

## **Rock Bee Honey, its Extraction and Preservation.**

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and

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**Introduction.** The Rock bee (*Apis dorsata*,) has been the main source of honey in India from time immemorial, though the quality of the material available to the public was poor. The recent introduction of modern methods of beekeeping and their rapid spread in this presidency have revolutionised the popular notion about pure honey. Machine-extracted honey from the domesticated Indian bee (*Apis indica*,) always fetches a good price, while Rock bee honey is not so popular on account of its impure and sometimes fermented condition when it reaches the consumer. A study of the existing methods of honey extraction and preservation was therefore taken up and the possibilities of improvement explored. The present paper contains a short account of the trials conducted and the results obtained, therefrom.

**The Rock bee.** Before giving the details of these trials, a short description of the Rock bee and its peculiar habits will not be out of place here. Of the four indigenous honey bees, viz., the Rock bee, the Indian bee, the Little bee and the Dammar bee, the first one is the biggest in size. Its favourite haunts are hilly and forest areas, mostly above 2000 feet elevation, but stray colonies are often found on the plains also. Swarms of this bee establish themselves in the open in inaccessible places such as precipitous cliffs and over-hanging rocks, branches of tall trees, etc. Occasionally 50 to 60 colonies are found on a single tree. The combs are built singly and very often reach three feet in length and about two feet in breadth. The top portion of the comb is about nine inches—where honey and pollen are stored bulges out to a width of about six inches. The brood is reared in the lower portion. This bee is a very good honey-gatherer and a strong colony may yield up to 40 lbs. In spite of its good honey-gathering qualities, this bee has, unfortunately, a few undesirable traits which render it unfit for domestication. The single comb building habit, necessitates the destruction of the brood while extracting honey. This unnecessary destruction of life and crushing of the comb is against the very fundamentals of scientific beekeeping. On the other hand the Indian bee constructs a series of parallel combs and invariably stores honey separately from the brood. Under domesticated conditions the honey combs can be easily taken out for extraction of honey and the empty combs given back without disturbing the normal working of the colony. Secondly the Rock bee is easily irritable and vindictive when provoked. It has been reported that men and domestic animals are sometimes stung to death. Lastly this bee is migratory in habits; visiting the hills during the summer months and moving down to the lower elevations after the outbreak of the

monsoon. The domestication of this bee, therefore, seems to be out of question and only better methods of extraction and preservation of honey can be suggested.

**Existing methods of honey extraction and preservation.** The handling of these bees and the collection of honey and wax are exclusively done by the jungle tribes. They know by experience the seasons of honey flow and the combs are taken only when they are sure that a good quantity of honey has been stocked in them. As a general rule the colonies are handled only after night fall. The ingenuity, coolness and daring exhibited by these "children of the forest" while approaching colonies of these dangerous insects are simply amazing. Before beginning the work, they fortify themselves against any accident or attack by the bees by a preliminary "puja" to propitiate the jungle deities. In cases where colonies of the bees have established themselves under overhanging rocks, the approach often extends to a few hundred feet over the steep precipices, a slip from which would mean loss of life. The equipments required for approaching the colonies and collecting the honey are a few lengths of forest canes tied together with jungle fibre or a sufficient length of strong fibre rope, a kerosine tin open at the side and slung to a long rope and the inevitable smoking torch. One end of the cane or rope is well secured to a tree at the top and the man gets down to the work spot with the help of this improvised ladder. The task appears to be comparatively easier, in cases where the colonies are found on trees; as the men easily climb up even to the dizzy heights at which the colonies are found. When there are a number of colonies on different branches of the same tree, they move from branch to branch with the help of bamboos tied across them. The crowning feat of their admirable skill and daring lies in the fact that all this work is done in pitch darkness. When they have to tackle a larger number of colonies they are able to camp the whole night either under the rocks or on the top of the trees.

Regarding the collection of the honey, the bees are first brushed aside with the smoking torch. The brood portion is then broken off and sent down in the kerosine tin. The empty tin is sent up again to get the honey comb. It takes only about 5 to 10 minutes to tackle each colony.

The brood combs are sometimes boiled and eaten by the jungle tribes but the bulk of them is kept for wax extraction. The honey combs are then taken and the small bits of brood that may be still adhering to them are removed. The honey is then squeezed out with the hand and is either handed over to the contractors immediately or sold locally. No attempts are made to store the honey. It is needless to add here that the methods are thoroughly unclean and the quality of honey very poor on account of the admixture of considerable quantities of pollen and possibly some brood-juice as well. Till recently the Forest Department were leasing out the right of collecting honey and wax. Realising the possibilities of improving

the methods of collecting this very useful forest produce, the Department has now taken up the work under its own supervision in certain centres. According to the figures kindly furnished by the Forest Utilisation Officer, about 45,000 lbs. of honey are said to be available from the few centres where they carry on the honey collection departmentally. Cleaner methods are adopted in getting the combs and squeezing out the honey. The squeezed honey is filtered, then boiled directly over fire and filtered again before storing in kerosine tins. These methods, though they are an improvement over the existing crude ones, are still far from being perfect. There is always a possibility of large quantities of pollen getting forced out along with the honey when it is squeezed out by the hand. The presence of the extraneous matter as well as the contamination by hand cause rapid fermentation of the honey. The direct boiling over fire will ruin the essential qualities of honey, as the enzymes contained therein are destroyed at this high temperature. But recently the Department appears to have taken up the scientific ripening of honey.

**Trials of honey extraction and preservation.** Trials were, therefore, started to improve the existing method of extraction and preservation of honey. The main principles underlying the trials were (a) clean and hygienic extraction of honey and (b) its proper preservation. Three appliances viz., the honey press, the honey strainer and the centrifugal honey extractor were designed for the extraction of honey and tried at different places. Trials were also conducted on the preservation of honey by (a) artificial ripening and (b) proper storing.

**Appliances for extraction of honey: The honey press.** This machine was designed after the model of the Scottish heather honey press. The honey is squeezed out by the pressure exerted by a vertical screw-rod with a metal plate attached to its free end. It was tried at Top slip (Thunaccadavu Range) and Onnaithittu (Talamalai Range) and found quite efficient as it was able to squeeze out the last drop of honey from the combs. But the quality was not satisfactory since considerable quantities of pollen, bits of wax and other extraneous matter got forced out along with the honey, thus impairing its flavour, purity and clarity.

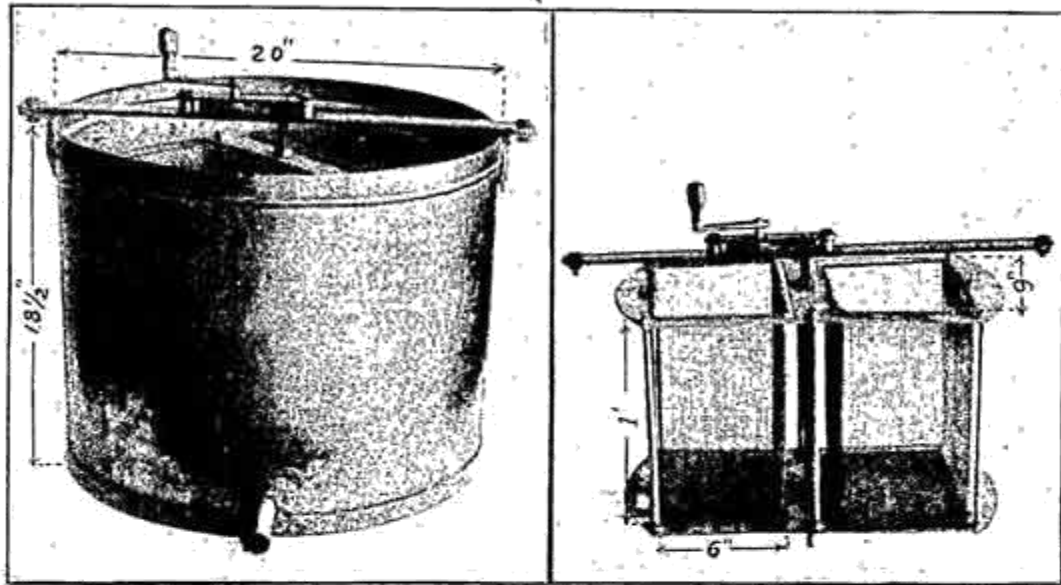
**The honey strainer.** This consists of two vessels kept one over the other with a thick wire-net (4 meshes for 1") partition between the two. The honey combs were first cut into small bits with a clean knife, scrupulously eliminating the brood portions and as far as possible the pollen bearing cells also. The pieces were then tied in a cloth bag and the bag was kept inside the upper vessel of the strainer, so that the honey may gradually ooze out by mere gravitation. The appliance was used at Top slip and Onnaithittu. At the former place nearly 90 per cent of the honey drained in 3 hours and at the latter 81.5 per cent in 18 hours. The period taken for the honey to drain out obviously depends on its density, which again varies according to the source from which the nectar is collected. Apart from the long time taken appreciable quantities of pollen also came out through the meshes of the

cloth and thus spoiled the quality of the honey. The latter factor is not, however, constant since the degree of admixture depends on the quantity of pollen stored in the combs.

*The honey extractor : (plate).* This was designed after the model of the honey extractor commonly used for the Indian bee (*A. indica*) with certain modifications. The machine consists of a cylindrical metal drum  $1\frac{1}{2}$  ft. in height and 2 ft. in diameter and a box to hold the honey combs. The box is fixed to a rotating rod at its centre and the revolution is affected by the action of a set of gear wheels on the central rod. Two movable wire-gauze cages each  $6" \times 9" \times 1"$  are provided in the comb box for holding the honey-combs. Whole pieces of honey-combs each measuring about  $9" \times 9" \times 6"$  and weighing about 4 lbs. each were uncapped, kept inside these cages and the box rotated. The machine was tried at Onnaitthitu and Begur (Wynaad) and found quite efficient. Combs weighing about 10 lbs. were worked at a time in the machine and almost the last drop of honey was thrown out in about 10 minutes. The machine was also found capable of extracting the honey even from small pieces of combs. In this connection mention has to be made of the possibility of an admixture of pollen in the honey. The Rock bee does not appear to be clean and regular in its food-storing habits. Considerable quantities of pollen are often found stored in the midst of the honey-bearing portions and in many cases both honey and pollen are found stocked in one and the same cell. In such cases a few pellets of the powdery material also get thrown out along with the drops of honey. Though this defect is inevitable, the undesirable matter can be skimmed off when it generally collects at the top in the form of a scummy layer within about a fortnight after storing. But this difficulty is not met with in cases where there is not much pollen stored in the combs. Of the three appliances tried, the centrifugal honey extractor is considered to be the most efficient for the following reasons:—

1. The honey extracted is untouched by hand.
2. There is no chance of contamination by the grubs and other extraneous matter.
3. Chances for admixture of pollen are much less.
4. The process of extraction is much quicker.
5. Honey can be easily extracted from all sizes of combs varying from the biggest pieces to the smallest bit.

**Preservation of honey: Ripening.** A good sample of honey generally contains about 15 per cent of moisture and any quantity in excess of it may induce fermentation. In nature, when the honey reaches this optimum condition the cells are generally sealed by the bees and the honey inside these cells is said to be "ripe". In the case of the honey combs of the Indian bee the sealed condition or otherwise can be found out by frequent examination, but in the case of the rock bee, it can be known only when the bees are driven off and the combs removed. All the honey obtained from the Rock bee



The Honey Extractor and its parts.

colonies cannot therefore, be said to be ripe and under such circumstances the elimination of the moisture by artificial ripening becomes an absolute necessity. The process consists of keeping the honey with the container in hot water for about half an hour, taking care to maintain the temperature of the water steadily at 80° C. Apart from pasteurising the honey and eliminating the superfluous moisture, the process also clears the honey of the undesirable matter contained in it. Only some samples appear to contain the latter material, and in such cases, it collects itself as a scummy layer at the top when the honey is heated and this can be easily removed. Samples of honey collected from the forests were ripened and kept under observation with appropriate controls of untreated material. In all these cases, the latter material began to ferment very soon, thereby indicating that the artificial ripening ensures the keeping qualities of honey.

**Storing honey.** Honey, whether ripened or not, will absorb moisture from the air and ferment if it is kept carelessly. Due attention should, therefore, be paid to the proper storing of the material. Only scrupulously clean receptacles should be used and those containing honey should be kept properly sealed. In cases where large quantities are handled, honey can be stocked in clean kerosine tins, but care should be taken to seal the lids. Frequent opening of the containers is not desirable and in cases where small quantities of honey have to be taken out frequently, it is better to stock the material in smaller containers such as jam jars.

**Drained honey.** A certain amount of bad handling and crushing of the combs is inevitable when they are collected. A considerable quantity of the honey drains out in the vessel itself during transit, partly due to the bad handling but mostly due to the pressure exerted by the weight of the combs and this cannot be avoided under any circumstances. An appreciable quantity of brood, bees, as well as other undesirable matter such as lumps of pollen, broken bits of twigs, leaves, pieces of burnt sticks etc. are invariably found floating in this honey. There was nothing wrong with it except for the temporary contamination. It was, therefore collected and *filtered immediately*, ripened and bottled. Special attention should be paid to the promptness with which this honey is filtered and treated, since the dead grubs, pupae and bees that may be floating in the honey are likely to decompose and ruin its quality, if there is any undue delay.

**Summary.** Of the three machines tried for the extraction of honey the centrifugal honey extractor appears to be the most efficient on account of the thoroughness and quickness of the work and purity of the honey.

Drained honey, also is of good quality, provided all the undesirable material is removed immediately as suggested already. If, in spite of these precautions, the quality is not as satisfactory as that of the extracted honey, the material may be graded as No. II.

Artificial ripening of honey is an absolute necessity, as it is the only method to prevent fermentation and subsequent deterioration of the material.

Equal attention should be paid to the proper preservation of honey.

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## **The Cultivation and Marketing of Roses at Iquaripalayam village.**

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**Introduction.** It is a known fact that there is a continuous and growing demand in all urban areas for roses among other flowers, throughout the Presidency. Many villages near such areas grow this crop on a field scale and Iquaripalayam is one such village. Roses fetch to its producers, the ready money to meet their house-hold and other day-to-day expenses. This village consists of nearly 100 homes and is situated about six miles from Gummidipundi R. S. on the Madras—Calcutta line and is about 36 miles from Madras by road. The total area of the village is about 1,000 acres, of which only 500 acres, are cultivable. The village has a tank with a very good water supply lasting for 6 to 9 months in a year, from August till April following. The ryots who cultivate roses belong chiefly to the Kshatriya caste, though a few Vysias and Adi-Dravidas also grow them.

**The Land.** There are nearly 40 acres now under roses in this village: It is cultivated in both wet and garden lands but more in the wet lands. The soil is light red, sandy loam to clay loam and homogeneous to a depth of 8 to 10 feet. It is surprising to see a rose garden coming up well between plots of wet paddy, with stagnant water all round. Even though the fields round about are wet, the plots where roses are grown, are not at all miry. I was told that even in rainy season water does not stagnate in these plots and that it could be easily drained if necessary, within a few hours. The water table is nearly 4 feet from the ground level during the wet months and 10 to 12 feet in summer. Even so, the plants in garden lands produce more flowers than in wet lands during the rainy months as the wet plots do not dry up soon; and again the plants in loamy soils produce more flowers than plants in light sandy or clay loams. But much depends upon the care that is bestowed on the plants.

**Season.** The usual season when roses are planted in this village is between September and January, but plantings in September and December,