

The cocoon is made of sand and the remnants of the bees. It is a neat oval shell about 12 mm. long and 3 mm. in cross section. In about two days the cocoon becomes hard.

**The pupa.** The pupa when fresh is pale white in color and later becomes brown. It is about 10–11 mm. long and  $3\frac{1}{2}$  mm. broad. Adult wasps emerge from the pupae in due course.

**How the wasp affects the bee colony.** The loss caused by these predatory wasps is serious since each wasp is capable of robbing about 15–20 bees in a day. If there are more than one wasp preying in a day and if this repeated for a number of days the loss to the colony will be severe. Apart from the actual loss due to the visits of these robbers the routine work of the colony is disturbed. Most of the bees become guards and thus the number of bees going out foraging decreases. The colony therefore never works well and consequently brood rearing becomes slack. Moreover there is an increased tendency for bees to sting freely.

**Localities.** The wasp has been observed in the following places:—Tirur, Edappal and Ponnani in Malabar District; Tiruchengode in Salem District; and Telungapalayam in Coimbatore District.

**Remedial Measures.** One of the methods of dealing with the wasp is to locate its nest and destroy it. The location of the nest is not a difficult matter as the wasp as soon as it catches the prey carries it to the tunnel. The direction of its flight can be observed and the nest located without difficulty. It is also possible to handnet the adult wasps during the bright hours of the day. By these two methods the pest can be controlled satisfactorily.

## THE STORY OF COFFEE

BY S. DORASWAMI AIYAR, B. A.,

*Assistant, Messrs. Parry & Co. Ltd., Fertilizer Dept.*

According to some botanists, the Coffee plant is indigenous to Arabia, while some think that it may have been indigenous to Abyssinia and carried from thence to Arabia. Coffee is not mentioned in the Koran. It is believed that the Arabs knew of coffee only in the 14th century and even then it was probably viewed as a medicinal plant. It is also probable that the Arabs were then only preparing a decoction from the succulent rind or pulp of the coffee-cherry, which, as it contains sugar, was liable to ferment and become alcoholic on standing for some time. It was therefore associated with wine and so the zealous followers of the Prophet discouraged the use of it.

The art of roasting the coffee beans and making a decoction from this was probably discovered in Persia in the fifteenth century. A Mohammadan priest of Aden had an occasion to go to Persia where he



**Preying.** The scene is now shifted to the hive entrance. The wasp sits upon the alighting board with its back towards the hive entrance and looks alert and busy by vibrating its antennae and wagging its abdomen. She attempts to pounce upon every flying bee. Generally it catches hold of outgoing bees. But bees with pollen loads have also been observed being made victims. Bees are held on the dorsal side, by the front legs of the wasp. Bees writhe and struggle for release, but they are incapable of stinging in that position. When the bees struggle much the wasp drops them down but in a few moments takes them up again.

**Stocking bees.** Within about 5 to 10 minutes the wasp returns to her tunnel with her victim. She hovers for sometime and dropping the bee just at the edge of the tunnel, shoots inside it and then drags it into the tunnel. After about 3 to 5 minutes she again appears and repeats the process of gathering bees. This she continues to do for a period of 1 to 1½ hours collecting as many bees as possible. Till that time the tunnel is left open; afterwards she pushes up some quantity of moist sand from inside to close the tunnel and remains in her nest for about 2 hours after which she reappears and begins preying in a similar manner as she did in the forenoon. Afterwards she goes inside the tunnel closing it once again. When the conditions are unfavourable the wasp stops the work temporarily and remains inside by closing the tunnel and the work is resumed after the expected bright weather starts again.

**The tunnel.** In the moist sand (below the loose sandy layer) there are three or four separate apartments or pockets about 3 to 4 inches apart from each other in which are stored groups of bees varying from 2 to 6 in number. All these lie within a surface area of one square foot.

**The egg.** In each group of bees there will generally be one egg deposited on one of them but sometimes none may be found in a group of even three or four bees. The egg is seen thrust between the head and throat of the bee, the free end curling a little over the ventral side of the thorax and passing between the front and middle legs. The egg is white in colour, about 3 mm. in length and 1 mm. in cross section.

**The larva.** The egg hatches on the second day and the small larva is more or less of the same size but its color is slightly dull. Naturally the grub begins to consume the first victim on whose body it hatches. It takes about two days to consume the first bee. In the first five days the larva feeds on all the bees in the pocket leaving only the outer shell of the abdomen, throat, head, wings and legs as remnants. The length of the full grown larva is about 15 mm. On the 6th day it begins to spin its cocoon and on the 7th day it completes spinning. Hence the active larval period is five days.



The cocoon is made of sand and the remnants of the bees. It is a neat oval shell about 12 mm. long and 3 mm. in cross section. In about two days the cocoon becomes hard.

**The pupa.** The pupa when fresh is pale white in color and later becomes brown. It is about 10–11 mm. long and  $3\frac{1}{2}$  mm. broad. Adult wasps emerge from the pupae in due course.

**How the wasp affects the bee colony.** The loss caused by these predatory wasps is serious since each wasp is capable of robbing about 15–20 bees in a day. If there are more than one wasp preying in a day and if this repeated for a number of days the loss to the colony will be severe. Apart from the actual loss due to the visits of these robbers the routine work of the colony is disturbed. Most of the bees become guards and thus the number of bees going out foraging decreases. The colony therefore never works well and consequently brood rearing becomes slack. Moreover there is an increased tendency for bees to sting freely.

**Localities.** The wasp has been observed in the following places:—Tirur, Edappal and Ponnani in Malabar District; Tiruchengode in Salem District; and Telungapalayam in Coimbatore District.

**Remedial Measures.** One of the methods of dealing with the wasp is to locate its nest and destroy it. The location of the nest is not a difficult matter as the wasp as soon as it catches the prey carries it to the tunnel. The direction of its flight can be observed and the nest located without difficulty. It is also possible to handnet the adult wasps during the bright hours of the day. By these two methods the pest can be controlled satisfactorily.

## THE STORY OF COFFEE

BY S. DORASWAMI AIYAR, B. A.,

*Assistant, Messrs. Parry & Co. Ltd., Fertilizer Dept.*

According to some botanists, the Coffee plant is indigenous to Arabia, while some think that it may have been indigenous to Abyssinia and carried from thence to Arabia. Coffee is not mentioned in the Koran. It is believed that the Arabs knew of coffee only in the 14th century and even then it was probably viewed as a medicinal plant. It is also probable that the Arabs were then only preparing a decoction from the succulent rind or pulp of the coffee-cherry, which, as it contains sugar, was liable to ferment and become alcoholic on standing for some time. It was therefore associated with wine and so the zealous followers of the Prophet discouraged the use of it.

The art of roasting the coffee beans and making a decoction from this was probably discovered in Persia in the fifteenth century. A Mohammadan priest of Aden had an occasion to go to Persia where he



found his co-religionists partaking coffee. When he returned to Aden he tested its value in several ways, and, as he specially found it exhilarating and as a preventive against drowsiness, he recommended its use to his followers with whom he used to spend the nights in prayer.

From Aden the knowledge of coffee seems to have spread to Mecca and Medina where it was adopted first by the pilgrims and then by the rest of the people. It is said that within a century after its introduction to Aden the use of coffee, as a beverage, spread to Cairo, Damascus, Aleppo and Constantinople.

However, in Mecca the more orthodox were objecting to the public coffee-houses as they tended to gaming, singing, dancing etc. In 1511, the Governor of Mecca, who was the Viceroy of the Sultan of Egypt, prohibited coffee drinking on the ground that its exhilarating effects were intoxicating and so contrary to the things permitted in the Koran. But the Sultan of Egypt revoked this and reproved his Viceroy "for venturing to prohibit an article of daily food used by the people of the capital of the Empire (Cairo) and by the Sultan himself." In 1524, however, the coffee houses of Mecca had become the scenes of so much rioting that they were closed by the order of the Sultan himself. In Cairo also there were some who considered coffee drinking as lawful and some who did not think so.

In Constantinople attempts were made by some zealots to raise a religious prejudice against coffee drinking by pointing out that the roasted berry was charcoal and that charcoal was not "of the number of things created by God for food". In consequence of this the coffee houses of Constantinople were ordered to be closed in 1554. But, later on a decree was issued declaring that coffee was not charcoal and thereupon the business of selling coffee was resumed. But still later, the Grand Vizier, Cuproli, suppressed the coffee houses on the war breaking out with Candia. This was done under the pretence that its exhilarating effects induced the people to talk with too much freedom about the politics of their country. In course of time, however, the religious and political prejudices subsided and Turkey is now one of the most important countries consuming coffee.

In 1615 coffee drinking was prevalent in Venice. In 1644, it was taken to Marseilles and in 1652, Mr. Daniel Edwards, an English merchant of Smyrna, took to England a Greek servant, by name, Pasqua, who made his coffee. Shortly afterwards Pasqua set up a public coffee house in Cornhill. In 1675, Charles I characterised the coffee houses as seminaries of sedition and endeavoured to close them and it is said that he actually issued a proclamation which, however, was suspended a few days later. By 1688, London had rivalled the Grand Cairo in the number of its coffee houses.



In 1657, the Turkish Ambassador made coffee drinking fashionable in Paris and by 1670 roasted coffee berries were sold even at £5 per pound in Paris. By 1680, coffee drinking was quite popular in Paris.

It is said that even in Europe there was religious opposition to the drinking of coffee. Many sermons are said to have been preached against coffee and in one of them coffee is characterised as "a poison which God made black, that it might bear the Devil's colour".

Until 1690, the world's supply of coffee came from Arabia and Abyssinia. In 1690, live seeds had been conveyed to Batavia. A plant was then taken to Amsterdam and it is said that the Dutch presented a seedling from this to Louis XIV and that seedlings from that plant were sent to Martinique in 1720. During the voyage, the story runs, the ship's supplies of water ran short and the man in charge of the seedlings gallantly saved them by depriving himself daily of the greater part of his allocated portion of water. He had, in consequence, the good fortune to see the plants arrive in safety and a new source of wealth thereby added to the island.

In 1723, coffee was taken by the Portuguese to Java. In 1728 it was introduced into Jamaica and in 1770 to Rio de Janeiro. In all these places the production of coffee increased year after year.

Regarding the introduction of coffee in India it is believed that it was brought to Mysore over two centuries ago by a muhammadan pilgrim named, Baba Budan, who, on his return from Mecca, brought seven seeds with him. By 1825, coffee was growing in the Botanical Gardens at Calcutta. The first systematic plantation of coffee was established in 1830 near Chickmagalur in Mysore state. About the same time coffee was grown in the Shevaroy and the Wynad. In the Nilgiris, plantations were organised only in 1846.

As the cultivation of coffee spread in many countries in the tropics, its consumption also increased rapidly and coffee is now one of the most popular of all beverages and may even be considered as having passed from the position of an occasional luxury to that of a daily necessity, rivalled only by the sister beverage tea.

As a result of the legislative measures prevalent in many countries and as a result of the abnormally high taxation on coffee at various times, recourse was made to adulterate coffee and to find substitutes for coffee. It is even said that no other article of diet is so much and so persistently adulterated as coffee. The principal substances used for this purpose are roasted chicory and roasted beans and corn. Among others of less importance are acorns, dried beet-root, dandelion, mangold-wurzel, turnips, carrots, peas, date stones etc.

When the duty on coffee was high in many consuming countries, there had always been a large number of substitutes for coffee which were more or less satisfactory and some of which even replaced



coffee. But the importance of these substitutes waned as the duty was reduced. Among the more important substitutes for coffee were the following:—*Acron Coffee*, from acrons deprived of their shells, husked, dried and roasted; *almond coffee*, rye or wheat roasted with a few almonds; *bean coffee*, horse-beans roasted along with a little honey; *beet-root coffee*, from the yellow beet-root, sliced, dried in a kiln or oven and ground with a little coffee; *Egyptian coffee*, from chick-peas; *German coffee* from Chicory; *lupin coffee*, *rice coffee*, *rye coffee* etc.

During the Great War, the high price of coffee occasioned an increase in the trade of coffee substitutes and when the importation of coffee was rendered impossible for Germany and Austria on account of the blockade, the manufacture of substitutes for coffee developed there to an enormous extent. Numerous seeds, roots, fruits etc. were tested and even such materials as fruit stones, nut shells and sawdust were used. According to a writer, "there is no materials which has not been made into coffee substitute, from the wild radish to sawdust". It is said that during the War, the number of authorisations granted by the National Food Ministry in Germany for the manufacture of substitutes for coffee was 511.

After the War, however, conditions changed so thoroughly that during the past few years the world production of coffee has been considerably in excess of the demands and that during the past seven years some millions of pounds of coffee have been allowed to be destroyed by burning or otherwise, especially in Brazil, on account of over-production and with a view to secure a reasonable price for coffee.

In our own country, South India is the seat of the coffee planting industry and it is here that coffee drinking is also more popular. The production of coffee in South India is far more than what is required for local consumption and so the surplus is exported to the European countries. In recent years the demands from these countries have not been encouraging and the prices obtainable have also been declining. During the past three years the price of coffee has been low. In order to improve the prospects of trade, a cess is levied on the coffee exported from the country and the amount realised is being utilised for propaganda in this country and abroad for the more extended use of South Indian coffee.

Many virtues have been attributed to coffee drinking. It is said that Sir John Floyer was cured of asthma, after 60 years' suffering, by drinking coffee freely. It is also said to cure gout to promote digestion, and exhilarate the spirits. It has a stimulating effect on the system by rousing the nervous system to fresh activity. The sense of hunger is suppressed and the desire to sleep is driven away. When taken strong, it causes sleeplessness. It is said to dispel flatulency, to remove dizziness of head, to cause biliousness. Drunk in moderation, and especially with sugar and milk, it is perhaps the most wholesome



beverage known. Very strong coffee is said to produce palpitation of the heart, congestion of blood in the brain, trembling of the muscles and similar affections of the nerves.

To produce the beverage in perfection it is necessary to employ the best materials in its preparation. The berries must be carefully roasted by a gradually applied heat until the aroma is well developed and the toughness is destroyed. Too much heat must be avoided, as the volatile and aromatic properties of the coffee, and, consequently, the flavour, are thereby injured; on the other hand, if the berries are roasted too little, they produce a beverage with a raw, green taste, and very liable to induce sickness and vomiting.

The use of berries of uniform size is very important in order to ensure uniform roasting. Nothing injures coffee more than a percentage of small berries that become charred before the others are sufficiently roasted and as charcoal absorbs completely the aroma of coffee, charred berries are objectionable.

The roasted coffee should be kept dry and excluded from air as much as possible. It loses flavour by keeping and it also absorbs moisture from the atmosphere. It is advisable to use freshly roasted and freshly ground powder for preparing the coffee. Boiling water should be poured over the powder in the coffee-pot. This will extract the useful and agreeable matter in coffee and all its flavour and aroma. Boiling the coffee is quite unnecessary and long or violent boiling might even be injurious.

## AN ACCOUNT OF THE TOUR OF THE SECOND YEAR B. Sc. (Ag.) STUDENTS

BY P. K. S. MANI

On the third of January we met at Ernakulam. The most striking thing that drew our attention here, was the extent to which the human labour had supplanted cattle labour; even huge waggons were drawn by teams of men. We visited the Tata Oil Mills; we were much impressed on seeing the intricate processes by which oils, particularly coconut oil, are transformed into various articles of luxury and necessity. We next visited the Palace Orchards of His Highness the Maharaja of Cochin. We also went to the Government coconut farm wherein we learnt the details of the cultivation as well as those of several experiments conducted. The next item of interest that we saw here, was the manufacture of coir and coir articles in the firm of W. M. Goodacre & Sons. The fundamental processes are all done by