THE HONEY INDUSTRY IN NEW SOUTH WALES*

R. E. COOKE-YARBOROUGH†

1. SUMMARY

The fourteen and a half million pounds of honey which New South Wales contributes annually to total Australian output greatly helps to make Australia one of the top five producers, and third most important exporter in the world. In yield per hive, Australia actually is one of the leaders, obtaining over 100 lb. each year—a level approached only by Canada.

* Acknowledgements are due to a number of people who freely gave their comments, suggestions and criticisms at several stages in the preparation of this article; and especially to Alan A. Clemson (Principal Livestock Officer, Apiculture) for his assistance in compiling the illustrations used in section 5, and to C. H. Gray (Biometrician) for advice on some statistical procedures.

† Economics Research Officer, N.S.W. Department of Agriculture.

The beginnings of apiculture can be traced to an importation of Black Bees in 1822 but the advancement towards industry status did not gather momentum until the middle 1930's. Since then, the number of apiarists has increased by about a third, the number of hives and yield per hive have doubled, and the volume and value of production have increased four times and thirteen times respectively.

The most important beefarming areas of the State are the Northern Slopes and Tablelands (at least for large scale production) and the Central West. Nearly half the commercial beekeepers live in towns with over 3,000 population. The reasons for this are two-fold. One, the services (access to railway and roads, availability of jobs—60 per cent of beekeepers derive some income from off-apiary work) offered by townships, and two, the risks involved in keeping hives on the same site all the time. Indeed, over four-fifths of commercial beekeepers do not have permanent sites but move their hives around the countryside (as circumstances dictate) operating from headquarters conveniently situated to the honey-producing areas.

Most of the honey produced in New South Wales is obtained from eucalypts, with a small proportion coming from other native and cultivated plants. The succession of species coming into flower during the year, or flowering at different times in different areas provides a season of eight to nine months for the migrant beekeeper.

Questionnaires returned by 207 out of the 576 commercial beekeepers (that is, with 100 or more hives) in a postal survey provided information about production and marketing practices. It has been possible to determine, though not to quantify the effect of, the types of sites used ; the types and range of apiary equipment ; the manner in which honey is extracted and prepared for marketing ; and the types of containers and outlets used by beekeepers when disposing of their honey.

2. INTRODUCTION

Beekeeping has long been carried on in New South Wales as a sideline to other agricultural practices but in recent years has developed into a separate specialized industry. In 1960-61 the gross value of production of honey and beeswax was £811,000, and in the three seasons 1958-61 averaged £867,000. This latter value, when compared with the average gross value of production in each of the periods 1938-41 and 1948-51, £69,000 and £497,000 respectively, illustrates the growing importance of the industry in the last two decades.

However, despite the growing importance of beekeeping to the rural economy, very little is recorded about the production and marketing of honey in New South Wales. Indeed, many of the problems now being encountered by beekeepers can be traced to this lack of information on the structure, organization, and likely costs and returns in the industry.

Early in 1962, the Division of Marketing and Agricultural Economics began a study intended to provide information of this nature. This article represents the first part of the study, which was concerned with the collation of information (largely of a descriptive nature) on the structure and organization of the industry. Many questions remain unanswered: no attention has been given, for instance, to costs and returns in honey production, or

to the marketing channels and the distribution pattern: Nonetheless, this preliminary investigation should be of value to those closely connected with apiculture and provide the basis for further research and discussion.

The statistics presented in this article have been drawn from a number of sources. Due caution must therefore be exercized when attempting comparisons between the various sections, though within any one section the data have been drawn as far as possible from the same or comparable sources. Specific sources are referred to in footnotes at the appropriate place in the text but in general the records kept over a number of years by the New South Wales Department of Agriculture and the Government Statistician provided data on the production and diposal of honey, and the size structure and distribution of the industry in the State: statistics for the section on beefarming as a Commonwealth and International Industry were obtained from Commonwealth and FAO publications: the sources of honey were compiled from the various publications dealing with the flora of New South Wales, amended where necessary in the light of present day knowledge: and a survey, discussed below, provided the data on practices associated with the production and marketing of honey.

Survey Procedure

Although there are nearly 4,000 registered beekeepers in New South Wales, only 576 have 100 or more hives (Table 1) and are thus regarded in the terms of the Marketing of Primary Products Act, 1927-1956, as commercial apiarists and accorded voting rights in polls to constitute a State Honey Marketing Board. The remainder, over 80 per cent, are

Table 1

Numbers of Registered Beekeepers in New South Wales, by Size of Apiary and in Total, 1962

Apiary Size in Hives	Number of Beekeepers	Percentage	
		of all Beekeepers	of Beekeepers with 100 or more hives
		Per cent	Per cent
0– 99	3,389	85.5	..
100–199	269	6.8	46.7
200–299	148	3.7	25.7
300–399	78	2.0	13.5
400–499	36	0.9	6.3
500 or more	45	1.1	7.8
TOTAL			
All hives	3,965	100.0	..
100 or more	576	14.5	100.0

Sources: Registration Statistics, Department of Agriculture, Sydney.

regarded as non-commercial or amateur beekeepers; and though numerically superior they manage less than a third of the hives and produce only a sixth of the honey.[1] It was therefore felt that a more worthwhile examination of the industry as a commercial venture would be obtained by confining the enquiry to those beekeepers with 100 or more hives. However, in certain other sections the contribution of amateur beekeepers has been included, both from necessity (there being no distinction in the statistics) and for completeness of the analysis.

Questionnaires were mailed to all 576 commercial beekeepers—there was no purposive sampling—with a covering letter explaining the purpose of the study and asking for co-operation in the enquiry.[2] As well, a business reply envelope was included for the return of the questionnaire. There was no second mailing to those who did not respond. Instead, follow-ups took the form of press releases to appropriate newspapers and journals, and a paper on the study was delivered at the Annual Conference of the Commercial Apiarists' Association of New South Wales.[3]

Altogether, 227 questionnaires, almost 40 per cent, were returned. Twenty were rejected on checking, mainly for incompleteness, leaving 207 (representing 35.9 per cent of commercial apiarists) from which the data presented in Section 6 have been processed.

The 207 questionnaires were then stratified into five groups on the basis of the recorded number of productive hives. The choice of productive hives as the criteria for stratification, rather than the reported total number of hives, was based on the fact that it accorded more closely to the number of registered hives, the original basis of selection. This is because in counting hives for registration, nucleus and other hives score less than productive hives.[4] The same values may not be applied in all apiaries but in general, except where the apiary includes a large proportion of nucleus and other hives, the number of registered hives approaches close to that of productive hives.[5] Therefore, stratification of the sample beekeepers on the basis of recorded numbers of productive hives allows comparison of the percentage distribution by apiary size in the population and the sample.

The comparison of the percentage distribution of beekeepers in the sample (shown in Table 2) and those with more than 100 hives in the population (shown in Table 1, column 4) indicated that there were less

---

[1] Derived from information furnished by the Commonwealth Statistician.

[2] At the bottom of the letter there was a separate query asking if the beekeeper was, or was not, willing to show his records. Those who returned a positive answer will form the population in the second stage of the study.

[3] For a comment on this paper, see *The Australasian Beekeeper,* Vol. 63, No. 12 (June, 1962), p. 271.

[4] A nucleus hive may be a special small hive taking standard or non-standard length frames, or a single box of an eight or ten frame hive with only three to five frames in it: sometimes this box may be further divided to give two or more nuclei hives each of three to five frames. Since a productive or standard hive is generally taken as three boxes each containing eight or ten frames it is obvious that on average a nucleus hive is approximately one-sixth the size. Similarly, other hives comprising less than three boxes are counted as only part of a productive hive.

[5] In actual fact no apiaries in the sample carried a large proportion of other hives and two of the rejected questionnaires came from beekeepers whose main enterprise was Queen Bee rearing.

TABLE 2

Size Distribution of Apiaries, Survey Farmers, 1962

Number of Productive Hives	Number of Beekeepers	Percentage
		Per cent
100–199	85	41.1
200–299	49	23.7
300–399	32	15.4
400–499	16	7.7
500 or more	25	12.1
TOTAL	207	100.0

with 100-199 hives and more with over 500 hives in the sample than in the population. However, a chi-square test showed that the difference was not significant.[6] Further tests for any bias or error were not possible in this instance but it seems likely from the above discussion that the information about production and marketing presented in Section 6 may reasonably refer to all beekeepers with more than 100 hives, though not perhaps to those with less than 100 hives.

3 BEEFARMING IN AUSTRALIA AND OVERSEAS

Before embarking on the intimate discussion of the honey industry in New South Wales, it may be appropriate to first give an outline of beefarming as it appears on a national and international basis, and briefly discuss the pattern of world affairs in honey.

All Australian States have well established Honey Industries.[7] That in New South Wales is the largest, contributing about two-fifths of total Australian output. Next in importance are Victoria, Western Australia, South Australia, Queensland, and Tasmania in that order. Australian production varies from year to year and depends on climatic conditions, but there has been a well defined increase over pre-war (Table 3) and in the last five years production has averaged 37 million pounds.

Considerable quantities of Australian honey are exported—as much as a half in some years. Table 4 shows exports of honey from Australia for the period 1956-57 to 1960-61, in quantity and as a proportion of total output. The figures for 1960-61 have been broken down to show further the State of final shipment. This shows that Western Australia and Victoria are the most important exporters.

[6] $x^2 = 3.78$, $p = 0.50$.

[7] Though there is no documentary evidence of beefarming in the Territories it is probable that there are some hives (but not in numbers to warrant enumeration, let alone industry status) in the Northern Territory, and also in Papua and New Guinea.

TABLE 3

Production of Honey in Australia 1934-35 *to* 1960-61

Period	Honey Production
	'000 lb.
Average for five years ended:—	
1938–39	12,814
1960–61	37,318
Year:—	
1947–48	25,843
1948–49	53,200
1949–50	25,663
1950–51	27,439
1951–52	20,653
1952–53	27,810
1953–54	35,737
1954–55	33,633
1955–56	34,464
1956–57	40,458
1957–58	32,286
1958–59	32,487
1959–60	45,562
1960–61	35,801

Source:—Commonwealth Bureau of Census and Statistics.

TABLE 4

Exports of Honey from Australia, 1956-57 *to* 1960-61

Year	Honey Exports			
	Total		As Percentage of Output	
	'000 lb.		Per cent	
1956–57		12,828		31.7
1957–58		19,685		55.7
1958–59		11,194		34.4
1959–60		13,706		30.0
1960–61:—				
New South Wales	2,349		6.5	
Victoria	4,405		12.3	
Queensland	1,681		4.7	
South Australia	3,140		8.8	
Western Australia	5,190		14.4	
Tasmania	60	16,825	0.2	46.9

Source:—Oversea Trade 1956-57, Bulletin 53 *ad passim,* Commonwealth Bureau of Census and Statistics.

Various estimates of world honey production suggest that on average Australia is the third most important, though actual ranking, after the United States, in any one year of Australia, Argentina, Canada, Western Germany and Mexico depends on climatic conditions (which affect output) pertaining in each country. In 1959, for instance, Australia was fourth behind the United States, Mexico and Western Germany (see Table 5).

The production of honey in the 19 countries from which data are available was 561.4 million pounds in 1959. Table 5 gives the production in the most important, and certain other countries in that year together with the number of hives and the indicated yield per hive. It will be seen that the United States has by far the largest number of hives and produces

TABLE 5

Honey Production, Number of Hives, and Indicated Yield per Hive for Certain Countries, 1959

Country	Honey Production	Number of Hives	Indicated Yield per Hive
	'000 lb.	'000	lb.
United States	247,523	5,438	45.5
Mexico	36,376	1,126	32.3
West Germany	35,274	1,276	27.6
Australia	32,496	315	103.2
Canada	31,527	331	95.2
Argentina	30,865	630	50.0
Turkey	20,327	1,381	14.7
Czechoslovakia	13,889	896	15.5
New Zealand	8,488	176	48.2
Greece	7,716	700	11.0
Switzerland	7,055	280	25.2

Source:—Derived from Tables 90 and 91 in *Production Year Book* 1960, Vol. 14, FAO, Rome, 1961.

nearly half the world's honey. Turkey ranks second in number of hives but does not produce the quantity of honey that Australia or Canada do from a much smaller number. Indeed, Western Germany and Mexico only rank as important honey producers by virtue of a relatively large number of hives.

However, no great significance should be attached to any ranking on the basis of yield per hive, since it affords no measure of the relative costs and returns but rather the way in which the honey is collected. For instance, the high yields obtained by Australia and Canada reflect not necessarily economic production but the itinerant nature of the industry: this practice has been found to generally give higher yields than can be obtained from hives on permanent sites, as is usual in most other countries. As well, some allowance must be made in the case of the United States for the relatively large proportion of hives placed mainly for pollination because the use of hive bees as pollination agents generally has a depressive effect on yields.

WORLD TRADING IN HONEY

Though subject to some reservation due to incomplete documentation by some countries, world trade has been estimated at over 100 million pounds annually. The major exporters are the United States,[8] Australia, Cuba, Mexico and Argentina: these countries provided three-quarters of the 133 million pounds entering world markets in 1959 (Table 6). Smaller but appreciable quantities were moved from Chile, Hungary and Gautemala, and altogether 41 countries reported exports in that year.

TABLE 6

Exports of Honey from Certain Countries in 1959

Country	Exports
	'000 lb.
United States	12,507
Australia	13,706
Cuba	7,714
Mexico	36,625
Argentina	28,729
Chile	5,071
Hungary*	4,581
Guatemala	5,725
China Mainland*	4,441
Czechoslovakia*	2,239

* Net Importers.

Source:—Department of Primary Industry, Canberra. *Honey Notes*, Vol. 5, No. 19 (May 5, 1961).

Ninety per cent of this honey was sold in Europe, Western Germany taking over a half. The next most important market was in the United Kingdom, which took 14 million pounds, followed by Austria and the Netherlands (Table 7). As well, the United States and Canada each

TABLE 7

Imports of Honey to Selected Countries, 1959

Country	Imports
	'000 lb.
West Germany	70,942
United Kingdom	14,277
Austria	5,266
Netherlands	5,055
France	4,838
Hong Kong	386
Malaya	232
United States	4,509
Canada	4,529

Source:—Same as Table 6.

[8] Considerable quantities of U.S. honey are exported under foreign aid programmes.

imported over 4 million pounds. Thus, three of the major producers, viz., Western Germany, Canada, and the United States, were also importers, though imports and exports formed only a small part of total supplies in the case of the United States.

There are certain preferential tariffs and grading regulations imposed by some importing countries but in general the prices of honey on the world markets are determined by consumer preferences for the various types produced in different parts of the world. Typical prices on the London Market are shown in Table 8.

TABLE 8

Prices for Honey on London Market

Source and Grade	Price Range per cwt. stg.
	Shillings
Australia—	
Light Amber	102–105
Medium Amber	97–100
New Zealand—	
White Clover	180–187
Light Amber	120–130
Medium Amber	97–110
Canada—	
No. 1 White Clover	143–147
Argentina—	
Light Amber	100–125*
Mexico—	
Light Amber	98–102*

* Forward delivery price c.i.f. Such prices are commonly 5s. to 6s. per cwt. lower than the other prices in this table which are spot quotations.

Source:—Department of Primary Industry, Canberra. *Honey Notes,* Vol. 6, No. 38, (October 12, 1962).

4. GROWTH OF THE INDUSTRY

As a business . . ., as a subsidiary to farming or fruit growing . . . , beekeeping has nowadays throughout Australia so many votaries, that it almost goes without saying some brief account of the inception and growth of apiculture under the Southern Cross will be appreciated.[9]

The hive bee was first successfully introduced to Australia by Captain Wallis of the "Isabella", who brought hives of black bees to Sydney in 1822, but honey had been garnered prior to this from wild nests of the so-called native bee "*Trigona carbonaria*". Two colonies of the Italian strain were imported from America in 1880, and W. Abram brought more stock with him when he came from Italy in 1883.[10]

[9] A. Gale, "Introduction of Bees to Australia", *The Agricultural Gazette of New South Wales,* Vol. XVI (September, 1905), p. 848.
[10] *Loc. cit.*

By 1897 bee farming had become established. In that year, there were 41,900 hives (of which 32,557 were said to be productive), and 1.4 million pounds of honey were produced at an average of 42.3 pounds per productive hive. Observers of the day forecast that within a decade or two *this State, from the great plains to the eastern seaboard would become, in the Mosaic sense of the term, "a land flowing with milk and honey".*[11] However, growth of other agricultural industries, which required removal of trees which yielded honey, frustrated the efforts of beekeepers and between 1897 and 1906 the industry in actual fact increased in size by only 4,032 hives, though yield per hive improved to almost 50 pounds. Indeed, it was not until the middle of the 1930's that the growth referred to above lifted the honey industry to its present position.

Growth in an industry can be gauged from the performance of several factors but in this instance discussion is confined to the more important ones; namely, number of beekeepers, number of hives, yield per hive, and volume and value of production.

Number of Apiarists

In 1935-36 there were 2,912 beekeepers in New South Wales. The number then declined slowly until in 1940-41, when this statistical series was discontinued, there were only 2,488.[12] No statistics were collected again until after 1945, when an amendment to the Apiaries Act required all beekeepers in New South Wales to register with the Department of Agriculture.[13] The first enumeration of these registrations was made in 1948 and showed that in the season 1947-48 there were 2,892 beekeepers. By 1961-62 the number of registrations had increased to 3,965.[14]

Data made available by the Commonwealth Statistician reveal that latterly the increase in beekeepers has been confined to apiaries with less than 50 hives. Between 1954-55 and 1960-61 the eleven per cent increase in the number of beekeepers with more than five hives (Table 9) was attributable solely to a thirty-two per cent and two per cent rise respectively among beekeepers with 5-20 and 21-50 hives, for there was a fall in the number of larger apiarists, by up to seventeen per cent among those with 51-100 hives. The same pattern of growth may not necessarily have occurred previously, though a knowledge of the industry does suggest that such would be the case. The establishment and building up of a bee-farm does not require large amounts of capital. On the other hand, bee-keeping demands a peculiar type of ability that can only be gained by experience and it would therefore be unlikely that outsiders could be technically capable of entry at any but the lowest levels.

---

[11] This remark (made in retrospect) and the statistics which belied the point were taken from A. Gale, "The Bee Industry", *The Agricultural Gazette of New South Wales,* Vol. XVII, (January, 1907), p. 79.

[12] *New South Wales Statistical Registers.* The census statistics referred to holdings of one acre or more and did not include hives kept on Crown Lands, Forest Reserves or Land not used for Agricultural purposes. As such the count was probably incomplete.

[13] Apiaries (Amendment) Act, 1944. Number 22. Gazetted November 14, 1944, to be operative as from February 1, 1945.

[14] *Annual Reports of the New South Wales Department of Agriculture.*

TABLE 9

Changes in Numbers of Beekeepers with Different Size Apiaries in New South Wales between 1954-55 *and* 1960-61

Apiary Size	Number of Beekeepers		Percentage Increase (+) or Decrease (—)
	1954-55	1960-61	
5 –20 hives	962	1,275	+ 32.5
21– 50 hives	528	538	+ 1.9
51–100 hives	384	317	— 17.5
101–200 hives	243	231	— 4.9
201–400 hives	169	167	— 1.2
401 or more	74	67	— 9.5
All Hives	2,360	2,595	+ 11.0

Source:—Commonwealth Bureau of Census and Statistics.

Number of Hives

In the period 1935-36 through 1960-61 there was approximately a two-fold increase (from 96,356 to 190,061) in the number of hives. Figure 1 shows that most of this increase occurred during and shortly

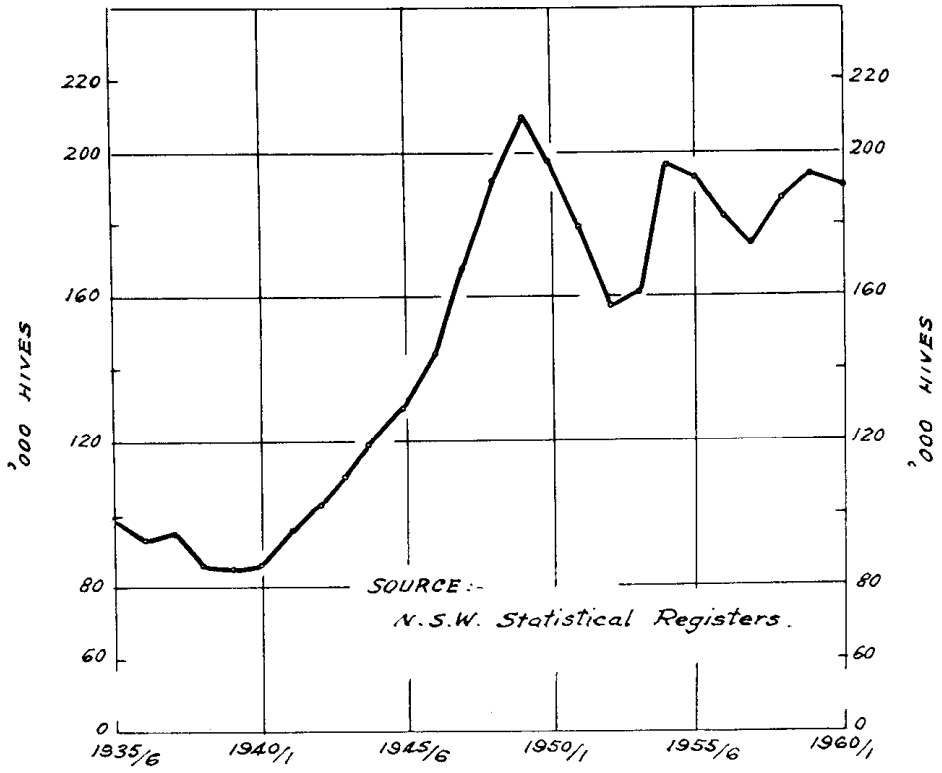

Fig. 1. Number of Hives in New South Wales Apiaries, 1935-36 to 1960-61.

after the war when hive numbers rose from 86,638 in 1940-41 to a record 210,402 in 1949-50. They then fell back, and have since fluctuated between 180,000 and 200,000 though trending upwards.

The greater number of beekeepers undoubtedly accounted for some of the extra hives but previous discussion has suggested that this could not have been the only, nor perhaps the most important, cause since the new operators may not have had many hives. Rather, the main cause was probably the increase in apiary size—from 33 hives in 1935-36 to 50 in 1947-48 and to 59 in 1960-61. That this has been possible is due to the technological improvements made in the industry, principally the introduction of portable honey extracting plants, the use of steam to heat the various items of plant and to process honey and beeswax, and the use of multi-frame honey extractors. These have allowed beekeepers to handle more hives, and in many cases without any obvious need for hired

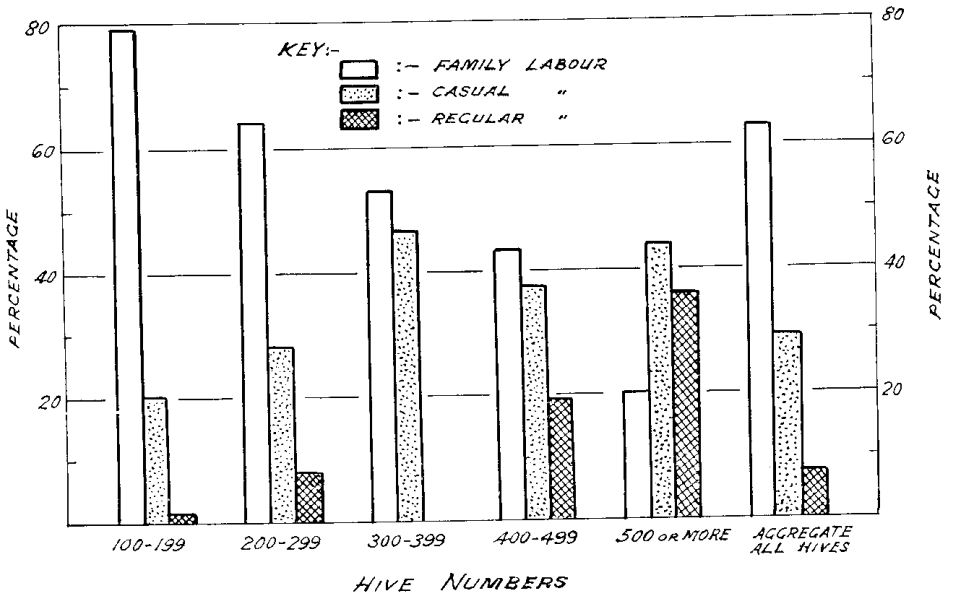

Fig. 2. The Labour Pattern of the Honey Industry Shown in Terms of Family Labour, Casual, and Regular Labour, According to Hive Numbers. Column on Right Shows Aggregate Labour Usage.

N.B.—It is likely, though not shown, that some Beekeepers with 300-399 hives use regular labour.

Source:—**Beekeeper Questionnaire Returns, New South Wales Survey, 1962.**

labour. Thus, survey returns show that less than 40 per cent of beekeepers with 100 or more hives employ any hired labour (Figure 2). As might be expected, however, the hiring of workers, both regular and casual, is more common in larger apiaries though in apiaries of over 500 hives nearly 20 per cent of beekeepers manage entirely with family labour. The need for hired labour may be obviated in some instances by sharing labour at busy times of the year, and the sharing of equipment is also practised. Just over a fifth of beekeepers helped each other in this manner (Table 10). The arrangements were more commonly made for assistance at extracting time than shifting time, and envisaged slightly more sharing of labour than equipment.

TABLE 10

Sharing Arrangements among Beekeepers, New South Wales Survey, 1962

Beekeepers Working Together who:—	Percentage
	Per cent
Share Labour	16.0
Share Equipment	13.6
Work together at Shifting	16.0
Work together at Extracting	18.8
All Arrangements	21.8

Yield per Hive

Beekeepers in New South Wales (and Australia generally) have traditionally obtained higher output per hive than their counterparts in other countries. However, in the period under review the yield more than doubled, from an average of 48 pounds in 1935 through 1940 to 111 pounds in 1946 through 1960 (Table 11, column 3). Again, most of this increase occurred in the post-war years.

A part of this increase may be accounted for by higher rainfall. In 1956-60 the average rainfall was five inches more than in 1946-50 and ten inches more than in 1936-40, and analysis of available records since 1920 revealed a significant correlation[15] between yield per hive and annual average rainfall. These data, grouped to five-year periods, are shown in Table 11. In the long term, then, it would appear that rainfall has an effect on production and yield per hive. On the other hand, while a significant correlation was still found when the analysis was restricted to the period up to

TABLE 11

Annual Average Rainfall and Yield per Hive, five-year periods 1920-1960*

Period	Annual Average Rainfall†	Yield per Hive
	inches	lb.
1920–25	32.4	65.0
1926–30	30.9	59.2
1931–35	30.6	46.9
1936–40	27.0	47.8
1946–50	31.7	110.0††
1951–55	34.7	91.3
1956–60	36.4	111.5

* Excluding 1940-45, for which comparative figures are not available.

† Excluding the Western Division.

†† Exceptionally favourable conditions in 1948-49 enabled beekeepers to obtain 184 lb. of honey per hive, and this record yield raised the five-year average to 110 lb.

Source:—Bureau of Census and Statistics, *Statistical Registers for New South Wales.*

[15] $p = 0.05$.

1940, the same was not true of the period since then. Thus, the effect of rainfall on yield per hive has diminished, though there can be no doubt that general climatic conditions still exert a profound influence on the honey industry.

A more potent cause of the increase is the change that has taken place in the husbandry practices of the industry. Survey returns show, for instance, that over 80 per cent of commercial beekeepers practice migration to some degree. In this way, they overcome the restraints imposed in any one area by too much or too little rainfall, and may select more specifically the plants to be worked: the art is well developed. There is also a better understanding of the flowering habits of the various honey and pollen plants, though cases still occur of a promising flow that does not develop (due mainly to adverse weather conditions) necessitating early transfer to yet another site.

A further explanation of rising productivity, and one assuming some importance latterly, is the research that has helped to moderate loss of production through disease and increase the potential through better strains of bees.

Volume and Value of Production

The marketed output of beefarming consists of two products—honey and beeswax. Honey accounts for over 90 per cent of output, both by volume and by value, yet beeswax, despite its small contribution, has an important role in apiculture. It is a joint product with the honey, for about 1½ pounds are obtained for every 100 pounds of honey extracted. The comb in which bees store honey is made from it, and no satisfactory substitute has yet been found for this basic material. The capping placed over each cell of the comb as it is filled with honey is also beeswax and the proportion of the frame so covered gives an indication of the ripeness of the honey. It is generally accepted that 75 per cent should be covered before honey extraction is started.

The output of honey increased approximately fourfold between 1935-36 and 1959-60; an increase of similar magnitude occurred in beeswax production (Table 12). There have, however, been some marked shorter-term interruptions to a secular trend that has been steadily upward during the period. In 1942-43, for instance, honey production slumped to less than two million pounds and in 1948-49 reached a record 26 million pounds.

As a consequence of the increased production, and with an advancement in producer prices, the Gross Value of Production has shown a very large increase. Between 1935-36 and 1959-60 the gross value of honey production rose from £70,564 to £1,129,000, and that of beeswax production from £4,884 to £70,000.

A similar increase in Net Value of Production has also been recorded, though the percentage that Net Value is of Gross Value (some measure of profitability) has latterly fallen by about five per cent. This means that the cost of marketing[16] now absorbs more of the product price and the unit return to the producer (from which must be met all other costs of

[16] See footnote to Table 12.

TABLE 12

Quantity, Gross Value and Net Value of Honey and Beeswax Produced in New South Wales, 1935-36 to 1959-60

Year	Honey		Beeswax		Net Value of Honey and Beeswax†	Net Value as Percentage of Total Gross Value
	Quantity	Gross* Value	Quantity	Gross* Value		
	lb.	£	lb.	£	£	Per cent
1935-36 ..	4,577,097	70,564	62,886	4,884	68,000	90.13
1936-37 ..	2,935,282	44,182	52,461	3,659	43,000	89.88
1937-38 ..	3,356,609	53,286	49,945	3,438	51,000	89.91
1938-39 ..	2,723,719	44,379	43,780	3,046	43,000	90.68
1939-40 ..	2,477,381	43,767	42,393	3,012	42,000	89.78
1940-41 ..	4,771,422	106,562	68,670	6,014	102,000	90.61
1941-42 ..	7,465,926	148,000	124,432	13,000	146,000	90.68
1942-43 ..	1,744,560	41,000	29,076	3,000	40,000	90.91
1943-44 ..	7,722,302	201,000	105,688	13,000	196,000	91.59
1944-45 ..	8,534,640	231,000	142,244	18,000	228,000	91.57
1945-46 ..	3,915,519	122,360	57,490	7,186	120,000	91.63
1946-47 ..	9,016,638	281,770	111,916	13,990	272,000	91.97
1947-48 ..	9,775,673	305,490	113,211	14,151	293,000	91.67
1948-49 ..	26,007,774	812,743	295,892	41,918	792,000	91.50
1949-50 ..	9,227,004	288,344	117,939	17,691	280,000	91.49
1950-51 ..	9,994,195	312,000	126,047	19,000	298,000	90.03
1951-52 ..	6,813,912	270,000	85,801	13,000	254,000	89.75
1952-53 ..	8,046,456	369,000	94,297	31,000	359,000	89.75
1953-54 ..	10,380,969	476,000	122,985	41,000	464,000	89.75
1954-55 ..	16,410,859	752,000	193,544	64,000	736,000	90.20
1955-56 ..	15,207,330	789,000	183,931	60,000	771,000	90.81
1956-57 ..	14,945,957	938,000	187,750	57,000	905,000	90.95
1957-58 ..	12,868,130	818,000	161,018	44,000	764,000	88.63
1958-59 ..	10,583,214	661,000	136,852	38,000	618,000	88.41
1959-60 ..	18,681,499	1,129,000	256,720	70,000	1,030,000	85.90

* Gross Value of Production is the Value at Principal Markets.
† Net Value of Production is Gross Value less the direct costs of marketing.
Source:—Commonwealth Bureau of Census and Statistics.

production) has declined. On the other hand, the index of prices received by beefarmers is still, at 381 in 1959-60, more than 30 points above the 348 recorded in that year for the Foodstuffs and Tobacco group of the Wholesale Price (Basic Materials and Foodstuffs) Index.[17]

The above discussion has outlined the changes in the factors from which can be measured the growth of the honey industry. It is not possible to assess accurately how the changes in one factor may have affected those in another, nor what exactly provided the stimulus for growth. However, it appears that the more important changes have been in the number of hives and yield per hive. The increase in beekeepers may not have had a very great influence because the indications are that new entrants started with only small apiaries and, in view of footnote 12, the increase may not have

[17] The index of prices received by bee farmers has been derived from Table 12. It has been computed to the same base (average three years ended 1938-39) as the Wholesale Price Index. For more details of this latter index see, for instance, *New South Wales Monthly Summary of Business Statistics*, No. 349 (August, 1962), Bureau of Census and Statistics, Sydney.

been as great as suggested by the statistics. Similarly, the increase in value of production has been more a result of greater output than higher product prices, for the price index of honey and beeswax stands at almost the same level as the Wholesale Price Index.

5. DISTRIBUTION OF THE INDUSTRY IN THE STATE, AND RELATED FACTORS

It is possible that in exceptionally favourable seasons commercial beekeepers may venture into the Western Division but normally their activities are restricted to the eastern part of the State, and mainly to the 20-30 inch. rainfall area of the Tablelands and Slopes. Even then, however, few beekeepers establish their apiaries on permanent sites. Rather, they move their hives around the countryside, operating in many cases from headquarters in townships. In this way, they obtain the services offered by these townships, and also the opportunity to utilize the alternative sources of nectar and pollen provided by the district-to-district variation in the most important honey plants.

Beefarming Districts

The principal commercial beefarming districts of the State of New South Wales may be delineated and grouped as follows:—[18]

North Coast District—Tweed River, Richmond River, Clarence River, Hastings River, Manning River, Hexham to Dungog and Stroud, Bulahdelah, portions of the Hunter River Valley.

Inland Northern District—Inverell to Tingha, Deepwater to Emmaville, Tamworth, Quirindi, Muswellbrook to Sandy Hollow, Bingara, Warialda.

Central Western District—Capertee to Mudgee, Bylong Valley to Coolah, Bathurst to Hill End, Trunkey Creek to Tuena, Molong to Yeoval, Forbes to Eugowra, Condobolin, Wellington.

Southern District—Albury and the Murray River District, Gundagai, Tumut, Frampton, Young, Goulburn, Crookwell, Captain's Flat, Burragorang Valley, Nowra, Queanbeyan, Bermagui to Monaro.

TABLE 13

Distribution of Beefarms in Districts of New South Wales, 1940-41

District	Number of Beefarms	Percentage
		Per cent
North Coast	604	25.58
Inland Northern	299	12.64
Central Western	740	31.28
Southern	723	30.56
TOTAL	2,366	100.00

Source:—Derived from *New South Wales Statistical Register* for 1940-41, Bureau of Statistics and Economics, Sydney (December, 1942), p. 171.

[18] After W. A. Goodacre, *The Honey and Pollen Flora of New South Wales,* (New South Wales Department of Agriculture, Sydney: Government Printer, 1938).

In 1940-41, the last year for which such records are avaliable, the Central Western District was relatively the most important (on the basis of number of beekeepers), closely followed by the Southern and North Coast Districts: the Inland Northern District contained only 12 per cent of the total (Table 13). However, this classification does not exactly indicate the commercial importance of an area, for the statistics relate to a population that included a large number, probably nearly 75 per cent of the total, of beekeepers with less than 100 hives.

A rather more exact and up-to-date indication of the importance of these districts is provided by Figures 3 to 6. These show the location of the headquarters of commercial beekeepers who were the survey population referred to earlier. In general it is obvious that the Central Western District is still numerically the most important but the Inland Northern District has as many if not more commercial beekeepers than the North Coast and Southern Districts. Indeed, the coastal areas of the State, and even the irrigation areas of the Southern District do not appear to support many commercial beekeepers.

A closer study of the illustrations reveals further that as the scale of enterprise increases there is a movement northward as well as away from the coast. It can be seen from Figure 6 that there are more beekeepers with over 500 hives in the Inland Northern than in the Central Western District; and very few in the Southern District. This contrasts markedly with the distribution shown, for instance, in Figure 3 where more beekeepers are found in the Central Western and Southern Districts. Thus, it seems likely that the Inland Northern District is better suited to large scale production of honey, though from a general viewpoint the Central Western District, and to a lesser extent the irrigation areas of the Southern District, support a greater total number of individual producers.

Urban Headquarters

It was noticed during the preparation of the above illustrations that a great many beekeepers seemed to live in towns. Subsequent analysis (Table 14) revealed that almost half the commercial beekeepers in this State lived in towns with a population of more than 3,000, and nearly a

TABLE 14

Distribution of Beekeepers amongst Towns of Certain Size in New South Wales *

Population of Town	Number of Beekeepers	Percentage
		Per cent
Under 3,000	315	57.1
Over 3,000 but under 5,000	22	4.0
Over 5,000 but under 7,000	77	13.9
Over 7,000, but under 10,000	45	8.2
Over 10,000	93	16.8
TOTAL	552	100.0

* Classification based on Tables 40 and 41 in *The Official Year Book of New South Wales*, No. 57, 1960, Part II, Population and Vital Statistics. Pp. 63-65.

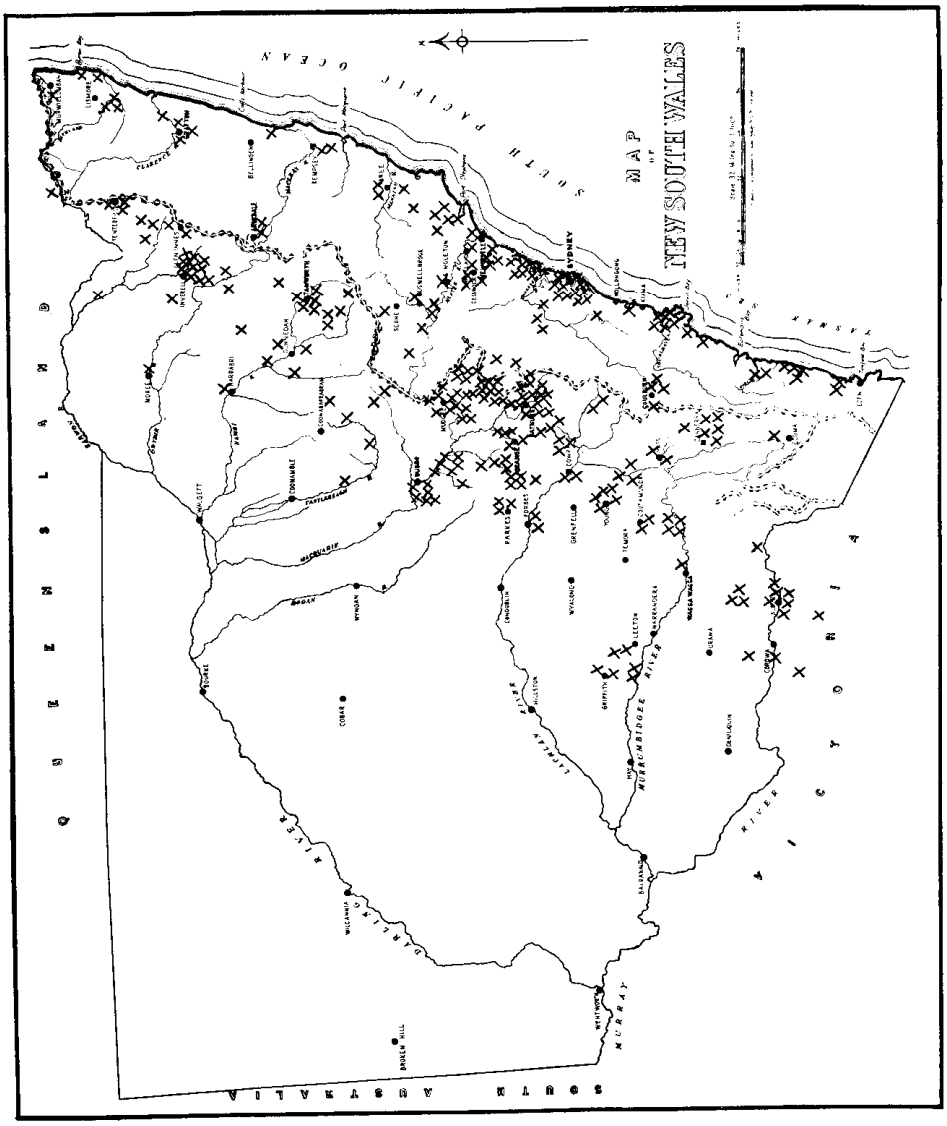

Fig. 3. Showing the Headquarters of Beekeepers with between 100 and 199 Hives

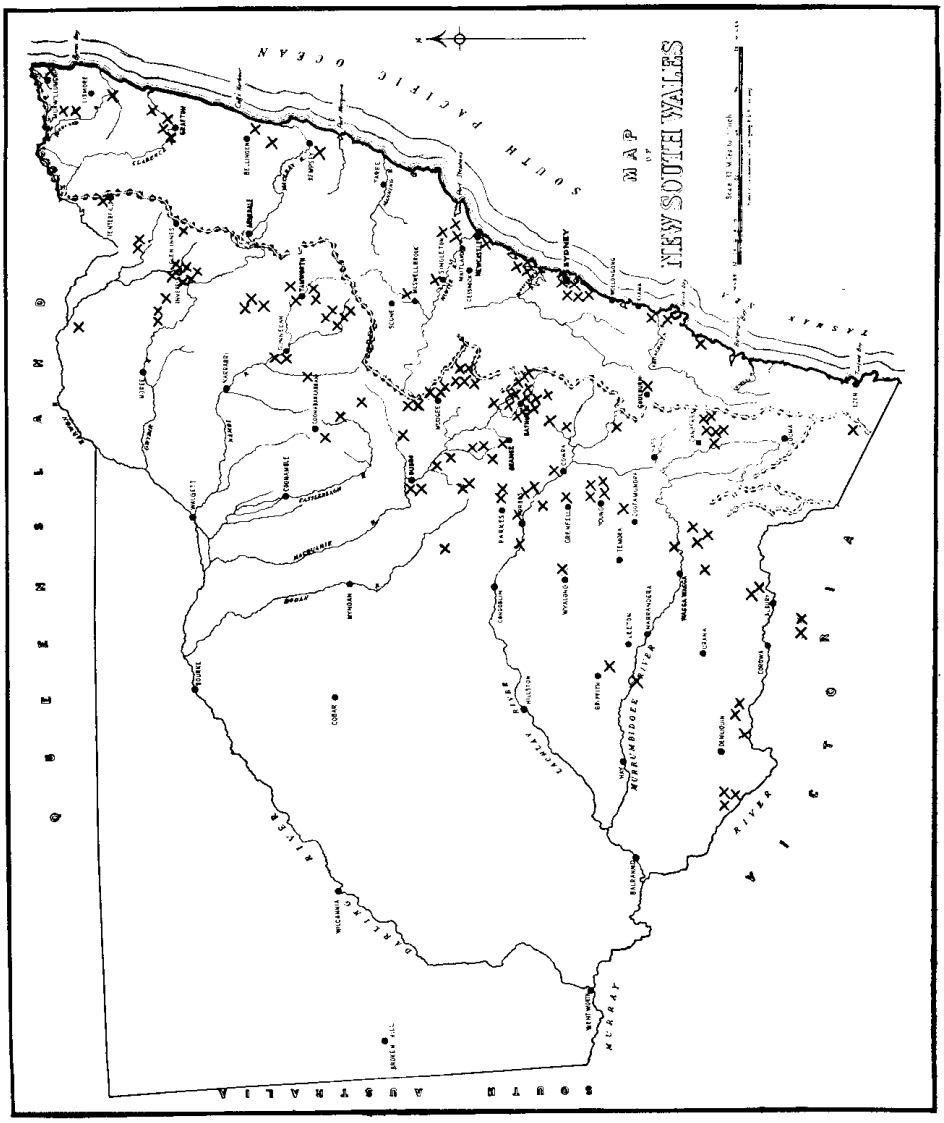

Fig. 4. Showing the Headquarters of Beekeepers with between 200 and 299 Hives

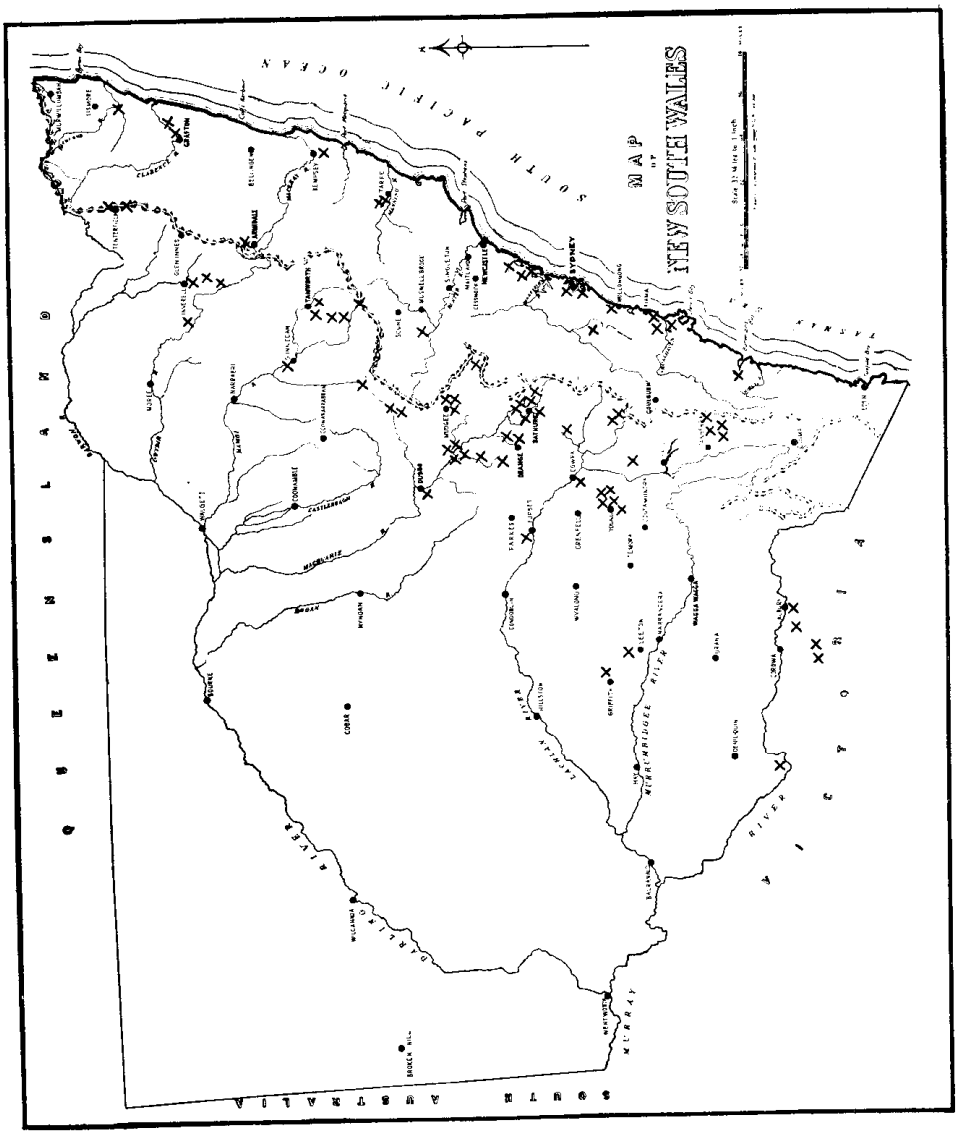

Fig. 5. Showing the Headquarters of Beekeepers with between 300 and 399 Hives

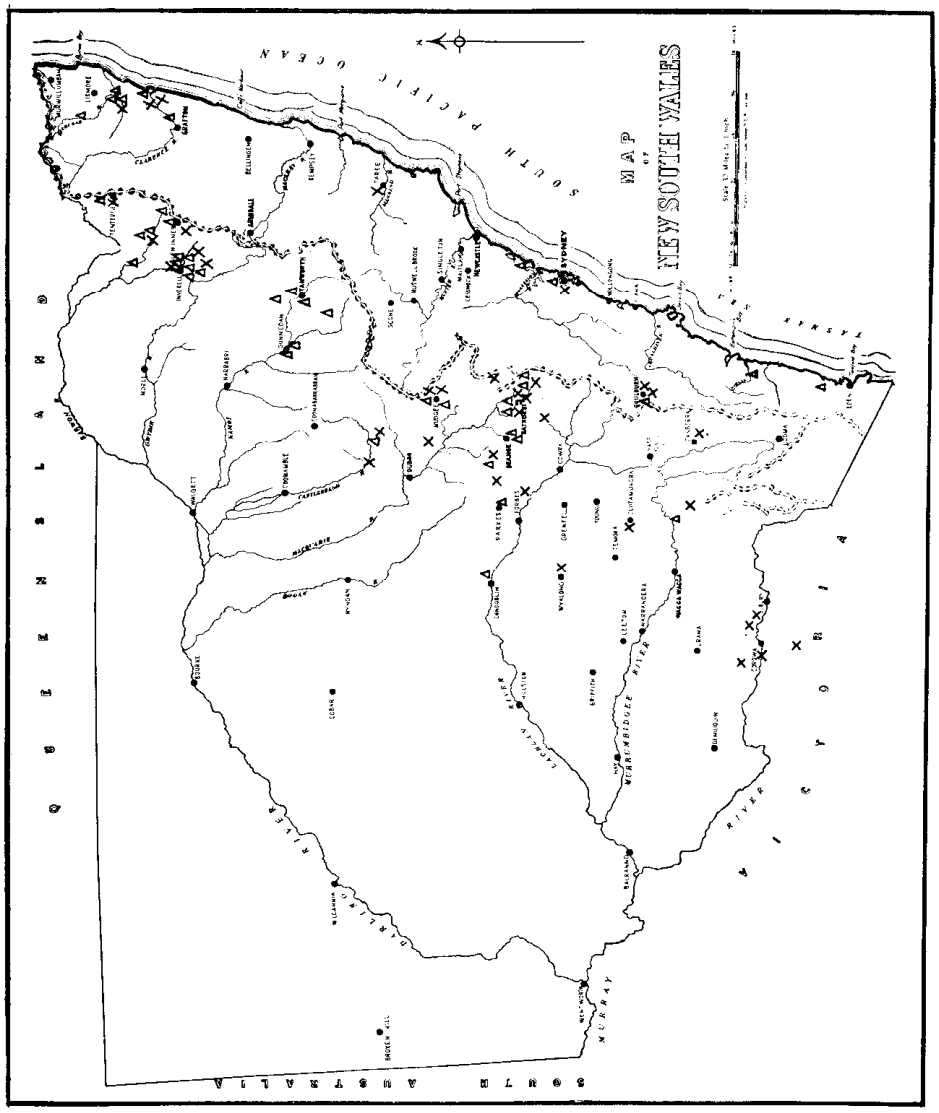

Fig. 6. Showing the Headquarters of Beekeepers with between 400 and 499 (crosses) and 500 or more (triangles) Hives

sixth in towns of over 10,000 population.[19] Towns of this size offer many facilities—piped water and sewerage, electricity, proximity to Schools, but the most important to the beekeeper are the availability of work and proximity to main roads or railways.

Towns with over 3,000 population generally have a reservoir of jobs in both primary and secondary industry. This is becoming increasingly important, for in very recent years some of the smaller beekeepers have had to take part or even full-time jobs to augment their income from honey. Indeed, the survey revealed that less than 40 per cent of beekeepers derive all their income from apiculture (Table 15). A further fifth combine apiculture and some other aspect of farming; 10 per cent derive part of their income from beekeeping with the remainder coming from casual work on farms; a small proportion are engaged in forestry; and nearly a third draw some income from jobs in secondary industry or other occupations.

The juxtaposition of primary and secondary industry as income sources is probably the most important reason for beekeepers living in towns. A further reason stems from the difficulty in finding satisfactory apiary sites.

TABLE 15

Income Sources of Beekeepers, New South Wales Survey, 1962

Income Source	Proportion of Total
	Per cent
Honey Production only	37.2
Honey Production and: —	
Crop or Livestock Farming	19.8
Casual Farm Work	9.6
Forestry	3.4
Secondary Industry	15.4
Others	14.6
TOTAL	100.0

TABLE 16

Proportion of Beekeepers Using Permanent and Temporary Sites, New South Wales Survey, 1962

Type of Site	Percentage of Beekeepers
	Per cent
Permanent	14.4
Temporary:—	
booked in advance	56.0
not booked in advance	29.6
TOTAL	100.0

[19] Tumut is the smallest town with over 3,000 population and Dubbo the smallest with over 10,000 population.

The choice of any site on which to place hives depends on several factors—a good range of useful plants or the certainty of a flow from a variety which yields good quality honey; pollen supplies; access to water; reasonable proximity to service facilities—and there are very few areas of the State that can provide these in amounts adequate to justify permanent location of the apiary. Survey returns show in fact that only 14 per cent of beekeepers (almost entirely those with less than 300 hives) have permanent apiary sites (Table 16). The majority move the bees from site to site, cumulatively obtaining the required conditions for honey production. And since this may involve travelling considerable distances in a season it is natural that headquarters should be located at a place allowing maximum travel on good roads. Further, the bulk of honey produced in New South Wales moves from production to consumption areas by road transport. Very little honey is moved by rail, though easy access to the railway saves time when picking up equipment, such as new tins, hive material, and queen bees.

Sources of Honey

Innumerable plant species have been reported as giving some honey but only relatively few warrant serious attention by commercial beekeepers. These comprise mainly native plants, and particularly eucalypts. Few cultivated plants (that is, clover, lucerne, etc.) are actively exploited by bees, and the honey obtained therefrom is not a very large proportion of the total crop.

The dependence on native flora means that useful species vary slightly from district to district but for purpose of exposition the State can be divided into two main regions; the Coastal and the Inland Region.

In the Coastal Region (Figure 7) the outstanding species are *Eucalyptus maculata* (Spotted Gum) and *E. paniculata* (Grey Iron Bark). The former, although flowering during the winter season, has a very heavy nectar flow and Grey Iron Bark yields honey of the choicest quality. By comparison, the quantity and quality of honey from other species is much lower, though good crops can be obtained from *E. siderophloia* (Broad-leaved Iron Bark), *E. gummifera* (Bloodwood), *E. longifolia* (Wollybutt) and *E. hemiphloia* (Grey Box). On the other hand, many species have only localized distribution and relatively short flowering periods: in particular this is evident in the spring and early summer.

Beekeepers do not greatly favour the Region for honey production. Rather, they tend to look to it more for wintering bees, or for building up hive strength in the early spring, and extensive exploitation is largely confined to seasons which generate favourable conditions on the Coast and, or, unfavourable conditions Inland.

The flowering period of useful species in the Inland Region is noticeably longer, and the distribution more general (Figure 8). Most of them are capable of yielding good crops, but the most valuable are *E. melliodora* (Yellow Box), *E. albens* (White Box), *E. sideroxylon* (Mugga Iron Bark), and *E. caleyi* (Caley's Iron Bark). These yield honey of the choicest quality —fairly dense (possibly because of the dry climate), light coloured, and with an excellent flavour. Unfortunately, some areas have been almost

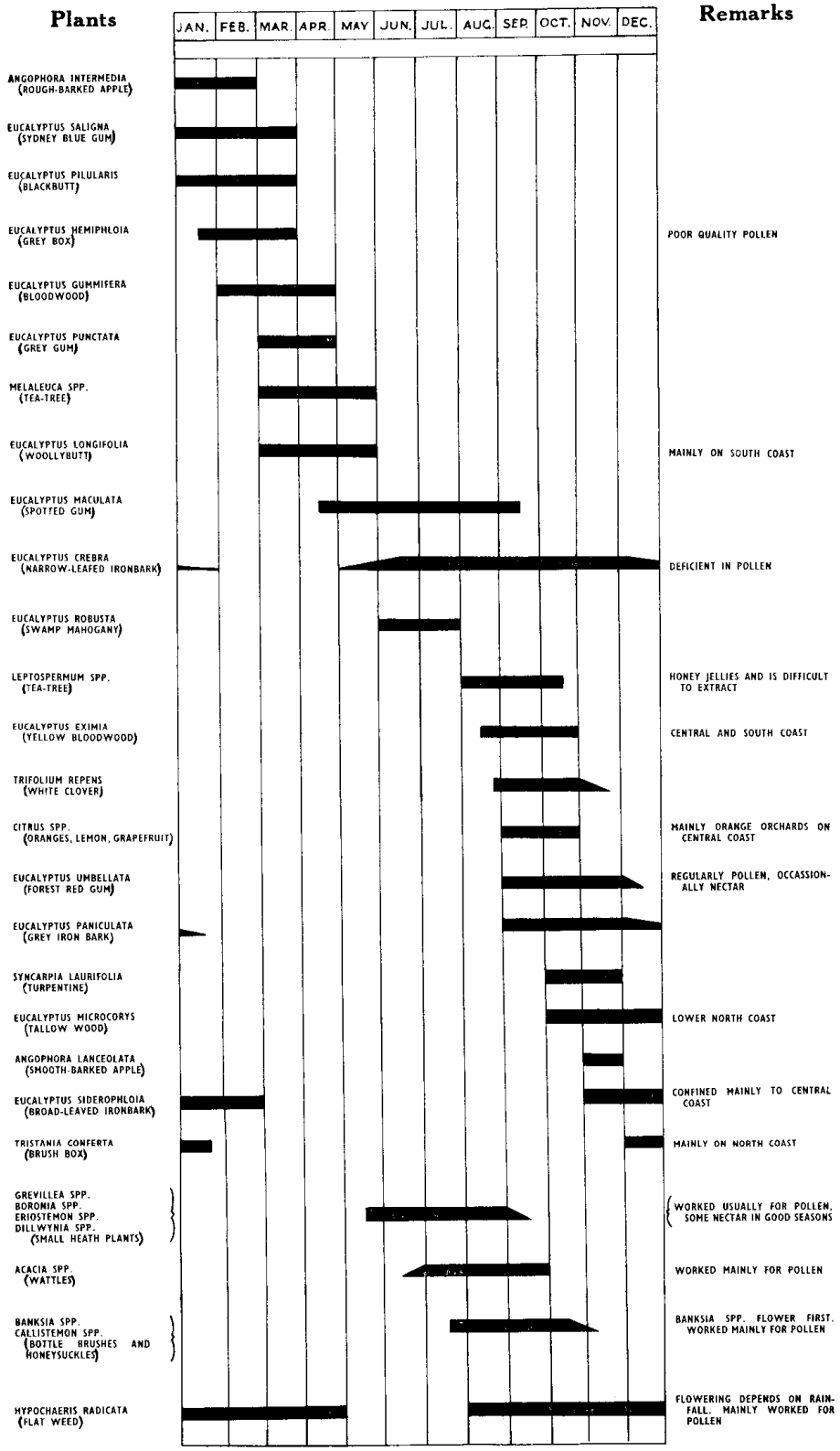

Fig. 7. Flowering Periods of the Principal Honey Plants in the Coastal Region

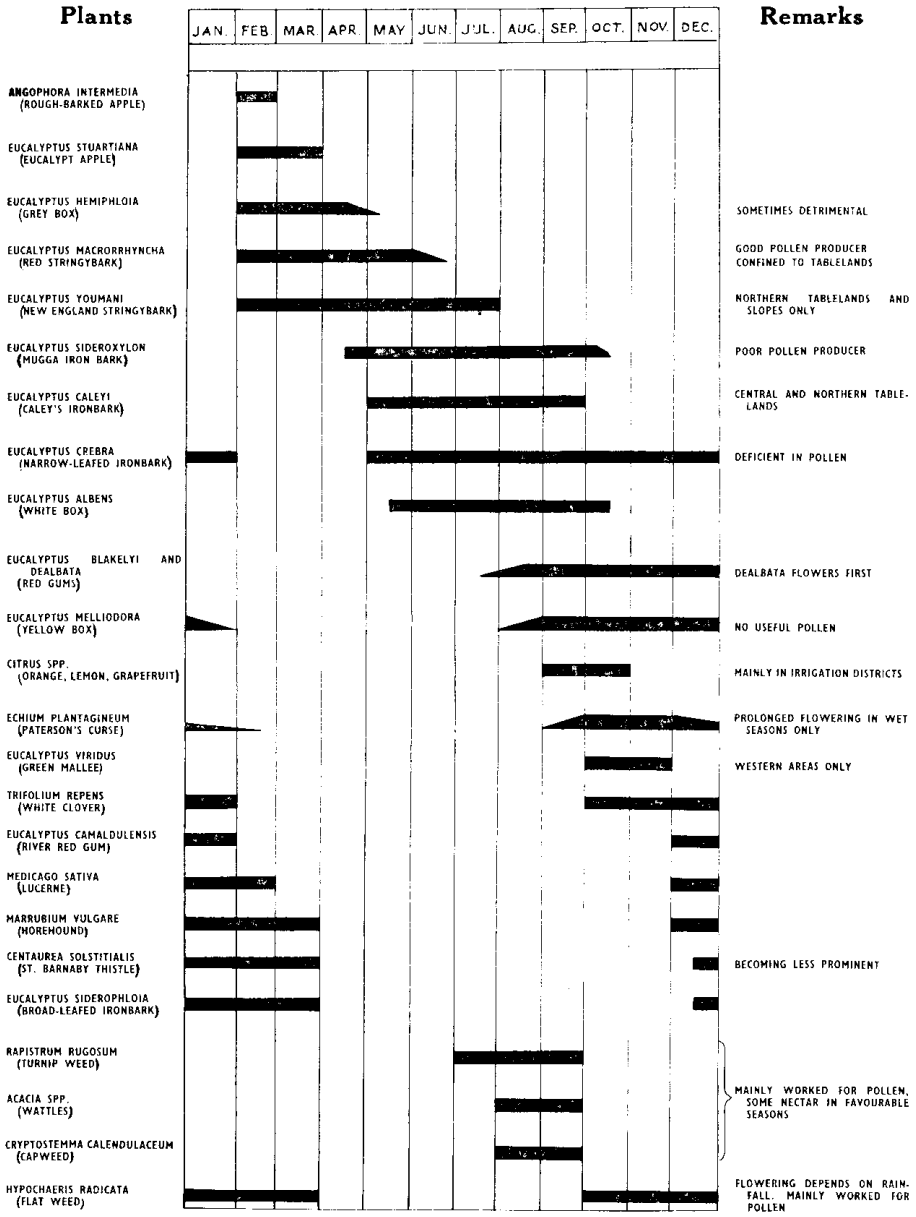

Fig. 8. Flowering Periods of the Principal Honey Plants in the Inland Region

denuded of these honey plants as land has been cleared for more intensive farming, though subsequent seeding to improved pasture (especially when they are lucerne or clover dominated) has afforded some compensation.

The inland species generally are heavy nectar producers, and are able to support more productive hives in a given area than is the case in the Coastal Region. On the other hand, this is not always an advantage since it may lead to a relative scarcity of pollen. In particular, this is evident when working certain Boxes and Ironbarks which produce little, or unusable pollen.

Some of the plants shown in the illustrations (for instance, Capeweed, or the small Heath Plants) and certain others not listed are valued for their pollen, rather than their nectar. Pollen has a valuable role in honey production, for it is an essential pre-requisite for breeding hive replacements. Usually, the bees are placed near suitable pollen-producing species in the spring to build up hive strength and thus ensure that they can effectively work the nectar flows during the ensuing months. Even then, access to pollen must be maintained to ensure adequate replacement stocks of young brood. Most plants provide some pollen in addition to the nectar though, as mentioned above, shortages can occur from time to time in the Inland Region.

On a broad view of all species in all districts it would appear that honey could be produced throughout the year. This is so in some years, when weather conditions are favourable. More often, however, the weather during the winter season (approximately June to August) is not favourable and attempts to work nectar flows during this period usually have a detrimental effect on the bees.

6. PRODUCTION AND MARKETING PRACTICES

Choice of Sites

It has already been intimated that hives are seldom kept permanently on one site. More generally they are moved (often several times in a season) around the countryside, and depending on the size of the apiary the move may embrace all or just some of the hives. The sites used can be broadly classified into three types—Private, Forestry, and Pastures Protection Board (P.P.B.). Some private sites will be owned by the operators, and the remainder will be rented from other landholders for various payments but most often a 60 pound tin of honey. Forestry sites, costing £3 for three months or £6 per annum, comprise a square mile of land controlled by the New South Wales Forestry Commission. P.P.B. sites are on the travelling stock reserves provided throughout the State by the Pastures Protection Boards. Charges for them are determined by the individual Boards but £1 seems to be the most usual.

More than twice as many beekeepers use private as use Forestry and P.P.B. sites (Table 17). This is probably because the former are more freely available and hives on them are less liable to interference, for payments must frequently be greater than required by Forestry and P.P.B. authorities. Forestry sites are limited in number by the stipulation that each must be

TABLE 17

Percentage of Beekeepers (Migrant, Non-migrant and in Total) using Different Types of Apiary Sites

New South Wales Survey, 1962

Practice	Type of Site		
	Private	Forestry	Pastures Protection Board
	Per cent	Per cent	Per cent
Non-migrant	83.3	13.2	13.2
Migrant and Book in Advance	75.8	47.2	36.2
Migrant and do not Book in Advance ..	83.6	69.0	34.2
All Beekeepers	79.2	38.2	37.2

N.B.—Percentages do not add to 100 since Beekeepers may use more than one site.

one square mile, and P.P.B. sites are not as numerous as might be expected because some authorities will not allow beekeepers to place hives on travelling stock reserves.

Most of the non-migrant beekeepers use private sites, and only 26 per cent have apiaries permanently established on the other types. While most migrant beekeepers use private sites, they also tend to make more use of Forestry and P.P.B. sites. Thus, Table 17 shows that among those who book in advance 47 per cent and 36 per cent respectively use Forestry and P.P.B. sites and among those who do not book in advance 69 per cent and 34 per cent respectively use them.

Apiary Equipment

Under the Apiaries Act, 1916-1944, beekeepers must use properly constructed hives, and the industry has standardized on two types, an eight-frame and a ten-frame hive[20]: the use of other types for honey production is extremely rare, though smaller hives (of three, four or five frames) are commonly used for queen breeding.

Nearly half of all beekeepers use both types (Table 18), a quarter use only ten-frame and the remainder only eight-frame hives: there does not appear to be any discrimination between, or preference for one or the other of the main types.

[20] It is assumed that the reader has some basic knowledge, at least the terminology, of the Industry. For those who have not, a good background can be gained from: New South Wales Department of Agriculture, *Bees and Honey* (4th Edition, Sydney, Government Printer, 1960); or C. R. Root and M. J. Deyell, *The ABC and XYZ of Bee Culture* (3rd Edition, Medina Ohio: The A. I. Root Co., 1950).

TABLE 18

Proportion of Beekeepers using Eight, Ten, or Eight and Ten Frame Hives, New South Wales Survey, 1962

	Per cent
Eight-Frame Hives	29.0
Ten-Frame Hives	24.1
Both Eight- and Ten-Frame Hives	46.9
TOTAL	100.0

For each type there are four frame-depths available: Half, Ideal, W.S.P. and Full.[21] In general, Full-depth frames are most popular, being used exclusively by two thirds, and in combination with others by 96 per cent of beekeepers (Table 19). The next most popular is Ideal-depth, used by nearly a quarter, and then W.S.P. and Half used by 13 and 11 per cent respectively but in all bar 3 per cent of the apiaries they were used in some combinations or with Full-depth. It is not difficult to understand why beekeepers should prefer Full-depth frames—*per se* they yield more honey. However, extension of this thesis would suggest also the more widespread use of the larger ten-frame hives (which is not the case) and further inquiries revealed that such hives present loading and handling difficulties because they are too heavy. Even fastening together of the hive bodies does not overcome the problem.

TABLE 19

Proportion of Beekeepers using Full, WSP, Ideal and Half Depth Frames, Only and in Combination, New South Wales Survey, 1962

Type of Frame	Percentage of Beekeepers using	
	Only	In Combination
	Per cent	Per cent
Full Depth	66.2	96.7
WSP Depth	1.8	13.0
Ideal Depth	1.0	23.2
Half Depth	0.5	11.1

For moving hives, the most popular form of fastening is the Strapping Machine, used by over half the migrant beekeepers (Table 20).[22] The Emlock or similar type, the Reade Fastener, or Cleats are individually less popular but in total are used by nearly two-fifths of the beekeepers. The other types listed are used by only relatively few people.

[21] The distinction between these is in the dimensions. Half-depth frames measure 19 in. x 4½ in., Ideal 19 in. x 5⅜ in., W.S.P. 19 in. x 7⅛ in., and Full-depth 19 in. x 9⅛ in.

[22] Beekeepers using permanent sites have no cause to strap their hives. The data used thus refer to only about four-fifths of the total.

TABLE 20

Proportion of Migrant Beekeepers using Certain Types of Hive Fasteners, New South Wales Survey, 1962

Type of Fastener	Proportion
	Per cent
Strapping Machine	53.7
Emlock or Similar Type	19.8
Reade	8.5
Cleats	9.6
Wedge Clips	3.4
Others	5.0
TOTAL	100.0

Extraction and Processing

Because the apiary is dispersed over the country-side there are two alternatives when the time comes to extract the honey. Either the extracting equipment can be taken to the site, as is done by over two-thirds of beekeepers (Table 21) or the full frames (in the boxes) may be removed from the hive and taken to a central extracting plant. This latter system

TABLE 21

Proportion of Beekeepers using Mobile or Central Extracting Plants, New South Wales Survey, 1962

Beekeepers using	Proportion
	Per cent
Mobile Plant	68.5
Central Plant:—	
with Hot Room	20.8
without Hot Room	10.7
TOTAL	100.0

allows for better facilities, in particular the use of a heated room for storing frames whenever the honey cannot immediately be extracted. While it does not appear (Fig. 9) that there is any great variation[23] in the use of central extracting plants among beekeepers with different sized apiaries, there is a significant statistical difference[24] in the use of central extracting plants incorporating a hot room. Thus, Fig. 9 shows that less than three per cent of beekeepers with between 100 and 199 hives, compared with 32 per cent of those with 500 or more hives, use a central

[23] $p = 0.10$.
[24] $p = 0.01$.

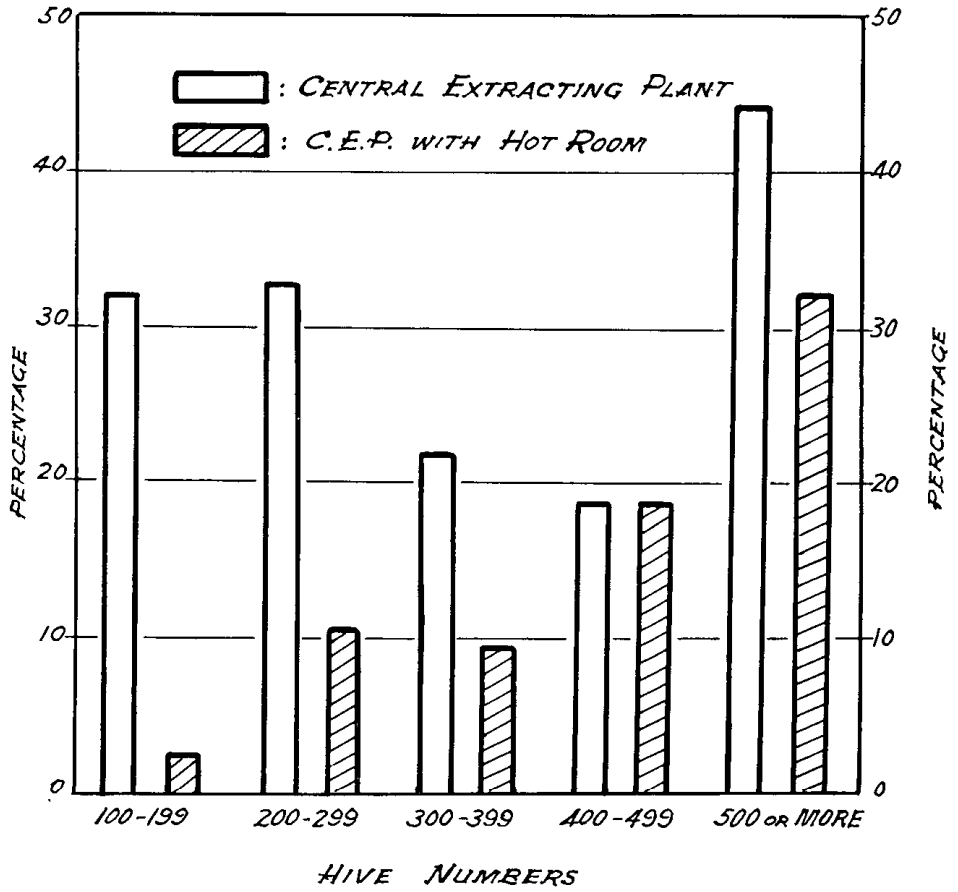

Fig. 9 Shows Percentage of Beekeepers, According to Hive Numbers, with Central Extracting Plants and Central Extracting Plants with Hot Room.

extracting plant incorporating a hot room. The reason for smaller operators not having a hot room is either that the expenditure is not justified for the amount of honey involved or, more likely, that there are capital limitations despite the obvious advantages.

The extraction and processing of honey can be divided into two phases. First, the full frames are removed from the hive body. Bees still working on the comb may be cleared off either by placing mats sprinkled with

TABLE 22

Carbolic Acid Usage by Beekeepers, New South Wales Survey, 1962

		Per cent
Users		47.8
Users but not satisfied:—		
Unsuitable in Cool Conditions	4.4	
Taints Honey	4.2	
Harms Brood	1.5	
Other Reasons	2.4	12.7
Non-users		39.5
TOTAL		100.0

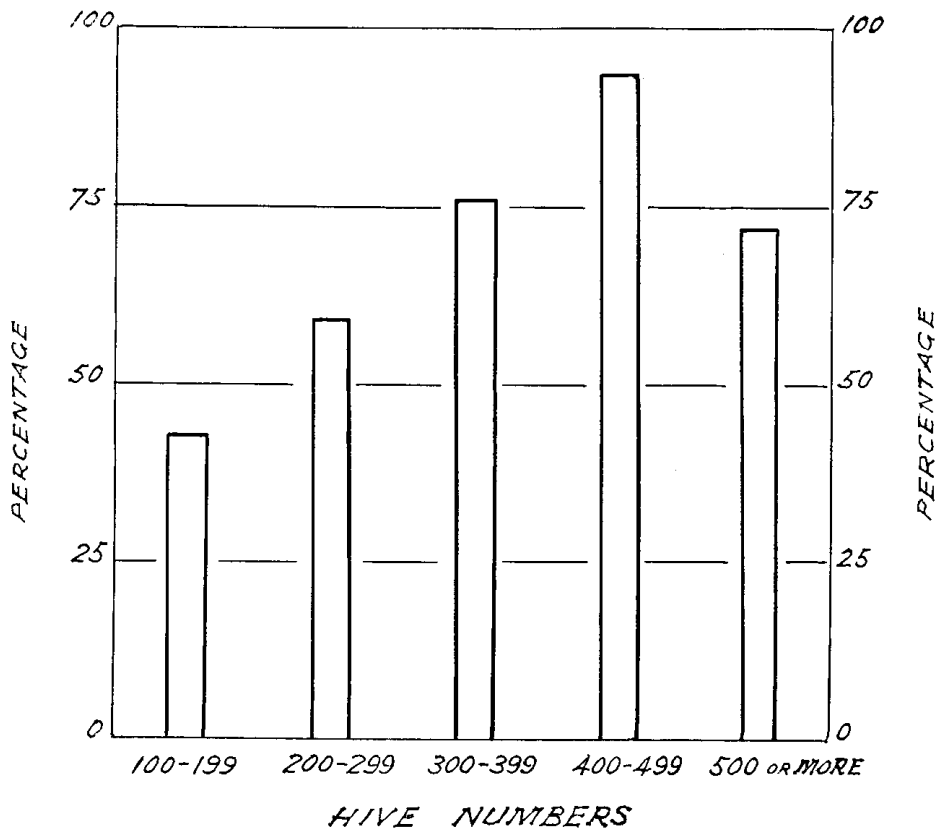

Fig. 10. Shows Percentage of Beekeepers, according to Hive Numbers, using Carbolic Acid.

carbolic acid on top of the hive, or by removing the frame and then brushing and shaking off the bees, or by using carbolic acid and finishing off with brushing and shaking. Nearly 60 per cent of all beekeepers use carbolic acid (Table 22). Of these 60 per cent, however, 12 per cent are dissatisfied with it, and the reasons were in many cases echoed by non-users. The percentage of beekeepers using carbolic acid increases steadily (Figure 10) as apiary size increases to 499 hives, and then falls again. The reason for this fall is not clear but industry experts consider that it is probably because beekeepers with more than 500 hives generally have hired regular labour and therefore prefer to use the more satisfactory but laborious brushing and shaking methods. Survey returns tended to confirm this by showing that in apiaries with more than 400 hives, the beekeepers using carbolic acid in general do not employ regular labour, whereas those not using carbolic acid do employ regular labour.

In the second phase the capping of beeswax is removed and the honey extracted from the comb. It is at this stage that the honey is partially or completely processed for marketing by heating, straining, and settling. Slightly fewer beekeepers settle the honey rather than strain it, and only 75 per cent use heat in the extraction stage (Table 23). It may well be, however, that the proportion using heat is slightly understated: the honey may be warmed to make it less viscous and thus aid straining but the temperature reached is not high enough to warrant calling the warming part of the treatment.

TABLE 23

Proportion of Beekeepers Heating, Straining, and Settling Honey during Extraction, New South Wales Survey, 1962

	Per cent
Heating	75.8
Straining	85.5
Settling	76.8

Of the combinations of heating, straining, and settling, the most usual is all three, and other variations are relatively less common (Table 24). The actual combination used, however, seems to depend on the type of extraction plant, and it is particularly noticeable that beekeepers with central extracting plant and hot rooms use only those combinations, viz.; heat and settle, heat and strain, or heat, strain and settle, which are considered the most desirable. It is undoubtedly the possession of a hot room, allowing,

TABLE 24

Combination of Heating, Straining, and Settling used by all Beekeepers and those with Different Extracting Plants, New South Wales Survey, 1962

Combination	Percentage of all Beekeepers	Percentage with:		
		Mobile Plant	Central Plant	C.P. and Hot Room
Heating only	3.0	3.0	..	..
Straining only	6.8	6.3	0.5	..
Settling only	5.4	2.4	3.0	..
Heating and Straining	12.1	9.6	1.0	1.5
Heating and Settling	7.0	3.0	1.5	2.5
Straining and Settling	12.2	7.4	4.8	..
Heating, Straining, and Settling	53.5	36.8	10.0	6.7
TOTAL	100.0	68.5	20.8	10.7

as it does, for more orderly and convenient extracting, that enables these beekeepers to dispense with the less complete treatments. It is also noteworthy that combinations incorporating straining rather than settling are more commonly used by beekeepers with mobile plants and that altogether less satisfactory treatments are frequently noted with this type of plant.

FURTHER TREATMENT

Nearly two-thirds of beekeepers regard the above processing as sufficient to prepare the honey for market (Table 25): among the remainder, 15 per cent always and 20 per cent sometimes further treat the honey before marketing. This further treatment variously comprises reheating, restraining, resettling, and blending the honey. The proportion of beekeepers using these aids as part or all of the further treatment is given in Table 26.

TABLE 25

Percentage of Beekeepers Treating Honey after Extracting, New South Wales Survey, 1962

Practice	Proportion Using
	Per cent
Never	64.2
Sometimes	15.0
Always	20.8
TOTAL	100.0

TABLE 26

Practices of Beekeepers using Further Treatment, New South Wales Survey, 1962

Practice	Proportion Using*
	Per cent
Proportion of Beekeepers using Further Treatment	35.8
Proportion of these Practising:—	
Reheating	23.6
Restraining	23.6
Resettling	16.0
Blending	5.2

* Percentages not cumulative because some beekeepers use more than one practice.

TABLE 27

Extracting and Selling Practices, New South Wales Survey, 1962

Practice	Always	Sometimes	Never
	Per cent	Per cent	Per cent
Less Complete Extraction Treatment* ..	48.4	16.2	14.2
Complete Extraction Treatment	51.6	84.8	85.8
Sell in Small Containers	61.2	60.4	22.6
Do not Sell in Small Containers	38.8	39.6	77.4
Sell to Shops, Stalls, Consumers	77.4	79.0	40.6
Do not Sell to Shops, Stalls, Consumers ..	22.6	21.0	59.4

* Less complete extraction treatment implies heating, straining, settling only, or straining and settling (See Table 24).

The need for further treatment seems to arise in the following instances:—(1) less complete treatment during extraction, (2) sales in small containers up to 7 pounds, and (3) sales to shops, road-side stalls, or directly to the consumers. Less complete treatment is a feature common to nearly 50 per cent of beekeepers who always use further treatment (Table 27). On the other hand, less than 15 per cent of those who never further treat their honey were found to follow the less complete extraction practices. There is, however, no indication that honey extracted in a mobile unit is more frequently reworked than that extracted in a central plant.

It would thus appear that while the extraction treatment has some influence the main reason for further treatment lies in the selling practices. Table 27, then, also shows the proportion of beekeepers who do or do not further treat honey and then sell it in small containers and/or to shops, road-side stalls, or consumers. The noted similarity in selling practices (as contrasted with extraction treatment practices) between those who always and sometimes re-work is due most likely to the work being orientated more towards the portion of the crop going to retail outlets than to correcting deficiencies in the extraction stage.

Packaging and Selling

The above discussion has suggested that some beekeepers sell honey in small containers—that is, up to and including seven pound tins. Table 28 shows that 22 per cent and 33 per cent respectively sell some of the crop in small jars and seven pound tins. The total quantity so marketed is not

TABLE 28

Proportion of Beekeepers Selling Honey in Certain Container Sizes, New South Wales Survey, 1962

Container Size	Proportion Using
	Per cent
Small Jars and Bottles	22.7
7 lb. Tins	33.8
60 lb. Tins and Drums	98.6
44 Gallon Drums	7.2

known but it is unlikely to represent a large portion of the crop for until recently most of it has been packed in 60 pound containers and moved direct to packers and wholesalers. Indeed, 98 per cent of beekeepers still sell some honey in 60 pound lots. Another fairly recent innovation (though for bulk movement) is the 44 gallon drum but it is not yet used by many beekeepers due to lack of handling facilities.

The changing emphasis on packaging has also undoubtedly altered the selling practices. Nowadays, nearly half the beekeepers sell some honey direct to consumers and 30 per cent sell some to shops (Table 29). It should not be thought, however, that sales through these outlets are solely in small containers: there is still traffic in 60 pound tins and drums. That

TABLE 29

Proportion of Beekeepers Selling Honey Through Certain Outlets, New South Wales Survey, 1962

Outlet	Proportion Using
	Per cent
Packer and/or Wholesaler	90.3
Shops	30.9
Roadside Stalls	12.6
Direct to Consumer	45.9

this is so can be deduced from the fact that 90 per cent of beekeepers sell to packers and wholesalers whereas 98 per cent make use of 60 pound tins. Thus, at last eight per cent of beekeepers sell honey in this way to shops or direct to the consumer.