations of foraging bees. He said that the "trick" when endeavouring to pollinate a crop, was to ensure that the majority of foraging bees were pollen collectors. This is the case in a strong building colony where the protein and vitamin-rich pollen is required to feed brood.

He said that nectar collecting bees are usually not good pollinators because they often miss anthers and stigma, whereas pollen collectors are usually good pollinators because they frequently cross anthers and stigma.

To assist in pollen transfer in a bee-pollinated crop it is essential, said Dr Jay, that kiwifruit males and female flowers should be open at the same time; that there should be viable pollen present and that the female flowers are receptive. There must also be a presence on the target crop of the correct number of pollen collecting bees at the correct time. This implies good flying weather and low floral competition.

Kiwifruit flowers
Bright display but no nectar.

Newcomers effective

Dr Jay advised that the best pollination is done during the first few days the hives are in the orchard. After that, the bees locate more attractive sources further away. One of the chief problems, he said, appears to revolve around the difficulty of holding bees on a crop like kiwifruit that requires pollination especially if it is not very attractive to them. This is a universal problem.

Leading New Zealand bee scientist, Mr Pat Clinch of Wallaceville told the meetings that weather during the blossom period has a major effect on honeybee activity, and consequently, the visitation rate of kiwifruit flowers in fine weather. He said, competing plants have a far more serious effect on pollination rates because in fine weather bees can travel long distances to them. In changeable weather bees tend to be restricted to work within the plantations.

Mr Clinch and his fellow researchers have also noted that individual hives, even if situated side by side, may have very different preferences for kiwifruit pollen. This effect, said Mr Clinch, may be partly related to differences in the genetic makeup of the bees as it is possible to breed for particular pollen preferences. It may also be the result of recent experience of pollen collection before hives are moved into a plantation.

More mates best

Mr Clinch's work also bears out the experiences of commercial growers who have opted for higher densities of male vines. In trials during the 1981-82 season, in orchards with satisfactory bee visitation, fruit close to the male vines contained significantly more seeds than those most distant from the males.

"I found that in some seasons that 770 seeds may be required for fruit to reach 72 grams minimum export weight. Fruit most distant from the males contained only slightly more than this number of seeds.

"Thus in a good season, when pollination is normally less satisfactory on account of a greater number of flowers competing for pollination, it could reasonably be expected that much more of the fruit would fail."

While the scientists work out the optimum ratios of male to female vines and the correct density of hives per hectare, the problems faced by beekeepers providing a pollination service tend to be found at a very practical level.

The layout of kiwifruit orchards must not only take into account the demands of the vine, shelter and orientation toward the sun, but also allow for the needs of the beekeeper and his truck providing individual hives or groups of four on pallets. Norman Finlay and Ian Berry, commercial beekeepers with considerable pollination experience both referred to the problems faced when dealing with poorly designed headlands or badly located corner posts.

Murray Reid advised kiwifruit growers to leave generous headlands so beekeepers can get their trucks around the orchard. Access for a three tonne truck should be regarded as the minimum.

Other Reid advice included the leaving of corners where pallets of hives could be placed; the removal of irrigation pipes, taps, overhead wires and pipes which might be damaged by a truck at ▶

▶ night or which may even damage a beekeeper.

"Have you left enough room for a central yard where a truck can turn or park or if hives or pallets have to be relocated on to a trailer or smaller utility for distribution?" asked Reid.

For the beekeeper, Norman Finlay advised taking a close look at the truck being used for the service. It is important, he said, to ensure that it will serve both the honey operation as well as kiwifruit pollination. His choice is a 1974 three tonne Bedford TK with a very good steering lock which makes for good manoeuvrability.

A pollinating unit

Norman Finlay advised that beekeepers must have good equipment for shifting bees. This means they will need:

- A top class floor board, that has only one entrance, in the front and with no holes underneath, at the back or sides. I also put four nails in each corner of the floor or base board to stop the bottom box from sliding off.
- Two first class brood boxes and a good fitting lid.
- As for the inside, I like the bottom to be full of brood, pollen and nectar and a syrup feeder. The second or top box, should have a minimum of four frames of brood and supporting combs of nectar and pollen.
- The bees must be on the upward move to get what I consider is a unit that will give the best pollination service to the orchardist. After all, he is the guy that is paying for your service.

Preparation of a pollination unit

"The first thing you must know," said Mr Finlay, "is the approximate number of hives you are going to require. It is best if you can get your required number of hives ready in one or two yards close together so as to be able to pick them up quickly and get away.

"You can start late summer by making up nucs and over wintering these, but you will need to watch them very closely in the spring because with these young queens they can starve out very quickly. I start checking and feeding these nuclei in the first week of August.

"If you get a hive that is just average strength after the winter, you will find by mid-November you will have about the right strength as mentioned in 'a pollinating unit'.

"Personally, I prefer to take a full size hive, with young queen for preference and start to feed from the end of August. Old queens can fail while in the orchards which will cause a lower demand for pollen. These are often poor pollinating units. Always be sure that you have three to four frames of honey and pollen per hive to see them through, as they get no nectar from kiwifruit flowers.

"If kiwifruit flowering time varies, as it will, you may find your colonies becoming too strong, before the flowers open. You can get to a stage when you don't know whether to super up or take out some excess brood. This I feel would be best left to your own judgement, but is another cost to be borne by you, the beekeeper."

Mr Finlay says he usually starts loading up at about 7 pm. "If it is raining we can start earlier. A puff of smoke at the door before lifting each hive usually keeps the bees at bay. As we leave all the entrances open we get some clustering on the front, but a puff of smoke on arrival usually returns the bees to their hives.

"We tried locking the bees in once, but found they tended to panic and if boxes became separated and bees got out it usually caused more trouble than it was worth.

"This method eliminates all risk of smothering and the loss of field bees is minimal. You should carry a roll of scrim or fine netting to cover the hives in case of accident or breakdown.

"We usually leave Hamilton in time to be in Katikati before dark. If the weather is wet and raining we can usually leave a little earlier. We have all sites prepared ready to put the bees down on our return. Usually we are back in bed by about 1 am, and hope to have a fairly easy day before the next pick up the following evening," said Mr Finlay.

Mr Finlay said that it had been his experience and that of a number of other beekeepers that bees appear to go through a dwindling stage once they come out of the kiwifruit orchards.

Syrup feeding

To remedy this, last year Mr Finlay experimented with a little syrup feeding which appeared to have positive results. During 1983 Mr Finlay proposes to carry out more tests in conjunction with Trevor Bryant of MAF.

Like Murray Reid, Mr Finlay stresses the importance of co-operation between the orchardist and the beekeeper. He likes to be in touch with the orchardist from about mid October, expecting a final ring about a week before the bees are required.

It is important that the orchardist understands how and when to get the best pollination from the bees advised Mr Finlay. "There must be at least 15-20 per cent female flowers out before bees are moved in – do not be fooled by male flowers which usually open a lot earlier than females."

As a final piece of advice Mr Finlay said the preparation of a list of essential gear was a 'must'. "You need plenty of ropes, torch, hive tools, helmets, overalls, gloves, matches, smoker and fuel and last of all, sufficient petrol or diesel in your tank for the return trip. Garage proprietors are not fond of bees flying around electric lights and dropping down their necks.

"You should also take things like rain wear because it can often be fine on this side of the hill and wet on the other. Make sure you have all your tools in case of mechanical breakdowns, scrim to cover the truck in case you have to call a mechanic because you would be very lucky if you found one who liked bees."

Like many beekeepers involved in providing kiwifruit pollination services, Norman Finlay said he found providing the service to be a challenge – one which has enabled him to build his hive numbers and to obtain guaranteed income at a time of the year when honey sales tail off.

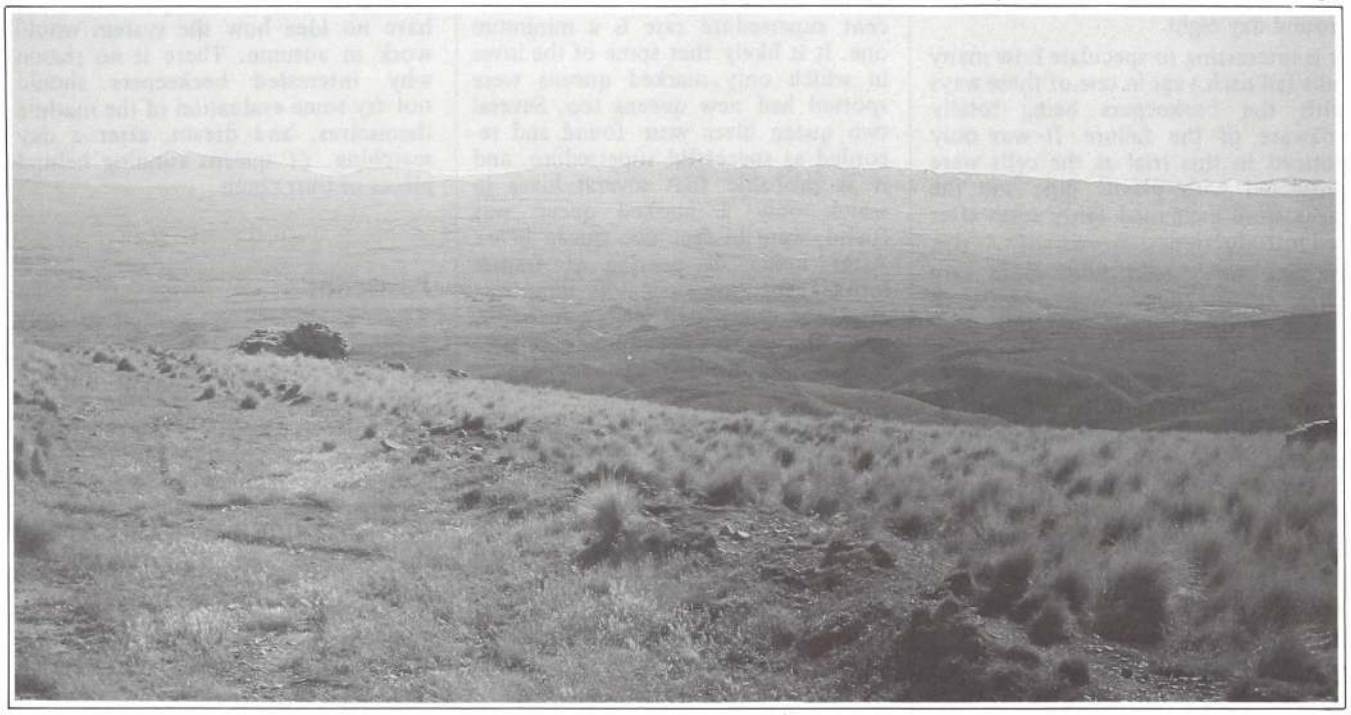
Trevor Bryant believes it will be commercial beekeepers who fill the demand for hives for kiwifruit pollination. He said the history of grower or farmer-owned hives was not encouraging and that it didn't take much imagination to predict the potential hazards. He also pointed out that bees maintained in orchards all year round are not good pollinators of kiwifruit.

"In conclusion," said Mr Bryant, "I would say that the beekeeping industry can meet the demands of a dynamic kiwifruit industry."

The beekeeping industry, in his view, has the skills and the initiative to meet and overcome all the challenges, but must be more positive in projecting itself.

Mr Bryant is sceptical of those scientists who believe that through artificial pollination a mere 97 hectares of male kiwifruit vines would produce enough pollen for the entire industry. Drawing attention to the potential for disaster if one of the all-male orchards were struck by disease or adverse climatic conditions, he said he believed that artificial pollination and honeybee pollination would both have a place, but even if artificial pollination was not perfected, the beekeeping industry could by itself meet projected pollination needs at the current rate of growth in hive numbers.

The Maniototo from the Rock and Pillar Range



Requeening without dequeening in Boondocks

by Kerry Simpson, apicultural advisory officer, Oamaru.

"MOST BEEKEEPERS appreciate the value of a young vigorous queen in the colony, especially if she is from proven and selected stock. But requeening is an expensive, frustrating, time consuming and often difficult chore. Yet any progressive beekeeper can't afford to neglect this part of colony management." These words from an article by Murray Reid in the NZ Beekeeper, September 1979, are well worth reconsidering.

There are too many beekeeping outfits with a high proportion of passenger hives due to failed and failing queens and with hives weakened by swarming. It may be timely (if the cap fits) to re-read Murray's article together with this account of requeening trials in an outfit recently purchased by Lindsay McKenzie in the Maniototo.

The Maniototo is a broad basin bounded by four mountain ranges. Rainfall is usually low, the winters are long and cold, the springs windy and late, and the summers usually very hot. Lack of shelter and hot, dry nor-westers and bitter southerlies make spring management difficult. Snow in December is not unusual for Ranfurly, the town in the centre of the basin.

Lin McKenzie purchased an outfit of about one thousand hives in this rather difficult country during the spring of 1981. This was not a good year for starting beekeeping due to severe drought and cold, southerly weather throughout January of 1982. Crops in the area were not much over two tonnes per hundred even from established beekeepers used to local conditions.

By the use of some wise management Lin survived this very difficult first season, and was determined to get his hives in as good shape as possible for this year. Intensive management with plenty of feeding was out because of the twin problems of lack of labour and finance. We discussed the importance of good young queens and decided the circumstances dictated that requeening with cells was worth a try. Lin was interested in how successful this would be in his area so offered the use of some of his yards for a trial.

The trial was fairly simple in plan. As many apiaries as possible were gone through in the early spring and all the queens marked with typists correcting fluid. No note was taken of apparent age of individual queens, but they ranged from the last autumn's to very old. About 150 queens were found and marked. Grateful acknowledgement is made of the assistance of Walter Adamson and David Poole in this tedious exercise.

It was considered important not to disrupt spring work by this trial, so subsequent apiary management was done for the benefit of the hives, not the trial. Quite a number of hives were eliminated various ways by splitting or uniting with other colonies. However, each hive retained in the trial was given a protected cell during the mid-spring.

From four to six weeks later the hives were again inspected and a search made for queens; either the marked queen or a new queen, or sometimes two queens were found. An unexpected cause of the elimination of some hives from the trial was the failure of many of the introduced cells. About 12 per cent of the hives originally in the trial had to be eliminated because of dead cells.

There was no obvious cause of failure common to the hives concerned. However, many of the cells had been put out as early as five or six days after grafting and they were also in plastic cell cups which are more prone to chilling than wax cups. It is not uncommon for beekeepers to put out cells earlier than the tenth day after grafting but it is not recommended.

The metamorphosis of larva to pupa that occurs just after sealing is a very delicate stage and jolting or chilling could cause fatal damage. Wing devel- ▶

opment occurs very late and malformed wings can occur if cells are damaged around day eight.

It is interesting to speculate how many cells fail each year in one of these ways with the beekeepers being totally unaware of the failure. It was only noticed in this trial as the cells were protected with plastic pipe and the hives were examined fairly soon after cell introduction.

Perhaps we should take more care after raising good queen cells to transport them gently and introduce them on day ten after grafting. This may mean rethinking the cell raising programme with smaller batches at more frequent intervals. More trials on cell failure after introduction are certainly needed before definite conclusions can be drawn.

The results of the trial on the ninety-one hives evaluated were as follows:

Original marked queens only found in hive	50 (57%)
Original marked queen and virgin	3 (3%)
Successful supersedure	36 (40%)

Despite the poor spring weather these results are encouraging as the 40 per cent supersedure rate is a minimum one. It is likely that some of the hives in which only marked queens were spotted had new queens too. Several two queen hives were found and recorded as successful supersedure, and it is probable that several hives in which only a marked queen was found, were in fact two queen hives. After hours of peering at frames looking for queens it was tempting, after one queen had been spotted, to give the remaining frames a less thorough scrutiny.

Even at 40 per cent success rate the economics and improved production from this percentage of requeened hives should be worth evaluating. The cost of producing good cells (from good stock) is not great, nor is it difficult. Beekeepers who do not run a regular requeening programme or who have restricted seasonal finance could consider this method as a valuable management tool.

For me the trial has posed far more questions than it has answered, and more evaluation is needed of several aspects. Many of the points raised in Murray Reid's article need to be considered – for example, we still have no idea how the system would work in autumn. There is no reason why interested beekeepers should not try some evaluation of the method themselves, and dream, after a day searching, of queens running behind pieces of burr comb.

Postscript

After a phone conversation in early February with Lin McKenzie, it seems that our suspicions that we did not find all the new supersedure queens was correct. Several of the hives still with our 'marked queen only found' code on the lids were found to be a box and one half ahead of others in the yard, and in some cases Lin broke them down and searched for the queens.

The queens were new and unmarked and we presume at the earlier inspection there were both queens present but we found only one, and that the hive had two queens for part of the build up period. Obviously more careful (and time consuming) work is needed in evaluating this technique.

FROM THE COLONIES

NELSON

Driving up to Kaitaia for the Christmas break, my attention was inevitably drawn to the appearance of pasture or should I say clover. Well! If only one could have airlifted hives out from the crunchy stubble of the Nelson area to anywhere north of Turangi to Cambridge, we might even run out of drums. Plainly our blessings come in a series of micro-climates modified by seasonal variations.

In Nelson, some of us are hunting a market for partly filled combs!

The old proverb about the ill wind that blows no one any good has shown some truth. The cold spell in December put paid to many queen wasps, nipping their plans in the bud. Time will tell.

Pollination in a region of close crop diversification, where spray programmes inevitably overlap, such as ours, one simply has to accept intermittent loss of bees.

The password is "Get in and get out". A few hours can make all the difference to the flight bees. November and December are our most hazardous months, especially when clover has taken off early.

On February 14 we are looking forward to a visit by Professor Cameron Jay, an entomologist from Manitoba Canada, who has researched honeybee orientation. His findings should be of special interest to beekeepers and kiwifruit growers.

March 18 to 20 inclusive should find us at Rotoiti Lodge. An extended field day entitled "A Weekend Buzz for Beekeeping Families" is all set for a reunion with our counterparts from the Wellington and Blenheim branches. H. Cloak, G. Jefferies and A. Matheson, our A.A.O., will be our guest speakers. Their stimulation will undoubtedly provoke much cross chat over the odd gulp and crunch break.

Displays of equipment and a forum are also slotted in.

Meanwhile, speaking for all Nelson Branch members, we're looking forward to the next N.B.A. Conference to be held here in July 1983. A cordial welcome awaits all.

Fred Galea.
Hope.

SOUTH WESTERN DISTRICTS

Constant wind, more rain than usual and lower temperatures has had a serious effect on honey production and beekeeper morale.

From New Plymouth to Wellington westerly winds have been near gale force. Wanganui city's weather officer reported the windiest January for 19 years and the wettest January for six years.

The honey crop has ranged from zero to 2 tonnes per 100 hives. Best performance has been on the coastal strips from Wanganui to Foxton where there has been an abundance of clover and just enough calm warm days (though not more than 10 days) to achieve a harvest.

While Taranaki and Manawatu have struggled to gain winter stores, Wairarapa reports a good average yield.

This summer's challenge reminds me of that congratulatory telegram to the New Zealand cricketers in Australia – "When the going gets tough, the tough get going". It's incredible how the bees snatched a few hours here, a few days there to gather in; as if they knew a family's livelihood depended on them.

Our branch of the association will be having its annual meeting in the autumn.

John Brandon,
Wanganui.

WEST COAST

It would be a pleasure to be able to report a good honey season, but as at present all prospects appear gloomy, the only hope for some crop is for the weather to take up immediately, and not only be fine, but warm. Temperatures have been consistantly well below average for practically all of the season so far, as is indicated by garden plants flowering a month late.

The rata is in flower, perhaps not in record proportions, but more than enough to provide a good crop if temperature was high enough to encourage nectar secretion, and fine enough to allow the bees to get out without getting drowned.

While rata vine is also in flower and if past habits prevail, the red rata vine will flower early enough to provide some crop, if not winter stores as it has done in the past when the trees have bloomed.

Another problem that some beekeepers have to contend with is the late swarming of colonies, even those with young well-bred queens. The reason put forward for this is the weather confining the bees to the hive, and for something to do they build queen cells.

Those beekeepers without another source of income will be struggling to survive, striking a season like this after a not so good one last season.

A manufacturer has distributed trial hive bases to beekeepers for a season. However, it will be difficult for Coast apiarists to give them a fair trial because of the weather conditions. If they produce a crop this year when other conventional hives don't, then they must be good.

There were two successive seasons in the early 1950s very similar to last season and this when half a ton was harvested in the one and three-quarters in the next, and beekeeping was nearly written off. But the next season produced 12½ tons from the same number of hives, so it doesn't pay to give up hope, and when things are at a low ebb there is all the more room for them to get better.

Here's hoping for an Indian summer to provide some reward.

Peter Lucas,
Harihari. ▶

NORTHLAND

Thus far the season has behaved in a peculiar manner. There appears to have been a good manuka flow throughout the north, but following this flow things seem to have gone wrong. It has been the windiest, coldest, cloudiest summer in memory.

Farmers that cut hay or who have stocked their farms heavily got little or no growth until the drought broke in mid-January. Consequently, the resultant honey crop at this point is not good – in fact in areas with little manuka it has been downright pathetic.

It seems that the moisture and the cloudy cold conditions have caused many floral sources (including clover) to prolong flowering far beyond the normal period, so I guess if things warm up, there would still be time for a substantial improvement in the total honey crop. Anyway, we shall live in hope trusting that we will not come to a sticky end.

Mike Gauthern,
Dargaville.

HAWKES BAY

1983 would go down as one of the worst seasons on record for Hawkes Bay.

Most hives have a surplus of only a half super of honey. This applies to all hives from Dannevirke to north of Napier, from the coast to the hills. As everyone knows that isn't petrol money.

North of Napier a crop of a half box to three boxes so depending where the hives are in that area it's alright or a disaster.

The winds and cold temperatures from early October to after Christmas are the cause of our blues.

A lot of hives were shifted to other areas, one case being where hives were moved to a succession of frosts, so no clover, no crop. Another beekeeper moved 1400 hives – after a shift like that he deserves a crop, but unfortunately temperatures are still low.

Hives are being closed down and at least three commercial beekeepers are looking for work. Staff also suffered being laid off as soon as work ceased.

Dates for our next meetings: AGM Thursday, April 14. General meetings Thursday, May 19 and Thursday, July 7.

Better beekeeping.

Keith Leadley,
Hastings.

CANTERBURY

Following an exceptionally good spring build-up with fine warm days and good nectar and pollen sources, the prospects for the season were good.

By mid November hive strength was very good and clover was flowering profusely. No sooner had hope risen, than a blustery nor-wester blew for nearly three weeks. This dried the country and devastated field bee populations. Consequently, when the flow did begin, yields ranged from average to poor.

It has been a very patchy honey flow with tremendous variation in crop both between individual hives and between apiaries only short distances apart. Some areas which received thunder showers gave excellent crops of honey while other areas inland exposed to continuous westerlies did not even gather stores.

Honey dew production prospects are good with the possibility of an average crop.

T.D. Penrose,
Christchurch.

BAY OF PLENTY

We have reports of up to 30 kg average honey production per hive, however, I think that the average for the district may be well below that figure. Some developing beekeepers have just managed to put aside a minimal amount of winter stores only.

This season we again experienced a good pasture flow conflicting with kiwifruit pollination management.

The main crops of honey collected for the season came from the later thistle and bush sources.

Due to the extremely dry and windy conditions prevailing during the early kiwifruit pollination stage, all insect activity in the orchards, including honey bees, was at a modest level.

Pollen trapping revealed that the total amount of pollen collected by the bees at this early pollination stage, was well down on previous years, given the same hive strength. However, on closer examination, there appeared to be a higher than normal percentage of kiwifruit pollen compared to pasture sources, a possible effect of the bees being contained in the more sheltered orchard areas.

When the first drought-breaking rains came later on, honey bee activity in orchards was intense. The overall season effect seems to be that very good pollination was gained.

We continue to have major expansion of hive numbers, with existing and new beekeepers taking up the challenge. Perhaps the establishment of a high level beekeeping study course at the Bay Of Plenty Community College, Tauranga is quite timely. I understand that Nick Wallingford, a good practical beekeeper, has been appointed the permanent tutor's position.

A recent discussion day held at Alan Murray's, Opotiki, was well attended. Trevor Bryant introduced the main topics of Cell Raising and Autumn Splits and convinced many of the value of young queens. Thanks to Alan and Margaret for being excellent hosts.

Bruce Stanley,
Whakatane.

WAIKATO

In my December Waikato notes, I said that if the wind dropped and we got some rain we could have a very good season indeed.

Over Christmas and early January we did get rain, enough to keep the clover growing and producing throughout January, but unfortunately the wind stayed with us, varying from south to north west, strong and gusty, sometimes gale force, for days on end and with cool temperatures.

Double queen hives lost strength very quickly; the bees wore their wings out fighting against the wind.

Hives along the foothills of the ranges working up to the Tawari produced only about a super per hive but hives set down right in the bush did a bit better.

Taupo looked set for a really good season but the combination of wind and early January frosts ruined crop chances.

Swarming has been bad in my northern Waikato area from November through until this week. In fact on February 3, one landed on a car in Morrinsville main street and I have heard of two others on the same day. One beekeeper told me he has been called to over 40 swarms during the season.

I would estimate the crop to be about 1½ to 2 tonnes per hundred hives varying up or down in different areas.

Branch members are invited to a talk about kiwifruit pollination by Professor Cameron Jay to be held at the McMeekan Centre at Ruakura on March 4 at 7.30 p.m.

Our branch field day will be held at Mr Russell Berry's Reporoa honey-house on March 5. All welcome.

Ray Robinson,
Waihou.

MARLBOROUGH

Well, certainly a very unusual season. Like the rest of the country we experienced a very cold spring which stopped the bees building up strongly and disrupted requeening programmes. And then with the very dry windy season it looked as if the pastures would dry right off. However, while those hives on the plain had a lean time, most of the hill country had a couple of inches of rain over Christmas which resulted in a flow of sorts from clover and borage. Generally, the Wairau has done better than the Awatere, with parts of the Wairau getting up to 100 mm of rain in January. So as a result there is some honey on the hives, more than what was expected.

Hive numbers have continued to increase in Marlborough as beekeepers expand their operations into the high country. Around Blenheim large areas are being planted in kiwifruit, cherries, apricots, pipfruits and seed crops (onions etc), all of which are going to need large numbers of hives in the future to meet pollination needs.

It is hoped that this winter the local branch will have discussions with the horticulturists and work out the problems that are arising especially with regard to spraying and the hive mortality that exists around Blenheim.

The Nelson branch is hosting our annual combined Nelson/Marlborough/Wellington field day at Lake Rotoiti on March 19-20th. Accommodation is at the Rotoiti Lodge and there is a very interesting programme arranged for Saturday and Sunday. It is hoped members will make an effort to attend.

Craig Deans,
Blenheim.

SOUTH CANTERBURY

When the weather man predicted we would experience unusual persistent westerly winds for the summer little did we realise just how true this was to be.

Good rains fell in October, November and early December but as soon as the weather cleared, back came the winds and dried the pasture out again so we were back to drought conditions.

The result of these severe persistent winds was serious dwindling of the bee strength in the hives; bees that ventured out surely found a watery grave in the Pacific Ocean, some may have been lucky and found a new home in the Chatham Islands. However, do what we may we could not compete with these elements and so we found ourselves with a little better than half an average crop except in some sheltered areas.

Vipers Bugloss has flowered most profusely in the Waitaki valley and parts of the high country giving very good returns to those beekeepers in this area. Late frosts in other parts of the high country delayed the honey flow, but with abundant rains as the result of the westerly winds, the clover recovered remarkably and even at this late time of the season, the first week in February, I have seen thousands of hectares just white with clover. All this area requires now is fine weather to give a very good honey crop.

The introduction of the thistle weevil could well have a marked effect on the amount of thistle honey gathered as this weevil has now spread over the whole of South Canterbury and it appears has had some effect already.

Most local beekeepers are now well on the way to harvesting their honey and those who do autumn requeening have this well underway.

As usual we now have had our joys or disappointments and so have commenced planning for next season.

Harry Cloake,
Timaru.

OTAGO

Towards the end of 1982 a branch meeting was held with the social part being the most important. It is appropriate for that time of the year and was most enjoyable.

At short notice the Branch (I really should say its president, secretary and a few helpers) took part in the Trade Fair held in Dunedin. Different honeys from a number of packers went on sale. The public was welcome to taste the products. The stall was manned all the the time and besides the honey, many aspects of beekeeping went on display. A real formidable effort. Thanks Bill and John for your splendid exercise in public relations.

And now about Otago's honey crop. What honey crop? In many cases there won't be any surplus. Late October was bad as I told you in the previous notes. November was shocking for wind, and December no better. Sugar feeding was going on between Christmas and New Year, in someplaces.

January has seen a continuation of this abnormal weather pattern with only a few reasonable days now and then. Now we are into February and although it is not all over yet, we cannot see anything but a zero to very light return for the Gore apiary district.

Central Otago is perhaps faring somewhat better, I hear of a return from dandelion. In places, the bees gathered a super or so from bush sources. Manuka flowered very heavily this year. For clover honey it has just been too cold till now.

A meeting of commercial beekeepers was held at Gore to assess the situation two days ago. The picture was very much the same all over. It certainly will make it very difficult for some.

It is with pleasure that we welcome Clif van Eaton as our apiary advisory officer. He is certainly not starting under the best of circumstances but then things can only get better from now on. That is if one can weather it for 12 months.

We want to say thanks to Kerry Simpson, advisory officer at Oamaru, who put himself out no end in trying to service our district during the Gore vacancy on top of his own workload.

John Heineman,
Milton.

AUCKLAND

Summer – we should be in the middle of it but something seems to have happened to the seasons. The wind seems to be part of the situation, blowing like heck every day. There are a lot of long faced beekeepers around hoping that maybe we may still get a week of summer. After such a good spring, the December/January period has been awful, there has been little or no flow at all. Hives that have been into kiwifruit have little or no honey. This has given first time pollinators the realisation that $48 is not a pot of gold at the end of the rainbow, and caused the price cutters to think again, we hope.

A large group of beekeepers gathered with kiwifruit growers to spend an interesting evening with Professor Cam Jay. There were about 300 in attendance and some interesting facts and figures were put forward.

One item of concern to the commercial beekeeper is the instance of disease which seems to be popping up all over the district. A strict watch will have to be maintained to keep this problem under control.

Maybe one day late in February summer will come, too late to be of any good. Well, I suppose we can look forward to next spring and summer for better luck next time.

Graham Cammell,
Auckland.

SOUTHLAND

Since Labour weekend the southern oscillation has caused our wet windy weather to continue causing beekeepers considerable worry and frustration. Hives had to be fed much later than usual, with some beekeepers closer to the coast feeding late into January.

Rain fall has been double the average, sunshine hours way down. Good bee foraging days on the main have been reduced to the odd hours between showers with fine days averaging two or three a month.

Queen matings have been poor with a very high supersedure date for queens that did manage to get mated.

With the days now getting shorter, the ability to gather a crop may not be possible for some hives so surplus honey will be short this season in Southland.

The long-range forecast is for this to continue until the end of March.

Alister Lee,
Balfour.

NORTH OTAGO

This season has been one of hope and despair; we started off well in the spring, drought conditions and absence of wind, and we had the best willow flow possible. This cut down on the sugar bill considerably.

Drought conditions continued and up until Christmas things looked very bleak, and then Christmas eve it rained. We got 7mm of rain over the Christmas period, the best Christmas present we could ask for, the days following being overcast with no drying winds. Pastures sprang back into life and with so many sheep being sent to Southland everything looked rosy.

But unfortunately, the sun forgot to shine so, of course, no working days for the bees, and a fortnight into the New Year we had another 60mm of rain. Since then it has been more like autumn than summer – lack of sun, cold mornings and frosts inland.

The smaller beekeeper in favoured areas could possibly get an average to slightly better crop, but the bigger commercial beekeepers at this stage can expect a crop well below average; however this could improve if this month of February comes up to its expectations of being our warmest month.

At this time of the year we should all be well into extracting but other than trial runs to make sure everything is in working order, everyone is waiting for that flow to begin. At this stage hives have winter stores plus, but with the uncertainty of the weather it would be unwise to do much extracting. It could well be in line with the rest of the farming community that we will have to tighten our belts another notch and only do things that are absolutely necessary. We hope that the beekeepers in other areas are doing better than us and all we can look forward to now is better prospects.

George Winslade,
Oamaru.

How bee behaviour effects bee management

Bees and Mankind by John B. Free,
Published: George Allen and Unwin 1982.
155 pp with b/w photos and drawings.

'BEES AND MANKIND' by John B. Free is unique among recent beekeeping books in that it offers an overview of social insects in general, and presents beekeeping in historical context. Rather than merely provide basic biological data on the honeybee and then go on to management systems of interest only to keepers of bees, Free has examined bees and beekeeping with wider intent.

Dr John B. Free (it took me a while to understand the laughter his name on the cover provokes . . .) has a clear style of writing that easily conveys material of quite a technical nature. The book is very readable even to one with no previous study of bees. To the seasoned beekeeper it comes as a breath of fresh air, as most recent bee books seem merely recapitulations of each other.

The book begins with chapters for each of several bee types, progressing from solitary bees to bumble bees, honeybees and finally the stingless honey bees. Free carefully details the life strategies of individual species among these groups to demonstrate intermediate stages of social behaviour. The section on bumble bees has answered many of the questions I have been asked by friends about their life cycle and behaviour.

The book's second half traces beekeeping from prehistoric to present day and stresses the social importance attached to beekeeping and bee products through a variety of cultures. In the last chapter, 'The Present Situation', Dr Free describes modern beekeeping and the problems that face it. His analysis of the pollination role of beekeeping and its challenge is particularly cogent, and he writes with authority on the subject.

An apiary of vertical 'log' hives (16th century). The beekeeper is tanging the bees by banging the stick on the metal basin. This was supposed to make the swarm settle.

Throughout the book appear a number of clear and apt black and white photographs and line drawings. I prefer to see a large selection to illustrate items in the text rather than a much reduced number of colour, which always seem to feature as a colour plate section set away from the written description. Each sub-heading is accompanied by a poetic quotation related to the subject matter. The layout of the pages and the organisation of the material make the book both enjoyable to look at and easy to read.

The book is remarkably free of factual errors, and author Free is to be congratulated on his accuracy and presentation. I do question his grouping of New Zealand with the USA and Canada as producers and consumers of much honey, with the implication that we import much honey, rather than linking us with Australia, Mexico and Argentina which "both produce and export much honey".

I recommend the book highly to any who keep bees to get an up to date picture of bee behaviour and how it is related to our systems of management.

The chapters on the history of beekeeping and its integration with other aspects of life, will give anyone interested in bees a much richer idea of the role of bees and beekeeping in society. The final chapter that tells of the present situation of beekeeping and its future challenges is the clearest presentation I have seen recently, and even on its own should make the book required reading for anyone interested in agriculture or horticulture.

Using this system, hives weighing up to 110 kg could be easily weighed by one person.

Since 1956 the protection forestry division of the Forest Research Institute has maintained a field base at Craigieburn Forest Park. The park is some 100 km west of Christchurch on State Highway No. 73. The main function of the base, which is permanently manned, is to observe the local climate and to monitor field trials involving native and introduced plants.

Private individuals have kept bee hives within the park during a number of summers, but no detailed records of honey production have been kept. In 1980, six hives were placed in the park and weighed regularly over the next two summers in an effort to monitor honey collection at 900 m altitude. Of particular interest was the availability of beech honey dew or bush honey, which appeared to be at its altitudinal limit of production.

Researchers N. Ledgard and W. Simes report an average 80 kg/hive honey crop during the two years of their study . . . a highly satisfactory yield.

Honey production at 900m in Craigieburn Forest Park

THE SITE chosen for the hives was a small terrace on a 24 degrees north facing slope situated close to the main field base. Approximately 100 metres further up the slope behind the hives is the main Craigieburn meteorological station. Although handy to the weather station and living quarters, the site is well screened by beech forest, which also gives excellent shelter from the south and east.

The annual rainfall of 1450 mm is fairly evenly distributed, but a marked dry period can occur in February/March. Mean annual temperatures are 8.0 deg. C, with the warmest month (February) averaging 13.9 deg. C and rarely exceeding 30 deg. C. Frosts can occur throughout the summer, although ground-frost-free periods average 41 days. Strong nor'west winds can blow for short periods, but occur least frequently in late summer and autumn.

METHOD

Hive management

This project was not managed by professional beekeepers; none of the participants having more than a few years experience with 'back-yard' hives.

The six hives monitored during the summer months of 1980-81 and 1981-82, consisted of two full-depth brood boxes, with additional full depth boxes added as required. Queen excluders between the second and third box were present during all but the second half of the 1981-82 season. In 1980-81 most frames were added undrawn, but the majority were fully drawn for the 1981-82 season. Although weighings were made weekly, internal hive checks were carried out every two to three weeks. The major honey harvests were taken in February and at the season's end.

Between April/May and December/January of both years the hives were over-wintered in the F.R.I. nursery at Rangiora. The strongest hives (numbering three in 1980 and four in 1981) were moved up to the Craigieburn site in mid December because previous amateur beekeepers had found little honey collection occurring in the Craigieburns before this month. In addition, it was felt that the good early bee forage at Rangiora would enable hives to reach the high country in peak condition. The weaker hives were moved in January/February.

In 1981 there was little improvement in the condition of the weak hives at Rangiora between December and January, but once in the Craigieburns they improved rapidly. In 1982 the two weaker hives spent from early January to mid February pollinating clover at 1250 m before being moved to the weighing site.

The bees were encouraged to breed their own queens in an attempt to build up a vigorous strain that would be most able to handle the harsher high country environment. Although this resulted in more hazardous hive management, the bees did appear more vigorous in their nectar and pollen collection and hive defence. In the spring of 1981 a nucleus plus queen was taken from the three strongest hives, which all requeened themselves before the hives were relocated in the high country.

In 1981 weights started to decline significantly from mid-April and the hives were removed in early May. In 1982 the hives were shifted to Rangiora before the end of April.

RESULTS

Hive weight

Between the six hives a total of 20 hive months was spent at 900 m in Craigieburn Forest Park. During this period the hives increased in weight by an average of 80 kg in 1980-81 and 79 kg in 1981-82.

Hive weight and temperature

Weather records for the summer of 1981-82 were consulted in order to determine which temperature level (measured as degree hours above 10, 15 and 20 deg. C) most affected hive weight. The computer also tested the relationship between hive weight gain and the average daily maximum temperature during the period preceeding each weighting.

Results showed that degree hours ▶

▶ above 20 deg. C were most closely related to hive weight. Degree hours above 15 deg. C did not affect hive weight as markedly, while no significant relationship could be found between hive weight and degree hours above 10 deg. C.

When the average weight gain per hive was compared to the mean daily maximum temperature during the period prior to each weighing, the relationship was found to be positive but not as significant as the link between hive weight and degree hours above 20 deg. C.

TABLE 1. The relationships between temperature (expressed as degree hours * and mean daily maxima) and changes in hive weight.

No.	Time period Dates	Degree hours * above 10°C	15°C	20°C	Mean max. daily temp. (°C)	Ave wt., gain/ hive at period end (kg)
1	Dec 15-22	132	71	0	19.0	6
2	Dec 23-30	180	91	0	21.9	5
3	Dec 31-Jan 6	112	34	0	18.6	−1
4	Jan 7-13	97	59	12	20.3	16
5	Jan 14-21	142	73	5	19.1	3
6	Jan 22-27	82	30	0	18.2	−2
7	Jan 28-Feb 3	129	71	2	20.3	10
8	Feb 4-10	123	71	14	22.5	8
9	Feb 11-17	113	71	9	22.8	15
10	Feb 18-24	132	85	3	21.0	4
11	Feb 25-Mar 3	139	70	3	18.6	−3
12	Mar 4-10	119	65	15	20.2	12
13	Mar 11-19	117	71	7	18.6	10
14	Mar 20-24	46	24	1	18.6	−3
15	Mar 25-31	94	39	14	19.9	3
16	Apr 1-9	42	4	0	13.8	−1
17	Apr 10-15	17	1	0	10.2	−1
18	Apr 16-22	25	4	0	13.8	−1
					Total gain	+92
					Total loss	−12

DISCUSSION

Hive weight

For the practical beekeeper, the most obvious conclusion to be drawn from this study is that, even at 900 m above sea level the potential for honey production is significant. A gross honey harvest of around 80 kg per hive from a three to four month season is good by national standards. As a matter of interest, the average annual production from eastern Canadian hives is also 80 kg (Bryant, 1980).

The quality of the honey has yet to be officially determined, but consumer reaction has been favourable, both to the early season 'lotus' honey and the end of season 'bush' honey. Whether production would have been as great if lotus was not present in the area is debatable although it may not have been affected to a great extent as the total area of lotus on roadsides and seepages was not large (1-2 ha) and had it not been there, honeydew was available at all times and in greater quantity.

Hive weight and temperature

Many authors have found a positive relationship between hive weight gain and temperature. This study confirmed such a correlation, but did not attempt to determine whether the weight gains were caused by increased nectar flow at higher temperatures, or by greater bee activity, or both.

Mean daily maximum temperature was included in the comparisons in Table 1, because it is a measure of temperature which can be readily recorded by anyone interested in recording weather patterns. Degree hours are more difficult to obtain for they are computed from chart recorders, which are not frequently used by amateur weather enthusiasts.

Table 1 shows that 82 kg (89 per cent) of the 92 kg gained by the average hive during the season were accumulated when mean maximum daily temperatures were 19 deg. C or greater. No weight losses were recorded above this temperature. Below 19 deg. C, weight losses occurred in all but one period (No. 13). The gain of 10 kg during period No. 13 can probably be explained by a particularly warm productive spell of weather continuing briefly from the previous period into No. 13.

During the four months hives were at the Craigieburn site, 18 periods of honey collection were monitored. Ten periods had mean daily maximum temperatures of 19 deg. C or greater during which 82 kg of honey was collected. In other words, at the Craigieburn site over one season, hives averaged a gain of 8.2 kg in weight, for every period (averaging 5.8 days) during which mean daily maximum temperatures were 19 deg. C or greater. Putting this in even simpler terms, it could be said that, over the full season, the average hive gained 1.4 kg in weight for every day when the daily maximum temperature was above 19 deg.C.

Two provisos must be added to this statement; the hives were at or near full strength and a honey source was readily available all season. If these conditions were met, it would be interesting to determine how accurate such a statement might be during another season or at another site.

Hive management

The vigorous strain of bee involved in this study did cause some difficulties in hive management, but it is suspected that the bees may have coped with such problems as marginal weather conditions and wasps more effectively than the 'quieter' strains favoured by most apiarists. Wasp populations in the Craigieburn area can increase dramatically during mid/late summer. However, during the last two years wasp numbers have not been as high as in some past years, and they have certainly not been as great a problem as in the major honey-dew areas around Mt Thomas and Mt Oxford.

Forage sources

No detailed notes were made of forage sources, but casual observations revealed a similar pattern of foraging for both seasons.

In December, the main food source, and certainly the most prolific flowering plant at the time, appeared to be hawkweed, principally *Hieracium lachenalii*. *Dracophyllum uniflorum* was also in flower on the shadier slopes and was favoured by bees, as were scattered groups of dandelions, the few early flowers of white clover and lotus. Two *Cotoneaster microphylla* plants near the base were also popular with bees throughout the month. Matagouri flowered in some profusion, but was not seen to be visited by domestic bees. Droplets of honey-dew were present on most beech trees all month, but only wasps were observed feeding on them.

In January the most dominant flowering plant within 1 km of the hives was lotus, and the bees, along with a good number of bumble bees, worked it strongly all month. Other plants flowering in smaller quantities, but seen to be visited by bees were white and red clover, hawkweed, dandelions and manuka. Honeydew, although ▶

▶ visible on most trees, was not sought after by bees.

Early in February 1981, lack of rainfall caused lotus flowering to decline and for the first time bees were noticed working honeydew in some numbers. However, they still seemed to prefer lotus,and when rain in late February prompted a brief flush of lotus flowers, the bees were quick to move back onto this source.

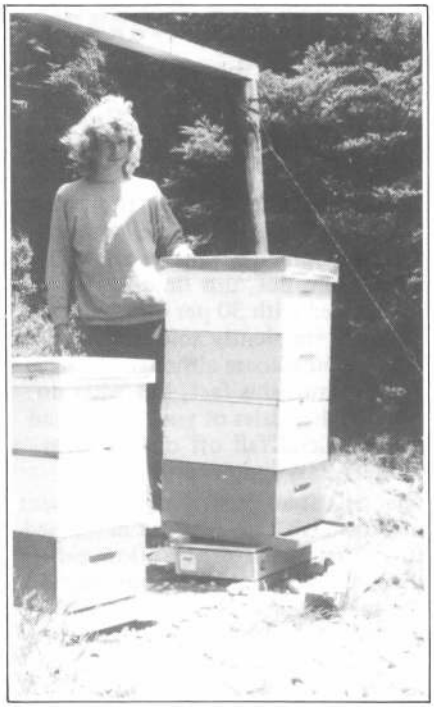
In 1982 more consistent rain allowed lotus to continue flowering almost to the end of February, and only then were the bees observed working honeydew to any great extent. From the finish of the lotus period to the season's end, honeydew comprised the major forage source in both years.

The significant drop in weight accumulation evident in late February could be partly explained by the slight drop in average temperature from period number 10 to number 11 (Table 1). It could also be attributed to an 'adjustment' period as the bees changed their principal food source from lotus nectar to honeydew. Certainly there were clear differences in the composition of honey harvested in February to that harvested at the end of the season. February honey was lighter and crystallised within a few months. Honey harvested later was darker and much of it never crystallised at all. A detailed study of the composition of the honey was not carried out.

A high country apiarist recently commented that where there has been no pasture improvement with legumes, high country forage sources are usually varied and for this reason it is difficult to obtain 'clean' flows. In his view, the potential of the high country is best captured through comb honey production.

The future

Some beekeepers familiar with honey collected from higher altitudes have remarked on the high quality of the product (Dickinson, 1980). The reason for this is unclear, but the good honey quality must add to the attraction of the high country to apiarists.



The hive on right is mounted on platform scales for daily weighing.

Despite these attractions, the difficulties involved in beekeeping in the high country often outweigh the advantages. Access to hives and feed sources is usually the main problem. Not only is the apiary often far from the apiarist's home, but the best feeding areas are frequently inaccessible.

For example, the patches of mountain beech forest on the northern flanks of the Torlesse Range are rich in honeydew, but good all-weather road access does not approach closer than 5 km. Access could no doubt be improved, but to utilize it profitably, beekeepers would have to be prepared to set themselves up away from home for weeks at a time during the summer months. It may soon be attractive for high country landowners to offer apiarists cheap or free summer accommodation and facilities to house extraction equipment, in exchange for the pollination services and possibly a slice of the apiarist's income.

From the experimental point of view, an encouraging feature of the results is the uniformity of weight changes among the six hives in response to climate change (notably temperature), despite large variations in basic hive weight.

The Craigieburn situation lends itself well to further more intensive studies, as the hives are located only a short distance from a permanently manned base and a well established weather station.

In the future it is hoped that daily, and perhaps even hourly measurements of hive weight can be taken, so that the reaction of bees to climatic change can be followed closely. Such a study should help apiarists to understand more completely the climatic limitations or advantages involved in high country honey collection. In addition, if the monitoring technique is successful it could be used elsewhere (e.g. Mt Thomas) to define the climatic events which promote honey 'flows', particularly of honeydew. If these were known and related to long-term weather records, predictions of optimum harvest periods could be made more accurately.

Less luck this year

Daily measurements of hives are being continued this season by researchers Ledgard and Simes. However, production is way down on previous years as a result of colder summer temperatures.

Over Christmas and New Year gains were ± 1.2 kg daily for eight days. Then, on the first warm day (daily maximum + 24 deg. C) the one monitored hive gained 8 kg.

BOOK REVIEW

Honey Bee Pathology,
by Leslie Bailey; 132 pages,
published in 1981 by Academic Press, London.

DR LESLIE BAILEY, of Rothamsted Experimental Station, England, is a noted authority on bee diseases. During the last 20 years he has become widely known for his research on bee viruses, having isolated most of those now known to be associated with honey bees. His earlier book "Infectious Diseases of the Honey Bee" was published in 1963, and was the only English text devoted exclusively to diseases of bees. "Honey Bee Pathology" updates this work.

Although books of this type usually aim only at gathering together published information, Dr Bailey has included some of his unpublished methods. Selection of information has resulted in a concise volume that is "based on experiments and observations that seem to be sound".

It spans all aspects of bee pathology with chapters on viruses, bacteria, fungi, protozoa, as well as parasitic mites, insect and nematode parasites, diseases of uncertain origin and non-infectious diseases, and treatment of bee diseases. Each subject is well covered, and numerous references are given for the reader seeking greater detail.

This is an excellent book, and although some knowledge of biology is required, it should not be beyond the understanding of most beekeepers. Those studying for the National Diploma in Apiculture will find it invaluable.

Reviewed by Pat Clinch.

BURRCOMB

from the editor

Live wasps please

Kevin Bateman, of Victoria University's zoology department, requires live wasp colonies for research purposes. He is also interested in collecting both spring and hibernating queens. These can be frozen indefinitely until collected, it being most important that the date of collection and locality of any queens be recorded, as the queens will be used for dissection.

If you can help Mr Bateman with either point, please ring the University, Wellington 721 000 ex 342.

BEEKEEPERS TECHNICAL LIBRARY

We have received two more IBRA reprints: M110 by L.A.F. Heath, 'Development of chalk brood in a honey bee colony – chalk brood pathogens', 1982/17p; M109 by H.R.C. Riches, 'Hypersensitivity to bee venom'; 1982/16p.

Both booklets appear to be very informative regarding these subjects. IBRA reprints are like that, they are a good investment.

Also available now from the library is 'Honey bee pathology' by Leslie Bailey. 1981/124 p. in hardback. Dr Bailey is well known in the beekeepers world through his research work at Rothamsted Experimental Station in the UK. The book is a follow up of 'Infectious diseases of the honey bee' written by the same author in 1963 (available from the library) but incorporates much of the knowledge gained since. It is not the kind of book a beginning beekeeper would look for and some knowledge of biology and its terms will be of help when reading it. Illustrated with good clear black and white photos and diagrams.

Hon Librarian
John Heineman
P.O. Box 112, Milton, Otago.

Those Aussies again

Remember the kangaroo for beef scandal a while ago. Well, it seems some Australian exporters are trying it on again. But, this time it's honey adulterated with 30 per cent glucose. Honey is frequently sold in Australia with added glucose although the label clearly states this fact. But what do you do when sales of your honey and glucose blend fall off on the local market? Easy, you export it!

Scientists at an Australian government analytical lab have recently developed a new technique called "flow programmed high performance liquid chromatography" which can detect low levels of glucose. On a recent test of 31 export samples, 10 have been adulterated with glucose syrup.

Apart from the obvious effects on export markets these recent findings will slow down the Australian honey industries attempts to remove any export checks and the export inspection levy.

American Bee Journal, Dec. 1982.

Answer to tussock clover loss

The loss of clover in oversown South Island tussock country has been a focus of considerable concern during the past year . . . especially in Otago/Southland.

Now Ms B. Barratt, a MAF Invermay researcher, has come up with some trial results which appear to place the blame on four species of native broad-nosed weevil.

She says damage can vary widely from season to season, but that in 20 trial plots on Otago's Gladbrook Station in 1978/79, 70 per cent of clover seedlings were either badly damaged or destroyed by weevils. Previous research, she says, has shown that losses from other causes were small.

An important finding has been that apparently small seedling losses can result in major clover production losses six or seven months later. "This suggests," says Ms Barratt, "that sub-lethal injury to seedlings has a profound and lasting effect on both subsequent growth and perhaps nodulation."

Trials last year with chemically-treated clover seed failed to solve the weevil problem and it is unlikely, because of the costs and health dangers associated with using treated seed, that this area of research will not be pursued for a while. This coming season, Ms Barratt will conduct trials in a wide range of sites, in order to assess the overall level of weevil damage.

Excellent reading

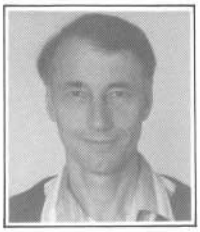
For a number of years the NZ Beekeeper has published extracts from the "Bees and Honey" newsletter published by Elbert R. Jaycox, formerly an extension beekeeping specialist at the University of Illinois.

Since Mr Jaycox left the university for a new posting at New Mexico State University, his newsletter has gone into hibernation. But the best of his newsletter articles and items now live on in a new publication "Beekeeping Tips and Topics".

In this 153 page booklet, Mr Jaycox has republished much of what made "Bees and Honey" so readable and interesting. An extremely practical man with a gift for writing technical matters in simple yet expressive prose, Mr Jaycox's book should be read by all beekeepers with an interest in furthering knowledge of their craft.

While some items relate only to the American situation, many others are of practical interest to anyone who handles moveable frame hives. Many more deal with understanding bee behaviour – something affects us all, no matter where we live.

Because a substantial discount is available for a bulk purchase of the book, readers who wish to buy a copy should write to The Editor, NZ Beekeeper, Box 594, Masterton. Likely cost, if we get 10 or more orders, less than $10 a copy. Don't send any money now. Just send your order by April 10 and we'll ask you for the money if we get sufficient replies to warrant placing an order. Your order will be treated as binding commitment to buy a copy of the book.

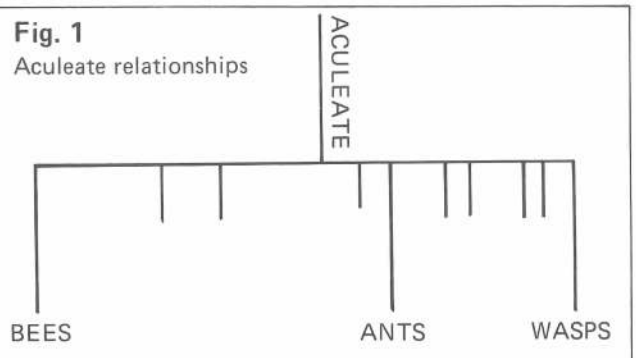


The next series of articles by David Williams will be on the bee today, yesterday and the day before yesterday.

The bee in pre-history

THE HONEYBEE is a member of the *Hymenoptera* order of *Insecta*, an order which is "highly organised and abundant . . . with a range of behaviour and specialisation without parallel in the insect world" (Spradbery, 1973). The word *hymenoptera* comes from *hymen*, meaning membrane, and *ptera*, wing. Going a little further down the line of descent we can say that the honeybee is one of the *aculeate* species, meaning that it is equipped with a defensive sting, from the Latin *acus*, a needle, giving it close affinities with ants and wasps.

Fig. 1
Aculeate relationships



These are genera, not species. The shorter lines represent related genera along the evolutionary line.

The hymenoptera probably originated toward the end of the Carboniferous age some 300 million years ago. This simple statement requires qualification: we must remember that when it is said that they "originated" then it does not mean that one day there were no hymenoptera and were then widespread the next. Just as later we must avoid the concept that the honeybees suddenly sprang fully formed from some more primitive ancestor. These events took place imperceptibly over millions of years, a slow progression by which one thing evolved from another.

Research into the history of insects is like a detective story in which all the clues are missing. Fossil remains are sparse or absent for most of the record and much of the reconstruction must be based on assumption or imagination.

This is so even for human evolution. How much more so for the insects, with their vastly expanded time span and fragile bodies. In many cases the timetable quoted is no more than an educated guess.

So we may have Colin Butler saying: "Unfortunately we know very little about the ancestry of the bees, as their fossil records are extremely scarce. Nevertheless there is good reason to suppose that sometime in the distant past, perhaps as long as 80 million years ago, the first bees developed from some wasp-like ancestor, forsaking a carnivorous diet for a vegetarian one" (Butler, 1963) while Spradbery can say that:

"The order diversified until, by the eocene some 60 million years ago, vespoid wasps related to our contemporary social wasp fauna had evolved" – presumably contemporaneously with the honeybee.

Continuing, the Milnes (1969) state: "The earliest of the cenozoic rock formations, the eocene (55 to 35 million years B.C.) is full of fine fossils, including great quantities of amber. Insect remains in eocene amber are so extensive, in fact, that more is known now of this group of animals in eocene times around the Baltic Sea than of any other group anywhere as shown by the fossil record . . . ants, bees and wasps of the eocene are much like those of today, without belonging to modern genera or species."

From this we can see the honeybee itself as a relative latecomer on the insect scene and this is confirmed by the degree of care needed to ensure larval survival. To digress for a moment, there are three forms of insect larvae. These are campodiform, eruciform and apodiform.

The most primitive forms are lively, scurrying little bristletail-like organisms, hard to catch and eager to survive. The eruciforms are the caterpillars, mobile but restricted to their food source, eating enormous quantities of green fodder in the course of development before pupating and emerging as adults. Apodous larvae are small, white, helpless grubs which must be tended in some protected environment.

This protection reaches its apex in the social insects where the larvae are in the centre of a colony for maximum attention and maximum protection. Species with apodiform larvae are the most recent and the most highly advanced.

There is only room for a quick palaeontological summary here: the following is largely taken from a 1967 Ward Lock encyclopedia because the table was so neatly done, although the periods do not always coincide exactly with those quoted earlier:

PERIOD	PLANTS	ANIMALS
Permian ice age 205 000 000	conifers	reptiles, beetles
Triassic 170 000 000	conifers, cycads, ferns	early mammals
Jurassic 135 000 000	the age of the cycads	dragonflies, termites, grasshoppers, flies, true mammals
Cretaceaous 95 000 000	first flowering land plants	the age of the dinosaur; all major orders of insects estab., poll. by flies, beetles, moths, butterflies, bees
Paleocene 80 000 000	grasses, herbaceous flowers	the age of mammals
Eocene 50 000 000	deciduous trees dominant	"bees in amber"
Oligocene 42 000 000	grasslands increase	all insects plus early elephants, horse
Miocene 25 000 000	prairie, present mountains formed	primitive apes, wading birds
Pliocene 8 000 000	present continents formed	Australopithecus
Pleistocene ice age 500 000	plants driven south	tool making man, ancestors of modern animals
Present 50 000	ice retreats, plants cultivated	man inherits earth

▶ So we have an order arising some 300 million years ago, which order developed and diversified until, 80 to 50 million years ago, we have recognisable ancestors of our present species, the wasps carnivorous, or largely so, the bees nectar and pollen dependent, to develop into the species known to us today and, no doubt, to continue their evolutionary way into the future. We will consider some implications of this in future articles.

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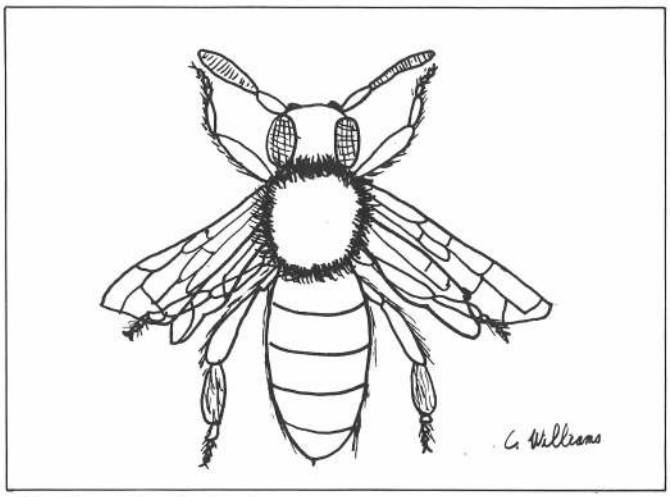


Fig. 2 Bee in Amber

Microwave melting of crystallised honey

INTRIGUED BY the casual mention of microwave melting of honey in an article in the American Bee Journal (Iannuzzi, 1982) which stated, amongst other things "... one may reliquify it ... by using a microwave oven ... for three minutes ...", I, being of an enquiring mind, seized a few honey samples and headed for the nearest microwave.

This turned out to be a Toshiba model ER649ETA, 600 Watts, frequency 2450 megaHertz, with a rotating inner base and a simple twist timer that turned the heat off after the selected elapsed time.

My honey was of the March 1982 vintage and was of high quality and very finely and solidly crystallised, but with a white foam-type deposit on the surface. It was in one of two types of container: Nestles glass 500 g coffee jars some 11 cm high by 6.5 cm diameter, and Miracle margarine containers, 500 g, made of a brittle thin white plastic and approximately 10 cm high by average 7 cm diameter.

The container plus contents was weighed in each case, with the lid removed, and then placed in the pre-set oven. Actual times of exposure to the energy source were checked with the second hand of a watch and, when time was up, the containers were removed from the oven, weighed, and a glass stem thermometer used to take temperatures at the centre. Degree of liquefication was noted, as were any subsequent changes:

RESULTS

Container	Set time (mins)	Final temp. (deg. C)	% Liquefication	Remarks
glass	3	79.8	99	behaved perfectly
glass	2	54.7 bottom 66.2 top	60	bottom quarter and top third clear, rest solid
plastic	1	39.8	25	soft, almost sloppy all way through; left out 20 mins., 39.4 deg. C 50% liquefied
plastic	2	59.8	98	reheated for second minute after 20 mins.
plastic	3	74.4	75	liquefied top and sides but not bottom
plastic	4	86.2	90	lump still undissolved, plastic container melting round top quarter

Super annual

AN AUSTRALIAN visitor spoke somewhat critically of the New Zealand habit of piling supers on before they are needed. Bees, if already working in a super, will continue to work in that super, even if it is moved up above extra supers. If it has significant honey already in it, they may not seal it – they merely have extra distance to travel for no extra honey.

My visitor, a commercial operator, uses two brood chambers and one super. He visits every three to 10 days depending on how the flow is and removes supers as full, replacing with empty.

For hobbyists, as Dave Kershaw pointed out in club discussion, it may be necessary to pile on the extras if you go down south for a month as he did at the height of the flow, a thing no commercial operator could afford to do – neither the holiday nor all those extra boxes.

Conclusions

- Don't go away on holiday just when your bees need you most.
- Don't overload with supers – one at a time is plenty as long as visiting and supervision are adequate.
- One super until the first is substantially filled and sealed; moving full frames to outside edge and empty ones to centre. And even then the best move is to remove the full super, extract immediately, and return the honey-wet frames to the hive. That way both bees and beekeeper get the best of the deal.

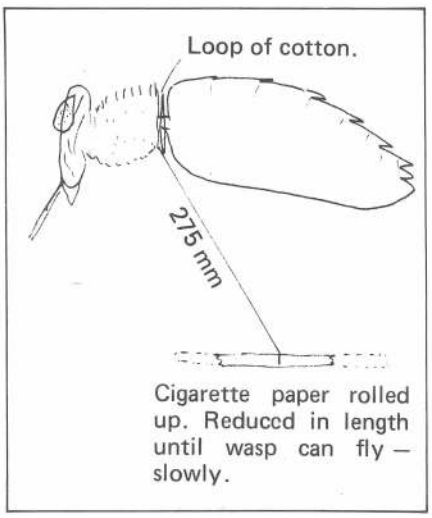
Location and destruction of wasp nests

AT THE FEBRUARY meeting of the Rotorua Beekeepers Club Bill Baulcomb, co-founder of the club, fisherman par excellence, beekeeper extraordinary, outlined his method of wasp location and destruction – he is on call to the local District Council and other bodies to rid schools, camps, etc., of these pests.

Bill first locates the wasps by luring them to a dish of honey. When the wasp is gorged he restrains it with a reversed shepherd's crook of thin copper wire while he attaches a length of cotton round the peduncle, the thin neck between front and rear halves.

To this length of cotton, some 275 mm long, is attached a cigarette paper somewhat rolled up. The wasp is then released. It will spend a little time fighting the attachment and then take off for home, stopping occasionally along the way to carry on the struggle.

Because of this hobble the wasp must fly slowly and not much more than a metre from the ground, so making it easy to follow. If it is a small wasp or cannot fly once hobbled, bits of the cigarette paper are snipped off.



Once the nest is located, Bill inserts a teaspoonfull of Carbaryl Pestone 80, obtained from IWD, New Plymouth, in the entrance, preferably at the warmest time of the day when the wasps are coming and going all the time. Those leaving through this powder do not return, those entering take the powder in with them. This kills the colony within two hours with no residual effects. Because of this it may also be used for killing out wild honeybee colonies without fear of destroying hives nearby that may rob them out.

I apologise in advance to Bill in case I have omitted anything important. If I have, the fault is mine. If it doesn't work, the fault is Bill's! He has followed wasps so treated for several hundred metres and located up to five nests at one site.

Although this year does not seem to have been too bad for wasps – or should it be, not too bad for bees because the wasps have been low-key – next year might be worse. Here in Rotorua there have been young queen wasps flying for mating in large numbers from mid-January on. We might be in for a mini-population explosion next season.

Hobbyists forever!

KERRY SIMPSON and Andrew Matheson's "Shedding The Hobbyist Mentality" series inspires me to write its reciprocal on retaining the hobby mentality. How should we define the hobbyist? What are his characteristics and tendencies? How may he be identified as true to genotype?

A checklist for the amateur

First, of course, is scale. I would not admit a man with fifty hives to be a hobbyist. It is difficult to put absolute boundaries on this but I would put an upper limit of twenty for a single hobbyist and perhaps twenty-five for a married couple.

Second, and important, the hobbyist must have no intention of increasing his hive holdings substantially. There must be no accelerated sub-division of hives to exceed the limit, no race to commerce. Stability and contentment are the true mark of the hobbyist. Small is beautiful.

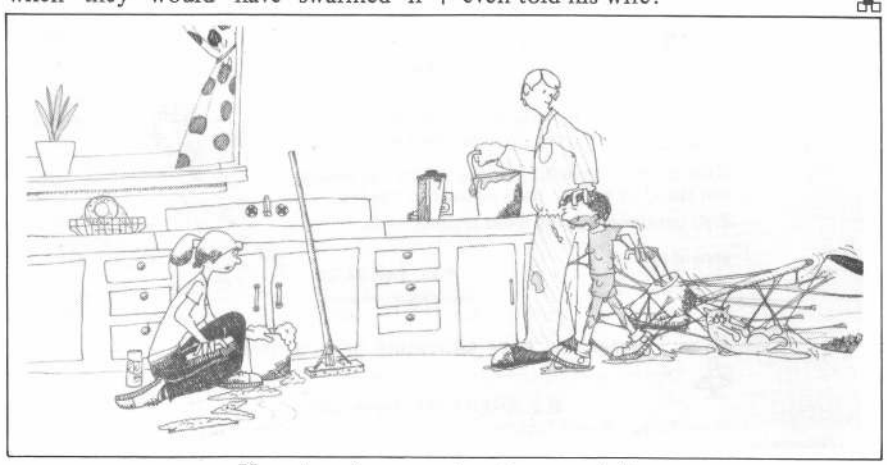
Third, he must keep his hives at one, or at the most two, locations, not scattered over half New Zealand. Any out-apiary must be not more than half an hour away and preferably a lot less. I would be reluctant to accept a hobbyist who did not have one or two hives in the garden unless there is a compelling reason for this self-denial.

Fourth, his beekeeping must be personally physical – he must do the work himself. I am all in favour of labour-saving gadgets but hobbyist beekeeping is still a matter of getting stuck in. The most I will allow is a trolley or wheelbarrow to carry supers, or a hive carrying cradle. No hoists, no bee-blowers.

Fifth, he must know every one of his bees by its Christian name. He must know what is happening in his hives at every minute of every day of every month. He must know when they are bringing in pollen, when feed is short, when they would have swarmed if they hadn't been requeened, when they need more supers, etc, not in the general sense that commercial beekeepers do certain things at certain times and think in hundreds, but in terms of specific awareness.

Sixth, the hobbyist must be a fanatic to some degree. He must think, feel, talk, practice and study his hobby. He must be convinced it gives meaning and purpose to life. I would not consider anyone a true hobbyist who does not bring bees into the first twenty minutes of conversation when introduced to perfect strangers.

And, finally, the hobbyist will have done one thing to the bees this season that he is so ashamed of that he hasn't even told his wife!



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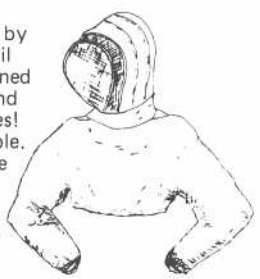

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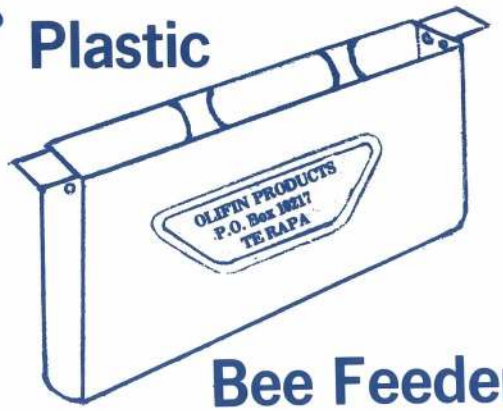

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