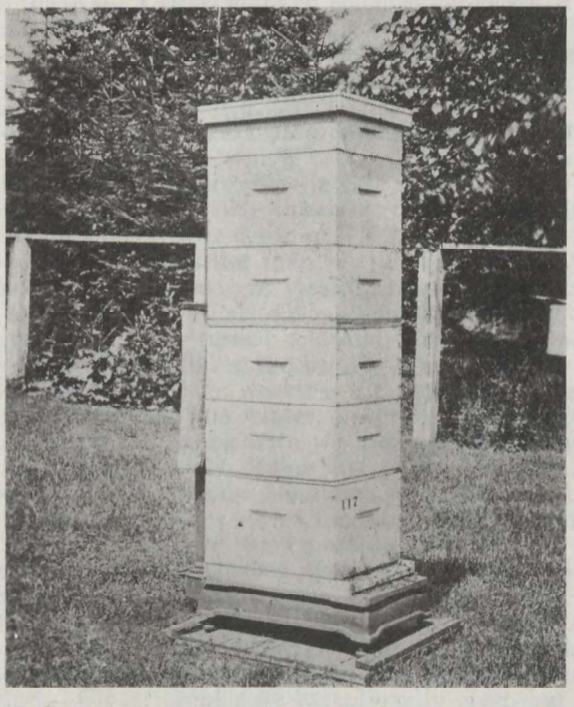
DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
DOMINION EXPERIMENTAL FARMS

BEE DIVISION

REPORT OF THE DOMINION APIARIST

C. B. GOODERHAM, B.S.A.

FOR THE YEAR 1925



A PROFITABLE COLONY
This colony stored twenty-four pounds of honey in one day, July 19, 1925, at Ottawa.

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Ottawa, 1926

OTTAWA
F. A. ACLAND
PRINTER TO THE KING'S MOST EXCELLENT MAJESTY
1926

DIVISION OF BEES

REPORT OF THE DOMINION APIARIST, C. B. GOODERHAM, B.S.A. FOR THE YEAR 1925

The winter of 1924-25 was a very satisfactory one for the beekeepers. Fine, open weather during the fall of 1924 enabled the bees to gather a considerable amount of fall honey, especially in the eastern and central provinces. This, in turn, stimulated brood-production so that the colonies in general were well filled with young bees for the winter.

The open weather also permitted generous feeding and careful preparation of the colonies for their long confinement to winter quarters so that, on the whole, bees were in fine condition both in strength and stores when put away for the winter. Cold weather set in rather early and was quite severe and steady throughout the latter part of November, December and January. This had the effect of keeping the bees closely clustered in their hives and resting contentedly, and not wasting their energy in useless activity. In the eastern provinces, it was not until February that the weather became mild enough for outdoor-wintered bees to show signs of activity by taking an occasional flight and during March flying became quite general. In the western provinces, with the exception of British Columbia, the bees were confined to their hives somewhat later than in the east. Cellar-wintered colonies, of course, did not feel the effect of this warmer weather, as they were not brought out into the open until about the middle of April. In a few localities in the West, especially where bees did not receive proper protection during the winter, heavy losses occurred, but such cases were not at all common. As such losses do occur, however, it is necessary to reiterate the factors that are essential for successful wintering. These are: (1) strong colonies of young bees; (2) enough wholesome stores given in the fall to last until the first flow in late spring or early summer; and (3) adequate protection from the cold, especially from cold winds. To neglect any of these three factors is to invite disaster.

The spring of 1925 opened earlier than in the previous two years and the early sources of nectar and pollen were yielding sooner. Unfortunately, however, these early, favourable conditions did not continue for long, and after the first few warm days, the weather turned cold and windy and remained so until the latter part of May, thus confining the bees to their hives for many days at a time and preventing them from working the early blossoms to the full. Although the bees came through the winter in very good condition, they were unable to build up during the spring with the rapidity that is apparent when there is a bountiful supply of early nectar and pollen available. These conditions were general over the whole Dominion. In most parts of Quebec, Ontario and the West, the greater part of the early flow from dandelion and fruit bloom was missed because of unfavourable weather. In the Maritime provinces and the eastern part of Quebec, these sources were a little backward and a spell of real warm weather during the latter part of May and the first week in June brought these flowers on with a rush and the bees worked them vigorously, so that in some localities a surplus was stored from them.

Early summer weather conditions were also unfavourable throughout Ontario and the East. Clover crops were exceptionally good, but poor weather prevented the bees from gathering nectar in large quantities from it, with the result that the average crop of white honey in the eastern provinces was rather low. In most parts of Ontario, however, a very heavy late crop was harvested from late clover and sweet clover. Conditions in the western provinces were favourable for good crops, especially in Manitoba and southern Alberta, where bumper crops were obtained. In British Columbia an average crop was harvested.

Fall conditions were only fair; in some localities a good crop of fall honey was obtained, while in others nothing was brought in. Feeding and preparations for the winter were, for the most part, carried out under adverse conditions; cool, wet weather hindered the beekeeper in his feeding operations and prevented the bees from storing their winter supply as rapidly as could be desired.

While it is a fact that honey crops were rather light in some areas, for the greater part of Canada they were good, and it is estimated that about twenty-one million pounds of honey were produced during the past season.

HONEY-PRODUCTION AT OTTAWA AND OUT-APIARY

In spite of unfavourable weather conditions during the spring and early summer which not only prevented the bees from taking full advantage of early sources of nectar, but had an adverse effect on early brood-production, a good crop of honey was harvested from white Dutch clover and sweet clover. The bees were first observed bringing in pollen on April 10—sixteen days earlier than in 1924—but they were only able to work the early sources for a few days before cool, windy weather practically confined them to their hives until the latter part of May. Dandelion and fruit bloom were abundant, but the bees were unable to work it to the full, and the colonies on scales registered losses instead of gains until these blossoms were nearly past. The number of days on which the colonies on scales showed any gains are given in the following table:—

HONEY-FLOW FROM DANDELION AND FRUIT-BLOOM

Year	Date flow started	Length of flow	Date flow ended	Highest yield in one day	Number of days during flow on which no gains were made
		days		pounds	days
1917	May 16	29	June 13	4¾	13
1918	" 17	15	May 31	3½	0
1919	" 24	13	June 5	2¾	0
1920	" 15	20	" 3	4½	2
1921	" 18	5	May 22	1	0
1922	" 18	12	" 29	3¼	4
1923	" 27	9	June 4	3½	0
1924	" 26	11	" 5	2½	2
1925	" 26	9	" 3	2½	3

A few years ago these sources of honey yielded a surplus of extracted honey at Ottawa, but of late years no surplus has been obtained due perhaps to a greater number of bees being kept. No gains were registered by the colonies on scales from June 3 to June 7, then an average gain of 1 pound 3 ounces was made by the four colonies. This gain came from alsike and white Dutch clovers. The gains made during June, however, were very light and were offset by losses during wet, cool days. In former years, the bulk of the honey crop harvested at Ottawa came from alsike clover, but this year practically no surplus was gathered from this source as no consistent gains were made by any of the colonies until after the bulk of this clover was cut for hay and the sweet clover began to yield at the latter end of June. The peak of the flow was evidently reached on July 19, when the highest individual gain was 24 pounds and the average gain for four colonies was 15 pounds 3 ounces. The following table summarizes the time, length and density of the main honey-flow at Ottawa for the past nine years:—

TIME AND LENGTH OF CLOVER HONEY-FLOW

Year	Date flow started	Length of flow	Date flow ended	Highest average yield in one day		Number of days during flow on which no gains were made
		days		lb.	oz.	days
1917	June 25	39	Aug. 2	9	4	4
1918	" 25	36	July 30	15	0	11
1919	" 14	42	" 25	13	4	7
1920	" 10	51	" 30	5	12	17
1921	" 5	44	" 18	11	4	1
1922	" 23	29	" 21	8	5	4
1923	" 17	57	Aug. 12	9	5	9
1924	" 18	42	July 29	8	8	8
1925	" 7	80	Aug. 25	15	3	17

The above table shows that the period over which gains in weight were made in 1925 was eighty days or twenty-three days longer than in any of the previous eight years and that, with the exception of 1921, it began earlier and also that it carried on much later than any of the other years. Although the flow lasted much longer than in previous years, the gains made during the first nineteen days were practically nullified by the losses, due to unfavourable weather, and the average crop per colony was not so great as in some of the previous years when the flow was shorter. The accompanying chart shows the average daily gains and losses for the entire active season of 1925.

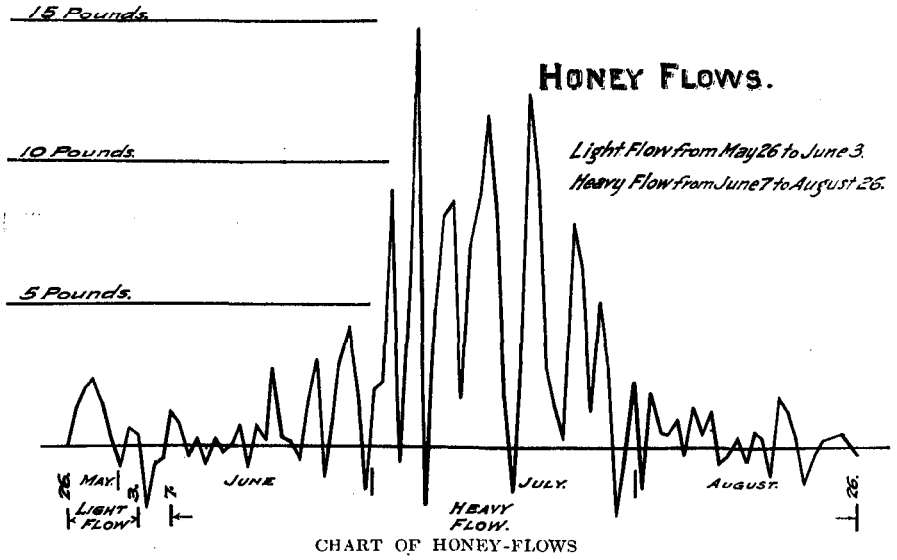


CHART OF HONEY-FLOWS

The flow in May is from dandelion and fruit bloom; during June, from alsike and white Dutch clovers, and during July and August from sweet clover. The curve above the horizontal line represents gains, while that below the line indicates losses in weight.

The chart shows that the daily gains made during the month of June were very small and that no gain above five pounds was made outside of the month of July. Where the curve falls below the horizontal line, losses in weight are indicated.

The total crop of honey produced by ninety-four colonies at Ottawa was 10,882 pounds or an average of 115¾ pounds per colony. The out-apiary of eight colonies at Britannia Heights produced 1,725¼ pounds, an average of 215 pounds, 10 ounces, per colony.

INCREASE

One hundred and fourteen colonies were placed in winter quarters in the fall of 1924, of these, three small colonies died in the cellar and two others—wintered outside—were so weak they had to be united. During the spring, seven colonies were sent to branch Farms, leaving a spring count of 102 colonies. These were increased during the summer to 113 colonies by division. The total increase then for the year, after replacing those lost during the winter, was six colonies. No loss or increase was made at the out-apiary.

BEES AND POLLINATION

The work of determining the value of honey-bees as agents in the cross-pollination of fruit was again continued in conjunction with the Horticultural Division.

Placing tags and counting blossoms on check tree in pollination experiment.

This year trees of the common red plum (*Prunus nigra*) were used instead of apple. As these trees were much smaller than the apple-trees used in 1923 and 1924, several trees could be enclosed under one tent; this was desirable, as this plum is considered to be self-sterile to its own pollen but fertile to pollen of other trees of the same species. To test this, single trees were tented and bees allowed to work on one of them. In the spring, before the blossoms opened, tents were erected over the trees as follows:—

(1) Three trees enclosed in tent that excluded all insect visitors.
(2) Six trees enclosed in tent that excluded all insect visitors. A strong colony of bees was placed in this tent as soon as the blossoms opened.
(3) Three trees enclosed in tent constructed of gauze that permitted insects smaller than honey-bees to visit the trees.
(4) One tree enclosed in bell tent that excluded all insects.

(5) One tree enclosed in bell tent that excluded all insects and in which a nucleus of bees was placed when the blossoms opened.
(6) One tree untented, open to the visits of all insects and used as a check.

In tent No. 1, the trees were very close together, in fact, some of the limbs of each tree were interlaced and, although insects were excluded, a good opportunity for wind-pollination existed. Two trees in this tent were tagged.

In tent No. 2, the trees were farther apart and not touching. Two trees in this tent were tagged.

In tent No. 3, the trees were close together and the branches were interlaced and good opportunities for wind-pollination existed. Two trees in this tent also were tagged.

In tents Nos. 4 and 5, single trees were enclosed and bees allowed to work one of them. No other insects could visit these trees.

One hundred and twenty-five blossom-spurs were tagged on each tree and the number of blossoms on each spur were counted and recorded. The tagging was done after the tents were erected but before the blossoms opened. The bees were placed in tents Nos. 2 and 5 as soon as the blossoms opened.

The blooming-period of the trees lasted approximately for nine days, but most of the pollen was liberated before the seventh day, and the bees were removed on the eleventh day. During the period of bloom the weather was bright but rather cool, accompanied by high winds, therefore, the bees were not able to work the bloom continuously or to the fullest extent. Those in the tents, however, protected from the full force of the winds, were found working when no bees were seen on outside trees. It was also noted that during the first days of the blooming period, before the majority of the blossoms on any tree opened, comparatively little odour was given off, but as soon as they reached full bloom a strong odour was emanated which apparently attracted both wild and honey bees in large numbers as trees in this stage of bloom would have an abundance of insect visitors while those trees with only one-quarter or one-third of their blossoms open would have comparatively few insects on them. The trees were visited once or twice every day to take notes on condition of bloom and how it was worked in the various tents.

The first blossoms opened on May 14, but no bees were out working.

May 15.—Bees placed in tents. No bees or other insects found on any other trees in orchard.

May 16.—Bees working well in tent No. 2 only. No bees on any other trees. Wild bees and flower-flies present in fair numbers. Trees only partially in bloom.

May 18.—A few trees almost in full bloom. Bees working heavily in tent No. 2. A few working in No. 5 and on No. 6. About 2 per cent of the insects on No. 6 were wild bees. One honey-bee found and killed in No. 3. One wild bee also seen. High wind blowing trees vigorously.

May 19.—Bees working very heavily in No. 2 and on No. 6. Six bees found and killed in No. 3. These had gained admittance through small holes at one of the joints in the gauze. Bees also working well in No. 5. Early blossoms starting to lose petals.

May 20.—Very few honey-bees at any of the trees. Wind heavy and cool. A few wild bees in No. 3. Petals falling from outside trees.

May 21.—No honey-bees working. A few wild bees in No. 3.

May 22.—Blossoms falling rapidly. Most of the pollen liberated. High, cool wind, only an occasional bee seen.

May 23.—Very cold. Temperature at noon 37 degrees F. No insects seen. Work about over.

May 26.—All blossoms gone. Bees removed from tents which were taken down next day.

The first count to ascertain the set of fruit was not made until June 19, in order to allow sufficient time for all imperfect fruit to fall. When making the final count, it was found that a few of the tags had fallen from the trees,

the spurs on which these numbers were placed at the first count were therefore eliminated from the tables. The set of fruit on all trees is summarized in the following table:—

TABLE SHOWING NUMBER OF SPURS TAGGED, THE NUMBER OF BLOSSOMS COUNTED AND THE NUMBER AND PERCENTAGE OF FRUIT SET

Group No.	Tree No.	Number of spurs tagged	Number of spurs on which tags were found	Number of blossoms counted	Number of fruit set	Percentage of fruit set
						%
1	1	125	116	1,610	2	0·12
	2	125	122	1,265	0	
2	1	125	120	1,666	65	3·9
	2	125	119	1,622	378	23·3
3	1	125	114	2,935	1	0·03
	2	125	124	1,734	217	12·5
4	1 tree	125	121	2,141	2	0·09
5	1 tree	125	119	1,598	1	0·06
6	1 tree	125	119	2,070	116	5·6

Condition of blossoms when tagged and counted.

The other trees enclosed in tents Nos. 2 and 3 also had a fair set of fruit, while the untagged tree in No. 1 bore only twenty plums.

It will be remembered that in tent No. 1, no insects could visit the trees and that the branches of the trees were interlaced and, as the trees were of different varieties of the same species, there was ample opportunity for wind-pollination. The results as given in the preceding table, however, show that on one tagged tree there was no set and on the second only two fruit set, while the third untagged tree, bore twenty plums. As these were on the interlaced branches only, these few may have been pollinated by grains of pollen falling from the upper blossoms on to those beneath. The results obtained in this tent indicate that wind plays no part in the cross-pollination of the plums, especially as the winds were very high during the blooming period.

In tent No. 2, the highest set of fruit was obtained. On one of the tagged trees, the set was above normal, while on the other tagged tree it was low. The difference may have been due to ages of the trees, or to an off-bearing year for

one and the opposite for the other. The set obtained, however, shows that honey-bees are important agents in the cross-pollination of the plum.

In tent No. 3. A normal set was obtained on one tree, but practically nothing on the other. Here again the difference between the two trees is difficult to explain. The set obtained, however, shows that wild bees are also important agents in the distribution of pollen. As a few honey-bees accidentally gained admission to this tent, part of the distribution may have been caused by them.

In tents Nos. 4 and 5 the trees were shut off from foreign pollen, and, although honey-bees worked the blossoms of one of these trees well, practically no set was obtained. The indications are that *Prunus nigra* is self-sterile.

On No. 6, a comparatively small set was obtained, although it was exposed to the visits of both wild and honey-bees alike. This may be partly explained by the fact that it was not worked by insects as well as those trees in the tents as explained previously. Other conditions in the tents may also have been more favourable to the set of fruit in that they were sheltered more from the high winds. Or the unfortunate choice of a low-bearing tree may account for the difference.

QUEEN-BREEDING

The experimental work in queen-breeding was continued both at Ottawa and at Kapuskasing. In former years, all the queens were reared at Ottawa and a portion of them sent to Kapuskasing for mating. This year, however, a part of the rearing was done at the latter station, the breeding queens being sent from Ottawa in the spring. As in former years, the breeding stock was selected from high-producing colonies that had shown no tendency to swarming. In fact, some of the queens used this year had been used as breeders during the past two years. As much care was taken in selecting drone-mothers as for the selection of queen-mothers.

At Ottawa controlled mating is impossible, but a high percentage of pure matings was obtained by encouraging heavy drone-production in certain colonies and reducing it in all the others. At Kapuskasing, however, no other bees are kept within twenty miles of the apiary and no drones are allowed to develop in colonies other than those chosen for that purpose; therefore, all danger of mismating is eliminated.

The season at Kapuskasing was a very unfavourable one for queen-breeding, as spring and summer were both wet and cold. The rearing of queens was not started until June 30 and then proceeded very slowly because of the difficulty in getting them mated. Often the queens were in the mating-boxes three weeks before mating owing to bad weather. In all, 87 queens were successfully mated, 30 of these were used in the apiary at Kapuskasing, 55 distributed to branch farms and two died. In addition to these, 28 virgins were sent from Ottawa, of these 16 were mated and distributed. At Ottawa, 86 queens were successfully mated, of these 51 were used in the home apiary, 26 sent to branch Farms, and 9 to private bee-keepers. In former years, the method used in getting the queen-cells started was the swarm-box method, but this year queenless and broodless colonies were used as follows: Three days before the grafting of cells was to be done, a colony of medium strength was chosen and to it was given about 5 pounds of thin syrup through a slow feeder. On the third day, the queen and all the brood were removed from the colony and grafted cells given a half hour later. The queen and brood were placed in a super over a strong colony with screen between the super and colony. Two days later the cells were removed from the starting colony and given to a finishing colony and the queen and brood returned. This method of starting cells required less labour than the swarm-box method and gave equally as good results.

CARNIOLAN VERSUS ITALIAN BEES

The test between these two races of bees was continued at the out-apiary at Britannia Heights. This apiary was established in 1923 for this purpose but the Carniolan queens were not obtained until too late in the fall of that year to place in this yard. The queens were introduced to colonies at Ottawa and were wintered in the cellar while the Italian colonies were wintered outside in the out-apiary. The colonies of Carniolans were taken out in the spring of 1924. At this time the Italian colonies were slightly stronger than the Carniolans and the Italians also had the advantage of spring protection as they were left in their winter cases for several weeks after the Carniolans were taken from the cellar, therefore, the results obtained in 1924 could not be considered as fair. All the colonies were wintered outside in 4-colony packing cases for the winter of 1924-25 and all were in two full depth Langstroth hives. During the past summer, the apiary was visited once in every nine days to add super room as needed and to look for swarming tendencies. At the first examination in the spring (April 29), the Carniolan colonies appeared to have more combs covered with bees but slightly less brood, than the Italians. At the second examination, however, the Italian colonies appeared to be stronger both in bees and brood and this lead was maintained throughout the season.

During the summer only one of the Italian colonies contained queen-cells and this only at one of the examinations. This was thought due to want of room, for the cells were destroyed and supers given and no further preparations for swarming were made. One of the colonies superseded its queen during the season. Two of the Carniolan colonies made no attempt at swarming but the other two made persistent attempts throughout the honey-flow and it was with difficulty that they were kept from swarming. As in the previous year, the Carniolan bees showed more inclination to swarm than did the Italians.

The amount of surplus honey extracted from the two groups for 1924 and 1925 is summarized in the following table:—

HONEY-PRODUCTION OF ITALIAN AND CARNIOLAN COLONIES

Races of bees	Number of colonies in group	1924		1925	
		Total crop	Average crop	Total crop	Average crop
		lb. oz.	lb. oz.	lb. oz.	lb. oz.
Italians	4	765 4	191 5	900 0	225 0
Carniolans	4	348 0	87 0	825 4	206 5

All colonies in both groups were requeened during the fall of 1925 and are again being wintered outside under exactly the same conditions.

AGE OF QUEEN IN RELATION TO BROOD-PRODUCTION

This project of determining the average daily egg-production of young versus old queens was continued from the previous year. Two colonies were used for brood-counting in 1924 and five were used in 1925. As the highest daily average was obtained at the first count in 1924 it was thought that a higher average than the one obtained had been missed, therefore, the counting was begun much earlier in the season of 1925.

Two of the colonies used were wintered in the cellar, one of them headed with a queen in her first year and the other having a queen in her second year. Two other colonies were wintered outside in packing-cases and contained queens of the same ages as the two cellar-wintered colonies. In these four colonies the brood-counts were taken approximately once every seven days from May 16 to July 25. The fifth colony was wintered outside and contained a one-year-old queen and the brood-counts were taken once every three or four days. As the

measurements of this colony have not yet been completed, the results for the first four only will be given.

The method of taking the brood-counts was the same as followed in 1924, namely, that of making a tracing on glass of every area of comb occupied by eggs or brood at each examination, transferring this to paper, and then measuring the same with a planimeter so as to obtain the total area of brood in square inches that was present in the colony. The number of square inches multiplied by 25—the number of worker-cells to the square inch—gave the total number of cells occupied and, as it takes twenty-one days from the egg to adult bee, the number of cells divided by 21 would give the daily average egg-production for the twenty-one days just prior to each count. The results obtained are summarized in the following table:—

TABLE OF DAILY EGG-PRODUCTION

1924

Colony Number	Age of Queen	Date of 1st count	Daily average	Date of 2nd count	Daily average	Date of 3rd count	Daily average
No. 111	1 yr.	June 11	2,049	June 20	1,992	July 2	1,900
No. 104	2 yrs.	" 2	1,264	" 24	1,318	" 3	1,520

Colony Number	Date of 4th count	Daily average	Date of 5th count	Daily average	Date of 6th count	Daily average
No. 111	July 14	1,604	July 23	1,282	Aug. 2	1,170
No. 104	" 15	1,644	" 24	1,831	" 11	1,662

1925

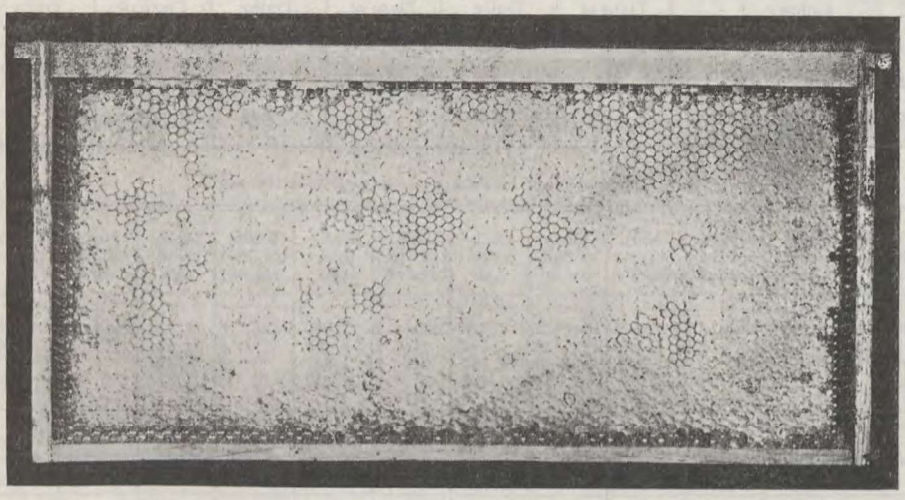
Colony Number	Age of Queen	Date of 1st count	Daily average	Date of 2nd count	Daily average	Date of 3rd count	Daily average	Date of 4th count	Daily average	Date of 5th count	Daily average
239	1 yr.	May 15	1,448	May 26	1,829	June 2	2,000	June 9	1,916	June 16	2,006
232	2 "	" 15	1,147	" 26	1,346	" 2	1,409	" 9	1,504	" 16	1,587
211	2 "	" 15	1,178	" 26	1,367	" 2	1,367	" 9	1,438	" 16	1,436
263	1 "	" 15	996	" 26	1,161	" 2	1,252	" 9	1,311	" 16	1,383

Colony Number	Date of 6th count	Daily average	Date of 7th count	Daily average	Date of 8th count	Daily average	Date of 9th count	Daily average	Date of 10th count	Daily average
239	June 23	2,024	July 2	2,234	July 14	1,968	July 25	1,473	.....	.....
232	" 23	1,759	" 2	1,904	" 14	1,918	" 25	1,724	Aug. 7	1,530
211	" 23	1,223	.....	.....	.....	.....	.....	.....	.....	.....
263	" 23	1,510	July 2	1,783	July 14	1,884	July 25	1,718	Aug. 7	1,669

The table shows that a slightly higher daily average was obtained in 1925 than in 1924, but in no case did it exceed 2,234. It is true that on certain days the number of eggs laid may have exceeded the averages given, but not likely by much. It will also be noted that in both years the youngest queens gave in the outdoor-wintered colonies the highest egg-production during the earlier part of the year when high brood-production is of vital importance, especially in localities where the main flow comes early, such as from alsike clover. This fact was more evident in 1924 than in 1925. This condition, however, was reversed in the two colonies wintered in the cellar.

ALUMINUM COMBS

The testing out of aluminum combs, both in supers and brood-chambers, was continued during the past season. Five full sets of aluminum combs were obtained in 1924 and were placed in extracting supers over strong colonies during the main honey-flow. It was found that these combs were accepted, drawn, filled and capped by the bees just as readily as the wax combs that were also given at the same time. The combs that were finished in the supers during 1924 were used as brood-chamber combs in 1925. During the early spring, five colonies of equal strength in 10-framed Langstroth hives gradually had their wax combs replaced by the aluminum combs. Five other colonies of equal strength were used as checks. As the 10-frame Langstroth hive is not large enough as a brood-chamber, each of the colonies had their brood-nest enlarged by a shallow super filled with wax combs. After the combs had been in the hives long enough to contain the second cycle of brood, an estimate of the amount of brood present in each colony was made. The average amount of brood contained in both groups was exactly the same, but, in the group on aluminum combs, there was more brood in the supers supplied with wax combs than there was in the supers over those colonies in which wax combs were supplied below. In fact 31 of the aluminum combs contained brood while 38 of the wax combs contained brood. The difference between the two groups was only slight and not enough to indicate that any preference was shown for wax combs over those made of metal after the latter were first drawn out and finished in extracting supers.



A WELL-FILLED ALUMINUM COMB

This comb was drawn and finished in super during the main honey-flow.

HIVES

The comparison between hives of different sizes as brood-chambers was also continued. The hives used were the 10-frame Langstroth, 10-frame Jumbo and the Modified Dadant hive.

During the winter of 1924-25, twenty-four colonies, eight in Langstroth, eight in Jumbo and eight in Dadant hives, were wintered outside in four-colony packing cases. All cases were of identical construction and all were packed with 4 inches of planer shavings on bottoms and sides and approximately six inches on top. The colonies were packed on September 30 and then fed. They were completely surrounded by a good wind-break and were left in the cases until May 21. At the first examination in the spring, April 21, the colonies in the Langstroth

hives appeared to be more thrifty in appearance than those in the larger hives. This was probably due to the fact that a larger proportion of the space was occupied with bees than in the larger hives, the shallow super to enlarge the brood nest not yet being given to the Langstroth hives. All colonies appeared to build up with equal rapidity during the season. As the colonies in the Langstroth hives became stronger, a shallow super was added to enlarge the brood-nest, otherwise early swarming would occur from these hives. This really gave a larger brood-chamber than the others, but it also gave greater flexibility.

During the season, no preparations for swarming were made in either the Langstroth or Jumbo colonies. One swarm emerged from one of the Modified Dadant hives, but as this swarm was led by a virgin queen and as no eggs or queen were seen at the previous examination, this cannot be considered as a normal swarm.

All colonies were examined once every ten days throughout the season to watch for preparations for swarming and to see that every colony was supplied with sufficient room for storing surplus. The results obtained are crystalized in the following table:—

COMPARISON OF HIVES

Group	Number of colonies in group	How wintered	Combs covered at first examination	Number of colonies swarmed	Total crop	Average crop	Combs covered last examination
					lb. oz.	lb. oz.	
Langstroth	8	Outside...	8·0	0	1,104 4	138 0	9·0
Jumbo	8	" ..	6·9	0	1,042 4	130 4	9·2
Modified Dadant	8	" ..	6·6	1	853 12	106 11	9·7

In comparing the number of combs covered with bees, as given in the preceding table, it must be remembered that the combs in both the Jumbo and the Modified Dadant hives are two inches deeper than those in the Langstroth hives, and it is possible that, although the bees were not spread over quite as many combs, the cluster may have been deeper and, therefore, just as many in the hives. The honey crop obtained was in favour of the Langstroth hives.

DISEASES

During the past season, fewer samples of diseased brood were received for diagnosis than during the previous years. This was due to the fact that more of this work is being done by the provincial departments in order to save the time required in sending samples to Ottawa. In all, nineteen samples were received. Of these, eight were affected with American foul brood, nine with European foul brood, while two showed no signs of disease, the brood having died from chilling or starvation.

Six samples of dead adult bees also were sent in for examination, although two of these showed light infection of *Nosema Apis;* the symptoms, as described by the senders, indicated bee paralysis.

WINTERING 1924-25

One hundred and fourteen colonies were prepared for the winter of 1924-25. Of these, eighty-nine were wintered outside in packing-cases and twenty-five in the cellar. All colonies were weighed on September 22 and feeding commenced the following day and was finished on September 29. Those wintered outside were first weighed, fed and then weighed again, after which they were packed in the cases. Those wintered in the cellar were fed at the same time as the outdoor-wintered colonies, but were not transferred to their winter quarters until November.

WINTERING OUTSIDE

Of the eigthy-nine colonies wintered outside, eighty were in four-colony cases with four inches of packing on bottom and all four sides and approximately six inches on top. Six of the colonies were in two-colony and three in single-colony cases with the same amount of insulating material as in the larger four-colony cases. The bees wintered on the following stores: forty-nine were given supers of honey, twenty-eight were fed honey-syrup and twelve honey-and-sugar syrup. The following table summarizes the average strength and weights of the colonies and the kind of stores given:—

FEEDING COLONIES WINTERED OUT-OF-DOORS

Group	Stores	Average number of combs covered by bees	Average weight before feeding		Weight after feeding	
			lb.	oz.	lb.	oz.
Single Langstroth	Shallow supers of clover honey	9·4	45	11	79	3
" "	Honey syrup	9·4	47	13	65	7
" "	Honey and sugar syrup	9·5	46	4	74	7
Double Langstroth	Honey syrup	8·6	48	8	77	10
Single Jumbo	Shallow supers of honey	9·5	49	0	80	10
"	Honey syrup	9·8	53	2	74	11
"	Honey and sugar syrup	9·75	58	8	77	8
Double Jumbo	Honey and sugar syrup	9·25	46	0	72	4
Dadant's	Shallow supers of honey	10·4	56	2	89	6
"	Honey syrup	10·6	61	10	78	6

The cold weather started soon after the feeding was finished and during the latter part of November, December and January was very severe. The bees were thus confined to their hives and compelled to rest until March with the exception of a few light flights in February. At the first examination on April 21, three colonies were found strong in bees but queenless. These were immediately requeened with queens from double colonies and thus saved. Two others were found weak, and, as one of them was queenright, the two were united together.

The following table summarizes the average strength of each group at the first examination:—

CONDITION OF THE COLONIES IN SPRING

Group	Stores	Number of combs covered at first examination	Date of first examination
Single Langstroth	Shallow supers of clover honey	7·3	April 21
" "	Honey syrup	5·0	" 21
" "	Honey and sugar syrup	6·3	" 21
Double Langstroth	Honey syrup	5·7	" 21
Single Jumbo	Shallow supers of honey	8·4	" 21
" "	Honey syrup	5·8	" 21
" "	Honey and sugar syrup	6·5	" 21
Double Jumbo	Honey and sugar syrup	6·2	" 21
Modified Dadant	Shallow supers of honey	7·1	" 21
" "	Honey syrup	6·0	" 21

It will be noted that all groups contained a strong force of bees at the first examination. And, by comparing the number of combs covered by bees at this time with those covered at the last examination in the fall, it will be noted that the average losses from bees were not at all heavy. It will also be noted that those colonies wintered with a super of honey were strongest in the spring and

that those fed honey in the form of a syrup were the weakest. The two weak colonies that were united were in this group. However, the bees wintered successfully on all forms of stores. Owing to the late date on which the bees were removed from their cases and to the fact that considerable nectar had been gathered before unpacking, no weights were taken at this time.

CELLAR-WINTERING

On November 17, twenty-five colonies were taken into the cellar five days after a good flight. All colonies were in good condition when brought in. Five of the colonies were kept on scales for the entire winter and the weights recorded each week. The temperature in the cellar was kept at approximately 45 degrees F. during the entire winter. No restlessness was discerned in any of the colonies and the average weekly loss in weight was only 11.5 ounces as compared with 14.1 ounces of the previous winter. The following table gives the average strength, weights before and after feeding and the kind and amount of stores supplied:—

CELLAR-WINTERING, WINTER 1924–25

Group	Stores	Average strength	Weight before feeding		Amount fed		Weight after feeding	
			lb.	oz.	lb.	oz.	lb.	oz.
Single Langstroth	Sugar	9·4	50	5	19	2	65	1
Double Langstroth	"	7·6	47	10	22	8	62	0
Single Jumbo	"	8·0	60	8	9	0	64	0
Double Jumbo	"	8·0	59	10	18	0	69	0
Dadant's	"	10·0	58	11	13	8	65	5

The colonies were removed from the cellar on April 14 and examined on April 21. Three colonies were found dead, having died during the winter. These however, were extremely weak, having been specially made so for a purpose. They died from suffocation. Eight of the colonies, when put away for the winter, contained two queens. Two of these had lost one each of their queens. Three queenless colonies were saved by using one of the queens from three other double colonies. The other colonies were in good condition so far as bees were concerned. The following table summarizes the condition at the first examination:—

SPRING CONDITION OF CELLAR WINTERED COLONIES

Group	Stores	Number of combs covered at first examination	Date of first examination	Average weight when removed		Average loss during winter	
				lb.	oz.	lb.	oz.
Single Langstroth	Sugar syrup	6·2	April 21	46	1	20	13
Double Langstroth	"	5·4	" 21	46	4	16	12
Single Jumbo	"	5·75	" 21	50	0	14	0
Double Jumbo	"	6·0	" 21	47	0	29	0
M. Dadant	"	4·8	" 21	48	8	16	13

The colonies wintered in the cellar were approximately the same average strength at the last examination in the fall as those wintered outside. They were somewhat weaker at the first examination in the spring.

WINTERING 1925-26

One hundred and thirteen colonies were prepared for the winter of 1925-26. Of these, ninety-two are wintered outside in packing cases, eighty-seven in cases as used the previous year and five in single cases supplied with an air-space between hives and cases instead of packing material. Twenty-one are being wintered in the cellar. All colonies were first weighed on September 19 and immediately fed. The feeding was carried on under adverse weather conditions and the bees were slow in taking down their stores. All feeding, however, was finished by September 28. All colonies were strong in bees and contained ample stores to carry them through until new nectar is available next spring.

EDUCATIONAL

During the year articles for the press on different phases of beekeeping have been issued from time to time. The "Apiary Reminders," which are really timely suggestions of work that should be attended to in an apiary at different periods of the active season, were continued during the past year; 13,433 copies of these being sent out on request. Addresses were given at the annual conventions of the Ontario and Quebec Beekeepers' Associations, and also at several other beekeepers' meetings and field days. Lectures were also given at beekeeping short courses held at Macdonald Agricultural College and at Guelph.

The apiaries at the various branch Farms were also visited during the summer and field days held at five of them at the time of the visit.