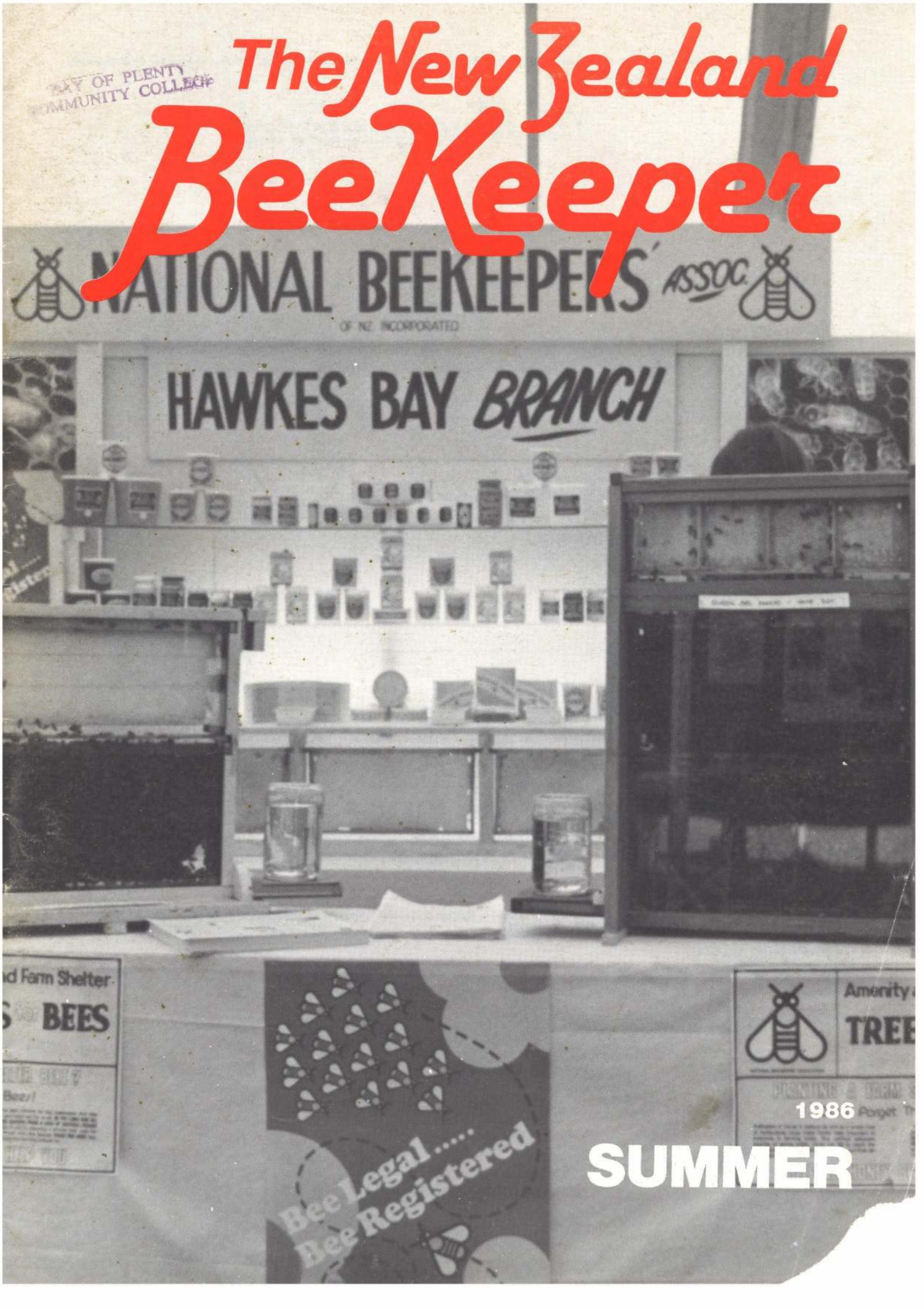
The New Zealand BeeKeeper



1986

SUMMER

The New Zealand BeeKeeper

OFFICIAL PUBLICATION OF THE NATIONAL BEEKEEPERS' ASSOCIATION OF NEW ZEALAND INCORPORATED

CIRCULATION 1,450

To Members of The National Beekeepers' Association of NZ Inc who own more than 50 hives each and so are legally subject to the annual hive levy. THESE HIVE LEVY PAYERS OWN APPROXIMATELY 87% OF ALL BEEHIVES IN NEW ZEALAND.

To Beekeepers with less than 50 hives who subscribe to the journal at $15.00 a year (plus 37 cents GST for Dec. 1986) which also includes membership of the National Beekeepers' Association of NZ Inc.

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FRONT COVER

The Hawkes Bay Branch's display stand at the Hastings A & P Show, 22-24 Oct. 1986.
Photo by Graeme Munro.

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A sting is needed

The MAF's campaign to combat the importation of bee diseases by education may need some judicial clout if it is to be effective.

That is not to denigrate the campaign; the more done to bring home to people the havoc that bee disease can cause the better. Yet a surprising number of people react adversely to education or rather, as they see it, education as you see it.

You can talk until blue in the face but they will still resent and resist any attempt to prevent them importing a pot of honey (or processed meat, or a wooden article) as an infringement of their inalienable sovereign rights.

The term "inalienable sovereign rights" is a more recent translation of the Latin "Per Ardua Ad Asbestos", earlier construed as "Up you Joe I'm fireproof".

Whatever, Fireproof Flossie intends to bring in her honey for some addled reason best known to herself and whatever you say will make little difference. That her honey contains enough spores of something to wipe out the whole bee-keeping industry five million times has nothing to do with the price of fish (or honey).

That you should be wiped out is small price to pay for the freedom of the individual. Besides, if you are indeed wiped out then she is sure that nice MP will arrange to import some honey — so much cheaper, too — so what's all the fuss about? And surely there's no need for this funny little Customs man — or whatever he is — to be so RUDE because she did not enter the honey on his silly form? She's a good idea to report him to his superior. After all, isn't he some kind of public SERVANT? Ah well, next time she'll wrap the pot in her dirty grundies. . .

You may think this very cynical, that most people are not like that. However, if its a matter of numbers how many Fireproof Flossies do you need?

The point is that as things stand very little happens to her if and when she's caught so if she has a mind then the risk's worth it isn't it? However, if the importation of a pot of honey ws treated with the same seriousness as the importation of the same quantity of heroin then it might make Flossie stop and think. The attendant publicity and sentence of imprisonment might also stop a few others in their tracks.

Michael Burgess

LETTERS

Dear Sir,

Would you kindly publish this appeal for help in your Journal. I am seeking confirmed evidence of how bees were first transported to Australia.

We know, or at least it is accepted, that Captain Wallis brought them here, on the ship "Isabella" in 1822 and that Dr. Wilson imported hives into Tasmania on the convict ship "John" 5/2/1831. So far, in my research of historical records no mention is made of the actual method of keeping bees alive, while in transit, bearing in mind that it would have taken seven months to get here and having to cross the Equator.

An unconfirmed source, informed me that when bees were first taken to America they were loaded at night, open entrance, in the stern of the ship. Unfortunately the source of this information, "Gleanings in Bee Culture" was loaned, and never returned. We know that the Rev. Cotton in his book called "My Bee Book", set sail from England using ice, with the bees in a state of suspended animation for New Zealand. There is some evidence to suggest that this wasn't very successful. This method and the way the Rev. Cotton wrote about it, suggests to me that it was his own idea.

Hopefully, somebody out there can help me, and would be kind enough to write. I would greatly appreciate any lead or information that would help me in my research.

Roy Glanville,
60 Jackson St.,
Eaglehawk, VIC, Australia. 3556

Dear Sir,

In 1980 and 1981, your association was most generous in that you provided me with some financial assistance towards my D. Phil. study on *Scolypopa australis* at Waikato University. As I was doing the study part-time because of family commitments, I was not eligible for the usual awards and grants available and thus your assistance played a large part in covering the costs involved. I have much pleasure in informing you that I finished my thesis last year and am now in the process of publishing my results.

My study ended up a little different from the proposed study as travelling to the Coromandel proved too difficult. I studied the population dynamics of *S. australis* in a local gully. I found that the rate of hopper nymphal development differed markedly from year to year in response to temperature and affected the number of eggs laid. Parasitism by the egg parasite *Centrodora scolypopae*, was the key factor determining fluctuations in the hopper population. This parasitism was the main cause of egg mortality. It was strongly influenced by the host plant, with eggs laid at greater depths in soft woods such as blackberry being much less susceptible than those in 'harder' woods such as bracken. Because very little was known about the parasite, I studied its biology and population dynamics.

Although my study does not give any answers to the honey-poisoning problem, I did find out facts that would help in providing more effective biological control. For instance, the older nymphal stages hardly suffered any mortality whereas overseas, other hopper nymphs are attacked by numerous predators, parasites and diseases. Scientists searching overseas for exotic biological control agents may therefore have more success if they aimed at agents for the numphal stage rather than the hopper eggs. If an egg parasite is considered, it should be one with an ovipositor longer than that of *Centrodora*, so that the two parasites complement each other rather than compete against one another.

Once more I thank you for your support and I am sorry that I did not inform your association of my progress earlier.

Philippa Gerard

Dear Sir,

Next year the Eastern Apiculture Society will be meeting in Blacksburgh, Virginia. At this event I will be giving a workshop on paraffin dipping of bee equipment for hive preservation and American Foulbrood control.

I will be bringing my 35-foot trailer on which is mounted my dipping vat which consists of a 150-gallon barrel for the paraffin over a 50-gallon wood stove. Besides demonstrating its use I also wish to pass out some literature on the rental fees I charge for its use.

In addition to this I will be having available a bibliography and as much literature on all the uses, research, discussions, etc. concerning the subject as I am able to find up to August 1987.

Any leads or information you can give me will be greatly appreciated. Also I am in need of the address of all bee publications — English text and worldwide.

Thanking you for your kind attention to this matter.

Wilhelm F. Gollub
Rt. 4, Box 54-G
Louisa, VA 23093
USA

Dear Sir,

At the Rotorua Conference, your Association honoured me with Life Membership. This, without doubt, was the highlight of my 23 years in beekeeping research. I thank you most sincerely for this mark of appreciation.

I have made many friends in the industry, and I thank you all for your co-operation and assistance over the years. As many will know, because of health problems the past eight years have been particularly difficult for me — yet the industry responded, not with reproach, but with kindness and support. Please accept by heartfelt thanks.

I wish you all every success in the future.

God bless.

Pat Clinch
Apiculture Section
Wallaceville Animal Research Centre
Upper Hutt

OBITUARY

Mrs Beatrice M. Berry, wife of well-known beekeeper and honey export expert Percy Berry, died on 30 October 1986 after a short illness in her 77th year.

Married in 1930, Percy and Beatrice lived first in the Northern Wairarapa then moved to the Hawke's Bay in 1941 to begin beekeeping.

An active bowler in her latter years, Mrs Berry to the last maintained contact with the large number of pen friends she had made over the years.

After a funeral service at the Hastings Wesley Methodist Church Mrs Berry was cremated.

She is mourned by her husband, three sons, two daughters, and a number of grand and great-grand children.

I am sure we all extend our condolances to Mr Berry and his family.

Michael Burgess
Editor

Are we beekeeping for fun or profit?

From: Graeham Gaisford

Are we beekeeping for fun or for profit?

Sometimes I suspect its purely for fun. If not, why do we continue to produce honey simply as a competitor for marmite and strawberry jam? If so, why do we wonder when the same old product in the same old form on the same old market brings the same old "No!" from the bank manager.

Certainly no businessman would invest in beekeeping in its present form. The return on capital does not warrant it. Far better to buy share certificates inscribed with names like Brierley or Fletcher Challenge.

But of course we beekeepers are not tainted with these trendy city ways. We know that money is little pieces of metal to jingle in the pocket and stare with blank amazement when economists talk of "real money": that is, a figure tied to a base year and adjusted regularly to maintain the buying power of the original. We fail to appreciate the essence of modern finance: that a 20% rise in dollar terms over three years with 15% inflation is a loss not a profit.

Furthermore we seldom seek out new products from our industry's raw materials, or listen to those who have pertinent ideas. And as for lateral thinking — oh dear, perish the thought!"

Conference '86 revealed that the value of the bees in our industry is 143 times that of the honey and the beeswax they produce. The number of hives employed on pollination has, of course, a lot to do with that, but surely the very existence of those hives confirms that there is more to beekeeping than honey and beeswax and that where there is one alternative avenue of profit there is probably another. For example, why not the pharmaceutical market?

The Health Department spends some M$400 a year on pharmaceuticals, yet we as an industry make no effort to promote research into the use of honey as a medicine. Through 6,000 years of folk medicine honey has cropped up time and time again as a treatment for burns, as a salve, and for umpteen other cures. But how many people realise this. For example, what do the valium poppers know about honey and insomnia? And how many people know of K. Russell's work on the antibacterial properties of honey being continued — grossly underfinanced — by Dr Peter Nolan and his associates? And what about the Japan Bee Acupuncture Association, or Dr Stanley Sommerfield's article in last April's NZ Medical Journal on bee venom and arthritis, or the reports from Apimonda 1985 on royal jelly and anorexia, or honey for stress and tension?

It seems we don't make much of a fist of searching out fresh markets. And as it is we almost stuffed up kiwifruit pollination: beekeeping's first meaningful break from the tradition. Even now we have no clear standard of charging for a pollination hive and rates vary depending on the desperation of the vendor.

Come to think of it, what is a pollination hive? How many frames of brood should it contain? What cost is involved in bringing hives to an early peak? Should we fit pollen traps as standard to prove the hive's effectiveness to the orchardist? Those are only a few of the questions. The industry has a long way to go yet.

LETTERS

Dear Sir,

Enclosed is my check for $25.00US for which please extend my subscription to the NZ Beekeeper as far as the money carries. Let's hope it goes to the end of 1988.

Our spring started out with a great brood boost. Odd weather caused willow to bloom for only about a week — in good quantity but so many bees can collect only so much pollen/nectar, so much was wasted. Main flow of fireweed came in strong but weather buggered up within a week and we lost the last 2/3rds of flow that really counted. Net result: what started out to look like a boomer year (haven't had one since '76) turned into a less-than-normal to normal season, meaning about 50lb/avg.

Pollen collecting was good so in my small operation the loss of honey (from expectations) was offset by good pollen yields. All in all just enough to keep this egg-headed optimist looking rosily to the next year and planning to have so much surplus I'll have to store it in the stock pond.

Keep publishing and sending that top-notch N.Z. "B.-Keeper" to keep me posted on how "Footrot Flats" copes.

Dave Tozier
Alaska

Scientist turned Beekeeper

By: George Nichols

A scientist is, by definition, the man who makes 100 experiments, throws 99 in the waste paper basket, and holds a boozy party on the results of the 100th. This particular electrical engineer obviously isn't much use as a beekeeping scientist since the 100th experiment has not yet been celebrated.

I can never find a queen when I want to squash her, particularly the black mother of a hive full of black vicious daughters. The good book (not in capital letters) said that virgins pipe in their cells as a challenge to the queen to come and fight. I had a brilliant idea (I always do) — record a virgin piping, then play this back at the entrance to the hive and watch the queen rush out to do battle.

POP BAND

The first snag was that it took the best part of two years before I heard a virgin piping. In those days there was little transistorised equipment and the borrowed tape recorder weighed about 15 kg (in the dark ages it was 30 lb which was a lot heavier). I lugged it over to the apiary, covered it with a plastic sheet becuse it belonged to the boss, laid 300 metres of mains cable in a terrible hurry in case the virgin shut up piping and finally got a good recording, about 10 seconds' worth, which I made into a continuous loop. It went "Pipe — pipe — pipe — pipe — klunk — pipe". A pop band would have loved it.

Came the great day. I laid my cable again, hoped the cows wouldn't chew it, carried the tape recorder to the hive, put the transducer (posh name for earphone) in the hive entrance and switched on. "Pipe — pipe — klunk —" went the tape recorder but no bee took any notice. I opened the hive and laid the earphone on top near the brood nest — nothing happened. Nothing for it but to find the queen. I found her quite easily: a bad omen, life's not that simple. "Pipe — pipe — klunk" right in her ear. Terrified she disappeared, and I couldn't find her again. Perhaps it was the klunk?

Pat Noble, the soil scientist, in the next door lab had an ultrasonic generator with which he used to shake soil samples to bits. This was a very unpopular machine, for so-called ultrasonics it had a particularly horrible scream which emulsified the brain of anybody else around and left you with a headache between the eyes for the rest of the day. "Brilliant idea No. 2" says I. "I can use it to shake manuka honey out of the comb." My bees over at Rukuhia were full of manuka. I got a comb, uncapped it, and hitched it to the ultrasonics. At that range all I got was a two-day headache. Later on with extracted honey I managed to produce a honey foam. if you want honey foam you can make it this way but don't make it near me.

VACUUM

Pat had his uses, he had a lot of equipment that my lab hadn't. In particular a glass bell-jar and a vacuum pump. Physics text book number 1 has a picture of a balloon in a bell-jar. When you apply a vacuum the balloon will blow itself up. Yes, you do need a piece of string. Manuka honey has lots of bubbles in it and my hypothesis (scientific word meaning "guess wot") was that expanding bubbles could uncap the comb and blow the honey out. This almost earned me a beer. I switched on the vacuum, the cappings broke and out poured the honey — well, about half of it. I turned the vacuum higher, a little more honey came out. More vacuum still but now no more honey. Soon the extracted honey in the jar started to bubble. This is called cold boiling. You can boil cold water in a vacuum same as you can't make a cup of tea on Mount Everest. This made a delightful honey toffee, if you want to patent this, go ahead! Guaranteed to remove fillings from teeth.

HEDGEHOG

Foulbrood was my next failure. One of my hives emitted a most appalling smell. The brood looked all right but everything stank. I went 30 km back to Hamilton, dragged out a very busy Alf Bennett, our apiary instructor, to have a look. He removed the dead hedgehog and was very nice about it.

A foreign scientist, an Authority according to the best Mother Nature books, had proved that beehives under electric power lines are always bad tempered. The article said he had achieved his success using 58,000 bees. Sounds to me like one medium-sized hive. My bees under a huge concentration of power lines at Ruakura hadn't read this article and, according to my records, appeared the usual mixture of nice and nasty bees as I had anywhere else.

SWARM

The Fertility Centre rang me: "George, there's a swarm on the trunk of the cabbage tree outside." I took a single box hive over, put it on the ground at the foot of the tree and then made my big mistake — I went inside to borrow a brush. When I came out the bees were walking down the tree and going into the hive entrance. I could have kicked myself. I should have stayed, pointed my finger at the bees, said "Come along girls" and my name would have been remembered for evermore: by non-beekeepers that is.

Queen rearing was my next effort. In science, if you read what everyone else has done before you start thinking about your own experiment, you follow tamely on and probably make very little progress. If you first think out what you would like to do and then read what the others have done, you will probably come up with a brand new idea which shows where many others went wrong. If you want to experiment with the velocity of light for Heaven's sake don't read Einstein first.

Where was I? Queen rearing. Having no ideas of my own I read all the best books, hundreds and hundreds of pages of them and got so confused that I tried a mess of everything and produced very few queens. Derek Bettesworth came into partnership with me some years ago, showed me how to do the job and I can now raise adequate queens (If I wrote up the complete process it might fill 2 pages).

TIDY BEES

Feeding sugar was an expensive mistake. To my reasoning the right place for sugar was in the comb. It was a bad spring, the bees were starving so Brendan (youngest son) and I bought a lot of white sugar and filled up hundreds of empty combs with sugar crystals. These combs we gave to the bees. later

→

SCIENTIST (concl.)

on you would think it had been snowing. The bees had cleaned the lot out and dumped it in front of the hives.

"These blasted beekeepers, I can't think what they are doing filling our nice honey combs with dust."

The negro beekeepers in Dares Salaam are famous for the quality of their beeswax. I saw a film of them melting wax in earthenware dishes over a small fire under the blazing African sun. "I wonder if it is being bleached by the ultra-violet in the sunlight." Back to the lab, get an oven and a UV lamp. I boiled up the wax in a stainless steel tank using rainwater, immersed the UV lamp in the boiling mess for two hours and then filtered. There was no apparent improvement, though I still think the scheme has merit. Getting the hot wax out I dropped the lot on the floor. The cleaners were not amused at my joke about using wax polish. I didn't think it was very good either. There is an Old Confucian saying "Better stick to electronics than to the laboratory floor."

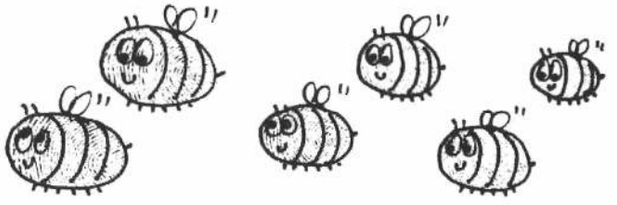
★ ★ ★

Bee Crafty

People really appreciate home made cards and these are bound to get a great response! You don't need School C. art to make them, they're quick and look great.

I use 6"x4" white cards brought pre-cut in packets from a stationers. With a black stamp pad make fingerprints on lower half of card to represent the members of your family. I found index and little fingers gave enough variation in size, but practise on paper first. (The lighter you press, the smaller the print). Do lots to make the most of your inky fingers, then have a clean up with soap or detergent while the prints dry.

When the ink is dry, fold the card in half so prints are on the front and draw on details and words as in example. I used a fine tip black ink pen. Carry on your message inside with the words " . . . to say Happy Birthday" OR "A special thankyou" OR "Hi!" or whatever else you'd like to say. Have fun!



Just buzzing by . . .

By: Jenny Bee

From MY BEE BOOK

by William Charles Cotton M.A. Student of Christ Church, Oxon. (Published 1842)

"One face has not, to my knowledge, been mentioned. The flowers of the plants abound with honey, which the natives frequently suck. Thus, should bees be introduced into New Zealand, and I see no reason why they should not, they will find abundance of food in the flower of the Phormium Tenax, as well as in others. I mention this, in case any one should be disposed to take bees as an experiment." — *Honourable Henry William Petre on the Settlements of the New Zealand Company, p.69.*

It seems to me that this is a lucky guess, which would entitle the clever writer of the book from which it is taken, to a prophetic mantle, at least as stately as that of old Merlin. And how do I know that it will turn out as true as, or rather more true, than any of the far-famed Welshman's prophecies? Just for this good reason — because I myself intend to have a good try at bringing it to pass. I hope many a busy Bee will

"Gather honey all the day
From every opening flower"

of Phormium tenax in New Zealand. There is enough and to spare, for Bees as well as men; so these new flower-suckers will not, if they get safe to New Zealand, which I trust they will, deprive one single man, who has the best right to all that is good in his native land, of the *sweet* occupation of sucking the Phormium tenax, or any other of the unnumbered and unnamed flowers. The Bees will do more effectually for them with their small proboscis what the natives now do for themselves with their large mouths. I hope a Bee will never be killed in New Zealand, for I shall start the native Bee keeper on the no killing way, and when they have learned to be kind to them, they will learn to be more kind one to another.

"To Bee or not to Bee — that is the question" — as Hamlet would have said, if he had been sensible enough to calm his wounded spirit by *taking* to Beekeeping, instead of *taking* the poisoned foil. A Bee's sting is as sharp as any unbuttoned foil; but, as I said in my first Letter, the pain of a sting is a mere nothing, and the swelling goes off in a

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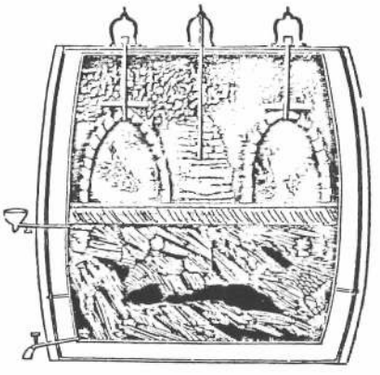
My Bee Book (cont.)

day. Bee keeping is a good thing to calm a sorrowful heart, so I think I can solve this question better than he did. In a former article of this Work, *you* have seen my notions — no dreamy ones, I believe, — of the way in which Bees may be put to sleep in winter. How those who are thus treated come out ready for harder work in the spring, than their fellows of other Hives, who have not enjoyed this state of hybernation — this state of what we may call true collegiate repose: — I call it collegiate repose, because they are all *collected* together at the *head* of the *Hives*. You have also seen, that the most intense degree of cold, if it be not accompanied with moisture, is highly conducive to the health of Bees in winter. Such was Mr Murphy's winter — such is every winter in Siberia. Now, more useful things are found out, by combining the knowledge of others than by presumptuously keeping ourselves perpetually on the stretch to start something new of our own. The world would never get on in this way if all men were so proud-spirited as this. As a disciple in the school of others, and above all, in the school which the schoolmistress Bee keeps for all who will learn of her, I believe that I may be able to confer on the natives of New Zealand the pleasure and the profits of Bees on their own.

The Bee of England, like the man of England, if he be but good of his kind, is, I think, surpassed by none in the world. I will not get Bees from India — nor Bees from South America — nor Bees from New Holland, but carry them direct from England, sixteen thousand miles over the sea. How is this to be done? — By putting them to sleep, by keeping them at a low temperature, by burying them, and keeping them dry. Ice has, I know, been carried from North America to Calcutta, in which passage it had to cross the line twice. It was taken for the purpose of packing fresh salmon: — it was not considered as a valuable part of the cargo; and yet, when it arrived at port, it sold for much more than the salmon which it preserved. Fresh salmon is not a necessary in India: ice is nearly so. The waste was, I believe, not great, and what melted was pumped out of the ship from time to time, together with the common leakage. The only care that was taken of this extraordinary cargo, was to keep the hatches closed and battened down, that the change of temperature might not affect the contents of the hold. The success of this scheme was entirely owing to the property of ice, in virtue of which, it conducts heat so slowly.

Now here is a diagram, showing, more clearly than I can do in words, the mode in which I intend to carry Bees to New Zealand; that is, to the furthest point of the globe. At all events, I will try: I will take care that my Bees shall send word to their relations in England how they fare. They will have put a girdle round the world, though not in the space of a minute, as the faithful Ariel did — Bees surely are aerial creatures, though not of super-Bee power. I shall be fully satisfied if they arrive safely at New Zealand in five months, or even a little more.



The diagram is a vertical section of an old hogshead, which I have had fresh coopered, and the joints properly fitted. It is lined throughout with a coating of thick felt, which is, I believe, one of the best non-conducting things. The bottom has a pipe and tap to carry off the leakage, and is filled with broken crocks, that the drainage may be most perfect. — N.B. always fill your garden-pots with such crocks as these. — Plants, Bees and Men all like to have their feet kept dry. — Man is often an ungrateful animal — but ingratitude is not the fault of Plants or Bees. The Plants will repay a gardener for his care by their healthy state: — the Bees, I trust, will repay me by voyaging safe to New Zealand — Man alone gives a grumble or hard look to the kind doctor who tells him to keep his feet dry, and his head cool, if he wishes to be well; I wish he would take a lesson from the Bees or the plants. They both teach the same, as do all the sinless works of God.

Now then to return to my Bees from this little side-path, in which, I trust, you have not been wearied; — f you have, let the prospect of some New Zealand honey revive you. As the ice melts away — as melt it will — though I trust two-thirds of it will safely cross the Line, I shall draw it off through the tap, and by measuring the waste every day, know how much I have left. When old Neptune comes on board to inquire the nature of our cargo, — of a surety the old marine *Ditty*, as I have heard him called, will, with his spouse, Mrs Amphytrite, be strangely surprised to hear that we have a hundred thousand passengers on board — which is about the crew which will be shipped in ten Hives. Such a crew he never, I am sure, dreamt of before — and I should not wonder to see him fly across the sea in his watery car, when he hears that each and all of them are armed with a poisonous dart, far more piercing than his own trident. Now, without some care we should have a pretty mess of half-melted ice — Virgil would have called it *tabes*, if he had thought of carrying Bees to the undiscovered parts of the earth, where he says the sun is hotter than a fiery furnace — we should have had a pretty mess of this "tabes," together with dead Bees and spoilt honey, if the Hives had been permitted to rest on the ice, and sink down with it as it melted. I have thought of this: and the same diagram represents a wooden frame, which is fixed firmly across the inside of the hogshead, about an inch above the ice. The Bees will be moved from their bottom boards on some cold November day, and securely tied, each in a square cloth of dairy canvass. The Hives will then be placed on the top of this frame, and well dried cinders, from which the moisture has been all baked out, will be poured in from above, till the hogshead is quite filled. By these means light and heat will be both excluded, and the Bees will be put into a deep and long sleep; though I hope not an eternal one. But some one who doubts my success may say, "Your Bees will be stifled; they can get no air, and air is necessary to their life." I do not think so. A friend has written to me about some Bees which were buried last winter, and were not supplied with any air, but that which *was drained*, you may say, into them through the earth; and they, without air, lived passing well, exempt from all those evils to which unburied Bees are heirs to in the winter. But in order to give my Bees every chance of a long life and a happy one, as well as of a long voyage; — that I may not have the pain of seeing their carcasses dug out of the cinders on the shores of New Zealand, instead of having the joy of hearing their merry thankful hum as I remove the load which has so long lain heavy on them, when the balmy breezes of New Zealand, loaded with the scent of flowers long unvisited, and of fresh honey long untasted gradually wakes them, softly from their sleep; — that this pleasure rather than that pain may be mine, I have planned, what you will consider, as he of Halicarnassus would have called it,

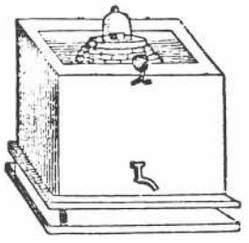
Each hive has a pipe leading from the outward air to its T hole; — this will supply fresh air. But you well know, that you cannot put any thing into a full

→

My Bee Book (concl.)

bottle, except you first take something out. So I must remove the foul air before I can put any fresh in. How then is it to be got rid of? Why, by a pipe to be sure, leading also into the outer air, but, as well as the other, guarded by a piece of perforated zinc, that the foul air may pass out without allowing one single Bee to accompany it. This will carry away all dampness, as well as foul air; the Bees' breath may be condensed in an inverted bell glass. It will then trickle down in the shape of water, just as the Bee-breath did in a long icicle from my Hive in the severe frost of 1838. Thus, I trust, my Bees will arrive safely at New Zealand; and their friends shall hear in a few months of their arrival, or *absit omen*, of their death by sea-sickness.

In order to give myself every chance of getting some Bees, at least, safe to New Zealand, I am not going to confine myself to the ice method alone, but I shall try to keep one or two stocks cool by means of evaporation. The cut, aided by description, will make it plainer to you than words could do. The Hive is placed on a board resting on springs, that the motion of the ship may not disturb the Bees. Another I have suspended on gimbles, by the aid of which

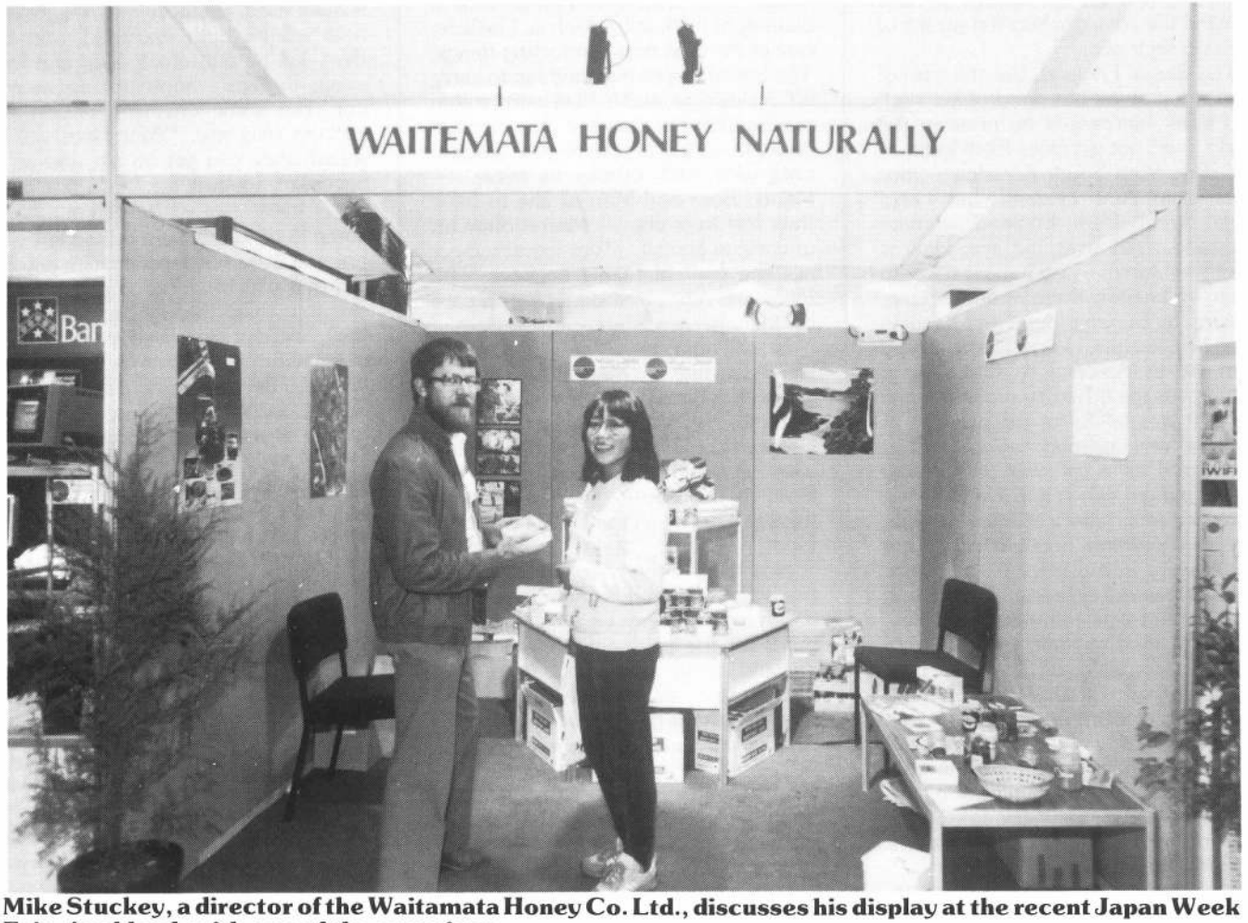


it will always remain quite upright.

A wall of water entirely surrounds the Hive. Fresh water is perpetually running in from the double case in which the Hive is placed, from the ship's cistern. The two cylinders of zinc, in which the Hive is placed, are open at the top, so that the water is exposed to the open air. A piece of rag, which will suck up the water, is laid between the two zinc cylinders. This will conduct the water on to the top of the Hives; evaporation will be always going on, and, as I believe, will keep the Hive so cool that the Bees will remain asleep. A few cinders will be also poured in between the Hive and the cylinder, to keep the Bees quite quiet. A pipe also will be fitted to the T hole to supply them with air, just as I did to those in the hogshead.

I shall also take an Observatory Hive in my cabin; they, of course, will be affected by every change of temperature, so I shall feed them by putting glasses of honey over the holes at the top of the Observatory Hive.

This historical gem came from Harry Cloake.



Mike Stuckey, a director of the Waitamata Honey Co. Ltd., discusses his display at the recent Japan Week Fair, Auckland, with one of the organisers.

Bee Brief

This new column from your Executive replaces the President's Report. More information on any item is available from your branch or the Executive Secretary, Wellington.

Quarterly crop and marketing report

EM (Executive Member) Keith Herron will compile at least four honey-crop and marketing reports each year from information supplied by the Honey Packers' Assoc., exporters, beekeepers, MAF, and the Stats Dept. These reports will go to (a) branch secretaries, (b) commercial members with 1,000-plus hives, (c) other hive-levy payers who request them from the Executive Secretary.

Trust Funds

The trustees have approved grants for the following projects. One, a further three years' support (1988-91) for the bee pathologist, DSIR, Mt Albert, Auckland, so Dr Denis Anderson's work will continue to benefit our industry, and two for research into the behaviour and life cycle of the *Mellitiphus Alvearius* mite by Mr Ron Van Torr, a scientist at Invermay Research Station, Dunedin. The discovery of this mite in bees from NZ caused concern overseas and we hope Mr Van Torr's research will tell us more about it.

User-Pays

With the MAF we are seeking the best way of financing hive-inspection and disease-control services. Legislation for a registration fee for all beekeepers is in the legal pipeline and should be enacted soon. It also seems that from early 1988 an increase of about 10 cents per hive will be needed to cover the balance of inspection costs.

This increase may require ammendments to the Act. Being considered is a change to the legal definition of a beehive to include hives for pollination and queen rearing.

Whakataniwha presented to Association

A highlight of Conference '86 was the presentation of a taniwha to the President by Howard Morrison. At the last Executive meeting Murray Reid kindly donated a whakataniwha: the traditional carved box to protect the taniwha. It was carved by Murray's brother Linsay and suitably engraved by the Waikato Branch.

'I love my honey' stickers and NBA pens are again available from our agents: Jackie Ashcroft, North Island, and Jan Chisnal, South Island. For the full range of promotional items see the NZBK Spring 1986.

Promotional recipe pamphlets will be available soon. The

Bee Brief (concl.)

first of a possible series, they may eventually lead to a NZ honey cookbook.

Quantification of the National value of beekeeping

Inspired by a Conference remit, EM Gavin White and AAO Andrew Matheson are preparing a report on the value of beekeeping to the National economy. Some good ideas have come from branches and the result should be useful in making submissions to the Government. The material may also be handy for an industry promotion pamphlet.

AG. Quarantine 'Honeypot' posters reproduced

MAF information services have kindly let us reproduce their excellent honey-quarantine ad. from the April issue of Air NZ's Pacific Way. We are printing some and hope branches will use them with the quarantine public awareness exercise, part of our industry plan for 1987, about which more information will be available later.

Industry plan

A goal within the Industry Plan this year was to: "further develop inter-branch communication networks". Consequently your Executive asked what branches had been doing and, from the replies received, gathered that probably the most effective way of drawing members together is the social evening. A good focal point for such an evening is a mead-making (brewing? vinting? hatching?) with ample samples to hand, of course.

Cast a net into a Government Department and you'll likely catch a speaker or two. Try our friendly MAF advisers. They'll tell you that we won't have them in a couple of years or so unless some financial props are provided, but some do show slides of their recent study tour to Australia to lighten the doom and gloom.

Don't forget the ACC. It's into backs at the moment but be quick to hook your speaker before the outfit cottons on to charging. (They're broke, remember?) Also remember to give your speaker a full super for his demonstration. These fellows get well paid for doing their thing so let's make sure they really do do it.

If you're a pollination outfit try someone for a session on Public Liability Insurance, or what about the local Smokey Bear to talk about the latest load securing regulations?

Thought of inviting our overworked bee patholigist, Denis Anderson, either to give a talk or to conduct a bee-diseases workshop. Most interesting to come face to face with a bee through a microscope!

Other speakers have covered practically everything from beekeeping in divers parts of the world to exporting queens and packages to North America.

Some branches have mounted displays at agricultural field days and horticultural shows. If you consider these remember the Executive has materials such as hand-out pamphlets and quarantine posters for display.

This handout and display material is useful when hosting school party visits to honey houses, etc.

Finally, branches might like to consider combining meeting notices with a newsletter — if you can find a willing scribe! Also the idea of sponsorship for newsletters to help with, if not cover, costs is worth considering.

And a final, final, if you think up any good ideas for branch activities in 1987 don't sit on them, please share them.

DISTRESS

By Ron Kilgour
Behaviour Scientist

Every issue in life, to be squarely faced must be known for what it is. The definition of stress or DISTRESS is the first task. We talk regularly about causes of stress, symptoms of stress, stress in the hives, etc, but does the person who hears us use these terms, know what we mean by this word? Stress is a very imprecise term with a wide range of meanings. Most scientists use it with caution or only after careful definition. Amoroso uses the following nemonic Situations That Release Emergency Signals for Survival. He keeps the word stress to cover those things which come from outside the body, from stressors, the word strain for what happens to and in the body. Similarly with a steel girder, the stresses on it come from outside itself, while the strain is what happens to the girder itself.

My personal preference is to think of stress as neutral or challenging, but the over-excitement of the high-frequency end or the listless boredom of the dull unexciting end of the stress curve to be the areas of my **distress.** Some daily stress helps me keep fit, alert and in good tone and shape. Too many stressors and my strain from distressing things that happen gets too high for me to cope and I no longer feel OK.

1. Goal setting:

Keeping on the set pathway. On discovery of honey, worker bees are able to communicate with other hive bees by dancing so that, keeping energy expenditure low, they too can participate in cropping the honey source. Setting our goals and keeping to them, like the bees, becomes the first task to reduce distress. Bees have honey guides to help. The simple basic rules (honey guides) to help us in setting goals are:

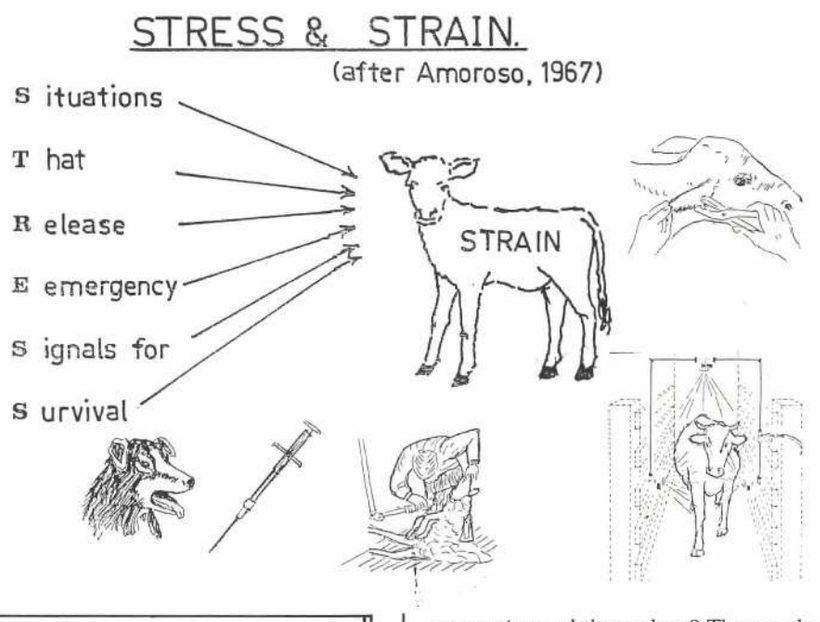
(1) **S, be specific.** Writing down a vague goal will never help. A two-sentence precise goal which states the aim of what we want cannot be misinterpreted. So BE SPECIFIC;

(2) **C, be clear, concise.** Do not ramble on. I want to achieve x by y, be it two new hive locations in two months or a straight talk with my banker;

(3) **R, be realistic.** Are you pushing yourself too hard, or your wife, or your family or your workers. . .? Be realistic. You cannot fly to the moon without a space craft. . . Does your goal belong to this real world?

(4) **A, is it attainable?** Setting goals which cannot be **attained** or **achieved** will add to the distress, not relieve it. Make your first goal one you can achieve without too much sweat and then set another goal a bit beyond that one when you have attained it;

(5) **M, is it measurable?** Goals are easier to achieve if you can count things off or have an easy yardstick to measure them with. A certain number of items; a new honey extractor or whatever your goal. SCRAM is the key to goal setting: **S**pecific; **C**oncise; **R**ealistic; **A**ttainable; **M**easureable.



DISTRESS

DISTRESS — What is it? How is it possible to mobilise the inner resources and discipline of each person to reduce distress and remain winners not losers?

2. Coping with your frustrations, anger or other emotions.

Bees do **not** see red. How often are you seeing red these days? The words which come up when we focus on our distress highlight how much feelings are involved. Feeling sick; feeling hopeless; disharmony; tightness; abuse; chaffing; guilt; fear etc. Distress is not only a big headache, but it is tension in the gut. Feelings are what make us warm and human. We all feel love and we relax when we are loved. If it is OK to love, to have positive feelings, then it is OK to feel angry, frustrated, depressed.

When bees get aggressive and defensive and sting, they leave a good deal of themselves behind and die. In people it is the reverse. Unless we let anger come out, allow the feelings to be expressed, then we tighten up and some of the liveliness and excitement within us dies. Redirected aggression is the name given to the process when, the boss uses agro on dad; who then shifts it onto mum; she moves it onto the kids and the kids belt the cat! Expressing your emotions and feelings is vital, but do it in an acceptable and responsible way. Run a mile when you are mad, or belt a pillow; but in whatever proper avenue you let it happen, let the feelings flow. Do what it is OK to do. Blowing off will reduce the distress.

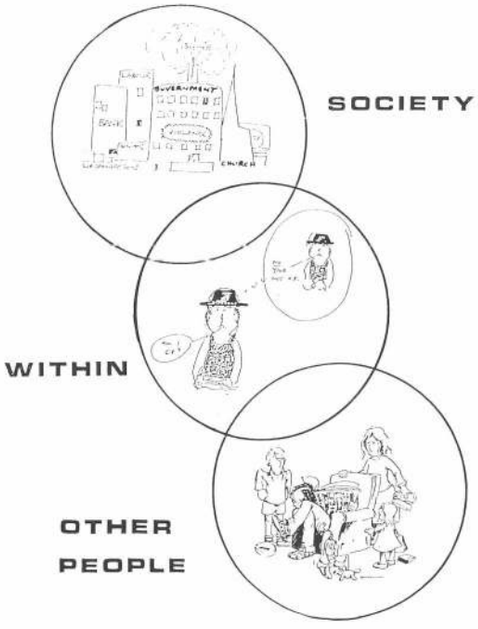
3. Bees dance while they work.

They dance to communicate good news to other workers. How long is it since we danced while we worked? And do we keep communicating well with others? Do you share all the information with your workers? If they are kept in the dark and merely asked

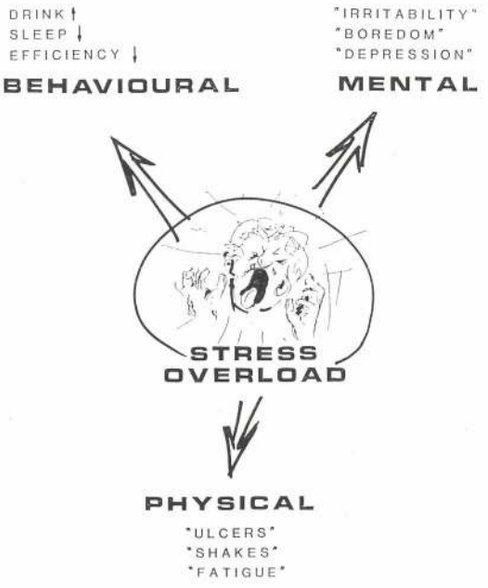
Distress (cont.)

SOURCES of STRESSORS.

THREE BROAD AREAS.



SYMPTOMS of DISTRESS.

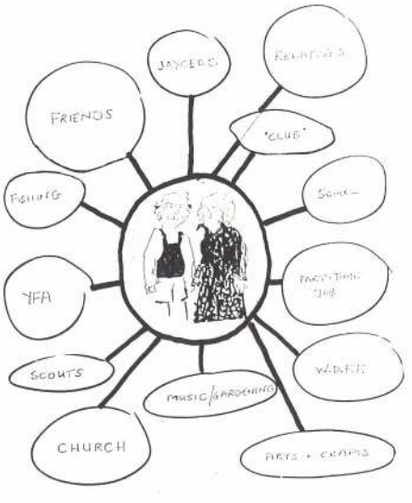


SUPPORT NETWORKS.

Halve a problem - share it!

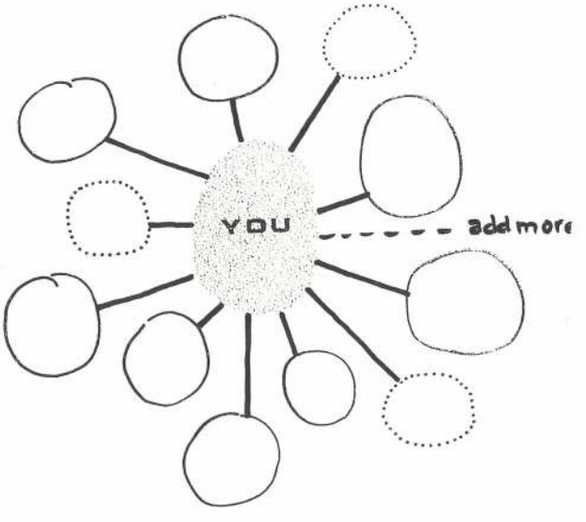
REQUIRED: 20 trusted people

Who? From where?



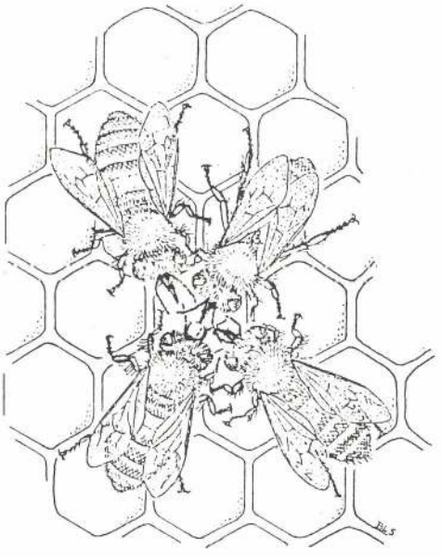
PEOPLE in YOUR NETWORK.

(write them in).



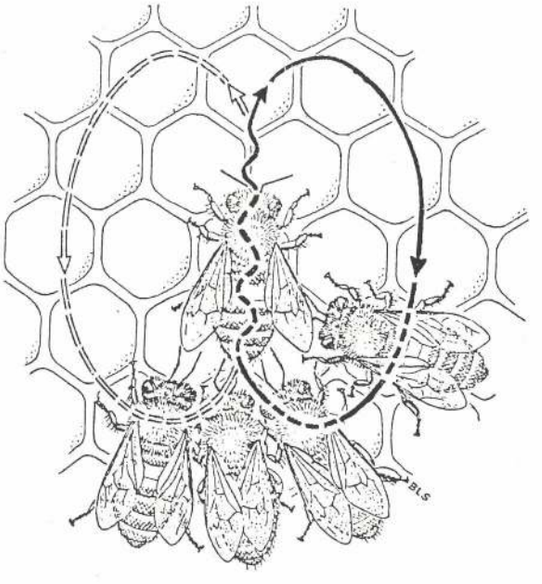
Honey Bee: Dances (after von Frisch 1967)

Honey regurgitation



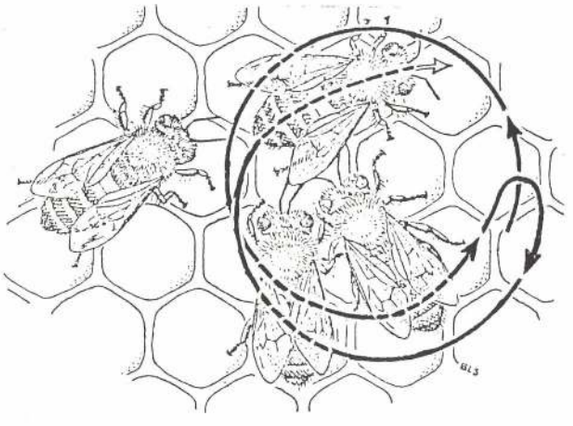
Liquid transfer in Apis mellifera. The returned forager (lower left) is giving nectar to three other workers.

Waggle tail dance



The tail-wagging dance of Apis mellifera. The upper worker is dancing in the pattern indicated; she is followed and antenated by other workers. (From Frisch, 1967a.)

Round dance



The round dance of Apis mellifera. The upper worker is dancing in the pattern indicated and is followed and antennated by other workers. (From Frisch, 1967a.)

Distress (concl.)

to be robots, like transplaced bees they will not perform well and your distress is liable to go even higher. When bees are working on a direct line to a honey source, they go around hills and obstacles. We are allowed to be a little flexible as well. If a brick wall looms up, it is permissible to go around it rather than to keep bashing at it with your head. Let us take a lesson from our own bees. Have you taken out enough energy from the pool of honey to keep yourself in good running (flying) order? Half-starved workers do not work at all.

As well as dancing we need to take time out for self-nurture. Take time off to worship or have a sauna or write a letter or go to the concert or get your spouse to rub your back. There are many ways of grooming ones self-esteem. This is self-nurture. The **old rule** is clear, 'Love your neighbour in the same way and with the same intensity as YOU LOVE YOURSELF'. Have you loved yourself lately? Don't drink or smoke too much. Why let these noxious products place extra strain on your body when you are distressed!

4. A problem shared is cut in half.

We all have our friends and our networks. There are the links with Rotarians, sports friends, family and so on. These people are essential for our survival when we are distressed. People with only a few in their network, few reliable people to call on, to share concerns with, are very much at risk. Do you need to add to your network or strengthen some of the links tht have decayed over the years? Remember HUGS ARE HEALING and the recipe for HUGS is simple. Four a day are needed for survival; eight a day for maintenance and 12 hugs a day will certainly lead to growth.

5. Being in command and choosing.

The feeling often comes at times of distress when we survey the work which is to be done during that day, that there are too many things we HAVE to do. We HAVE to do this and we HAVE to do that. This is a choice we make for ourselves. We do not have to do anything at all. The things we do, we do by **choice.** It is important to state again that we are in command of all the forces from outside, the stressors. It is not the weather or the bees or the orchardists who manipulate us, because we are in command. We each control our own choices.

As beekeepers a great deal of pride can be felt about the operation and products produced. In these days of natural foods even greater appreciation is shown of this industry. You are involved in an enterprise of which you can feel proud. Your product is good. Perhaps you need to promote again the good things coming from bees as an exercise from your association and remind the general public of the vital role of bees in pollination. I doubt that message has got through.

In summary

We are involved in an on-going process of living and working and playing and sleeping. As it is a process and we need some normal-level stress to keep us functioning well, stress is OK but the extremes of stress, DISTRESS is not. Eliminating these extremes will be assisted by setting SCRAM type goals; letting our feelings come out in an acceptable way by bashing a pillow, not the wife and kids; widening and keeping in workable order the links with people in our networks of which there should be about 20 people; taking time out to 'DANCE' at work and being a bit softer on ourselves, our bodies, our associates; keeping slots of time four our own self-nurture and remaining in command by choosing the style of life and work which we really want. I give you full permission to live full and exhilerating lives.

TIPS FOR HANDLING DISTRESS

1. **Go easy on yourself early in day.**
2. **Get appointments which suit your.**
3. **Make notes — don't rely on memory.**
4. **Have a good spare tyre.**
5. **Cut duplicate keys.**
6. **Don;t drive in rush hours.**
7. **Learn to say "NO".**
8. **Eat when you are hungry.**
10. **Go early to airport — take a book.**
11. **Make diary appointments for you — then those slots — full.**
12. **Ease up — give yourself a treat.**
13. **Get more friends.**
14. **Copy key documents.**

HUGS are HEALING

DAILY DOSE

4 hugs = survival
8 hugs = maintenance
12 hugs = growth

Heating Problems

By: Peter Bray

Often when I discuss honey plants with beekeepers heating problems crop up. More often than not it's a simple matter of how you decide how much heat you need. Unfortunately that's frequently done by suck it and see, what a neighbour is doing, or past experience (if any). However, a few calculations before you begin can save you much hearteache later.

First you need to know:

1. Your basic starting temperature. Are you extracting in a frost, with two feet of snow around the honey house, or what?
2. At what temperature do you need the honey? That is, do you want it to pump easily, or so the wax will settle on top, or simply to get the boxes in the hotroom warm enough to extract.
3. How much honey do you need to heat?
4. How long will it take?

Buy a thermometer to find the answer to the first two. Get one in Celsius with a scale from 0degs to 100degs. All the following calculations are based on this scale.

Now for the theory:

Heat is energy. One measurement of energy is the kilowatt hour. Electricity comes in kilowatts. Use one kilowatt for one hour and you have used one kilowatt hour. This is also a unit. All those little things that add up and get charged to you in a thing called a power bill. Boilers are often rated in kilowatts but can be in horsepower. One horsepower equals .7 kilowatts or 700 watts.

The usual units for measuring heat are the calorie and the Bthu (British thermal unit). I will deal with calories because they are easier to work with in this instance. One calorie equals 3.968 Bthu if you want to convert.

One kilowatt hour produces 859.6 calories. Very important! One calorie is the amount of heat required to raise one kilo of water by one degree celsius. Three calories could raise one kilo of water three degrees or three kilos by one degree. Simple!

Honey only requires 54% or .54 of the amount of heat that water does to reach the same temperature.

Here's an example:

Suppose we heat the honey as it goes through a baffle tank with recirculating hot water. We'll assume that it enters the baffle tank at 25degC and we want to heat it to 45degC so most of the wax will float off and the honey will go through a filter without problems.

We'll assume that at the maximum flow rate we would get through five tonnes of honey in a day (you must use the maximum rate or the system will be overtaxed when a flood of honey comes out of the extracter).

Therefore we need to heat five tonnes of honey (5,000 kilos) by 20degC.

The number of Calories needed to achieve this is 54% of 5,000 kilos multiplied by 20degC.

.54 × 5,000 ×20 = 54,000 calories.

Remember one kilowatt hour = 859.6 calories.

Therefore we need 54,000/859.6 or 62.8 kilowatt hours.

To do this in eight hours we need 62.8/8 or 7.85 kilowatt hours which means we need 7.85 kilowatts of heating. To achieve the same result in four hours we would need 15.7 kilowatts.

By allowing for some loss of heat and a small amount of leeway a figure of eight to nine kilowatts of heating is needed in the hot water supply for this example.

Another example:

A hotroom holds 200 fulldepth supers.

Temperature in is 20degC.

Temperature required is 33degC.

Amount is 20 kgs per super × 200 = 4,000 kgs.

Time is 5.00 pm loaded and 8.30 am ready to go. 15.5 hrs.

Heat required is .54 × 4,000 kgs × 13degC =28080 Calories.

= 28080/859.6 or 32.7 kilowatt hours.

32.7/15/5 = 2.1 kilowatts needed to heat just the honey alone.

This last example doesn't take into account the heating of the wax, wood, floor, walls, or air also in the hotroom. Nor does it take into account how long it may take to bring the room up to temperature. In a case like this best put plenty of heating in so the room gets up to temperature very quickly.

These calculations simply provide you with the amount or rate of heat you require, not how efficiently you are applying it. One rule is to supply as large a surface area of heating as possible. The more surface area you have, the closer the heating medium can be to the desired product temperature. This gives more stable control of the product temperature especially if the product may be prone to fluctuations in flow as is the case with one or more extractors starting and stopping. This means you don't burn your baffle tank full of honey when you go for lunch.

MEMBERSHIP

"Membership records are being computerised and members given permanent identification numbers. When advising changes of address, or any matters pertaining to membership, please quote your numbers."

Re-queening without looking for the Queen

By: Skep

The column in the last issue of the NZ Beekeeper gave all of the positive aspects of re-queening. It listed all of the advantages, such as easier management, more production, and a reduction in the swarming impulse that you can expect if you replace the queens in your hives regularly.

One of the big stumbling blocks for many beginner-beekeepers, however, is that problem of how do you actually get the queen into the hive. Again, the last column gave you the fundamentals: the colony should be queenless, well fed, and have young bees emerging.

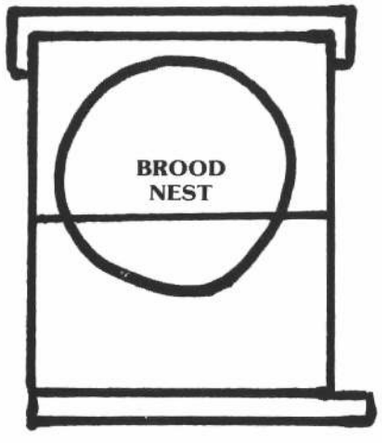


FIGURE ONE: Brood nest before re-arrangement.

How do you actually go about it? Most books tell you simply to find the old queen, kill her, and introduce your young queen in the mailing cage she came in. Fine, you think. Until you go out to look through your (strong) (aggressive) (agitated) colony for the queen. And knowing that you have your valuable, newly-arrived queen sitting in the house just waiting to be installed!

So this month will be mostly devoted to a method of introducing new queens to your hives without having to look for the old queen. Like any such system it is not foolproof. It works for me and for many other beekeepers, but if it doesn't for you, first make sure you are following directions. Then consider special problems you might have, especially as they relate to the 'golden rules' of queenless, well-fed, with plenty of young bees. Then, if you are still convinced you did it all properly, send your complaints to anyone but me. After all, I didn't make you do it, did I?

The system I describe is not new, and is not my idea. It's a combination of all sorts of ideas. Its the sort of management technique that develops when you have a fair idea of what you want to do, but you're not sure how. Then, rather than just making up your system, you sit back and think about bee behaviour and try to make the bees work for you.

The object of the system is to create a nucleus colony on top of the old colony. I wanted a system that could be easily used by hobbyist or commercial beekeeper alike, without ever looking for the queen. It should be versatile, both in being able to deal with colonies of differing strengths and with end results. That is, the resulting nucleus, or top, can be used to re-queen with, or to start a new colony. The method should use a minimum of extra equipment, and no exotic or complicated gadgets (much as I like them. . .)

The only 'extra' piece of equipment needed is a split board, also known as a division board. To those of you who may not know what that is, it is simply a hive mat (inner cover) that has had a notch cut out of the rim on one side so as to form an entrance for a colony set above it. The notch can be anywhere from 20 to 100 mm wide; I prefer to have mine about 50 mm, making it large enough for a fairly strong unit but still small enough that the bees can protect it while the colony is still small.

I have modified the inner covers on all of my hives in this manner. Just to try something new this last autumn, I turned them over on my hives in an effort to give some sort of upper ventilation. I'm not really sure how much good it did.

You will also need a queen excluder. As I have one of these for each hive as a matter of course, that is no problem. One last piece of equipment needed will be another box of drawn combs.

Now after all that prelude, let's see how the system works. For the sake of beginning, let us assume that it is springtime and your colony is housed in two boxes and you want to simply re-queen it. As you'll see later, you have other options, but let's start from this basic case.

When you open your hive, you'll find most of the brood and bees in the upper box. Remove three frames of brood, both sealed and unsealed, from the centre of the brood nest. Take a glance over them first to see if you can spot the queen. Now that you're starting on a method that means you don't have to find her, its amazing how often you will! Then shake all of the bees off of them, back into the colony.

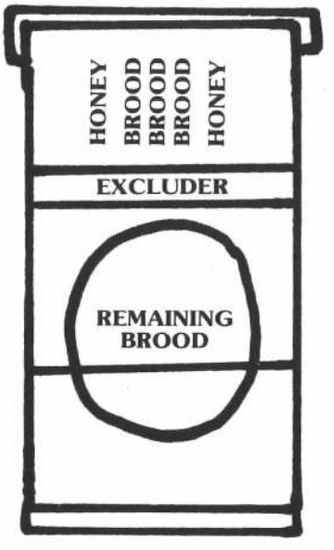


FIGURE TWO: After re-arrangement of brood and stores.

You needn't shake off every last one of them, so long as you are sure that the queen is not one of the bees remaining. Now, place these three frames into the middle of the box of combs you have brought with you.

If there are plenty of stores in the parent colony, take two good frames of honey, shake the bees from them, and place them in the new box with the three frames of brood. If there is not much honey in the hive, you will have to feed either the parent hive, the nucleus, or in the worst case, both.

Now, you can start to re-build the hive. Replace all the frames you have taken from the parent colony with empty combs, doing your best not to split the brood nest if possible. On top of this second box, place the queen excluder. On top of the excluder, place the new box containing the brood and

→

Re-queening (cont.)

honey that has had the bees shaken from them.

Put the lid on the hive and go away. Think about what you have just done. You have lifted brood and bees above the excluder. What is going to happen to the brood up there? The pheromones it gives off will attract nurse bees that are down in the main hive up to it. Combining that with the frames of honey, the third box that you have added has quite a 'pull' to bring bees up into it.

But remember, there is a queen excluder between the boxes, so there is no way the old queen can come up there.

After about 20 minutes, if you go back to the hive and lift the lid, you will find that enough bees have come up into the nucleus to take care of the brood, defend the colony and take care of your new queen.

All you need do now is replace the queen excluder with the division board and presto! You have your nucleus colony ready for introducing the young queen. It is queenless (because the queen couldn't come up through the excluder). It has plenty of young bees (because they have come up to take care of the brood you lifted). And it has plenty of food (because you provided them with two frames of honey). All the conditions have been met for ideal queen introduction.

This system could be used on a larger number of hives. By the time the beekeeper has worked through the yard, shaking bees from brood and honey to lift into the new box, the first hive would have been left long enough for the bees to come up.

Introduce your young queen into the top and wait a week. Don't disturb them in this time if at all possible; until the new queen is established and laying fully, the bees haven't really fully accepted her. Disturb her during this period and it is possible for them to turn on her.

After a week, you will have a parent colony on the bottom, only slightly reduced in strength by the bees, brood and honey you took. And you will have a nucleus colony headed by a young queen above the split board, all set for your next decision.

You can either use it to re-queen the parent colony, or you could place it on its own floor to use for increasing your colony numbers. If you choose the second option, it would be best if you actually moved it several miles away to avoid the loss of field strength through drifting.

If you want to re-queen the parent colony, you could now go through it, looking for the old queen, preparing to unite the two colonies by replacing the split board with a sheet of newspaper for them to chew their way through. But that would defeat the whole point, wouldn't it? We're supposed to be doing this without ever looking for a queen, aren't we?

If you can go through and find the old queen, aided if necessary by some of the hints I gave in the last column, so much the better. You're certain of results then.

But, believe it or not, you have the odds of success heavily in your favour if you simply newspaper the two units together without looking for the old queen at all. In almost 90% of the cases, if you unite two colonies with the young queen on the top of an old queen, the young queen will be left to head the resulting hive.

Why this happens is open to argu-

Requeening (concl.)

ment. Some beekeepers will tell you that the bees always select the best of the two queens. I doubt that. My explanation goes along the lines of the young queen's bees are confined in the top box when you replace the split board with newspaper. As well, her field bees returning cannot use their normal entrance, the slot on the split board. I think the old queen is probably killed by the 'scissor' effect of bees foreign to her coming at her from both directions.

But it certainly works, and if the thought of trying to find queens is an impossible one for you, the system might be worth considering. You might just want to experiment with it to see if the time savings will repay the small amount of uncertainty involved.

Its not the answer to all of a beekeepers problems, but it just gives you an idea how by thinking a little bit about bee behaviour, you can sort out your management system to make your life a little easier while doing all you can in the interests of maximum production.

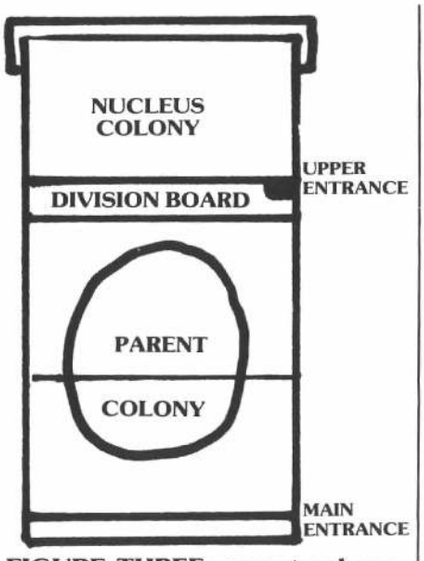


FIGURE THREE: parent colony with nucleus colony above after replacing excluder with division board.

Old-established business changes hands

An era ended recently when the long-standing family wax business of A. Ecroyd & Son changed hands.

The business, founded by the late Arthur Ecroyd before WWI was carried on by his son, Kevin Ecroyd, until its sale recently.

The new owners, New Zealand Beeswax Processors Ltd will, apart from a change of location to Orari, South Canterbury, continue the business much as before. However the combs and slum-rendering services will be expanded.

The proprietors of New Zealand Beeswax Processors Ltd, Peter and Stephen Lyttle, have been commercial beekeepers for 20 years. With the knowledge and experience built up in the business over the last 70 years by Ecroyds, and the attention to detail that owner-managers can give, they plan to offer top-quality products and excellent service.

Exotic Bee Disease E.R.P.

Since August 1986 MAF has had a new system for dealing with outbreaks of an exotic bee disease. Based on a manual written by Cliff Van Eaton, AAO, Whangarei, it uses the experience gained in the 1985 Kerikeri chalkbrood exercise.

The manual slots into the existing MAF Emergency Response Procedures (E.R.P.) system and provides a formalised decision-making process so necessary in such outbreaks.

MAF created the ERP system for dealing with emergencies, including fruitfly, floods, even snow storms. But exotic bee diseases have been given priority and MAF staff throughout the country are being trained to set up and man emergency headquarters should such a disease be identified.

Obviously, inspection and eradication of an exotic disease will be carried out by AAO's and apiary inspectors, but all MAF staff will have a role should an outbreak occur. The system also relies on the services of a bee pathologist. The pathologist and his staff must set up a diagnostic laboratory and process all samples collected by inspection teams.

A distinctive feature of this ERP system is the way it manages the difficult problem of quarantines. If an exotic bee disease was discovered in a major horticultural area during pollination, quarantine on site (as provided for in the Apiaries Act) would seriously affect grower spray programmes.

The ERP system provides, instead, for shifts of pollination hives to secure quarantine holding areas outside orchard areas. To succeed such a shift requires close beekeeper MAF cooperation. It is hoped AAO's in pollination areas will meet with beekeepers yearly to update holding area designation.

The Exotic Bee Disease ERP system is an essential part of the MAF network which protects the beekeeping industry from disease and pests. But no matter how good the system, MAF still must rely on beekeeper observations to make the whole thing work.

The Plant Protection Centre, MAF Lynfield, is now offering beekeepers a diagnostic service which can identify the major exotic pests and diseases. And as always, Apicultural Advisory Officers throughout the country are available on request to investigate suspect conditions in our hives.

LIBRARY NOTES

From Mr Harry Cloake a photocopy of some pages of "My Bee Book" by William Charles Cotton, MA, published in 1842. The author describes his plan to bring colonies direct from Great Britain to New Zealand using hogheads insulated with felt and provided with proper drainage in which the hives were packed in ice. Very intriguing indeed. The book seems to be a very rare item. Enquiries are being made, it would be a valuable addition to the library. "A Manual for New Zealand Beekeepers", by Mr Cotton was published in 1848. This was the first NZ bee book. Thank you Harry.

From the MAF Tauranga: **"Kiwifruit Pollination Seminar Proceedings"** Oct. 1986. Good value for the grower and the pollinator. If you are involved in the kiwifruit industry and have not attended this seminar read these notes, it will pay you. Thanks Trevor.

There are a couple of trays with papers etc. I have not had the opportunity to go through them and make a list. They come from Mr Chris Dawson who started the library and built it up from a small collection to something very worthwhile and has not forgotten about it after retiring as librarian. No doubt we will get some treasure out of this lot. It is greatly appreciated Chris.

John Heineman

From the Colonies

WESTLAND

With the main honey flow just days away most beekeepers are busy with those last-minute jobs — shifting, uniting, supering-up — in readiness for THAT BIG CROP. Well, we are looking for Rata this year and hopefully a fine settled summer to go with it.

Spring has been somewhere around average — some heavy falls of rain but no long spells of wet weather that we sometimes experience at this time of year. Queen-rearing and queen-mating have been quite successful from reports received, although hive strength appears variable from district to district. The incidence of nozema is a little higher this year and no doubt has a lot to do with the varying strength of individual hives.

Spring being spring, not too much contact has been made with other members save for the odd telephone call and with the prospect of a good season it could remain a heads-down, backs-bent situation for the next couple of months.

Sandy Richardson

SOUTH CANTERBURY

What a reversal of the notes I wrote last November and how nature can taunt us.

This November I write: "No willow flow — perhaps a good honey crop?" Neither is there a drought but oh, so much rain! One of the wettest years on record! Every cloud which appears over the horizon seems to dump its load of moisture on South Canterbury. What a performance getting to apiaries on the heavy downland country. Bogging has been the order of the day: even with four-wheel drive vehicles. Gum boots, oil skins, and mud have been the normal and no one likes working bees under these conditions. Nor do the bees like it either.

There is still a lot of snow on the high country so late frosts could be a danger to the honey crop up there. In spite of the amount of snow, growth is good so we look forward to plenty of this high-value white honey.

Hives of bees in South Canterbury have been changing owners like musical chairs, and at pretty high prices. Must still be a lot of faith in the industry. Should be if the price of white honey remains high.

The bees developed very slowly in early spring and a shortage of drones delayed queen raising but mating has been quite good in spite of the weather. Widespread feeding has been necessary and unless the weather settles down and the sun shines feeding could continue until well into December.

We have the ingredients for a good honey crop, lots of moisture, less sheep and grain crops, all we want is sunshine and then who knows. Here's hoping.

Harry Cloake

NORTH OTAGO

Since about April it hasn't stopped raining. The wettest year on record! Still, most of the rain has been warm, thus we have good ground temperatures and plenty of grass to keep ahead of the sheep.

After continuous drought and now rain we hope we're not in for a re-run of South Canterbury last year where it forgot to stop raining.

The willow flow was patchy along the coast, but most hives are in good order due to taking honey into the brood nest in March.

Competition for honey seems to be building up. Wilson Neill-Hororata Honey put on a social evening for us, and Peter Bray attended our last Branch meeting. All points of view about markets and marketing were aired.

Dalgety International has also been doing the rounds of late. I hope all this activity opens up new markets.

One of our past AAO's, Vince Cook, well-known to most, is visiting in January with a group of English beekeepers. It should be a good get-together for past and present members. Maybe it will show us what a loss Vince is to NZ beekeeping.

G.R. McCallum

NORTHLAND

Here we are with another season just started. At this stage it looks promising. The honey flow is getting under way and kiwifruit pollination is due to start any day. We have had quite a good spring in the North with rainfall lower than average. The Branch has been rather inactive but the pollination and queen producers' associations have been busy. Here's hoping for a good season. Seasons greetings to all.

Pat Gavin

NELSON

With winter and a fair slice of the spring behind the colonies have not faired too badly. But as the willow flow began wearing out the rain became generous. Not beneficial to the stores which can be depleted for better use. Perhaps now the barberry is flowering the elements will smile kindly on our precious bees.

From the Colonies (cont.)

Our field day at Peter Hobson's on October 11 was aimed at deciding the optimum strength of colonies for kiwifruit pollination. After an assessment of the hives brought by various beekeepers, the findings were discussed and analysed.

Unfortunately bad weather prevented the representatives of the kiwifruit growers from seeing as much as they might. The wet and cold made the bees cluster and the bee handlers take care not to expose valuable brood to the elements.

Many thanks to the ladies who catered for the occasion and made everyone feel that the day was a success despite the weather.

Ron Stratford

SOUTHLAND

Southland's weather has been reasonably settled with a good spring and a steady build-up. The hives tended to be strong early which could be a problem in some part when they run short of feed. The weather has encouraged splits to be made where feed allows and queen raising has gone reasonably well. Some parts of Southland, however, tend to be on the dry side so I hope this does not mean six inches of rain in January.

Our Field Day this season will be at Telford Farm Training Institute, Balclutha, on Saturday, January 31. A varied and interesting programme is planned and accommodation is available. Telford has pleasant surroundings and given a fine day it will be a good opportunity to meet old friends and perhaps make new ones.

We are also organised to go under cover should the weather turn against us.

Alister Lee

SOUTH AUCKLAND

Sorry folks that nothing appeared from the Auckland Branch in the last issue but it appears my copy never made Wellington. Probably lost in the post somewhere.

Even at this late date I should like, on behalf of the Branch members, to congratulate Mr Heini Belin on becoming a National Life Member. Good luck, Heini, and may you enjoy many years of life membership.

A second discussion group has been formed in the Auckland Branch: the first in South Auckland, and now one on the North Shore. Both groups are well-attended.

A recent field day, held at the Carrington Institute, featured Mark Goodwin who is studying bee behaviour in kiwifruit. He gave a most interesting address with plenty of facts and figures. Dr Denis Anderson, our man with the DSIR, Auckland also brought us up to date on his research into bee diseases and showed us some interesting sights through a microscope.

Our old friend Colin Rope told us about queen rearing with the Nicol system of collecting larva for transferring. He outlined several members' experiences with this system.

Several commercial people mounted displays and took orders.

In general, I'm pleased to report a growing interest in Branch meetings. For this our thanks must go to Chairman Graeme Carmell and Secretary Charles Reid who do their best to provide something novel and interesting each time.

The weather recently has been great for both queen rearing and mating. The barberry is producing a heavy flow of nectar with the bees working from early morning to late evening. Some parts are white with clover and if the weather stays hot maybe, just maybe, this will be THE YEAR.

Dave Young

OTAGO

We held our Spring Field Day at Allanton, just south of Dunedin, at the honey house of Bill Ross. It did not feel like spring really as the day was cloudy with cold wind and rain in the afternoon, but there was a good sized-crowd and a good programme: a speaker from Invermay Ag. Research Station with his microscope and slides, some problem hives for inspection, new equipment for demonstration and introduction, NBA information by Alan McCaw and a "High Country" beekeeping panel, and two advisory officers with

From the Colonies (concl.)

their contribution, plus cups of tea and lunch filled the day. Thank you Bill and Mrs Ross for your hospitality.

Colony development this spring has in general been slow, thanks to many overcast cold days and lots of strong easterlies which kept the bees at home. Shortage of pollen, because of the lack of forage opportunities, did occur in many places. But there is still time to catch up betwen now and Christmas. Pasture look good, lots of clover showing.

John Heineman

BAY OF PLENTY

With a heavy demand for hives for kiwifruit pollination most beekeepers have been very busy splitting and building up their numbers. The publicity about artificial pollination seems to have made many orchardists much more aware of the importance of this stage of their fruit production and they have increased their orders for hives.

There have been varied reports about the spring, some beekeepers producing a box of honey off the willows while other s have been suffering from severe dwindling.

The Branch put on a display at the Te Puke Horticultural Field Day with honey tasting, a competition to estimate the number of bees in an observation hive, some promotion of the kiwifruit Pollination Assoc., an Agricultural Quarantine Service display of seized honey imports, and beekeeping videos.

We will be holding a Field Day on Sunday 25 January at 10.30am at the Katikati Bird Gardens. This will coincide with the visit to the area by a group of beekeepers from the UK led by Vince Cook who some of you know. Anyone who fancies a day with the birds and the bees and a chance to meet some overseas beekeepers will be most welcome to join us. If wet the Field day will be held at the BOP Community College.

Peter Townsend

MARLBOROUGH

A hard spring. Generally there are enough minor spring flows to avoid the need to feed sugar but this one was different. Queens did not get mated for a three-week period when it was more or less rain. Fortunately the bees had most of the willow flow before the bad weather and it was fine again for the barberry. The start to November has shown a huge improvement The clover starting to produce nectar a little earlier than usual so taking the pressure off. Hives going into pollination were later than normal, with kiwi fruit still to come. The number of hives used were up from last year.

The local club held a spring management field day at Craig Dean's honey house. The theme of brood equalisation fell on deaf ears or to be more accurate a well balanced hive. A good turnout for yet another damp spring day. Later in November we are having Jasper Bray over to address a meeting on marketing and the season's prospects. Hope the warm weather continues with periods of warm rain. Time will tell.

James Jenkins

SOUTH-WESTERN DISTRICTS

Queen rearing by the Nicot method held sixty people rapt at our Foxton Field Day in October. Norm Keane hosted us at his honey house. The day also included demonstrations of sugar feeding, the correct way of manually lifting loads, and how to secure a load of hives on a truck.

At the time of writing we are 10 days from the mass migration of beehives into kiwifruit. Some orchardists have increased their orders for hives to aim at 10 hives per canopy hectare. This follows a series of seminars held at New Plymouth, Wanganui, and Levin where both spray pollination and bee pollination were outlined.

"Like the winters used to be", has been the regular comment of older beekeepers. To reach some of the apiaries for feeding meant churning through a bog. It has not been an easy winter for either bees or beekeepers, and we've had to use more sugar than usual.

However, we've had a perfect spring with plenty of sun and warmth as well as rain, and the bees have gathered fodder from gorse acacia, willow, and barberry hedges to strengthen the colonies. Pastures seen in great order for a good start to the honey season.

John Brandon

HAWKES BAY

Our Branch took a stand at the local A & P show this spring, as much as a public awareness exercise as anything. We displayed a variety of honies and by-products available in Hawkes Bay, as well as two glass single-frame observation hives with marked queens which drew the crowds so our pollination people could give away leaflets, the Story of Bees and Honey, and I Love My Honey stickers to the children.

A rooster of volunteers manned the stand for the full three days.

Our latest branch project was a hive inspection day. Under control of AAO Ted Roberts and Martin Taylor, it began at 8.00am in the MAF HQ with a briefing. Twentyone volunteers arrived to make nine car teams. Each team included a commercial beekeeper, able to positively identify foulbrood.

During the day 320 hives between Napier and Hastings were inspected and 10 diseased hives discovered by the time the last of the teams returned to base at 6.30 pm. The day was so successful that we have now made it an annual event.

We hope that other branches throughout the country might coordinate a day like ours with the aim of stamping out foulbrood.

John Walker

CANTERBURY

The much-needed willow flow came and went with next to no nectar being gathered, although the dandelion proved a real saver, with some hives gathering a surplus.

Overall hives have eaten more stores than usual and have been slow building,up, but this has been a blessing in disguise because otherwise swarming could have been a problem in our unsettled weather.

Pollen substitutes have been fed in many problem areas with varying results, although nothing beats the real thing.

The season is progressing well and the main honey flow should be on time, but remember: "Don't count your kilos until they are in the drum".

R.D. Bensemann

NEW PRODUCTS

The Syme Two-in-one

John Syme, New Zealand bee-keeper with an engineering bent, has developed a combined wax spinner-honey extractor.

Called the "Syme Two in One", and constructed entirely in stainless steel in the interests of hygiene, the machine consists of a circular outer similar in size to a 50-frame radial extractor and a perforated inner spinner which is driven directly by a variable speed ¾hp motor.

When loaded with up to 100 full-depth frames, the operator merely sets the electronic switch to the required speed and time. The spinner builds up to the set speed in five controlled steps, then automatically brakes at the designated time. It averages three to five minutes per load. The machine is simple to operate (John claims it's idiot-proof) and runs quietly and smoothly.

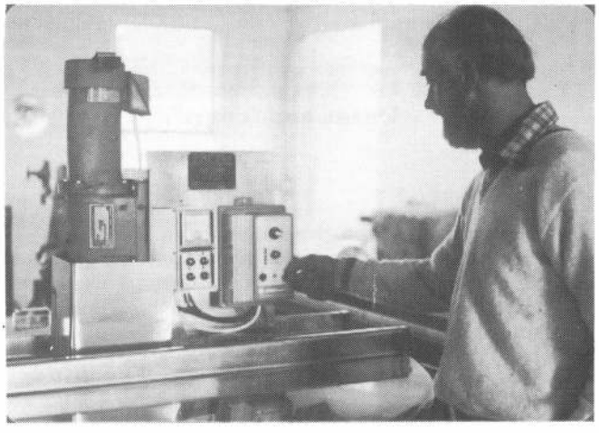
Because of the gradual build-up of speed and the way the frames are packed into the machine damage to both frames and foundation is negligible and the extraction process is efficient.

No pre-warming is required, saving both time and money, and even Manuka honey — difficult to extract because of its hard jelly-like consistancy — is effectively and quickly extracted after being pricked.

The machine's wax-spinning function also appears most effective.

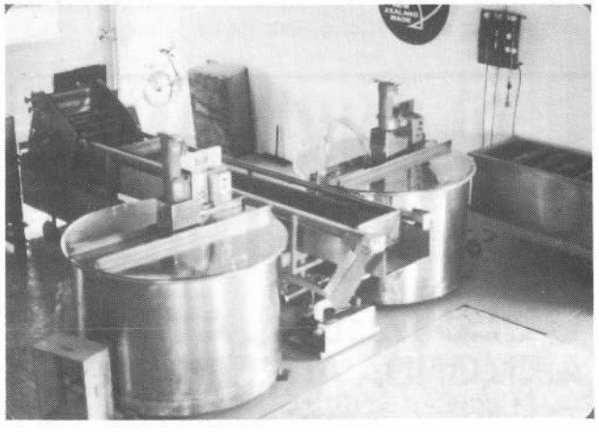
The recommended load is cappings from 200 frames. These cappings are pumped into the stationary spinner, the speed and timer controls set, and within five or six minutes a high percentage of honey is extracted leaving dry, flakey cappings ready to be bagged and stored.

John says that two people can extract 320 full-depth frames and separate the cappings within an hour. He estimates that four people using two machines could extract and separate cappings of eight to 10 tonnes of honey in eight hours.



Control panel of Syme two-in-one.

Below: Penrose uncapper-cappings rail. Syme two-in-one on either side. Honey heater on right.



The Carricell Portable Cell Incubator

John Dobson, a Hawkes Bay queen bee breeder, handles thousands of queen cells each season.

He found the usual methods of transporting the delicate cells unsatisfactory, so set about developing a better way. The result is the Carricell — a portable cell incubator.

I've seen nothing like this on the market," he says. "Before we had to keep the cells in a chilli bin with cotton wool or put the frame of cells into a box of bees to keep them at the right temperature."

An electronic sensor keeps the temperature constant and the cell hatching rate is high.

"The possibility of chilling is eliminated," says John. "We usually initiate mating nucs in the evenings and the Carricell ensures cells are protected, even in cold weather."

The incubator plugs into a vehicle cigarette lighter socket. With an adaptor it will also operate from mains power. Ninety-six cells can be carried in a natural vertical position or up to 200 can be laid flat on a foam pad.

An important advantage is the ease and efficiency of handling the cells.

"The convenience is a big plus," John says. "I can recommend the Carricell to all beekeepers who requeen with cells as well as to queen bee producers."

Determinants of Queen Quality in New Zealand Commercial Queens

By Cliff Van Eaton
Apicultural Advisory Officer, MAF

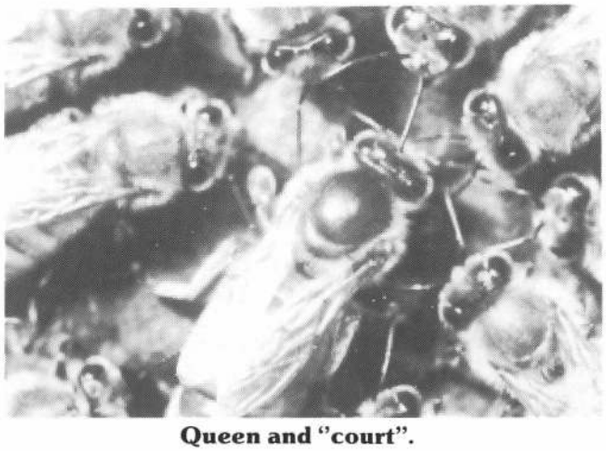
Honey bee queens are normally judged by how the colonies they head perform. A queen is said to be good if its colony builds up well and produces an above-average crop. Many beekeepers also look critically at the brood pattern and in some cases even take the size of the queen into account.

But how do we know for sure what makes up a quality queen? Quality can come from two sources: inheritance and physiology. Genetic queen quality normally refers to the traits passed on by the queen to her worker progeny.

But the quality of the queen herself is more influenced by her physiology. The way the queen is reared greatly influences the number of eggs she can lay, the amount of sperm she can retain, and probably even the levels of pheromone she can produce. The presence of the adult bee disease nosema also affects queen performance and can even lead to premature supersedure.

At least one observer (Taber, 1981) has suggested that improved queen physiology can have a greater affect on increased honey production than genetic stock improvement.

In 1985 a nationwide survey was conducted to determine levels of physiological quality in New Zealand commercial queens. The survey was the first of its kind in New Zealand and now forms a base level of information which producers are using to rear even better queens for the future.



Queen and "court".

Survey Method

Commercial queen producers from throughout New Zealand were asked to supply five non-selected queens from their 1985 spring production runs. Queens were sent as normal in mailing cages with attendants. Type of cage, candy, and number of attendants varied between producers.

Thirteen producers took part in the survey, with queens arriving between 4 November and 3 December 1985. To eliminate bias and approximate commercial conditions, all queens were held for four days following post mark. Water was fed daily during the holding period in the normal manner.

Queens were anaesthetized and weighed on a milligram load cell scale. Queens and attendants were then preserved in alcohol and later dissected. Sperm and nosema counts were made using a standard blood cell counter. Thoraxes and spermathecas were measured using a microscope lens measuring scale.

Results and Discussion

Results of the 1985 New Zealand queen quality survey are summarised in Table 1. The information is quite interesting, particularly when compared with results obtained overseas.

Queen Weight

In a similar-sized sample from one US producer, Nelson and Gary (1983) obtained an average weight of 207.9 mg in mated queens held for eight days. Queens in the New Zealand survey fared slightly better at 214.3 mg, although they were not held as long and queens **do** lose weight during captivity.

Nelson and Gary (1983) also found a strong correlation between queen weight and subsequent colony honey production. To improve queen quality they suggest a culling process to remove lightweight queens, excluding the bottom 20%. Accordingly, in the New Zealand survey the cut-off would be 200 mg.

Ovarioles

Obviously the number of ovarioles is of paramount importance in judging queen quality. The number of ovarioles

Determinants of Queen Quality (cont.)

determines the queen's daily egg laying (oviposition) rate. This rate ultimately affects brood production per cycle, colony population, and honey production.

Various researchers have studied ovariole number, usually in relation to the age of larvae grafted. Woyke (1971) found an average of 308 ovarioles in queens from one day old larvae, decreasing to 272 for three day old larvae.

No doubt larval nutrition and strength/type of starter-finisher also greatly affect ovariole number. At least one researcher (Orosi-Pal) has suggested 300 ovarioles as a standard for good quality queens (Ruttner, 1983), similar to the survey average of 296 ± 4.

Spermatheca Volume

The size of spermatheca determines the potential amount of sperm a queen can retain following mating. Because sperm concentration does not vary appreciably no matter what the spermatheca size, the smaller the spermatheca, the smaller the number of sperm that **can** be retained.

Woyke (1971) found a correlation betwen spermatheca volume and both queen weight and age of larva at graft. Spermathecae averaged 1.093 mm^3 from queens raised from one day old larvae, decreasing to .821 mm^3 for three day old larvae. Spermathecae of queens in the New Zealand survey averaged .943 mm^3.

Bee on clover.

Sperma Amount

While spermatheca volume determines the potential amount of sperm a queen can retain, sperm amount measures the number of sperm she actually receives during mating. Woyke (1971) found a correlation between sperm amount and queen weight, indicating a possible difference in sexual behaviour and/or attractiveness to drones in these queens.

Jay and Dixon (1984), in a six-year study of commercial queens from the United States, suggest three million sperm as a minimum for queens heading honey-producing colonies for one full season. In the New Zealand survey, 87% of queens met or exceeded this standard.

Thorax Size

Some beekeepers gauge a queen's potential by the size of her thorax. Thorax size, it is argued, can give an indication of how well the queen was reared even before the abdomen has sized out from egg production.

The problem is that visual comparisons of something as small as a queen's thorax are subject to a high degree of error. Nevertheless, using precise measurement the New Zealand survey found significant correlations between queen weight and both thorax length (95%) and thorax width (99%). Thorax size did not correlate with ovariole number. (Table 2).

Nosema-Attendants

Nosema disease has been shown to be partly responsible for both reduced brood production and queen supersedure. One possible way queens can become infected is through contact with infected attendants. Jay and Dixon (1982) in their long-term study of United States queens, found up to 67% (average 48.3%) of attendant samples infected with spores of the disease. In the New Zealand study 68% of the samples had nosema spores. The average spore level of infected samples was 3.73 million spores per bee. This is classified as a moderate nosema infection.

Nosema-Queens

Interestingly, however, nosema spores were found in only 18% of the New Zealand survey queens. This discrepancy was also apparent in Jay and Dixon's study (1982), where up to 18% (average 7.5% of queens examined had nosema spores.

This does not mean, however, that the remainder of queens, exposed to infected attendants were necessarily nosema-free. The vegetative stage of nosema has a 6-10 day life cycle, with spores being formed only at the end of that period. As a result "clean" caged queens can develop detectable infections (spores) within a short period of time.

Determinants of Queen Quality (conc.)

In a study by Shimanuki, Lehnert and Knox (1973) where mated queens exposed to infected attendants were held with clean workers for an additional two weeks, 40% became infected.

Conclusions

New Zealand commercially produced queens achieve high marks when measured against recognised determinants of queen quality. New Zealand queen rearing methods produce large queens with high numbers of ovarioles and large spermathecas.

Use of drone mother colonies in most commercial mating yards results in well-mated queens with high volumes of sperm.

Interviews with producers of queens with above-average scores have identified various management practices which can improve queen quality. Advisory programmes are now underway with individual producers to increase queen quality and decrease nosema levels in mating nucs, banks, and attendant donor hives. There is some suggestion, however, that fumagillin fed directly to queens and attendants in mailing cages may lead to other queen-related problems. Tests are currently underway to determine if there is any casual relationship involved.

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Table 1.

1985 NEW ZEALAND QUEEN QUALITY SURVEY

n=65	Mean (±Standard error)	Range	Coefficient of Variation (%)
Queen Weight (/mg)	214.3 ±2.13	181-256	8.02
Ovarioles (number)	295-9 ±4.47	200-364	12.2
Spermatheca Volume (/mm^3)	.943 ±.023	.508-1.370	20.14
Sperm Amount (/Million)	4.72 ±.20	1.5-9.5	34.32
Thorax width (/mm)	3.99 ±.02	3.7-4.5	4.57
Thorax length (/mm)	4.62 ±.03	3.4-5.1	5.41
Nosema-Attendants			
a. samples infected/ % of total	46/68%	N/A	N/A
b. spore level (/million spores per bee)	3.73 ±.70	.05-14.9	119.3
Nomesa-Queens			
a. samples infected/ % of total	12/18%	N/A	N/A
b. spore level (/million spores)	3.06 ±2.11	.05-23.6	229.08

Table 2.

CORRELATION COEFFICIENTS (r) FOR THORAX SIZE AND QUEEN WEIGHT /OVERIOLE NUMBER

n=65	Queen Weight	Ovariole Number
Thorax-Width	r=0.40*	r=0.13 NS
Thorax-Length	r=0.26**	r=0.18 NS

* $P < 0.01$
** $P < 0.05$
NS $P > 0.05$

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