THE NEW ZEALAND beekeeper

MARCH, 1976

PUBLICATION APRIL 1976

LIMITED EDITION

REPRINT

a book of great rarity and considerable interest to

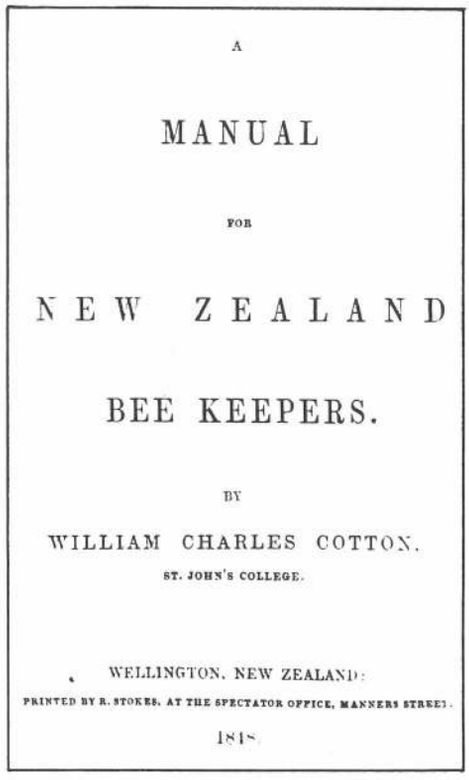
○ *BEE KEEPERS* ○ *BOOK COLLECTORS*

○ *LIBRARIANS* ○ *SCIENTISTS* ○ *BOOKSELLERS and others*

Originally printed on the premises of an early Wellington newspaper this publication was one of the first books to be actually published in New Zealand. Written in delightful 19th century prose, the author (personal chaplain to Bishop Selwyn) manages in over 115 pages to cover in detail the following topics:

1. *PROPER SITUATION FOR AN APIARY*
2. *OBTAINING AND MOVING BEES*
3. *FORM OF HIVES*
4. *SWARMING AND HIVING*
5. *TAKING HONEY*
6. *UNITING HIVES*
7. *FEEDING*
8. *PREPARING HONEY AND WAX FOR USE*
9. *BEES ENEMIES*
10. *MISCELLANEOUS REMARKS*

He is also thoughtful enough to provide recipes for a number of liquors capable of being made from Honey. These include, Meath (or Hydromel); Royal Mead; Sack Mead; Bottled Beer (like Scotch Twopenny–an excellent summer drink; Ginger Wine; Honey Vinegar; and finally, a Honey cough mixture.
The appendix provides Cotton's conception of how a Bee Register should be kept if the budding apiarist wishes to succeed. "...each hive should be numbered and the weight of the box painted outside before you put the bees into it. Give each swarm a page in your register..."



A

MANUAL

FOR

NEW ZEALAND

BEE KEEPERS.

BY

WILLIAM CHARLES COTTON.

ST. JOHN'S COLLEGE.

WELLINGTON, NEW ZEALAND:

PRINTED BY R. STOKES, AT THE SPECTATOR OFFICE, MANNERS STREET.

1848

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attention BEE KEEPERS

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THE NEW ZEALAND BEEKEEPER

Registered for transmission by post as a magazine.

March, 1976
Volume 38. No. 1.

In this issue:

The N.Z. Beekeeper is published by Agricultural Promotion Associates, Box 176, Carterton on behalf of the National Beekeepers' Association of N.Z. (Inc.), Box 4048, Wellington in the first week of March, June, September and December each year.

Editor: Trevor Walton, Box 176, Carterton, phone 8348. Advertising manager, Alyson Mackey, Box 11-137, Wellington, phone 857-480. Advertising and editorial copy deadline for June issue: 10-5-76 Advert booking deadline: 3-5-76.

Editorial

A time for alarm

by Trevor Walton

EVEN BAD SEASONS have their silver linings. This year we hope that what looks like being a mediocre honey crop will strip the mystery from our annual accounts and reveal to all and sundry the plight of the honey industry.

Relentlessly as ever the industry is being squeezed between pegged prices for honey and rising production costs. With an average or less than average crop, and the effects of reduced margins obvious, the time has arrived for beekeepers to give their executive the mandate they need to lean on government to get a complete restructuring of honey pricing and marketing policies.

But, at a time when the industry should be shouting its concern, it is radiating com-placency. At a time when a united front is essential, it has never been more divided.

In the months which remain between now and the association conference beekeepers should consider the various alternatives open to the industry for the future and develop an informed viewpoint on each one of them.

Of course, there are some areas of concern where the industry seems to be united: The situation where the HMA is unable to include increases in producer production costs as a justification for an increase in the wholesale price of its honey, being a case in point.

Recent deputations by your association executive to the minister of agriculture will — it is hoped — bring about a policy change.

However, there can be no going back to the 1950s or wherever the fondest beekeeping memories lie. The precedent for government involvement in local market honey pricing and, more recently, price smoothing of producer incomes has been set and despite a change of government, is unlikely to be revoked.

The beekeepers of New Zealand must come to grips with the fact that sooner or later a new formal pricing, marketing and incomes structure for the industry will be established. We must insist that the restructuring is done on our terms and to our timetable.

The alternative is socialism by stealth, no matter what government is in power.

Some necessary changes are apparent:

* The need for industry unity. No minister of agriculture will take much notice of an industry which speaks with two voices or, when the Honey Packers' Association is involved, three.
* A pricing system which recognises increases in producer production costs is essential. The alternative is larger, more vulnerable and less socially desirable beekeeping enterprises.
* A price smoothing scheme to provide the funds to make the above possible. (Exports may require price supplementation to meet the cost related price, achieved from the local market).
* Regulation of private packers to ensure that a co-ordinated honey marketing system is effective and that the local market is not over-supplied with produce.

The form that the changes take is up to the industry, though most would agree that they should meet these broad requirements.

Industry unity, for instance could see an amalgamation of the HMA and the NBA, the take-over of one by the other, or a defacto marriage such as that which currently operates between the Wool Board and Wool Marketing Corporation. Alternatively, it could just be the result of some civilised co-operation.

Similarly, the regulation of private packers could at one extreme take the form of self-

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Rates: Full-page, $50; Half-page, $30; Quarter-page, $15; $1 a column cm. No deductions for contracts will apply.

Commercial Rates
Full-page, $80; Half-page, $50; Quarter-page, $25; $2 a column cm. $20 per page loading for inside cover, outside back over and spot colour. Concessions available for contracts.

SUBSCRIPTIONS
The NZ Beekeeper is distributed free to all beekeepers owning more than 49 hives who, after paying their compulsory hive levy, automatically become members of the National Beekeepers' Association of New Zealand (Inc.)

Beekeepers owning less than 50 hives and others who may wish or may not wish to join the association, will pay an annual subscription of $7.50 which includes the cost of a subscription to the NZ Beekeeper.

KING BEE

(WHERE THE NBA SHOWS ITS STING)

Hive Levy

The minister of agriculture has advised the National Beekeepers' Association that the hive levy rate for 1976 will remain at 15 cents per hive on all hive holdings of 50 or more hives.

The association's executive was prepared to support an increase of 1 cent a hive if expenditure from the account was likely to exceed income.

Hive Identification

While the loss of hives by theft is not reported very often it does highlight the need for apiarists to mark their hives with a suitable identification mark or brand. Unless hives are capable of identification then ownership can be open to doubt.

Private Honey Exports

Some concern was expressed by the NBA executive at its December meeting at the rather long delay in the Honey Marketing Authority's policy review of exports by private packers and it was decided to raise the matter with the authority at any joint discussion held.

Apiary Advisory Committee

The appointment of Mr Ray Robinson as the NBA executive's representative on the Apiary Advisory Committee has been confirmed by the minister of agriculture, Mr Duncan MacIntyre.

Honey Cartons

As a result of an exchange of letters with Frank Winstone Ltd it is clear that the production now of a 1kg carton would be extremely uneconomic. It was decided to advise the Ministry of Trade and Industry accordingly. It should be noted, however, that it is still quite legal to pack and use imperial measures and cartons.

Election Roll

The NBA general secretary, in commenting upon advice from the Post Office about authority election rolls, indicated that he would consider alternative and less costly methods of a making the rolls available in future.

1976 Conference Venue

Members are reminded that the 1976 NBA conference will be held in Taupo during the last week of July. Particulars will be circulated to branches in due course.

South Canterbury's Plaudits

The South Canterbury branch of the National Beekeepers' Association recently forwarded a cheque for $140 to the NBA executive, being the credit on the branch's organisation and running of the 1975 conference and associated functions.

The executive decided to thank the South Canterbury branch for its time, effort and for the cheque sent forward: The money is to be credited to a special conference account.

All who attended at Timaru will be pleased at the result achieved and also for the branch's hospitality.

Straight Facts Please

When asking your association office to take up matters with officialdom, please check and recheck your source information. Facts are facts and are essential to the presentation of a good case. Your office is there not only to help beekeepers generally but is pleased to do so.

New Association Rules

New NBA rules have been discussed with the association's solicitor and the draft to be submitted to the Special General meeting to be held in Wellington on March 24, was to be circulated to branches by mid-February. The final draft varies little from that circulated earlier.

Pay Up or Dip Out

The 1976 "ordinary" membership subscription applies to those beekeepers owning 49 and fewer hives — the sub is $7.50. Unless subscriptions are renewed, the June "Beekeeper" will not be mailed. The same applies in the case of any outstanding hive levy members.

1976 Base Price

The delay in getting a pricing recommendation to the Government this year was a matter of concern to the executive. It was suggested that the authority and the association should set up a small Basic Price Co-ordinating committee as both parties are involved in the matter.

Since the meeting, the new minister of agriculture has written advising that he desires the present Base Price system for honey to continue and requesting production cost movement data as expenditiously as possible.

The president was able to arrange a discussion with the chairman and vice chairman on the way home from the executive meeting.

The matter was raised directly with the minister by the president at an interview held on January 23.

Petrol Price

In view of the further increase in the price of petrol it has been decided to re-present the association's case for special consideration. It is accepted that the beekeeping industry is far more adversely affected than is the case with most farming sectors.

The request has now been renewed.

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Price Stabilisation Levy

The NBA executive noted at its December meeting that HMA recourse to reserves in the trading year ended August 31 1975 had amounted to over $90,000.

Accordingly it seemed appropriate that the industry give some consideration to a long term pricing system. It was also noted that by joint agreement between the HMA and the association, a stabilisation levy of up to 5 cents a hive could be operated.

The matter was debated in depth and it was duly resolved:

* **That the executive recommends that the question of the stabilisation levy be a matter for industry consideration during the early months of 1976, and**
* **That the executive committee record its support in principle for a stabilised honey price to be operated in harmony with the basic honey price system.**

Low Membership Branches

The attention of some branches is to be drawn to the new rules requirement whereby minimum branch membership must not be fewer than 10 members. This provision will, however, not affect 1976 conference recognition.

Tax deductions and you

IF YOU ARE one of the many beekeepers worried about the tax deductibility of new beehives, the results of some queries by NBA general secretary, Graham Beard, may set your mind at rest.

But then again. . . . .

Mr Beard's enquiries were directed to the Inland Revenue Department, following a request by delegates to the 1975 annual conference of the National Beekeepers' Association. The delegates were concerned that hives constructed on the apiary were eligible as a tax deductible expenditure, whereas those purchased from a manufacturer were not.

The response of the department's director of revenue, Mr J. Simcock, was as follows:

"Beehives are regarded as capital "plant" for income tax purposes. The cost of additional hives therefore is not deductible in calculating assessable income, although the cost of maintaining existing hives is deductible.

"Ordinary depreciation is not allowable because any loss in value due to wear and tear can be restored by repair.

"The first year depreciation allowance on the plant in terms of section 114F of the Land and Income Tax Act 1954 which was introduced in the Land and Income Tax Amendment Act (No. 2) 1974, would be allowable. The first year depreciation allowance would be allowable in one sum for the income year in which the new hive is first used by the taxpayer in the production of assessable income. The amount of the depreciation allowable would be 60 per cent of the cost of the additional hives.

"In the event of the sale of any of the hives, any of the depreciation allowance which is recovered would be added in calculating the assessable income of the beekeeper.

"If the first year depreciation allowance is claimed it will be necessary to be able to identify the particular hive boxes which have been subject to the allowance so that any necessary adjustment can be made in the event of sale."

From Mr Simcock's reply, it can be assumed that the cost of a new beehive, whether purchased entire from a manufacturer or made on the apiary is not eligible as a tax deductible expense. However, the cost of repairing a hive, no matter how dilapidated, is deductible.

The department assumes, with its policy of not accepting ordinary depreciation on hives as an allowable expense, that hives can be repaired and renovated indefinitely. Thus, so long as a renovated hive replaces in whole or part a hive which has become obsolete or dilapidated, the cost of the materials used in the renovation, no matter whether purchased as entire supers or as lengths of wood, is tax deductible.

Similarly, the cost of renovating dilapidated or obsolete hives purchased from another beekeeper is tax deductible, while the cost of their purchase is not.

Cure was honey

WHEN A WOUND resulting from the amputation of his right leg defied conventional medical treatment, 70-year-old Marsden Bay resident Mr Reg Weeden's survival prospects looked grim.

Then infection — a result of failing blood circulation set in, necessitating the removal of still more of his leg. Again, orthodox treatment failed.

Mr Weeden was not expected to live when Whangarei Hospital medical registrar Dr Roger Cox, a Tasmanian now at Auckland's Middlemore Hospital, suggested a long shot.

Pure honey — recognized even in the days of Hippocrates for its curative properties — was applied to the stump of Mr Weeden's leg.

Almost imperceptibly, then with increasing speed, the infection was beaten and healing began.

Aware of what the Marsden Bay man's story could mean to others, Dr Cox said the hospital had achieved some remarkable healing results with honey.

It had been used successfully for badly infected wounds, skin and varicose ulcers and bed sores. It was also being used at New Plymouth and Middlemore Hospitals.

Dr Cox explained: "It is simply that germs can't grow in it."

"The Auckland Star". Wednesday, December 24, 1975.

regulation by the packers' association, or at the other take the form of a ban on all private packing. In between, lie alternatives such as registered private packhouses and co-operative packhouses.

Whatever alternatives are eventually chosen, the process of choice must start now.

It is important that beekeepers should show alarm at continuing rising costs and the absence of a mechanism to take account of these when product prices are set. It is critical that they should examine the options open to the industry for the future and discuss the pricing and marketing systems in operation in other primary industries.

Disinterest or apathy on our part can only be interpreted as a weakness by outsiders and tempt those who might have designs on our future to make decisions on our behalf.

Beware - bee rustlers!

by Mike Stuckey, Auckland,

THOSE OF YOU who subscribe to overseas bee journals will have read recently about "bee rustling", which is apparently prevalent in the United States.

We are indeed fortunate that this is not happening here to any extent. But it may only be a matter of time - especially when you consider that a site of 30 hives in the spring is worth in the vicinity of $800 and can be loaded in 30 minutes.

Problems can also arise when hives are on the properties of absentee landlords or in areas which are about to be developed into residential sections on the outskirts of cities.

You may be able to identify your hives by the way they or the frames are wired, nailed or painted. But can you prove that no one else is doing theirs in the same way? No authority is going to accept this as proof of ownership.

Your executive discussed the identification of beehives and the problems relating to theft at their last meeting. They decided that there was a potential problem here and some suggestions were made.

It is recommended that beekeepers give these suggestions more than just a passing thought:

☐ It would be a good idea to have your name, address and phone number on the peg showing your MAF site number.

☐ It would be advisable to brand all new gear as it is made with a hot iron, ensuring that either your name or your MAF site number is burnt deep enough into the wood that it cannot be removed.

☐ It would be advisable to either iron brand or, if this is impracticable, to spray the MAF number onto all honey supers before they leave the honey house.

SPECIAL GENERAL MEETING

Notice is given that a Special General Meeting of the National Beekeepers Association (Inc.) will be held in the Manchester Unity Board Room, Top Floor, Manchester Unity Building, Lambton Quay, Wellington (opposite Hotel De Brett, Wellington) on Wednesday 24 March 1976 commencing at 10.30 a.m.

Chairman: The President of the Association.

Business:

(1) Receive Apologies
(2) Consider and Approve Adoption of New Rules
(3) General Business

G.A. Beard,
GENERAL SECRETARY

Dated at Wellington this 29th day of January 1976

Note No.1: Any financial member of the Association may attend the above meeting including those members who achieve membership qualification by the payment of Hive Levy.

Note No.2: Copies of new rules have been supplied to all members of the executive committee and to branch secretaries. Copies may also be obtained from the General Secretary.

P.O. Box 4048,
Wellington

NEW FRONTIERS

Effect of feeding dry refined and raw cane sugar to honey bee colonies

HONEY BEE colonies fed on dry white cane sugar for 41 days before the nectar flow in 1973, and dry raw cane sugar for 46 days in 1974, were compared with hives fed white cane sugar syrup (60 per cent w/w sucrose) for the same periods.

In both years the subsequent honey storage was greater in those hives fed syrup.

From the results of this experiment it may be concluded that short-term feeding of honey bee colonies with dry sugar is satisfactory, particularly if, as at the start of these experiments, some honey is also available. Total dependence on dry sugar for long periods may reduce subsequent honey production in that season.

Syrup containing 40 per cent to 60 per cent sucrose by weight provides a satisfactory substitute for honey as a food for honey bee colonies.

Sugar is usually given in solution, but both white and raw sugar has been fed in a dry granulated state for many years in New Zealand. The practice is also established overseas.

In 1964 Mr J. Simpson showed that honey bees diluted dry sugar to a concentration of 30.7 per cent by weight before ingestion. This requires the gathering of extra water from outside the hive. He states that there is the risk of wastage caused by bees carrying crystals from the hive, a phenomenon observed by Mr V.A. Cook in the same year.

The use of dry sugar provides a simple convenient method of feeding bees. However, because honey bees must process dry sugar more than syrup, it appeared that measurement of the effect on colony performance was needed.

Sixty colonies of bees headed by sister queens and located in one apiary near Oamaru, were divided at random into two groups. On September 18, 1973 all honey, except for about 1kg per colony stored on the perimeter of brood combs, was removed and all colonies were fed 1A white cane sugar until sufficient nectar became available on November 29, 1973. One group received the sugar dry, and the other as a syrup containing 60 per cent w/w sucrose.

On September 26, 1974 the hives were re-randomized into two groups with equal numbers of second-year sister queens and first-year supersedure queens in each group. The method was the same as that employed the previous season, except that the dry cane sugar used was raw (98.6 per cent sucrose) instead of 1A white. Feeding continued until December 11, 1974.

Dry sugar was fed by pouring it over the tops of the frames in the second storey, towards the rear of each hive. Syrup was given in division board feeders of 2.27 litre capacity.

Colonies were operated with the queen confined by excluder to the two bottom storeys. Brood areas were measured as frames or parts of frames, and later converted to cm^2. Stored pollen was measured in cm^2. Honey was calculated on the basis of 2.75kg for each full depth Langstroth frame. All queens' wings were clipped in the spring of 1973 to allow supersedure rates to be assessed in the spring of 1974. Unclipped queens were clipped at that time and recorded to allow final assessment of supersedure in the spring of 1975.

Samples of bees were taken from each hive at the end of the feeding period each year and examined for Nosema infection.

Colonies fed white sugar dry in 1973 used 6.2 per cent less, and those fed raw sugar dry in 1974 3.3 per cent less, than syrup-fed colonies.

In 1973-74, significantly more honey was stored by the syrup-fed group than by those fed white sugar dry. In 1974-75, the difference between the syrup-fed group and those fed raw sugar dry was only approaching significance.

Queen supersedure rates did not differ significantly in either year.

Nosema infection was similar in each group in both seasons.

Acknowledgements: Help in planning the project was given by Mr T. Palmer-Jones, Wallaceville Animal Research Centre; statistical analysis by Dr K.J.A. Revfeim, Biometrics Section, Ministry of Agriculture and Fisheries.

References: Cook, V.A. 1974: Personal communication. Forster, I.W. 1972: Feeding sugar to honey bee colonies. *NZ Beekeeper 34(1):* 15-18. Simpson, J. 1964: Dilution by honey bees of solid and liquid food containing sugar. *Journal of Apicultural Research 3:* 37-40.

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NEW FRONTIERS

An all-season beehive entrance

by I.W. Forster, Wallaceville Animal Research Centre

BEEHIVES WITH shallow tunnel entrances 8 mm high by 360 mm wide were compared with others having deep direct entrances 20 x 360 mm in summer and 10 x 60 mm in winter. Using a total of 98 hives, no significant differences in the amount of honey stored or the quantity of brood queen supersedure, or Nosema infection over two seasons were recorded.

Although colonies with shallow tunnel entrances did not produce significantly more honey than those with deep direct ones, they had the advantage that they required no labour in fitting and removing mouse guards. However, as the bottom boards of two tunnel entrances had warped upwards reducing the entrance depth to less than 8 mm, it would appear advisable to use 10 mm, the maximum clearance that will not admit mice.

Honey bee colonies do not always fully utilize the bottom storey of their hives, and at times combs adjacent to the entrance deteriorate. Colonies can be forced to make full use of this storey by confining the queen in it.

The type of entrance is probably the most important factor determining conditions in the bottom storey, and may influence the whole hive. Some authorities recommend large entrances to allow for ventilation.

However, smaller entrances are more easily guarded against robber bees and wasps, and there is general agreement that large entrances should be reduced in size for winter. There must be adequate ventilation to combat dampness in winter, but entrances must also be small enough to debar mice, and to do this the height must not exceed 10 mm.

Bees must maintain a temperature of 34°C during the spring and summer to allow brood rearing, comb building and honey ripening to proceed at a desirable rate. In New Zealand, this temperature is usually far higher than that prevailing outside the hive and too large an entrance at this time could make it difficult to maintain. When brood-rearing ceases, the hive temperature is allowed to fall, and the bees then crowd together to generate sufficient heat in the centre of the cluster to keep the temperatures at the periphery of no less than 6°C. In this way bees can survive low winter temperatures.

In commercial beekeeping, entrance dimensions cannot be changed readily, so that throughout a season a particular size will have to meet a wide range of conditions. It appeared that an effective compromise would be to develop an entrance that could be used throughout the year. A simple bottom board which would provide a suitable entrance and also give some clustering space was therefore constructed and tested.

Bottom boards were constructed to support the lower storey 30 mm above the floor. A 20 mm thick baffle was fitted immediately below and flush with the front of the lower storey, extending back 90 mm into the hive.
This formed a shallow tunnel entrance the width of the hive, 8 mm high and 90 mm long. There was 360 mm between the rear edge of the baffle and the back of the hive. As the frames were 28 mm above the floor, this space was suitable for clustering.

Test colonies which were located in four South Canterbury apiaries were requeened with sister queens, and randomly divided into two groups. Half of them were on bottom boards giving 20 mm high full-width direct entrances, and were reduced with mouse guards to 10 x 60 mm for the winter. The remainder were on bottom boards with shallow tunnel entrances.

Colonies were operated during the 1973-74 and 1974-75 seasons. Queens were confined to the bottom two storeys by queen excluders, and were clipped to allow supersedure rates to be measured. Brood areas and honey storage in each storey were recorded at intervals. Samples of bees were collected in October 1974 and examined for Nosema infection.

Overall honey production and brood areas were similar; similar numbers of colonies in each group reared queen cells or became queenless. Overall Nosema infection was high, but similar for both types of entrance.

It might be expected that the greatest short-coming of the shallow tunnel entrance would be lack of sufficient ventilation. This was, in fact, not the case.

Acknowledgements: Cloakes Honey Limited made apiaries available for the experiment; help in planning was given by Mr T. Palmer-Jones, and the diagram prepared by Mr A.W. Barkus, both of Wallaceville Animal Research Centre; statistical analysis was carried out by Dr J.K.A. Revfeim, biometrics section, Ministry of Agriculture and Fisheries.

References: FORSTER, I.W. 1969: Swarm control in honey bee colonies. N.Z. Journal of Agricultural Research 12: 605-10. 1972: Feeding sugar to honey bee colonies. N.Z. Beekeeper 34(1): 15-18.

FROM THE COLONIES

The following report from the West Coast branch of the NBA was the only regional report received by the editor in time for publication and even then it was several days late for the closing deadline. On page one of each issue of the NZ Beekeeper there appears a deadline date for the subsequent issue which all contributors, letter-writers and branch secretaries should note.

Considerable space is set aside each issue for branch notes and readers' letters. The general absence of both in this issue reflect badly on the magazine and the industry. Healthy correspondence columns reflect a magazine which is serving its industry well.

Your letters and branch notes let everyone know what rank and file beekeepers throughout the country are saying. Help us help the industry communicate.

WEST COAST (SOUTH ISLAND)

Beekeepers are well-known for their optimism, but it would be a real optimistic West Coast beekeeper who would still expect a good crop.

The rata didn't flower, except for the odd tree that held its bloom for no more than a day or two, but we had plenty of bloom to have provided a good crop without it.

The kamahi flowered prolifically and should have supplied a whopping first crop, and before it finished blooming the clover put on the best floral display for years and is still flowering well. The blackberry also did better than for many years and lotus major is coming on to full bloom.

With all this potential why the gloomy prospects for a less than average crop?

Because Old Sol kept his face veiled for too long, causing the coldest summer I can recall, with snow as low on the foothills at Christmas as for any part of winter. There haven't been floods, but plenty of cold south westerly winds and fog and drizzle which not only prevents the bees going out but causes serious mortality if they do.

The only hope for a boost to the lagging crop prospects is for the rata vines to flower well, and for a prolonged Indian summer.

Field Day

We held a very successful field day before Christmas at Mr Busby's Poerua apiary and honeyhouse. Beekeepers from Canterbury were well represented.

Kevin Ecroyd gave an interesting talk on his overseas trip and attendance at a beekeepers' convention in Europe.

He was able to display a handsome gold medal presented to him for manufacturing the best uncapping machine in the world. It would appear that Mr Penrose had something to do with the origin of the machine.

The payout to beekeepers for the present season was explained and discussed as was the hive levy.

Several gadgets to facilitate the keeping and handling of bees and their produce were on display.

The weather was reasonably fine and the hospitality and friendliness enjoyed, also the locality as it is sited on rising grassland overlooking Lake Poerua, bordered by steep beech covered hills on the far side.

Peter Lucas

Harihari
Westland

No Mouse House

Hives must be protected against mice in winter. Clustered bees are helpless to prevent the entry of mice, which find the warm hive, loaded with food, irresistable. A mouse can ruin several good brood combs in a hurry.

Most beekeepers stuff notched cleats into the entrances, which allow bees but not mice to pass. These inhibit good ventilation, however, which is essential to good wintering, and they easily become plugged, threatening the colony with suffocation.

Entrance wedges are better. These are made from half-inch or quarter-inch haroware screening, the holes being large enough to enable bees to pass freely but preventing the passage of mice.

These wedges can be left in the entrances the year round if one is sure the hive is clean inside and the bottom board is not littered with an inch or so of dead bees. To determine this, have the hive tilted forward slightly through the winter. Then in the spring, if the entrance appears clean and unobstructed and if there are no significant numbers of dead bees there, you can be sure that all is well, and the screen wedge can be left in place for another year.

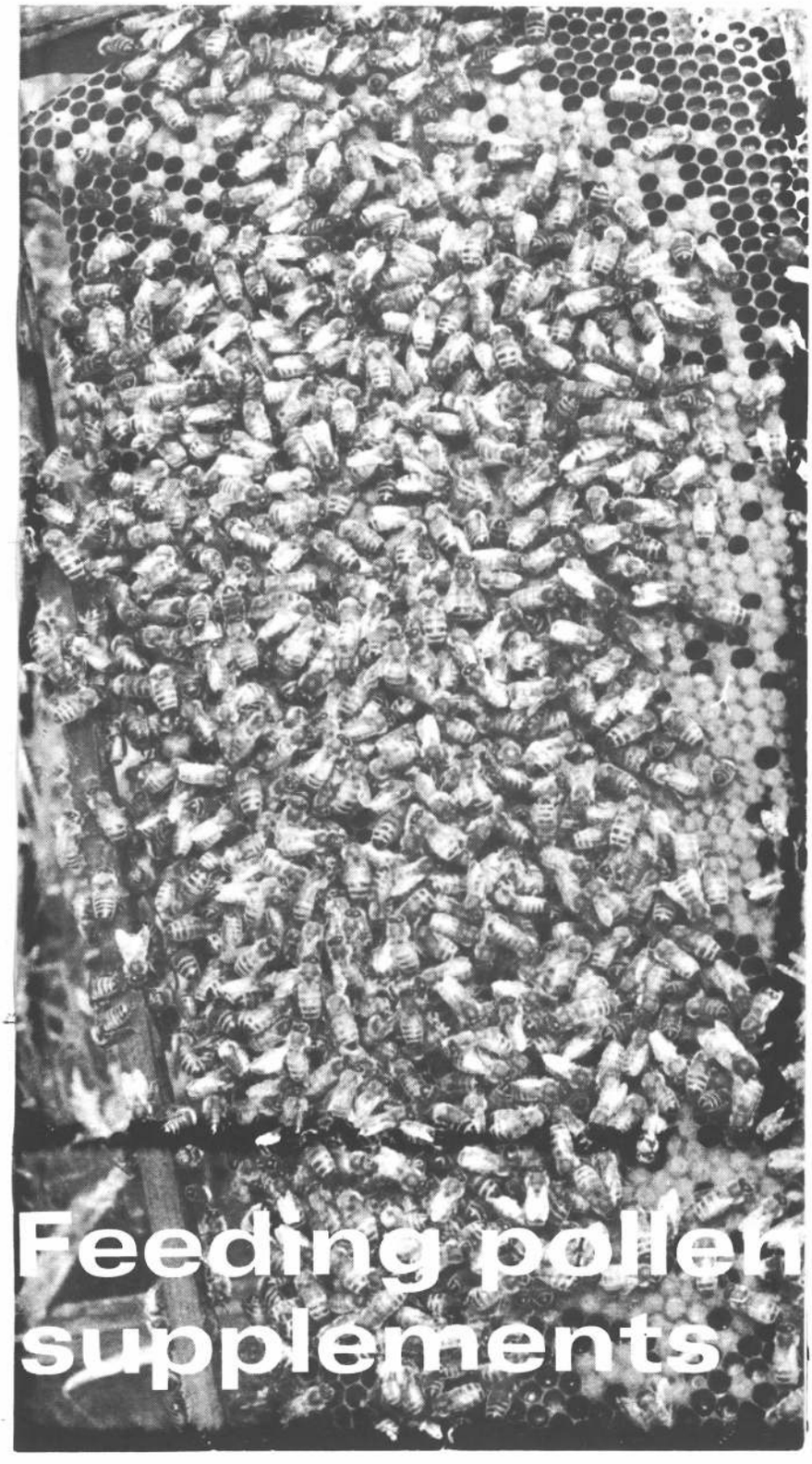
—American Bee Journal

Quotable Quote

From a letter to NBA general secretary, Graham Beard, from Mr D.P. Allwood, magazine secretary of the British Bee Farmers' Association:

"With the season's compliments and hopes of a better honey harvest than we had (It was like a government promise — it never really materialised) . . . . ."

This article is the final in a three-part series by Keith M. Doull, Waite Agricultural Research Institute, the University of Adelaide, dealing with the use of pollen supplements in beekeeping. Previous articles were published in the August and December 1975 issues of the NZ Beekeeper.



Feeding pollen supplements

FORAGING AND the collection of pollen and nectar are the innate responses of honey-bees to stimuli that are the result of the colony rearing of brood. If weather conditions inhibit flight, or if there is a scarcity of nectar of pollen in the field, the bees will not be able to exhibit these innate (and hence to a large extent automatic) responses. The provision of supplementary foods to stimulate the colonies in such situations may give rise to serious behavioural problems.

There is also an inherent "delay factor" that interposes between the time at which supplementary feeding is applied and the appearance of its effects on broodrearing. This "delay factor" is due to the fact that the provision of additional food sets into motion a sequence of events involving development of individual bees through various stages in their life history and through the various physiological phases of adult life. These events proceed at a pre-determined rate until the colony has arrived at a state such that effects on broodrearing and foraging become possible and obvious.

Due also to the timing and sequence of responses of the colony to the presence of supplements, there are limitations to the times of the year when supplementary feeding may be used to greatest effect.

Broodrearing is one of the major biological drives in the honeybee colony. In the presence of brood, bees are continually exposed to strong stimuli that induce them to leave the colony in search of the food required to support broodrearing.

Broodrearing also imposes a substantial demand on the energy resources of the colony. No colony will be able to support broodrearing for very long if the bees

The degree of success or failure that attends the use of pollen supplements is not necessarily a reflection of any virtues or weaknesses of the particular foods.

Indeed, there can be little doubt that the problems discussed in this series of articles will also arise when the long sought after complete substitite for pollen becomes available.

In many ways the honeybee might be regarded as an automatic biological machine exhibiting innate, stereotyped responses to the continually changing conditions in the hive and in the field. It will never be possible to suppress these innate automatic responses of bees to their environment. Thus the use of the complete substitute will never prevent bees from collecting pollen. It may lead to a reduction in the amount of atypical active pollen collection. But it is unlikely to lead to any substantial reduction in the intensity of typical foraging behaviour, in which bees collect both nectar and pollen on the same foraging flight.

are unable to restore the energy balance by collecting the pollen and the nectar that are the colony's main source of energy.

The rate of broodrearing always varies in relation to variation in the intake of nectar and to the amount of pollen available in the hive. If weather conditions inhibit flight for any length of time, or if there is a constant decline in the amount of nectar and pollen available in the field, the rate of broodrearing will always be reduced. This in turn means a reduction in the level of stimulation of the bees, and so the intensity of foraging will vary in harmony with variations in external conditions.

When a beekeeper supplies supplementary foods for his bees, he is injecting energy into the system within the colony. This removes the main limitation on broodrearing which may continue at a high level. This in turn leads to the maintenance of a high level of stimulation for foraging and this may be to the detriment of the bees.

If weather conditions permit flight, the bees may collect unsuitable foods such as thin nectar and poor quality pollens. Robbing of weak hives is a further consequence of this situation. In general, it is not possible to maintain a high rate of broodrearing for long in such conditions without causing distress in the colony.

If the weather inhibits flight, a greater degree of stress will occur. Initially bees may attempt to fly in cool or wet weather with a consequent increase in mortality. Eventually they will lose their ability to respond to the stimuli presented, but the colony will be subject to a high degree of stress. In spring this will be seen in a predisposition to disease — notably nosema disease. Swarm cells and supersedure cells may also appear, as the bees exhibit inappropriate responses to stimuli to which they are unable to respond in the normal manner.

The effects of the "delay factor" in colony development are predictable. A period of 21 days must elapse after the first eggs are laid before the first adults appear. A further three to five days must pass before these bees are able to assist with the feeding of larvae, and they will not become foragers until six weeks after the eggs are laid.

The "delay factor" is particularly important when supplementary foods are to be used. Colonies that are weak and broodless when the food is provided will require nine to twelve weeks to achieve optimum populations for pollination or honey production. Colonies that are relatively strong and are rearing some brood will show the effects of supplementary feeding much sooner, but even then a delay of up to six weeks must be expected.

The provision of sugar syrups is an important part of any plan for supplementary feeding. An intake of sugar provides the primary stimulus for oviposition — the first phase of broodrearing. Pollen and pollen supplements provide the essential nutrients that enable bees to rear larvae, but in themselves do not provide any strong stimulus for oviposition. When the colony is rearing brood and the bees are consuming a pollen supplement candy, the sugar component of the candy may possibly provide a weak stimulus for oviposition, but overall this is unlikely to be significant. Moreover, bees in broodless colonies do not normally eat pollen supplement candies, and in such situations the sugar component of the supplement is unlikely to influence oviposition.

The provision of supplementary sugar syrups to stimulate oviposition should always be considered when supplements are to be used to include colonies to increase their rates of broodrearing.

It is particularly important to control the rate at which sugar syrups are taken down by the bees. It is necessary only to provide a stimulus for oviposition and not to simulate a nectar flow. If the bees receive the syrup too fast, "false information" of a nectar flow will induce them to fly and robbing may occur.

Most nectars that bees collect contain 30 — 40 per cent sugars. Supplementary syrups should conform to this concentration, and in fact syrups with higher than 50 per cent sugars do not appear to provide the same degree of stimulation for oviposition.

Supplementary Feeding in Autumn

Autumn feeding is directly beneficial to the bees but will not confer any immediate benefit to the beekeeper, for results of autumn feeding do not become apparent until the following spring and summer.

Colonies that will develop quickly in spring, and that will require the least assistance from the beekeeper will have two particular

A complete substitute would, however, enable bees to initiate and maintain broodrearing in the absence of pollen, and this would be valuable when nectar only is available in the field.

Thus the degree of success or failure achieved by beekeepers who use any substitute or supplement for pollen must still reflect the amounts of nectar and pollen available to the bees.

It will also reflect the ability of the beekeeper to understand and to take account of relevant aspects of the biology of the colony and the behaviour of individual bees.

If supplementary foods are used so as to reinforce the bees' ability to exhibit their innate behaviour patterns, all will be well. However, if they are used without forethought, and only for the convenience of the beekeeper, some degree of failure is inevitable.

attributes. They will have overwintered with strong populations, and will contain a high proportion of the so-called "winter" bees. These are bees that were well fed during larval and early adult life, so that their brood food glands and fat bodies were fully developed. With the decline of broodrearing in the late autumn, the physiological development of most of these bees would be arrested at the onset of the "nursing" phase of their lives. Although they are old bees in terms of chronological age, they remain young in terms of physiological age, and are capable of rearing the larvae of the first spring generation.

The second attribute of these colonies is that they will emerge from winter with adequate stores of honey and pollen. They are then able to maintain relatively high rates of broodrearing despite the fact that the food intake may be limited by external conditions.

These two attributes are most likely to prevail in colonies that have received supplementary foods during the previous autumn. This would have enabled them to sustain a strong broodrearing cycle, and the overwintering bees would have well developed brood food glands and fat bodies. The use of supplementary foods will usually have resulted in the colonies entering winter with larger stores of pollen.

The timing of such end-of-season supplementary feeding must vary according to local conditions. Supplementary foods should be made available while there is still some nectar and pollen in the field, and while weather conditions are still conducive to active foraging. The bees will then be able to exhibit their innate responses to the presence of brood in the colony and there would be no major disturbance to the bees or to the colony.

It may be argued that it is not economic to overwinter strong colonies. This is true only if the amount of honey consumed during winter is considered to be important. However, colonies that are strong when broodrearing begins in spring should develop more quickly, and should produce more honey during late spring and early summer honey flows. This should normally compensate for the extra honey used by such colonies during winter.

Certainly it is uneconomic to overwinter colonies that contain too high a proportion of physiologically old bees. They will not play any major part in the rearing of the first brood in spring, and will be more prone to disease.

Autumn feeding should be considered obligatory for colonies that are to be used for pollination of early spring crops, or for the production of package bees and queens.

In general, most beekeeping enterprises would benefit if the use of late season supplementary feeding became a standard practice.

Spring Supplements

The biological drive for reproduction in the colony is particularly strong in spring. Early broodrearing, however, is often carried out under difficulties, since the weather is not always suitable for flight or for flowering of plants. Most colonies appear to be able to begin broodrearing in late winter or early spring, but this is usually at a low level and there is no excessive stimulation for flight.

Supplementary feeding at this time of the year needs to be more carefully controlled than at any other period. Supplementary syrups in particular, although they are usually necessary, are most likely to result in overstimulation, with the attendant problems of stress on the colony. The use of syrups should be controlled very carefully, and in general they should not be provided in quantity until regular flight becomes possible.

Pollen supplement candies, however, may be provided as early as is convenient. As with pollen that is stored in the combs, they will not provide the primary stimulus for oviposition. They will, however, contribute to the nutrition of adults and larvae, and will help to "extend" the intermittent supply of pollen that is often characteristic of this time of the year.

Spring feeding will be most successful in areas where the weather is consistently fine, and where some early sources of nectar and pollen are available.

In general, supplementary feeding has been regarded as necessary only to assist colonies to develop early in spring. However, experience has shown that colonies will often benefit more from supplementary foods provided at other times of the year.

Contrary to expectations, colonies that receive pollen supplements throughout the year consistently perform better than other colonies.

Thus, for example, experimental colonies that were provided with a supplement continuously for a year reared an average of 177,000 bees. This compared with colonies that did not receive the supplement and produced an average of 155,000 bees during the year. The average honey yield of the colonies receiving the supplement was 96kg per hive higher than that of the other colonies.

The cost of this continuous use of the supplement was not excessive. The colonies used an average of 5kg of the supplement and the increased return from honey was approximately four times greater than the cost of the supplement.

When supplements are continually available to colonies during the year, they are able to maintain a consistently higher rate of broodrearing. They are then better able to maintain the balance of "physiological age groups" among the population. This balance is essential if all the activities of the colony are to be carried out efficiently.

Strong colonies appear to be better able to exploit the food resources of their environment. They often collect nectar and pollen from what may be termed "hidden resources" and are better able to withstand periods of adversity.

Continuous use of pollen supplements is indicated in areas where there is a consistent shortage of pollen during summer.

Profitable beekeeping depends upon the colonies being able to achieve high populations as honey flows begin, and to maintain these populations during the honey flows. This requires that the queen should maintain an oviposition rate in excess of 1500 eggs per day. At this rate the colony will always have four full depth frames of sealed brood. If they are not able to rear brood at this rate, the provision of pollen supplements should be considered.

☆☆☆☆☆☆☆

Costly advice

BOOK REVIEW

"First-rate beer may be made from honey, according to the subjoined receipt. Without reckoning the worth of the honey, it is found to stand the maker at a penny a gallon. And what hard working man can have any excuse for sotting in a pothouse, when he can have a drink so strengthening and wholesome as this, if taken in moderation; with his wife, too, to share it with him after the labour of the day is over..."

So recommends the about-to-be published second edition of "A Manual For New Zealand Beekeepers", a quality collectors' reprint of one of the first books to be published in New Zealand.

"Bees' Enemies. — There is no greater foe to bees than man. Alas that it should be so! What with mismanagement, what with neglect, what with mistaken kindness, the poor bee has a sorry time of it from him who ought to be her guardian and friend; and yet she knows full well how to repay her master's care, and, if I mistake not, becomes attached even to his person..."

Mistaken or not, the manual is more a delightful compendium of Victorian English phraseology than a practical manual for today's beekeepers. Nevertheless, many of those collectors who purchase a copy will no doubt have their knowledge of bees increased manyfold.

As a collector's item, a work of the printer's art and a notable part of the nation's beekeeping history, the reprint will no doubt find its way (despite its price) onto many beekeeper book shelves. Though at $55 the Inland Revenue may question the eligibility of the deluxe version of the manual as a tax deductible beekeeping expense.

"A MANUAL FOR NEW ZEALAND BEEKEEPERS", by Charles William Cotton. First published in Wellington in 1848. Second edition published by Newrick Associates Ltd, Deluxe version (100 hand-numbered copies only) $55, Collector version (1150 hand-numbered copies only) $14.95.

From Volume 56, No. 4 of "Bee World" ....

Identity problems with Megachile

There has been confusion about the identity of the leaf-cutter bee that was accidentally introduced into North America, being first recorded there in 1937. The bee was referred to as Megachile rotundata (Fabricius), but this name applies correctly to a bee originally named by Fabricius in 1787 as Apis rotundata. The bee that reached North America, and has been reared so successfully for lucerne pollination, is Megachile (Eutricharaea) pacifica Panzer 1798. This identity was established by Rebmann in 1967 when he examined type material in the Berlin Zoological Museum.

The currently accepted name for Apis rotundata Fabricius is Megachile (Megachile) centuncularis (Linnaeus). Its identity was established by Hurd in 1967 after examining material in Kiel and Copenhagen collections, and in Linnaeus' own collection now in London.

To conform with the new findings, BRA journals now use the name Megachile pacifica for the leaf-cutter bee used for pollination; see e.g. Journal of Agriculture Research 14(2) : 101 (1975).

The accepted English name for Megachile is leaf-cutter bee or leaf-cutter in Britain and leafcutting bee in USA. For M. pacifica the Entomological Society of America has standardized on alfalfa leafcutting bee; in Britain Latin names are more widely used, and there seems to have been no move to specify M.pacifica as lucerne leaf-cutter.

A FRESH START

"First catch your swarm".

by A.L. Kidson, Days Bay

ONE WAY to make a start at beekeeping is by capturing a swarm from the many that pass overhead during summer. The first problem then is how to make the bees settle, though often they will solve that themselves by clustering on a low bough or hedge.

A time-honoured practice is to create a din, by banging on tins with sticks. Children home on holiday enjoy doing that; they also enter with zest into the sometimes arduous business of following the swarm across country until it does alight. Another method is to spray or hose the bees with water, while they are in flight.

To take the swarm you will need a box or basket, and some sort of cover, such as sacking. Approach the settled swarm with confidence, remembering that bees are seldom hostile when swarming. That is because they usually gorge themselves with honey before leaving the hive, and are thus not so ready for the abdominal flexion involved in stinging. But any fumbling through nervousness on the collector's part may lead to upsets all round.

Place the receptacle — or have someone hold it — immediately under the settled swarm, as close up as possible. Then give the bough a sharp shake; or, if the bees have chosen a rigid settling-place, dislodge them with a broom — using preferably just one smart stroke — so that they fall into the box. Then cover over quickly.

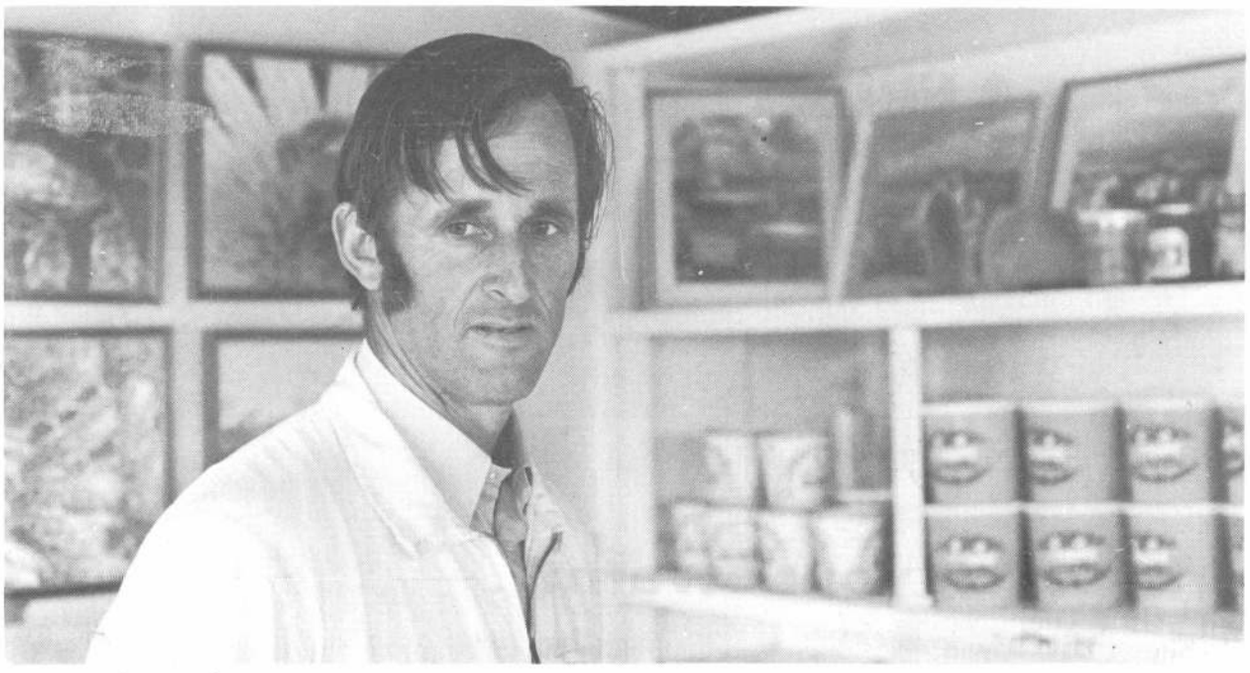
Next, fasten the covering by tying it to the box with twine or stout cord. Then carry the captured swarm carefully (since rough handling will anger the bees) to the place chosen for their housing. This place should be carefully selected and prepared in advance. It should be free from rank ground-growth — weeds, grass, etc — and not have overhanging trees or bushes.

In the evening, just before dark, introduce the bees to their new home. For this you will need to have prepared a brood-chamber (box hive) fitted with 10 or so standard frames each holding a wax foundation-sheet, on which the bees can start building. Ready-made frames and boxes can be bought from shops or commercial apiarists, but the handyman may prefer to make his own. A stout floor-board, no less than three-quarters of an inch thick, will also be needed to stand your hive on.

Raise the front of the brood-chamber clear of the floorboard by about one inch, and prop it up with chocks of wood. Next, make a gentle-sloping "bridge" from the hive-entrance to the ground, using a sheet of metal, stout cardboard, or wood. Cover this bridge, and the ground in front and at the sides of it, with a sack or blanket, so the bees cannot crawl underneath.

Now hold your container mouth downwards close to the bridge, remove the cover, and with a sharp jerk dump the swarm out onto the sack. The bees will then crawl up the bridge and into the hive without further prompting on your part, especially if the brood-chamber is "baited" with a store of honey or sugar-syrup.

Remove the chocks, allowing the brood-chamber to settle down gently onto the floor-board — and, hey presto — you are a beekeeper!



Taupo honey baron exudes optimism

MALCOLM HAYWARD and Nick Mansfield are learning beekeeping, honey processing and honey marketing from an expert — a relatively young man who has seen his enterprise grow from a handful of part-time hives 20 years ago to a thriving business boasting some 3500 hives today.

With a honey territory stretching from National Park in the south to Ohope Beach and the Mamakus in the north and Te Kuiti in the west, their boss, Robin Jansen, must be one of the most progressive beekeepers in the business. He's certainly one of the biggest.

Although Robin prefers to keep his turnover and profit figures private, he doesn't hide the fact that business is going well. His plans for a new retail centre, complete with museum, coffee bar, movie theatre and special bee and honey related displays would seem grandiose to some, but Robin looks at it all as a business proposition; a further step in the development of his current retail business. Last year Robin sold 30 tonnes of honey over the counter at his honey factory. This year he hopes to sell 50 tonnes.

His marketing techniques are sophisticated. Robin draws on the services of an advertising agency and a public relations firm to handle the professional aspects of advertising, public relations and the preparation of promotional materials, labels and so on.

When the "NZ Beekeeper" visited his plant about two miles from Taupo, in mid-January, Robin had just finalised plans for special honey promotions to coincide with both Wellington and Auckland anniversary weekends. Radio spots had been organised to offer holidaymakers honey in their own containers at '10 per cent off the regular price'.

Simple promotions like these had proved successful in the past and went a long way toward accounting for the 29c a lb price which his Taupo Honey Centre averaged for the 120 tonnes of honey it produced last year. This year, Robin hopes to average more than 30c a pound.

"We're doing very well," he admits. "We've got the potential to double our turnover in two years, by using the expertise we have in packing and by making use of our new hives. Last year we had 2400. This year we have 3500.

"Five years ago I thought the industry was on the verge of bankruptcy, but now it is very buoyant - especially if you are selling privately. We averaged 29c a lb last year. If we had supplied the authority, we would have only got 23 or 24c a lb."

Robin claims that he couldn't have progressed so fast if he had stayed with the authority. He supplied the Honey Marketing Authority with his entire output during his first 11 years as a beekeeper.

Today he regards the HMA as somewhat of a thorn in his side — an obstruction in the way of his making profitable sales overseas. He says he already has a buyer for his specialty honey lined up in England, with a price negotiated that is way above anything the HMA could offer selling to its sole UK agent.

With a new government in power and with verbal promises from Brian Talboys to 'look into the matter', Robin is preparing once again to open his large correspondence file and resume his battle to legalise the private export of honey.

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Malcolm Hayward works on the extractor

Nick Mansfield watches progress on the uncapping machine

Robin Jansen started beekeeping 20 years ago, aged 19. Like most newcomers to the business, it was a part-time start and Robin earned his bread and butter by carting logs to a nearby mill.

By 1962 he built his first honey factory in picturesque Acacia Bay. However, being only 1000 square feet, it didn't take him long to grow out of it.

In 1968, on the lookout for larger premises, but suffering very much from financial constraints, Robin bought a 3500 square foot ex-Ministry of Works cookhouse, pulled it to pieces and rebuilt it in Taupo township. The idea was good, but in practice it didn't work.

So when an agricultural contractor decided to sell his giant servicing barn four years ago, Robin couldn't be seen for dust. The property, which included 7000 square feet of buildings and two houses, was ideal and today forms the nerve centre of the business.

After three and a half years on the site, Robin has lined half the barn with Lami-wall, a fate which is reserved for the other half where spare hives are serviced and stored, frames await extraction and where all the other 'non-food' aspects of the operation are carried out.

Robin started 1974 with 1900 hives. It was a bad year.

Many hives were lost during the winter because of what Robin calls "just plain bad management". Hives which should have been fed were forgotten and subsequently didn't survive.

Robin places the blame on himself: "I lost track of what my staff were doing," he says and changes the subject. The men involved have long since departed.

During 1975, hive numbers were built up. Many hives were split to replace those which had been lost the year before. Also, 900 hives were purchased from another beekeeper who was scaling down his operation.

"We probably work our hives a lot more intensively than most beekeepers," says Robin. "We are using a two-queen system in most of our hives and are also doing a lot of migratory beekeeping.

"I went to Flock House last year for a course in Queen bee breeding. We now raise all our own queens. I find it both profitable and interesting.

"Four hundred and fifty of our hives start the season in Kawerau, are shifted to Rotorua for the tawari, then to Taupo for the clover or National Park for the ling heather or manuka.

Although there is plenty of scrub country in the area, Robin doesn't sell manuka honey — 'although we get plenty of customer demand for it.' He says the extraction problems are too great and consequently prefers to use his manuka frames for winter feeding.

All hives are given four of five frames of manuka honey to get them through the winter — which, given a normal year, and with enthusiastic staffers Malcolm Hayward and Nick Mansfield on the job, they will do quite successfully.

With good hive management, disease is little problem, with the exception of some foulbrood ('call it Bacillus larvae, it sounds better') which was bought in with the 900 new hives.

There is no doubt that a large part of Robin's success is the result of the large number of specialty honeys which he offers for sale. He says that customers are attracted by the bush honeys, in particular.

There is no longer a marked preference for the white, clover-type honeys which once were the premier products on the honey market. Rather, customers clamour for specialty lines like Rewa Rewa, Blackberry, Ling Heather, Tawari, Native Bush and Kamahi.

The products are as true as any honey can be to its label and are extracted and packed in honey rooms which are as clean as the gleaming stainless steel equipment they house.

Robin's main pride and joy is a new "Spin-flow Honey-wax Separator", a centrifugal separator of American design which takes in a heated mixture of cappings from his Penrose uncapping machine and liquid honey from the extractor and separates them into perfectly clear honey and damp, crumbly cappings.

Second in his pride and joy ratings is a heat exchanger of his own design which heats the liquid honey to about 125 deg F using heated water at only 140 deg F.

The scene in the honey room is one of great efficiency. With the extractors working on a special time switch which, after being started, turns them one way for (say) three minutes, then three the other, then rings a buzzer at the end of the cycle, all staff get into an efficient and comfortable work routine which enables about 180 boxes of honey to be extracted and processed with ease by two men in an eight-hour day.

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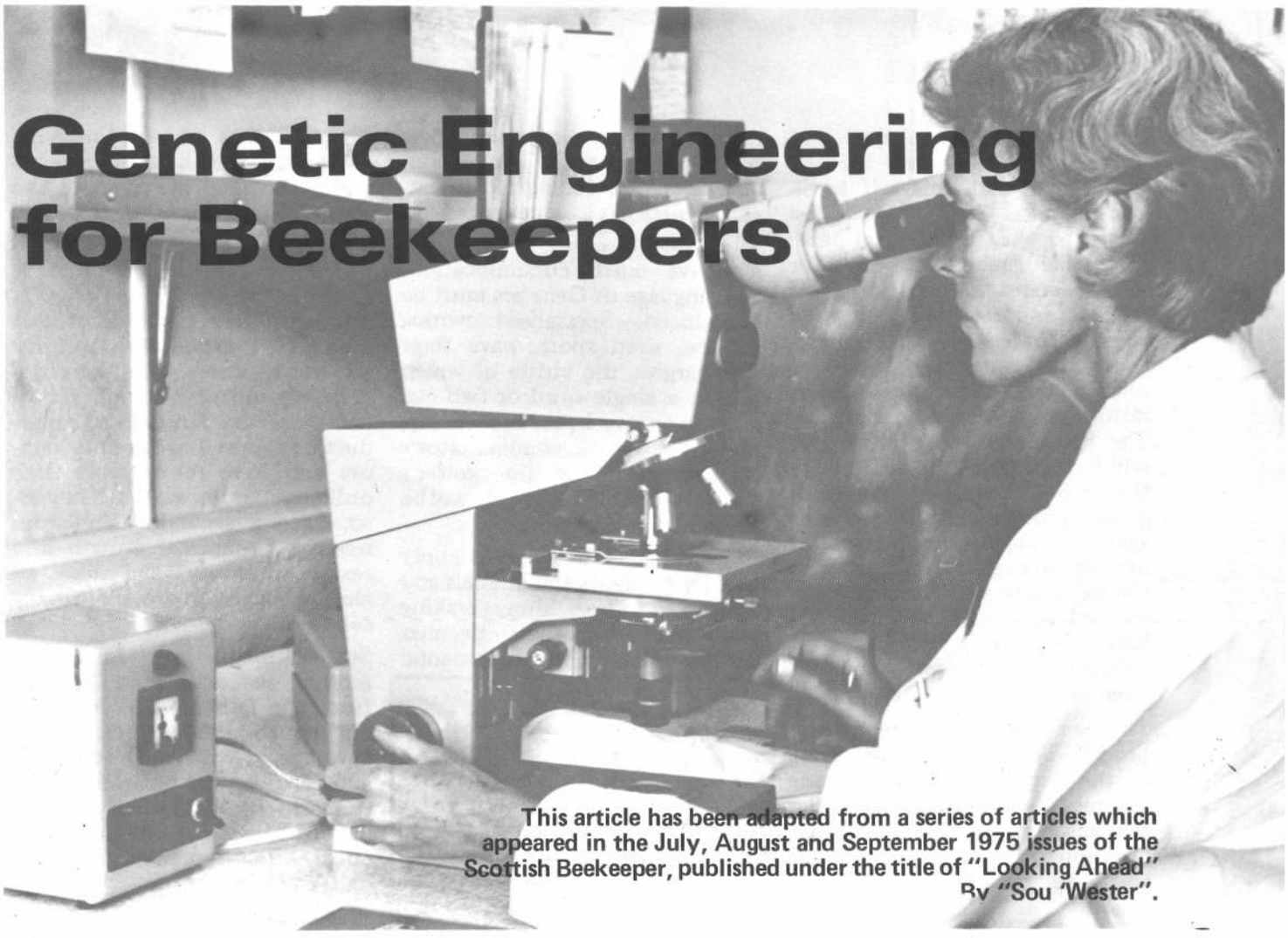
To date, most of the equipment and capital involved in the Taupo Honey Centre has been financed from income, with a little assistance from private sources. In years past, approaches Robin made to the old SAC for loan finance were greeted with the rejoinder that if his approach was successful, they would have 'every beekeeper in the country on their backs'.

However, recent approaches to the RBFC for further finance have been more positively received, though much will be depending on the policies of the new government.

That Robin Jansen has managed such a great success without the assistance which so many other classes of farmer have come to expect from the state, is a tribute to his ability and raises the question as to whether much of the current assistance is misplaced.

And it is certain that Malcolm Hayward and Nick Mansfield couldn't be learning their beekeeping from a more qualified tutor.

Genetic Engineering for Beekeepers



This article has been adapted from a series of articles which appeared in the July, August and September 1975 issues of the Scottish Beekeeper, published under the title of "Looking Ahead" By "Sou 'Wester".

1. Essential background

GREGOR JOHANN MENDEL (1822-84) was an Austrian botanist, who after joining the Augustinian order, moved to Bruun, or Brno, in what is now Czechoslovakia, where he became Abbot and taught natural history in the school there. His main interest was the study of inheritance and his carefully planned experiments resulted in the famous law which today bears his name.

For generations heredity had been a subject of interest and conjecture; the tendency for individuals related by descent to resemble each other, in looks, if nothing else, must have been recognised from the earliest times. There can be little doubt that, early in human history, man, in the light of such knowledge began to exercise choice in the mating of his domestic animals, in the hope of breeding stock better suited to the purpose they were intended for. As random matings were superseded by selective breeding, various theories were put forward to explain heredity, which in the light of new knowledge had to be abandoned.

Charles Robert Darwin (1809-1882) shared the accepted theory of the time, as being something akin to a souffle in which eggs, milk and cheese are cooked together and the resultant product is unlike any of its component parts, and cannot be separated into their original form. This was something he described as "Blended Inheritance"... that is an amalgamation of ancestral characters new in every generation.

It is now thought that Darwin sought to do too much in attempting to explain not only heredity, but, also, how differentiation of the body parts and growth were related to the germ cells — sperm and eggs.

Mendel's success lay in the fact that he concentrated on heredity alone. He conducted well planned experiments to reason out the inheritance of easily recognisable characters from parents to their off-spring.

He carried out his experiments with garden peas (Pisum sativum), but, today, the same results can be obtained using microscopic organisms with more rapid results. Mendel compared like with like, tallness and dwarfness, the arrangement of flowers, pod texture, colour of the pods, seed coat colour and flowers of different colours.

When he crossed pollinated pure tall and pure dwarf peas the resultant seed produced only tall plants; nothing intermediate between tall and dwarf. Reciprocal crosses gave identical results.

Here it should be explained that peas left to themselves are self fertile and that this self fertilisation takes place before the flower opens. The hybrid talls, first filial generation, F.1., for short, were allowed to self fertilise and set seed and when sown provided the F.2., generation. This generation produced both tall and dwarf plants in the ratio of three talls to one dwarf. The F.2. plants were allowed to self fertilise and provide seed for the F.3. generation. The F.3. dwarf bred true, but the talls again produced talls in the ratio of three to one dwarf. Apparently the talls were all hybrid or some are hybrid and some pure. The latter is correct and we will return to this important point later.

The fact that the F.1. generation produced only tall plants gave rise to the expression of dominants and recessives, in other words the tall factor masked the dwarf factor though it was still present and came out in the next generation.

Mendel's findings were published, in a local scientific journal, in 1866, but his conclusions were so far ahead of biological thinking of the time that his papers lay on the shelves of the publisher for thirty-four years.

His genius was not appreciated until August Weisman (1834-1914) taught a new theory that heredity is a question of continuity of the germ plasm and that acquired characteristics cannot be transmitted to descendants. At the turn of the century, attention to Mendel's work was given, almost simultaneoulsy, by Correns, Tschermak and de Vries, working independently of one another. Correns and Tschermak had repeated some of Mendel's experiments and were able to substantiate the accuracy of his observations.

Mendel's laws laid the foundation on which genetics have been developed. His principles provided the key which made it possible to understand the real nature of heredity and plant breeders were smart enough to apply the new discoveries to improve their methods. Today, it is questionable if plant breeding techniques can, genetically, be improved upon.

To save much circumlocation, the language of Genetics must be introduced. Specialised works, science, even sport, have their own jargon, the virtue of which is that a single word or two can be used to give a precise meaning, like the football commentator's "Square ball" or the golfer's "Long hole." These words will be explained as they occur.

The principles of genetics apply equally to plants and animals and equally so to bees, always making allowances for their peculiar breeding habits. Developmental

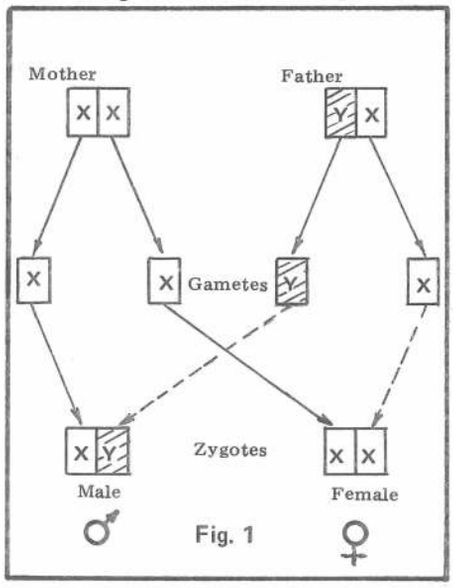


Fig. 1

factors are always of two fundamentally different kinds, inherited and non-inherited. Inherited factors are fixed once and for all when the egg from the mother is fertilised by the sperm from the father. Sperm from the father and the egg from the mother are single cells and are called Gametes. Once the egg has been fertilised it is called a Zygote.

The zygote grows by division into more and more cells until full development takes place. Geneticists call those inherited substances Genes and the kind of genes an animal has, fixes its Genotype, in effect, how it will breed. The appearance of an animal, how it looks, is called its Phenotype. Genes are contained within Chromosomes. Chromosomes are elongated rod like bodies, on which the genes are arranged like beads on a string. Chromosomes and genes occur in pairs, one member of each pair being derived from each parent.

In every species the chromosomes number is constant; Man has forty six, twenty-three pairs. Sex chromosomes differ from all others and serve the function of reproduction, as well as heredity factors and have fewer genes than ordinary chromosomes. They also, have a secondary function, relating to normal growth and sexual maturity and like all chromosomes are present in every cell in the body.

Sex chromosomes from the mother are designated XX and from the father XY. When eggs are formed in the ovaries, the XX chromosomes become separated and each egg has only one X and similarly in the father, roughly half of the sperm cells will have an X chromosome and the other half Y chromosomes.

The diagram shows how this is accomplished. (Fig. I).

Genes determine characters in a somewhat similar way as the X and Y genes determine sex. Each gamete contains only half as many genes as any other body cell; germ cells are said to be Haploid, and all the other body cells are said to be Diploid. When the body cells divide, their chromosomes also divide and this is called Mitosis. When germ cells are formed and the number of chromosomes is halved a special division takes place called Meiosis, as distinct from Mitosis.

Letters of the alphabet are used, by geneticists, to denote particular genes. If both parents contribute a certain gene A to the fertilised egg, the egg nucleus, becomes AA. The resultant zygote is said to be Homozygous, or is a Homozygote. It is possible that both parents do not contribute the same gene and in this case the zygote will be Aa; usually small letters symbolise the absence of certain genes and progeny of such a union is called a Heterozygote, or is said to be

Heterozygous. Thus we have two possibilities plus aa; a total absence of A to make a third.

From this we can make a drawing which will demonstrate the line of descent of Mendels tall and dwarf pea crosses. (Fig. 2).

Mendel had no knowledge of chromosomes or genes, but to account for his theories he had to assume the presence of 'factors' responsible for the transmitting of inheritance from parents to their progeny.

It will have been noted that the F.2. generation of peas show the reappearance of one dwarf plant to three talls. But, and this is very important from a breeder's point of view, only one of the three talls will breed true, the other two will be heterozygotes and will produce tall and dwarf in the next generation in the ratio of three to one. The fourth, the only dwarf, the double recessive, which alone, allowed the dwarf character to be manifested.

This is an excellent illustration of the difference between phenotype and genotype. Here we have two phenotypes and three genotypes. This gives the genotype ratio of 1:2:1, the so called Mendelian ratio. This ratio is only accurate when dealing with large numbers.

The proportions vary considerably from the 25 per cent: 50 per cent: 25 per cent:, when only small numbers are employed. Toss a coin twelve times and the result could be eight heads and four tails, a result of two to one, but toss it a thousand times and the result will be near enough fifty fifty.

This leads to Mendel's first law, the law of segregation. This refers to the way in which alternate genes controlling a character unite in the zygote. Heredity characters are controlled by pairs

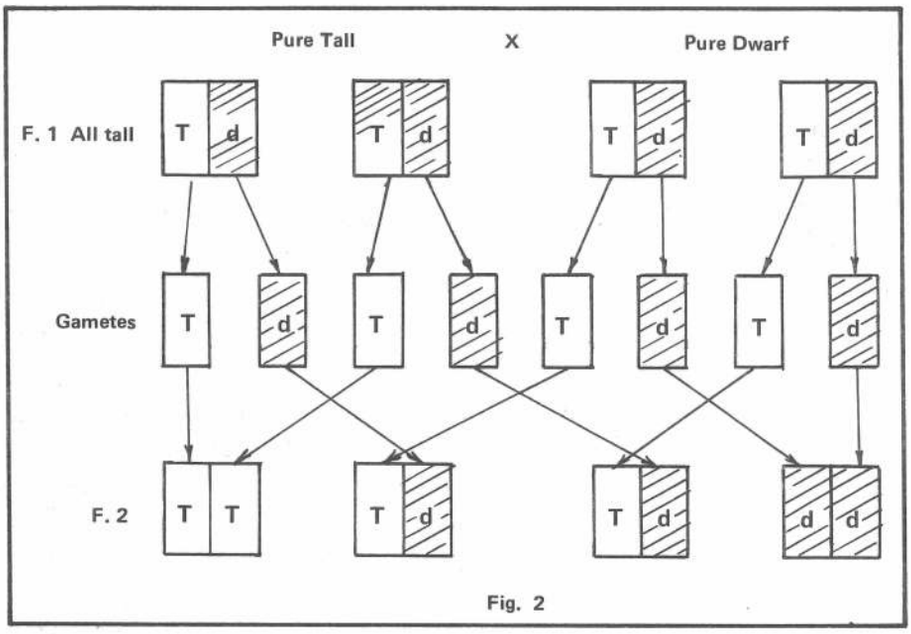


Fig. 2

of genes, the pairs of which separates during meiosis and pass into different gametes. At fertilisation these genes can recombine in definite proportions. We have already seen this in Fig. 2.

Before going on any further we had better take a look at the breeding behaviour of the F.2 generation. In the F.3 generation we will have 25 per cent homozygous for the tall factor TT, 25 per cent homozygous for the dwarf factor dd. Of the remaining 50 per cent, 75 per cent will be heterozygous, and Td, while 25 per cent will be homozygous dwarfs, and dd.

Due to dominance it is impossible to separate by phenotype the homozygous talls from the heterozygous talls, this is only possible by back crossing the talls of the F.3 generation with pollen from the heterozygous F.1 plants.

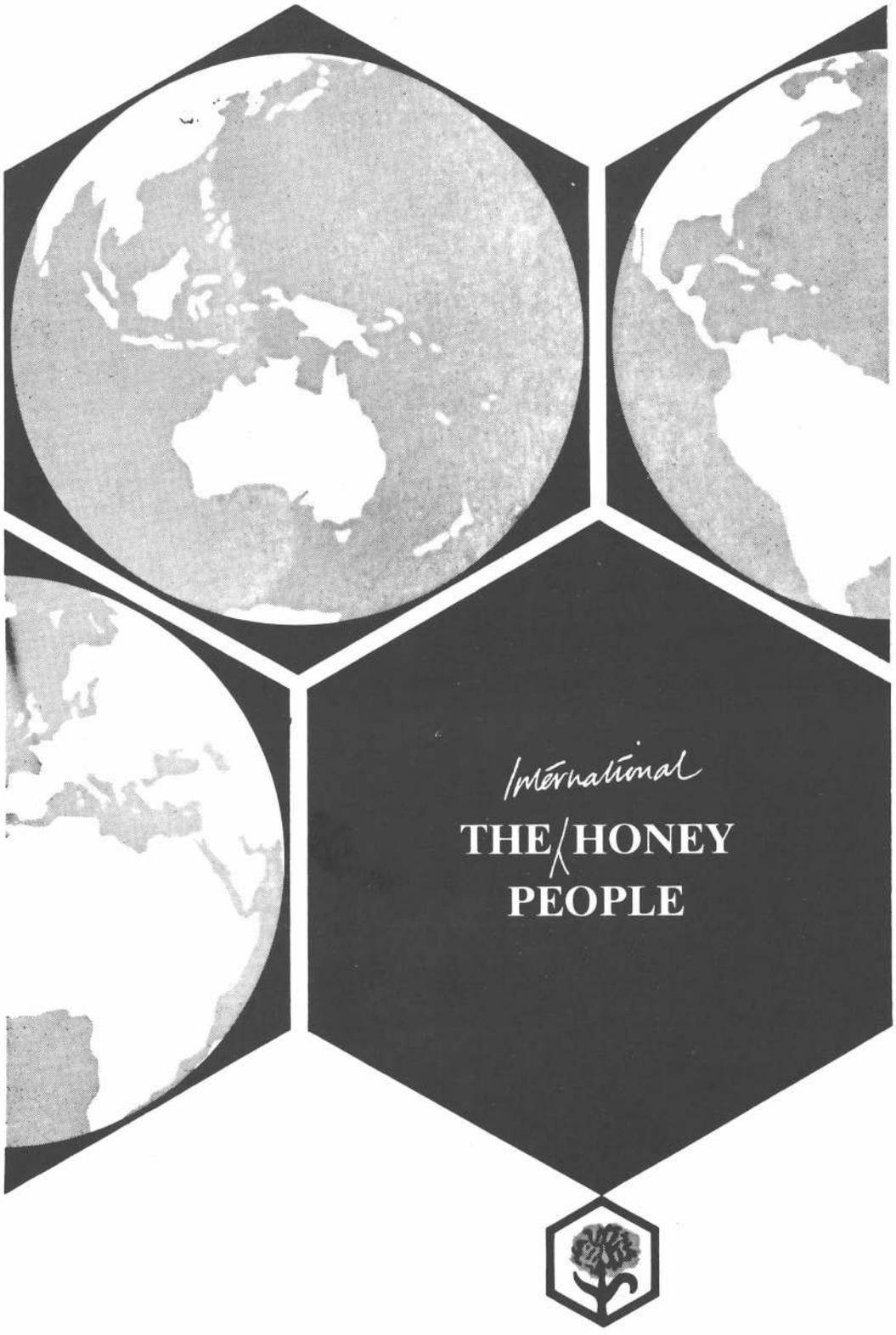
Dwarfs appearing are a sure indication of impurity for TT and if TT is what we want then the impure talls must be culled.

It will be evident that much careful and accurate recording of the work done is required if errors are to be avoided.

With small animals, which reproduce rapidly, this back crossing is easily done and the results assessed in a short time. This is especially so when what we are seeking can be assessed visually.

Mendel's second law lays down that when two, or more, pairs of genes are concerned, each pair may segregate independently of each other pair. In other words, pairs of genes which have arisen in the same sex cells become separated during meiosis and pass into different gametes. This law is of the utmost importance to breeders in allowing them to bring together in one animal the good points possesed by different individuals.

Mendel found that the ratio here was not 1:2:1 but 9:3:3:1. Fig. 3 shows the sixteen possible ways in which the genes can combine. Here we have nine different genotypes but because of dominance only four phenotypes. Again demonstrating that appearance is a poor guide to how an animal will breed.



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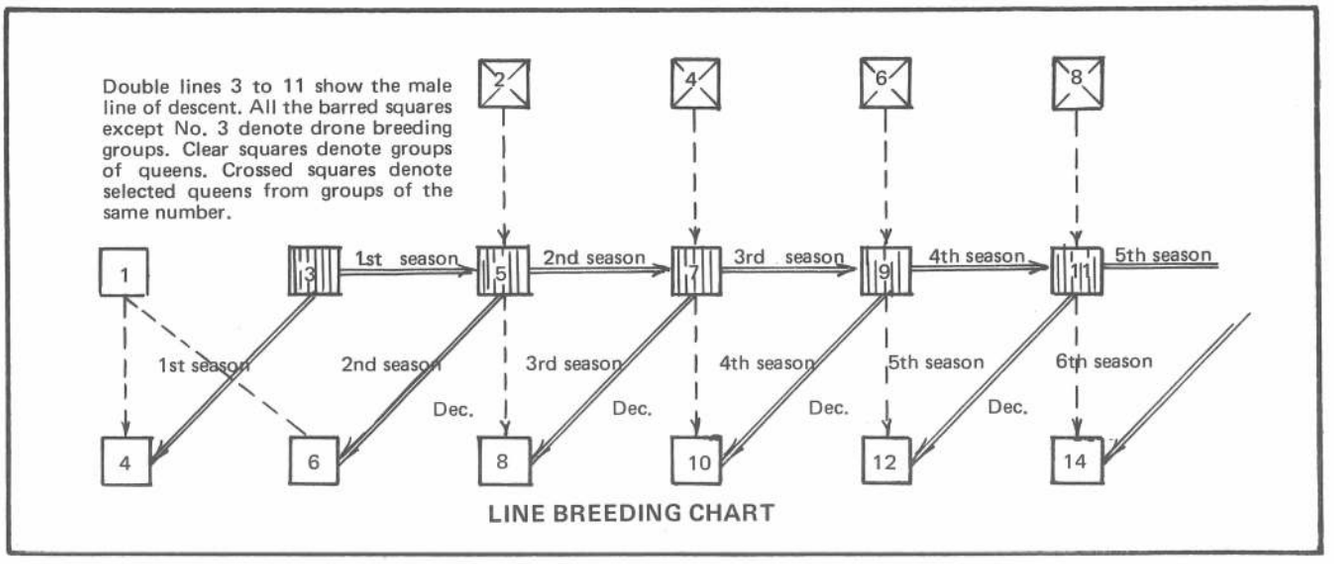


LINE BREEDING CHART

2. Genetics in your apiary

THOSE TAKING a serious interest in breeding better stock, whether bees or canaries, will most likely have made up their minds that even if genetics provide no short cut to success, at least an understanding of the elementary principles on which they are based will give a stimulus and added interest to their work.

Better and fuller explanations of the subject can be found in specialised books devoted to the subject.

By natural selection we mean the survival and increase of those best suited to their environment, while those ill adapted eventually perish. A good present day example of this is the emergence of resistant strains of pests to modern pesticides. Rabbits were almost wiped out by Meximatosis, but, nature while being somewhat careless of the individual is very careful of the species and the rabbit is on the way back.

With honey bees the Mendelian ratio cannot be reached until the third generation. Queen bees have thirty plus two X chromosomes. It is generally accepted that the X chromosomes from the mother determine sex. This is so in most insects, with the female being responsible as distinct from mammals where the opposite obtains.

Drones have half the number of chromosomes possessed by the queen, fifteen plus one X. Before fertilisation the queen's gametes have the same number of genes as the drone, fifteen plus one X.

After fertilisation and the queen commences laying the gamete from the drone, contained in the queen's Spermatheca, enters the micropile of the egg, unites with the queen's gamete and a female is the result, complete with a full compliment of thirty plus two X chromosomes.

Should the queen be infertile, or the drone gamete be prevented from entering the micropile of the egg, then the result will be a drone, or male bee.

This means that the drone which mated with the queen has no genetical influence on her drone progeny.

As far as we know, Brother Adam of Buckfast Abbey fame, is the only person who has, over a long and distinguished career in beekeeping, tried seriously to improve honey bees along the lines which have proved successful with plants and animals of benefit to man. Brother Adam has made this his life's work and has had facilities, especially time, which are far beyond the average beekeeper.

Our view is that this is work that agricultural research institutions and universities could undertake to the benefit of the industry.

It will be necessary, as with all other stock, for the breeding of honey bees to pass through stages in which progress is sought by cross breeding, selection and the recombination of genes carrying the most important factors, such as longevity, hardiness and the ability to produce surplus honey in our unpredictable climate.

Where does this leave the hobbyist who keeps from five to 20 stock? In most cases nowhere, because to begin with he is too concerned with poking into the brood boxes on any pretex at all; aye, even without one, just for the pleasure of perhaps, seeing the queen. This is the prerogative of the beginner and we would be the last to deny him his pleasure. But this man is unlikely to be the one to progeny test the worker of brother and sister matings for the characteristics the breeder is seeking to fix: in our case the outstanding ability to store surplus honey under average conditions compared with other similar stocks in the apiary.

Notice that we are testing the workers not the queens of our controlled matings. When we test the workers we are at the same time testing our future drones —

the workers being the unreproductive sisters of their reproductive mothers. In breeding bees it is impossible to breed sons back to their mother, because the mother is fertilised for life, or fathers to daughters, because the father is dead, having lost his life by the act of mating.

The best we can do is to mate drones of similar parentage to queens of similar parentage and test for genotype. For the test all environmental conditions should, as far as is humanly possible, be identical. Equalise the brood and stores in the hives before introducing the young mated queens.

All hives should be identical in every espect, the same number and size of frames and when artificial food is required by some of the stocks, all should be given the same quantity and at the same time. There must be no preferential treatment or our tests are worthless. Wintering? Here, too, all should be similar as should spring management.

No attempt is made to control swarming, other than to employ good bee husbandry as advocated in these notes. Super as required. Not all colonies will require supering at the same time because the ratio with hybrid bees will be roughly one good, two moderate and one poor out of every four, the 1.2.1. ratio. Most of our bees

are really mongrels and as a consequence accepted ratios do not apply. As we are primarily testing for yield, obviously, the stocks with the greatest overall weight are the ones to be set aside for breeders.

Unfortunately, our original high yielders were also inclined to excessive swarming. This we would like to reduce to a smaller percentage of the stocks kept, or, at least, most beekeepers would so desire and so we will leave it at that for the time being.

As all our queens will be in their first season there should be the minimum of swarming preparations made and those which do are placed at the bottom of the class and the fact noted. Incidentally, all queens are clipped for identification after they are successfully heading their stocks; if there is any supercedure we want to know of it.

Stocks determined to swarm are treated as recommended, except that the beeless brood is placed above a board on the parent stock — the feed holes being covered with queen excluder. All the bees produced must be kept under the one roof, otherwise proper comparisons cannot be made at the end of the season.

Assessments are made and if we are exceptionally fortunate the highest yielders will not have swarmed and we will have no problems as to future breeders. A further selection is made from the best the following season also.

Now, supposing the highest yielders all made to swarm, what do we do? Should the difference in yield between the swarmers and the best of the non-swarmers be insignificant, eliminate the swarmers and use the non-swarmers. Should the difference be significant then we must keep the swarmers and try and reduce the swarming propensity by selective breeding.

To do this it will be necessary to obtain a queen from a strain not over addicted to swarming or purchase a queen of a race acknowledged to have a low swarming propensity such as the Caucasian. As we are working with black bees it will be wise to use a dark race. Drones are flown from the "low swarmers" and mated to our queens with the high factor.

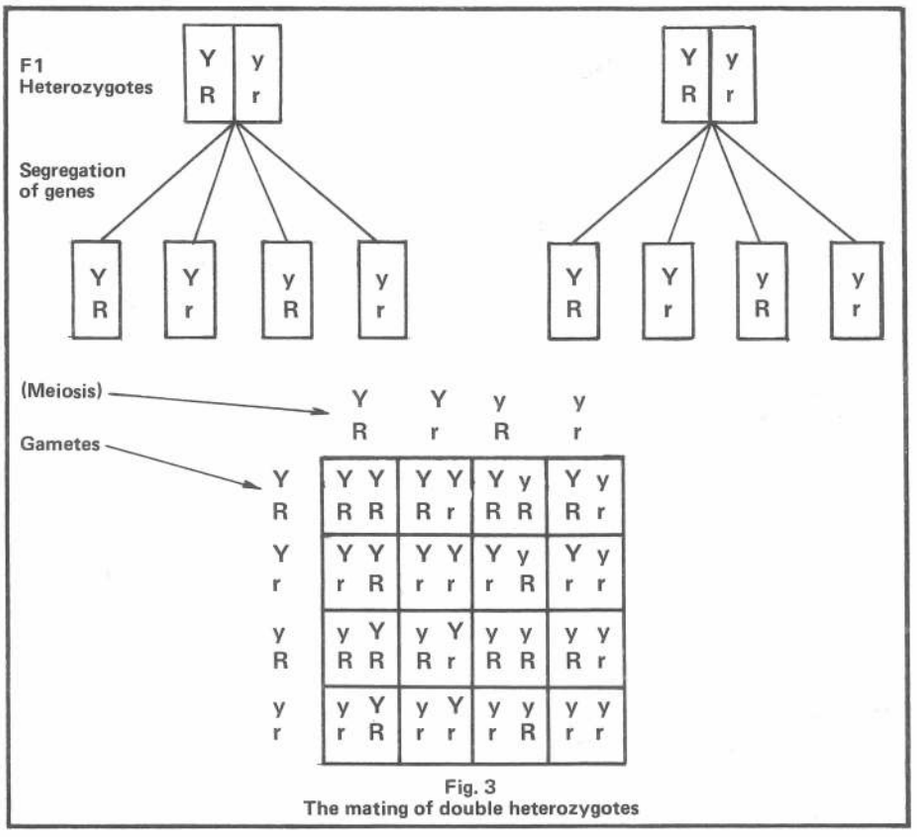


Fig. 3
The mating of double heterozygotes

This should give us progency which are heterozygous for the factors we are considering and will need to be thoroughly tested into their second year. Having selected a queen which failed to swarm over two seasons we mate her daughter queens to our own selected drones. To save time this is done after all risk of swarming is over and before the drones are eliminated by the bees.

A further period of selection takes place to seek out those queens which produce workers with the genes dominant for Y, equalling yield and recessive for s, equalling swarming, in order to fix YY and ss and get it into our strain by line breeding. Line breeding means that breeding is kept within a particular family and implies a certain amount of inbreeding as does all pedigree breeding.

The aim is to have stock displaying the same uniform excellence. No exceptionally outstanding individuals or worthless ones either.

Three queens are needed to set up the line and are numbered 1, 2 and 3. No. 3 should be the one whose drones carry the genes YY and ss and starts the drone line. Nos. 1 and 2 are selected for YY and any other outstanding characteristic each possesses.

The first season drones are flown from No. 3 and mated to queens from 1 and 2. These matings are shown as separate groups and number 4 and 5. The following December, virgins are raised from No. 1 and mated to drones flown from No. 5 group. This mating becomes No. 6 group and is tested for performance during the following season.

Meantime, group No. 4 is being tested and virgins will be raised from a selected queen to mate with No. 5 drones. This mating is from queens raised at the close of the honey flow and becomes group 7, providing drones for the next season. Thus drones are raised from the group made the previous January and are the only drones flown during the mating periods. One group supplies drones but two groups supply queens.

This line can be carried on for 10 to 15 years, or more, without the introduction of new "blood" and it is a good thing where two breeders working in parallel, though in different environmental areas, can exchange drones occasionally for this purpose. To reduce the swarming tendency it is suggested that those stocks which have given above average yields for two seasons without swarming and been satisfactory in other respects be allowed to supercede their queens. Their progeny can be introduced into the line to advantage from time to time.

CORRESPONDENTS

IN THE HOT SEAT

Dear Sir,
On the opening morning of the last duck shooting season, two local shooters visited their well-appointed maimai for another season's sport.

Sitting on the armchair in the maimai, they commented on its apparent warmth — a warmth far greater than that which could be attributed to the sustenance they had taken with them.

As the morning sun rose the reason for the warmth of the armchair became apparent: Bees were flying out of the arm rests.

Not waiting to savour any further delights of the chair, the shooters smartly left, telling a friend that he might like to have 'a shot' from their maimai.

The friend discovered the bees, but only after aquiring a few stings.

As a beekeeper, I was then called in to remove the hive, which I did, collecting a bucket full of honey in the process.

Yours,

A. Spinks,
Paeroa

P.S. Where will the bees go next?

CHOKERS MEET

Dear Sir,
Why do most smokers force their habit on others without asking, "Mind if I smoke?"

It seemed to be very evident at last year's conference that smokers were out-numbered. Yet these clouds of smoke from a few of ye hardy ole mates billowed forth a cloud of smog. Most certainly distressing to many.

I hope the executive will pass a resolution asking all to abstain from smoking in the assembly hall.

Let's see the smokers stand up for themselves; and pass on to an outer corridor during assembly for smokes so as not to distract their neighbours with their nervous shakes,

yours,

Ron Febus,
Kaitaia

GOOD AND BAD

Dear Sir,
Firstly let me congratulate you on the new format of the magazine. My wife and I were at last able to enjoy reading a complete article without fumbling through intervening pages. The size of the magazine is fine and the cover design is eye catching although the bee could be just a little over stylised even though it is pleasingly simple.

Having been pleased with one beekeeping publication I feel bound, unfortunately, to show displeasure with the latest publication of the booklet 'Beekeeping in New Zealand' published by the Ministry of Agriculture and Fisheries.

Surely a government publication with such a title should have the intention of fostering modern beekeeping methods, practises and equipment. Illustrations, photographs, plant, equipment and buildings should reflect current trends such as to stainless steel and new buildings conforming to Health Department requirements and also modern fashions and vehicles.

Where were illustrations and descriptions of modern honey houses and extracting plants? Where is mention of automatic uncapping machines, cappings spinners, honey and cappings pumps, pneumatic wax presses? Where is there mention of bulk honey handling in 200 litre (44 gallon) drums? Where is there illustration of an extracting room sporting modern stainless steel equipment in a room lined according to Health Department regulations.

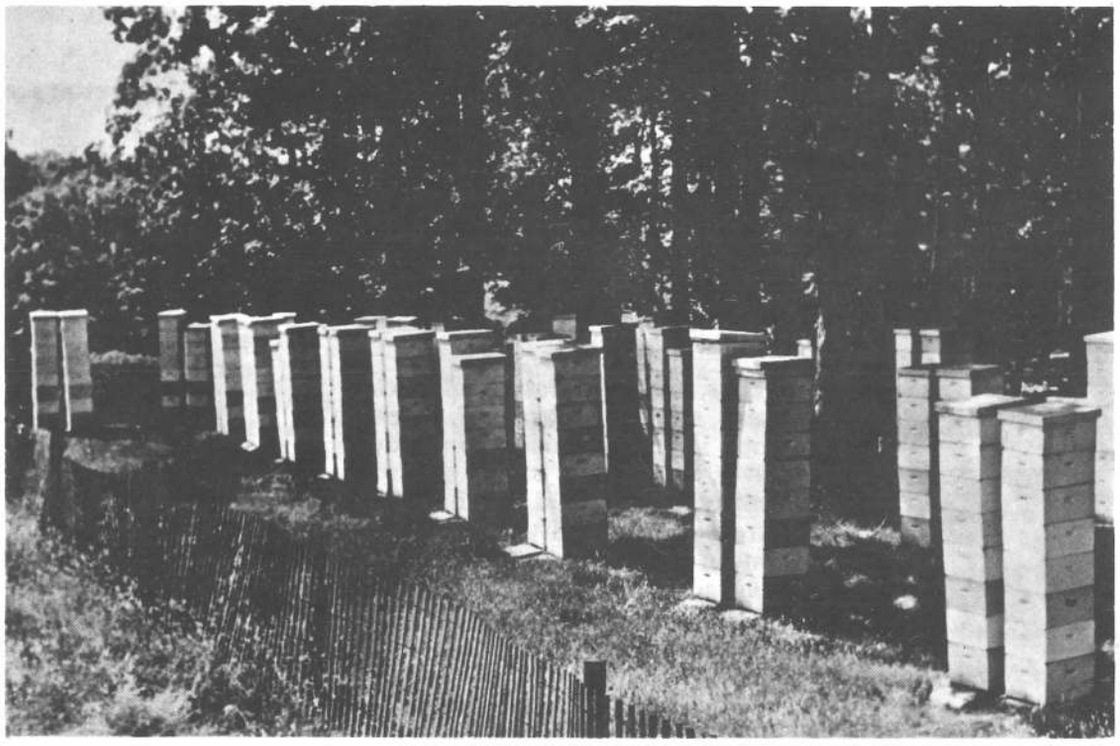
Certainly not all extracting plants now conform to the new regulations, nor sport modern equipment BUT ... surely the publication should show methods of advancing the beekeeping industry not merely reflect 1948 conditions.

Even the mere description of moving bees is outdated. Perhaps some beekeepers still do go to the trouble of blocking entrances and screening hives but what of the method used by all the commercial beekeepers I know of? i.e. Where hives are picked up as they are and moved by truck over quite long distances with no blocking or screening.

Considering the long delays with the republication of the booklet it would perhaps be more fitting to title it 'A History of Beekeeping in N.Z. circa 1940-1950' — even allowing for the metric measurements!

yours

B.E. Mitchell,
Hamilton



The value of nucleus hives in commercial apiaries

by D.A. Briscoe, Apiary Instructor, Tauranga

BEEKEEPERS IN many areas of New Zealand find it increasingly difficult to build up standard colonies to full strength in time for the main honey flow of nectar, often because of unfavourable climatic conditions. On the other hand, a few beekeepers in favoured localities are almost embarrassed by early strength in their colonies with the result that a large amount of their time is taken carrying out swarm control measures. Nucleus colonies can also be used to great advantage in requeening programmes and in boosting backward hives.

There should be no "passenger" or non-productive hives in an outfit that employs the judicious use of nucleus colonies.

Apiary locations must be considered when a decision is made about the best time of the year to make up nucleus colonies. As in all phases of beekeeping, planning is essential if good results are to be obtained and the beekeeper must first consider how the bees are to be housed. A division board can be used in the standard super, thus making use of equipment which is readily available. When this type of nucleus hive is being constructed, the entrances to be used by the bees should be at opposite ends of the super.

To do this, a special lightweight bottom board can be made up to suit the division in the super being used. It is also advisable to tack the mat to the top of the partition or dividing board to prevent the bees from passing from one division to the other when the hive is opened. These nuclei can be placed over division boards on top of standard hives, piled one on top of the other or placed in the apiary singly.

However, for ease of manipulation and for better results for mating and with mated queens, I prefer the four frame nucleus. If properly attended to these can be overwintered very satisfactorily. Perhaps in the colder parts of New Zealand, a five frame nuc. could be considered.

Preparation of Nuclei

Before nuclei are made up, it is very important that parent hives are checked out thoroughly for any signs of American Foul Brood (Bacillus larvae). Disease can be spread through an outfit very easily if increase is made up from diseased stock (or equipment).

A few days before making up the nuclei the selected hives should be opened and the required number of capped and emerging brood combs, from which the bees are gently shaken, should be placed above a queen excluder (making sure of course, that the queen remains below the excluder). The nurse bees will very soon be attracted to the brood above the excluder and in this manner, supplies of brood and bees are quickly available when required and no time is lost searching for the queen. A minimum number of field bees are taken with the newly formed nuclei.

After the division has been made a ripe queen cell can be given to each such nuc.

Another method is to slip a queen excluder between the two brood chambers of the hive. After 3 — 4

days an inspection of the colony will show in which super the queen is confined. In areas where there is a quick spring build-up of bees, nucleus hives can be prepared without affecting colony strength substantially. Brood combs from the upper portion of a "Demareed" stock may be used for this purpose.

Thus, the preparation of nuclei and swarm control are carried out in the one operation. However, too much brood and too many bees should not be taken from the one hive, as this may mean sacrificing a portion of the current season's honey crop. Frames of brood may also be taken from weak colonies which would not normally build up sufficiently to catch the main honey flow. (If a programme of operating a percentage of nucleus hives in a commercial holding is carried out, this situation should never arise.

In cooler parts of the country the work of making up nuclei can be carried out in the latter part of summer or early autumn, but in this case the winter stores must be watched and provided for.

In a four frame nucleus, two frames of emerging brood and bees with a frame of pollen and a frame of honey is desirable. When the nucleus has been prepared in this manner, the entrance should be blocked lightly with grass for 24 hours. They can then be transferred to other out yards or left on the original site (a little way apart from the parent colony). Although most field bees will probably return to their own hives if not moved to another out yard, the nucleus will be of good strength if sufficient nurse bees were taken in the first instance.

Requeening

Most commercial beekeepers have their own methods of raising queens. If spring requeening is carried out it is a waste of time and bee force to have virgins mate from honey producing hives. Before a nucleus is given a queen cell, the nuc should be liberally fed with sugar syrup. This will ensure better acceptance of the cell.

After the cell has hatched and the queen mated, she may then be removed and introduced to a colony due for requeening. A second cell may then be given to the nuc immediately.

If a cell is not available, the nuc will rear its own queen, but it must be remembered that a queen reared in this way is usually inferior to one raised from a cell selected stock.

As good queens are essential for successful commercial beekeeping each queen should be examined carefully before she is introduced to a honey producing colony. She should be bred from previously selected stock, be properly mated and laying, good appearance and have a long, moderately tapered abdomen.

The use of nucleus colonies in commercial outfits have many uses and for overall best results the nucs should be distributed throughout all out apiaries in a ratio of about 20 per cent to honey producing colonies. The greatest advantage of nucleus hives is two-fold: 1). The ever-ready supply of young queens and 2) the immediate ability to boost backward hives at any given time, thus eliminating completely non-productive or passenger hives.

A complete nucleus can also be given to any hive that has become queenless for one reason or another.

Nuclei require regular checking. Stores of honey and pollen must be watched carefully and also a very careful check should always be made for B.L. disease. A special examination for this purpose should always be made before any use of a nuc is made for queen replacement or the hive boosting of a honey producing colony.

BETWEEN THE COMBS

Motorway Sanctuaries

Although modern methods of agriculture are destroying hedges and other natural habitat of bees and other species of insects that are valuable as either pollinators or natural controllers of disease-carrying pests, British scientists have worked out a solution that could help save them from extinction.

Experiments by the scientists — from the Rothamsted Experimental Station at Harpenden, Hertfordshire, and Reading University Berkshire — have shown that sowing the verges of motorways and railways with special grasses and flowering plants can provide good nesting sites for beneficial insects without encouraging harmful ones.

American Journal Price-rise

Subscription rates for the American Bee Journal effective January 1, 1976 will be $6.35 for one year, $11.95 for two years, and $16.55 for three years. This covers the surface mail postage cost for sending the Journal out of the United States. Airmail rates will be given upon request by the individual subscriber.

The above rates are in American currency.

Moonstruck Heather

We accept the scientific evidence that the moon affects the tides. Has any beekeeper observed a similar influence of the moon on honey production?. Gerhard Goken, a German beekeeper, quotes an old saying: "The waning moon is favourable, the waxing moon unfavourable." He says that flower honey harvests were always good when good weather and waning moon coincided with full open blossom time.

By contrast, bad honey harvests and often starvation accompanied a waxing moon under similar conditions. This is taken to explain the disastrous year of 1974. In previous years the heather, being in full bloom, yielded no honey, and many colonies died of starvation. In the year 1937 at the time of the waxing moon many thousands of colonies died in good weather in sight of full blossoms. When the moon had reached her zenith, starvation ceased.

The moon influence is only active on flower nectar, not on honey dew. The heedful beekeeper would have to be careful of the times for removing supers for extraction, because if the German theory is correct and we remove honey during the period of the waxing moon, then our bees might face starvation from depleted stores. In addition to our other equipment we may be adding a moon calendar; or is this just another case of moonstruck madness?

— The Scottish Beekeeper.

Waxing Ridiculous

How much extra honey do you think your bees collect if you give them drawn comb instead of foundation? Or is there any difference in the time taken to pull out the foundation and fill the super as against the time taken to refurbish drawn comb and fill it up?

Bees produce wax freely when a good nectar flow is on and much less freely in times of dearth. If the bees must remain in the hive to build comb, fewer must be out in the field collecting nectar, and much of the nectar collected is consumed to produce wax. It all seems so very logical — an unanswerable case.

Where it falls down is that it is not the foraging bee which is the wax producer, but the young bee which has not yet reached the foraging stage of its life. At a certain stage of its life the bee has a biological necessity to produce wax, which must find expression somehow. Comb is not really drawn out from foundation. A foundation is always built upon. A normal colony will always have bees producing wax in the right conditions and they will consume the nectar no matter what, therefore that honey is never saved — or expended unnecessarily.

Of course, possibly as important to the beekeeper as the honey yield is the saving in costs of foundation. This is no inconsiderable matter at present-day prices, and will weigh as heavily as any possible saving of honey.

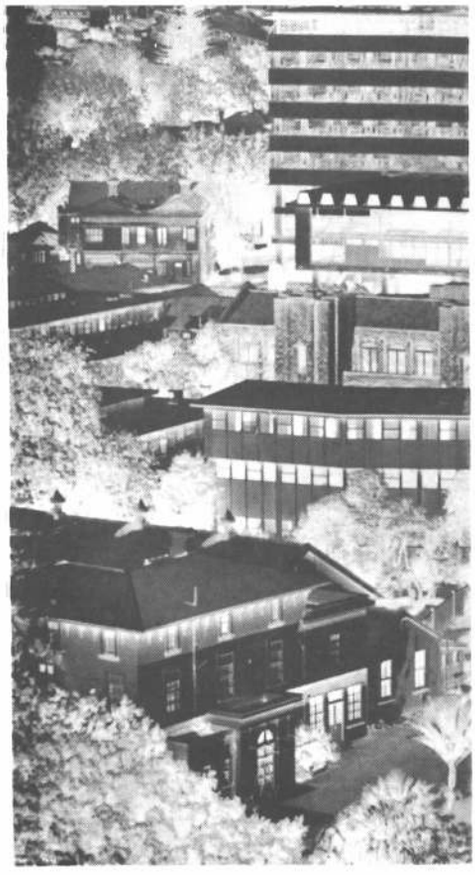
— The Scottish Bee Journal.

For What It's Worth

From the Evening Standard is extracted the following:

"An American by the name of Tompkins has, it seems, solved the problem of how to render bees, wasps and hornets harmless. He has brought to public notice an ingenious invention of his own called the bee-muzzle! It consists, we read, of a minute particle of cork, which is placed in contact with the extremity of the insect, and into which the bee is induced to thrust its sting.

A drop of cement is then placed on the cork, the result being the sting and cork are firmly attached together. The operation is described by the inventor of this novel kind of muzzle to be quite painless to the bee, although the insect is a trifle annoyed at first when it discovers the sting cannot be withdrawn."



Keeping bees in populated

BEEKEEPERS IN SUBURBS and cities need to manage their bees so that they are not a nuisance to their neighbours. Keeping bees successfully in a populated area requires an intimate understanding of basic bee biology, zoning laws, property rights, and human psychology.

People have kept bees in crowded suburban areas, on quarter acre lots, and on roof tops in cities. Even in a city, a hive or two of honey-bees can often find enough forage to sustain themselves and perhaps yield a small surplus.

If we understand under what circumstances bees will bother people, we can take measures to alter these circumstances so that the bees are not a problem.

Flight Patterns

Bees flying out to gather food will fly 1m to 2m above the ground which makes them an annoyance to people who might be passing by. Planting a hedge or building a fence at least 2m high will force the bees to fly above head level and thus avoids this problem. Alternatively, hives can be placed on a roof top, which again will start the bees flying at a level at which they will not bother people.

Fences, hedges, and roof tops also provide seclusion which is more important than some people realize. Keeping hives out of sight helps protect them from vandalism and theft. However, this is not the only factor involved.

Bees out of sight are less often objects of worry and controversy. To a beekeeper, a row of well kept hives generates a feeling of calm and serenity; to a non-beekeeper, they may symbolize a threat or discomfort. So, "out of sight, out of mind" and we'll keep both ourselves and our neighbours happy.

Locations

The hives themselves should be in such a condition that the bees are always warm and "happy". They need to be in full sun the whole day. Bees in the shade tend to be more aggressive. The hives should slope forward so that rain water can run out the front. Hive stands will get the bees off the ground. This makes it easier to keep the hives dry by letting air circulate under the bottom boards. Placing the hives 10cm to 16cm off the ground also makes it less likely that weeds or grass will obscure the entrance.

Entrances

Top entrances should be avoided in congested areas during the summer season. Whenever a hive with a top entrance is opened and supers moved, hundreds of bees will be flying around confused because their entrance is gone. Masses of field bees flying around the beekeeper's head will make things more uncomfortable for him as well as for his neighbours.

By providing a bottom entrance only, and working on the side or behind the hive, the bees are never really prevented from flying home even if all the upper supers have been removed. Keeping equipment in good repair so that cracks or chips in the hives don't provide extra holes for flight is equally important.

When to Inspect Colonies

The bee's sting is primarily for defence of the colony. Whenever a colony is opened or otherwise disturbed, it is potentially in its most dangerous state. Only when the hive itself is disturbed will the bees attack in any numbers.

During a nectar flow, many of the older workers will be in the field foraging. This is the best time to work the colony. At times during the summer (between honey flows), more bees will be in the hive and the situation will change so that the bees are more easily angered.

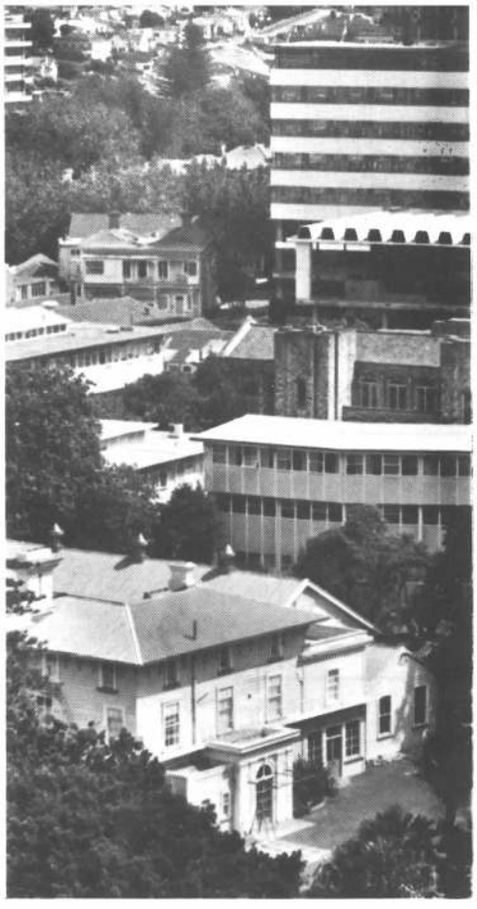
During such a time of dearth, there will inevitably be some robbing going on which will make the bees even more defensive of any intrusion into their colony. Leaving cappings, or honey exposed, or leaving a colony open for more than a few minutes may precipitate a robbing situation which will cause thousands of angry bees to take to the air.

Any hive that is weak should have its entrance reduced, otherwise other stronger hives may rob it out. While there is a honey flow in progress, robbing is much less likely to occur.

Weather and time of day also have an influence on the disposition of a colony. Working bees early in the morning, late in the afternoon, during cool weather (below 65° F.), in rain or when the sky is overcast will make the bees angry and more likely to attack.

To minimize problems, the hives should be attended to only on warm sunny days, preferably in the middle of the day.

This may vary according to other factors including the types of flowers that the bees are working. Many flowers produce most of their nectar during only a part of each day and unless there are alternate sources, the bees have nothing to do the rest of the day.



areas

The beekeeper should understand the subtleties of flows and be observant enough to determine when bees are bringing nectar in. An obvious indicator would be heavy flight activity at the entrance.

Weather on the previous day will influence the nectar yield of flowers. If it has rained the nectar will be more dilute (watery) making it less desirable to the bees. They may not forage heavily until the sun has evaporated the nectar down to a stronger (and sweeter) concentration.

Water

Honeybees need water to cool the hive and to dilute honey for feeding their young. Bees generally collect water from the nearest source, although they prefer standing water that is warm, has some organic material, and is located in very shallow pools.

Organic material might include some rotting leaves, and thin floats or sponges in a barrel could take the place of a shallow pool. Some beekeepers keep a tap running, leaving a steady trickle to flow over some boards. This assures a continuing supply of fresh water.

A backyarder's bees could easily collect water from other sources, but this presents a problem. Bees collecting water at swimming pools, bird baths, and wading ponds are a nuisance. People could get stung or they might avoid using a pool altogether because they are afraid of the bees.

At the very least, the aesthetics of having a number of dead bees floating around in the water leaves something to be desired. Once bees start using a particular water source, it is very difficult to keep them from returning to it. The answer lies in providing a constant supply of water close to the hives as soon as the bees start flying in the spring.

Stinging bees

Angry bees are attracted to movement, animal odors, and vibrations. Opening a hive while your next-door neighbour is mowing his lawn is definitely a good way to get him stung. If the bees are particularly touchy about lawn mowers, one might tactfully recommend that the lawn be mowed on cool evenings or early in the morning when the bees are less likely to fly.

A good general rule is not to disturb the hives when anybody in the immediate area is likely to be outside.

Beehives, like people, vary in temperament. Generally, if there is a mean hive, replacing the queen will alleviate the problem. A beekeeper should never keep a hive of aggressive bees near houses or where people will pass close by.

Whenever a beehive is opened the beekeeper must keep it under control at all times. A typical beehive contains tens of thousands of workers all capable of stinging. The bees have an elaborate and organized system of defense. If we chose to ignore this system the consequences could prove disastrous.

A beekeeper in a remote area may bundle himself up or take a number of stings and ignore them. These alternatives are not available to the urban or suburban beekeeper because of the proximity of his neighbours.

Smoke is the most important tool of anyone opening a hive. Smoke should be used in moderation. However, the smoker should be capable of producing large clouds of smoke on short notice. Smoke the entrance, under the cover, and periodically over the frames while the hive is open. Work carefully and slowly.

Jarring the hive or frames may anger the bees. Space the frames to nine in a super once they have been drawn out (from foundation). Keep the frames freely moveable by going through the brood chamber several times a year, scraping off excess comb and propolis.

The folly of wearing gloves cannot be overemphasized. Stings on hands are easily removed and the pain quickly passes, yet many beginners (and others) insist on using gloves. Stings on the gloves are not felt yet, because of the scent associated with the sting, they anger other bees in the hive to attack. The attack builds and the beekeeper ignores it until the bees find an opening. Thus, the beekeeper may lose touch with the mood of his hive.

By working with bare hands, one will be less clumsy and also will be less likely to let the bees out of control.

Public Relations

If one is on speaking terms with his neighbours, that friendship may be encouraged by giving them some honey at Christmas. It's amazing how interested and concerned people become when presented with an occasional jar of honey.

Show them the difference between wasps and bees and they will be less likely to blame you for every sting Be careful and tactful; befriending a neighbour is a lot easier than calming him once he has become angry with you and your bees.

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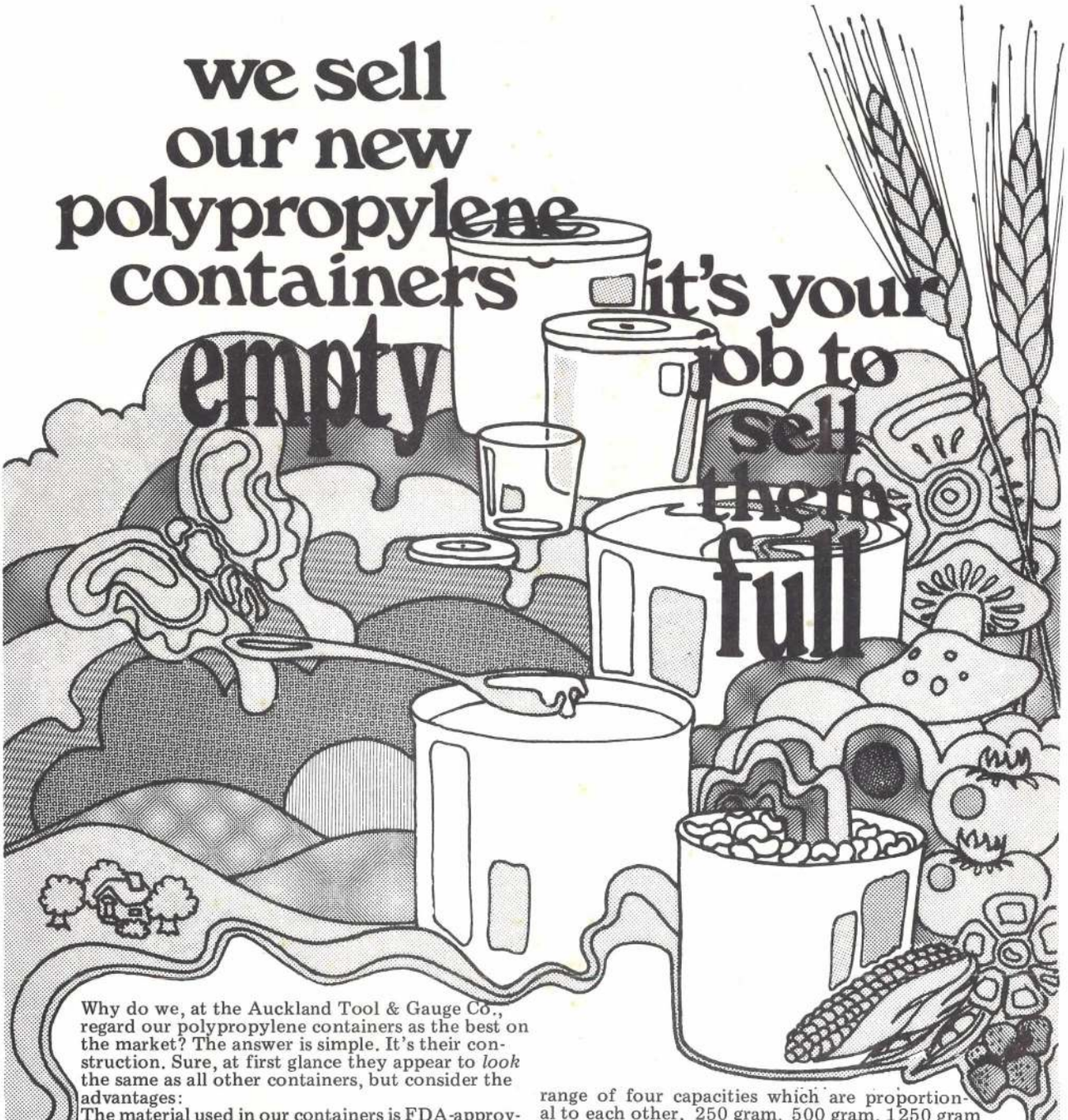

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