DEPARTMENTAL NOTES

BEE-KEEPING—THE MANAGEMENT OF A MODERN APIARY

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SELECTION OF SITE

IT is said that there is no spot where man can find sustenance that will not support a few swarms of bees. In Ceylon, although some places are more suited than others, bees are found under natural conditions both in the dry zone and in the wet zone from sea level to over 6,000 feet; even in towns bees are successfully reared. It may not always be practicable to select the ideal location for an apiary, but if the best results are desired the ideal should be aimed at as far as possible. It is generally believed that *Apis indica* flies to a distance of not more than half-a-mile from its hive in search of forage.

As the success or failure of an apiary depends to a very large extent on the presence or absence of natural vegetation, it is advisable to see that at least some of the plants described in *The Tropical Agriculturist*, Vol. XCI., 1938, pages 161–164, thrive in the locality. The number of colonies should necessarily be in proportion to the availability of bee-pasture. Even where sufficient bee-pasture is found among natural vegetation, it is expedient that the bee-keeper should plant some selected plants, so as to supply the bees with pollen and nectar during lean periods of the year. Bees flourish well in coconut estates and in fruit gardens, with benefit both to the plantation and to themselves.

LOCATION OF HIVES

Hives should be so placed as to get the sun from 8 to 10 in the morning and 4 to 6 in the evening. The morning sun is important as it makes the bees start work early. Excessive shade and intense heat are detrimental to the smooth working of a hive. The hives should face the East, under shady trees or under roofs. The distance between hives should be at least 6 feet. Hives should be placed on ant-proof stands and, if necessary, should be protected from high winds.

Antigonon leptopus, also known as the Mexican Coral Vine, Bride's Tears or Mountain Rose, can be trained on trellisses at reasonable intervals running from East to West. This is a beautiful flowering creeper than which there is no better nectar plant in Ceylon.

THE MANIPULATION OF HIVES

There is a common belief in Ceylon that bees should be subdued by smoke or otherwise before they are examined. With the Indian bee, this is not necessary. Local bees " respond kindly to kind treatment ". It is unreasonable to stand in front of a hive to open it. The bees which return from foraging will be disturbed and the interloper may be stung. In opening a hive, jerks should be avoided. Bees feel vibrations carried through solid bodies and they get excited. Sound does not affect them.

During the hotter part of the day, it is likely that the combs and brood will be adversely affected and it is, therefore, not advisable to open the hives at this time. Bees will not brook undue intrusion upon their offspring. On wet cold days, they prefer to remain indoors ; and for obvious reasons, they are in bad temper. They are never so contented as during the collection of pollen and nectar on hot sunny days. On such days, they may permit a certain amount of disturbance.

To open a hive, the roof must be gently removed from the rear. Then the super combs can be examined one by one. If the frames are pasted together with propolis, a knife will have to be used to detach them. The frames should be held at the two ends. After the combs have been examined, the whole super can be removed to examine the brood chamber. The frames of the latter should be examined in the same manner.

It is not uncommon to find irregular combs in a hive. These should be carefully removed with as little damage to them as possible, and replaced in correct position. The drone combs are always heavier than worker combs ; they should be handled in such a manner as not to detach them from the frames. When a hive is opened, the bees come to the edges of the hive. Care should be taken not to crush such bees, not only because of the loss of bee life, but also because it irritates the others.

Bees in a queenless colony are most likely to sting. If they must be handled, they may be gently smoked. A suitable smoker is described in *The Tropical Agriculturist*, Vol. XC., 1938, pages 358–360. The principle involved in smoking is that when this is done the bees feel that there is some danger and quite naturally try to protect their valuable store, namely honey. To do so they have to drink it, and they drink so much

that their abdomens become distended with the result that they find it difficult to move about freely in order to sting. Tobacco smoke, popularly used by our villagers, is too strong and its use should be discouraged.

The fear of being stung is the greatest drawback to progress in bee-keeping. The sting is an instrument for self-protection and it will not be used by bees unless they are in imminent danger because they die immediately after stinging. The sting is barbed with recurved teeth and when thrust into the skin it cannot easily be withdrawn. Generally, each sting has three barbs on the sheath and ten on the lancets. Bees invariably leave behind some portion of the body attached to the sting.

A sting causes a certain amount of irritation and swelling, but this can be reduced to a minimum by gently pushing out the sting with a knife or the finger-nail immediately after being stung. Then the injured portion should be rubbed with some leaves of overpowering odour. This is a precaution against further stings.

There is a poison sac at the end of the sting and the poison is gradually injected into the system by the working of the " muscles " of the sting. Hence the importance of immediate extraction. The sting should never be pulled out for, if this is done, the sac bursts and the poison is released. If the swelling is considerable, a hot foment or a cold wet dressing may be applied. The best remedy is not to trouble about it unless the sting is near the eye, in which case some care has to be taken. It is popularly believed that one becomes immune to stings in the course of time. The writer knows of two men who have kept bees for over 15 years and they do not feel the effects of stings at all.

Bees make a careful survey of the surroundings of their hives and have the power of remembering them so clearly that they make a " beeline " to their hives when they are laden with pollen and nectar. If, while they are foraging, the hive has been moved further than three feet, they will find it difficult to locate it. Most of them will hover round the place where the hive had been when they left it and they will ultimately die of exhaustion. If, therefore, it is necessary to move a hive to another site, it should be moved not more than 3 feet each day, or it should be moved by night. When a hive has to be transported long distances, the entrance should be covered at night by a narrow strip of strawboard. It can then be moved on the following morning. If the distance is considerable, it is essential that the insects should be supplied with a reasonable quantity of sugar in solution.

THE INDIAN BEE

The question has often been asked why so much of trouble is taken over the small Indian bee when there are the more profitable European and American bees. The answer is that there is no need for foreign bees, because research on *Apis indica* has shown that this bee is capable of giving returns as profitable as her cousins in Europe or elsewhere. Foreign bees are very susceptible to diseases from which our bees are free. Experiments conducted by Hatch and his colleagues in the Travancore State have amply proved that the mind-set of the Indian bee is now changed. She was at one time known to be migratory in nature and a poor worker, but now there is definite proof that she is capable of storing a surplus of honey.

Indian bees prefer to remain in one place so long as that place is a congenial abode for them and for their stored-up products. A thoughtful bee-keeper should examine his hives once a week, rid them of any pests and make certain that there is plenty of food during the rainy weather. If he expects bees to live under the conditions provided for them, then he must see that all their natural requirements are given them. Otherwise they are liable to vacate man-made hives for a more natural life elsewhere.

The Indian bee is fortunate in that she is not liable to any serious disease, but she has often to contend with enemies. The bee-keeper should assist the bees by removing such objectionable intruders from the hives. Uncared-for bees are often menaced by wax moths, the larvae of which completely riddle the combs which have been so well constructed with so much labour. In spite of the water trough, ants find their way into the hives. They do considerable damage to the larvae and also drink honey. The red-and-black-banded hornets carry to their nests a large number of bees ; their nests should be located and burnt by night. Cockcroaches, lizards and spiders often make a comfortable home in the hives. They are all unfriendly to bees. The king-crow and other birds need to be watched for and scared away from the hives.

HOW SHOULD THE INDIAN BEE BE MADE PROFITABLE

In his book *Further Upward in Rural India*, Hatch says that " The method by which our bees are now made to work like the Italian, English or American bees, producing surplus honey for sale is very simple. It involves two principles : using the combs over and over again, and frequent extraction.

" In the primitive method of squeezing the comb to get the honey, the storage cells were ruined and before the bees could begin to gather more honey they had to make new combs. According to the best authorities, it requires 6 or 7 pounds

of honey to make one pound of wax comb. By the modern method of extraction by gently whirling the comb in a small centrifugal extractor (described in *The Tropical Agriculturist* Vol. XC, 1938, page 235) the combs are unharmed and can be placed in the hive again. What a saving of time and labour for bees! All they have to do is to refill the combs.

"A further increase in production results from one simple method of making bees work harder and harder continuously. We cannot wait as in the West for combs to be full. It is necessary for the bee-keeper to keep ahead of the bees. If he finds at his weekly examination that the combs are a little over half full he at once extracts all the honey from the super, putting the combs one by one into the extractor, whirling all the honey out, and returning them to the hive empty. Then bees quickly collect more.

"The mind-set of the Indian bee has been changed. When we have made them conscious of the need of working, they can do work faster than the Western bees."

Last year the writer had the good fortune to make a survey of a village in South Travancore for the purpose of taking a stock of bee-keeping. The investigation revealed that there were nearly 300 families which owned over 1,000 hives. From these, the apiarists were able to get an increased income of Rs. 3,000. Some of these families live mainly on bee-keeping for they have no land to cultivate and there are a very few wage-earning vocations. There was one man who was able to save Rs. 150 from the proceeds of 31 hives in one year.

When honey is removed before it is ripe, that is, before all the cells are capped, it contains a certain quantity of moisture which must be removed before bottling. Moisture causes fermentation. The method of artificially ripening honey is described in *The Tropical Agriculturist*, Vol. XC., 1938, page 236.

Honey is an invaluable food ; its sugar is in an easily assimilable form and is superior to other sugars. It is regularly used in Ayurvedic medicines and there are many Western physicians who prescribe it. Some believe that honey has astringent properties. This is a myth. It can be taken even by diabetic patients. According to the analysis of the Government Agricultural Chemist, Coimbatore, honey contains 14·89 per cent. water, 0·47 per cent. ash, 73·96 per cent. reducing sugars, and 5·84 per cent. sucrose.

ECONOMICS OF BEE-KEEPING

With the co-operation of certain bee-keepers, an effort is being made to determine the economics of bee-keeping under Ceylon conditions. The figures so far obtained, though

encouraging, are yet too incomplete for discussion. The figures quoted below are, therefore, obtained from a paper read at the Association of Economic Biologists at Coimbatore, in 1933. Bee-keeping in Coimbatore is on the same lines as the work conducted by the Propaganda Division of the Ceylon Department of Agriculture.

During one year, 11 hives yielded 118 lbs. of honey which realized Rs. 148 at Re. 1·25 per lb. Each one of these hives gave out a swarm which in turn yielded Rs. 77 worth of honey. Thus in one year the total income was Rs. 225. The cost of these 22 hives, at Rs. 4·50 each, and the honey extractor, costing Rs. 6, came to Rs. 105. The initial cost of hiving the original 11 colonies was Rs. 22. The total outlay, therefore, was Rs. 127. The interest on the investment at 7½ per cent. comes to Rs. 9·75; the hives and the extractor are expected to be useful for at least 15 years, hence the annual depreciation will be about Rs. 7. The cost of supervision is negligible since the bee-keeper himself is expected to attend to the work. However, it may be put down as Rs. 10 for the year. The total annual expenditure, therefore, amounts to Rs. 30 approximately. Deducting this amount from the income, the profit realized amounts to Rs. 195, thus making an average nett profit of Rs. 20 on each hive.

In Ceylon, hives with one super can be turned out at about Rs. 2·50 each, and the extractor costs Rs. 5·40. The initial outlay is, therefore, less than at Coimbatore. We have more and better bee-pasture throughout the year. It can, therefore, be presumed that bee-keeping in Ceylon will give results at least as profitable as those of our neighbours across the Palk Strait.