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In its characteristics the Italian bee as we find it today is not different from that found over two thousand years ago, by Spinola, in a part of Italy called Liguria. No doubt bees of this variety existed in that country long before they were reported, for at that time they had assumed a disposition and habits that could be established only by unchanging surroundings, such as a particular food, protection against enemies, and isolation from other varieties of bees which would cause their characteristics to vary. The variety was well established through the isolation, as the seas and the snow covered mountains which completely surround Italy made it impossible for other insects to enter this territory.

There are many varieties of apidae. However we will not consider any except the Ligurian or Italian bee, as it is known, since it is far more numerous and important economically than any other variety of bees and the complete exclusion of other varieties by them is only a matter of time. While there is nothing but what is interesting and instructing about the work of the Italian bee, we will confine ourself as near as possible to their work of a single month, May.

Anyone who has observed with any interest a swarm of Italian bees will no doubt have noticed their two important characteristics, cleanliness and industry. It will be also noticed that these characteristics depend largely on each other. Although the Italian bee excels all other animals, probably, in ability for self protection and in cleanliness, some times they are overcome. For example, when a moth forces her way in a hive and begins her work it seems to be impossible for the bees to remove her and the effect on the entire swarm

is noticed at once. I have seen two hives of apparently the same size and healthy condition except one was free from moths and the other was infested. The bees in the infested hive would collect in small bunches in the hive or would go anxiously about, but little being done in the way of gathering food or in attempting to remove the intruder, while the neighboring swarm worked constantly. When the moths in the infested swarm were removed, their usual industry was resumed by all the bees and in two days one was as busily working as the other. Thus we can see the importance of having the home of a swarm clean in early spring if we wish a harvest of honey in the fall.

The month of May is far the most important month for the rearing of the young, as the workers and queens for the new swarms, also the workers for the old swarm, must be raised at this time. If the filth remains in the hive the young bees that should be fed will be neglected and die, the queen will stop laying, and the activity of the hive will stop. At this time pollen gathering is also very necessary, as any young bees must have pollen for food and this is the time when pollen is less abundant in the hive. However conditions will determine entirely the time of rearing both workers and queens. Temperature, cleanliness, food, all effect the number of eggs laid, a warm climate, a clean hive and plenty of pollen with which to feed the young being the best conditions for egg laying.

When an old swarm intends to send off a new swarm, a large supply of eggs must be laid by the queen, as workers and queens will have to be provided. This will make it necessary for the queen to lay from twenty-five hundred to thirty-five hundred eggs per day. However the queen seems to be equal to the occasion. She starts in the center of a comb that is as near empty as she can find, and works toward the

edge of the rack, going round and round, this being the easiest way for her to get to the cells, and she must lose ^{no} time in getting to the cells; for when the eggs are mature they fall from her like ripe fruit from a tree, thus wasting that number of eggs. When the egg is laid the queen goes on to the next cell leaving the workers to care for the egg. When the egg hatches the larva must be well cared for, it being a duty of the other workers to keep the young supplied with pollen, this being the only food they require. Some specially prepared meal is sometimes substituted for pollen with some success. In about three weeks after the egg is laid the young bee will be mature. The development of the queen is some what different from that of a worker. Instead of the egg that is to produce a queen being laid in a common cell, it is placed in one especially prepared, being about four or five times as large as other cells, also longer and opening downward. The workers are very careful and attentive in the care of the young queen. When the egg has been laid they will stand over the cell watching for it to hatch and seeing that it is not molested. As soon as it hatches they will begin feeding the young larva on a special prepared food called royal jelly. This is not the food given to the young workers, but is a finer pollen and more carefully prepared. It requires about three days after the egg is laid for it to hatch, the young maggot is about six days in the larva state and about a week in its further development. After from three to five days of her maturity the queen takes her only flight in the open, unless she later accompanies a swarm, and during this flight she is fertilized by a drone, once for all. When she returns she begins the task of laying eggs which she never stops till her death, six or seven years later. When a new swarm is sent off, the first one usually being the last of May

or June, the old queen goes with them leaving a new queen in the old hive; or sometimes a young queen and sometimes more than one young queen will accompany the swarm. These however, are all killed except one. I once found two beautiful young queens lying dead in front of a hive, but on looking inside found another which better satisfied the workers and which they had retained.

As all young bees must have pollen for food the month of May is the most important for gathering pollen. There is a great demand for it for food and fresh pollen seems to satisfy the bees better. So even should there be old bee bread in the hive, fresh pollen will be used if it can be found.

The work of an Italian bee as a pollenizer during the month of May is indispensable. Often the bees are raised for the honey they will furnish in the late summer with no account being made of their work in fertilizing flowers. This part of their work is however being appreciated more and more. As it becomes better known how fertilization takes place between the male and female organs in the plant kingdom; how cross fertilization is sometimes affected, producing better results than close fertilization; how the color and odor of flowers attract insects; how different varieties of plants assume different shapes to aid the insects in fertilizing them, etc; then we can see what aid the bee might be. And when we know that the bee must have pollen and that it must have it ⁱⁿ early summer, then we will appreciate to some extent the good a swarm of bees in May will be if they are given an opportunity.

As a result of the need of the bee for pollen it has developed special apparatus well adapted for carrying pollen, the tibia and metatarsus being provided with spines and having flattened portions so

that large quantities of pollen may be attached and carried to the hive.

The manner in which a bee collects and fastens pollen to her legs is very interesting. As the pollen is not dry it will not cling to the legs of the bee, so she must provide some substance to moisten or stick the grains together and fasten them to her legs. So as she collects the pollen with her mouth she moistens it with a sweet secretion, probably nectar, which she is carrying, and as fast as she moistens it she rolls it between her front legs, getting it into small rolls and then sticking it to her hind. All this is done so quickly that one can hardly tell how it is being done.

Bees are often dissatisfied with but one kind of food when they are collecting so they will gather both pollen and nectar. Bee keepers of one hundred years ago insisted that a bee would collect but one variety of food a day and that the work of collecting honey and pollen was divided among the bees of the hive. But as we see them collecting food often we find one that is laden with both pollen and nectar. When the bee first goes from the hive to collect nectar her abdomen is contracted and the black lines on the rear of each yellow segment is all that is exposed, thus giving the abdomen a black appearance. If she is laden with nectar the abdomen will be expanded and the yellow part of each segment will appear, causing a ringed or striped appearance. It will thus be easy to determine whether she is laden with both pollen and nectar as the pollen she would be carrying would always be visible. And often we find them with both. Collecting both nectar and pollen at one journey affords advantages; the nectar affords the bee a substance with which to fasten the pollen to her legs, she can save a second journey for the same amount of food and, especially in plants

that are close pollenized, the fertilization of the pistil is much more certain as she will work from the anther directly to the nectar thus being sure to come in contact with the pistil.

Why flowers are colored has been explained in many ways. However none of them seems to be thoroughly proven but there is but little doubt that the color was originally and still is for the advantage it furnishes in fertilization. Flowers that have color also have nectar and the color directs the bee to the nectar and leads her against the pollen and pistil as a rule,- against one of them at least. The color also brings the flower into prominence and makes it easier for the bee to find. It also makes it easier for a bee to determine the parts of species she is working on for she never visits more than one species at a single journey. Thus we can see that the flower does all it can to help the bee while the bee in return helps fertilize the flower.

Often farmers complain that their clover and alfalfa do not seed well the first crop. The weather being cold the insects that visit the field do not work till later in the season, thus allowing the first blossoms to wither. However this is not the case in a locality where Italian bees are plentiful. Then the first crop is a fair seed crop in spite of cool weather. And not this crop alone do they benefit; this is only an example of their work. Many varieties of strawberries would have no fruit whatever if it were not for the honey bee. Cherries, apples, plums and other fruits that bloom in May are also greatly benefited ^{by} her work.

The work of the Italian bee at this season is more valuable than other varieties because they live in larger swarms, they endure cold better, they are easier to manage, and they are far more industrious. However they work so quietly that never do we appreciate their real

worth, unless we have watched them carefully as they go quietly about their work.