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Queen Bees.

BY HY. W. SANDERS.

The queen bee has been for centuries the study of many naturalists, and we probably know more about her nature and habits and life-history than of any other insect that exists. In olden days, before the truth of many facts of natural history had been suspected, the queen bee was observed when she came out with a swarm of bees, and great was the speculation as to what the relations might be between the thousands of ordinary bees and the one large one. Bees were kept in very ancient days, and in the Roman classics there are works relating to bees, and in these the idea was first expressed that the large bee was the "king" of the hive. Virgil, indeed, goes one step further and speaks of the rival kings leading out their armies to war—that being the interpretation of the phenomenon of the swarm. The idea that she could actually be the mother of all the other bees in the hive was not suspected until many centuries later.

In the Middle Ages, writers on bees mostly spend their time in exploring the ancient classics for ideas, instead of attempting to carry out independent observations, as we would do in these times. Supposing that our civilization was to be swept away, but that a great many of our books were to be preserved, we can imagine that men might get into the same frame of mind, and assume that what was in the books contained the whole of wisdom, and that anything not confirmed by the printed page could not be considered correct. So it was in the dark ages. The inhabitants of Europe were so sunk in ignorance after centuries of warfare and destruction, that the few who actually did have the ability and opportunity to study (generally they were monks), naturally became absorbed in the classics of the greater men who had preceded them. Now the Romans, however advanced they had become in some things, were all at sea in their explanation of bees. They believed that bees could be bred from the decaying carcass of a cow, that they brought the young bees home from the flowers, and that the pollen they carried on their legs was beeswax. Above all, they believed that the large bee was the king, ruling over his subjects as a human king might, and wondrous wise. All these things were duly copied by intervening writers, and came down pretty nearly to our own times. As late as the reign of Charles II the "King's Beemaster" wrote a book in which he argued that as the bees had a king it proved beyond doubt that the monarchy was a divine institution. It isn't recorded whether he got a raise but we suppose he did!

Strangely enough, the man to whom we owe the foundation of our knowledge on bees was totally blind. Francois Huber was the keenest observer on bees, though he had to use another's eyes. His assistant was a man of great patience, and with Burnens, the observer, and Huber, the thinker, the truth of the bees' relationships was given to the world. There is one thing at the very outset about the queen that has never been explained. She is hatched from the same egg as an ordinary worker, or female. This can be proved by any beekeeper by taking the egg out of a queen cell, and placing an ordinary worker egg from a worker cell in place of it. A queen will be developed just the same. Further, she will get to maturity earlier, being full grown in fifteen days, whilst the worker bee takes twenty-one. Yet she has certain organs that the worker bee does not possess, and she lacks some that the worker bee does possess. The explanation that is given us is that the queen gets a great deal more of the specially-prepared food than the ordinary worker, and this is correct, but it only pushes the mystery a little further back; for of what nature is this wonderful food? We only know that it is produced by the bees as a sort of digestive process and that the young bees in the larval stage are fed thereby. It is given to the embryo queen in such abundance that

for the first few days the larva actually floats upon it, and it probably constitutes her food during the laying season, for she then lays many times her own weight of eggs in a day, and the consumption of food inside her body must proceed at an extraordinary pace.

About a week after she has been hatched out from the cell in which she developed from the egg, the young queen will set forth on her wedding trip.

The day after the nuptial flight the queen begins to lay eggs, and here we are brought up against another of the mysteries of beekeeping, for the queen seems to have the power to lay either male or female eggs at will. The drones or male bees are developed in a larger cell than the females or workers, and the queen begins in a circle in the centre of the hive and lays eggs in a circle, much like a spider spinning its web, and when she comes to a worker cell she lays a female egg, and when she comes to a drone cell she lays a male egg. This is the only explanation of the fact that the respective eggs thus laid all develop into their proper bees.

The only time the queen leaves the hive, other than to mate, is when she accompanies a swarm. She has often been described as leading out a swarm, probably the phrase being a relic of the times when she was supposed to be a queen in reality. As a matter of fact the queen is usually one of the last of the bees to emerge when the swarm comes out, and so far from taking any initiative in this or in anything else, the queen is probably more in the nature of an egg-laying machine than anything else. Her presence in the hive is essential to its welfare, however, and well do the bees know it. It takes only a few hours for them to ascertain her absence, if she is removed, and they will set up a plaintive hum in place of the brisk sound that every beekeeper knows. Immediately queen cells are erected to replace the missing queen, and rather than take chances with one, the bees will start quite a number, often a dozen or more in different parts of the hive. From one of these a queen will in due time emerge, and soon afterwards she will go around and kill the others in their cells, for a queen will brook no rival. A week later she will take her wedding trip and soon will be hard at work keeping the cells replenished with eggs.

The Theory of Silage.

Silage is kept in the silo very much as fruit, vegetables and other articles of human food are preserved in air-tight cans. The germs which cause fermentation and decay can only grow when there is a supply of oxygen present. Hence, if the air is kept from silage it can be preserved almost indefinitely. As soon as the silo is filled fermentation begins and continues until the supply of oxygen is exhausted. If the material put into the silo is neither too ripe nor too green, this fermentation will continue but a short time. That is, the heating which takes place is due to fermentation, and carbon dioxide gas is liberated by this action. This gas, being heavier than air, settles to the bottom of the silo and gradually fills all of the space in the silo, thus effectually stopping all fermentation, as no germs can live in the presence of carbon dioxide gas. Hence it is very essential that the silo be perfectly air-tight, so that this gas will not drain out and air enter. The top of the silo need not be air-tight as there will be a thin layer of from six inches to a foot of silage that will mold and form a tight covering.

The value and palatability of the silage depends considerably on just how far the fermentation goes. That is, silage cures very much as cheese, and is greatly improved if this process of heating or curing is allowed to continue to the proper point.

The progress of silage making is merely a partial digestion which aids and precedes the subsequent digestion in the animal's stomach. Many of the chemical changes are rather complicated, but interesting to any one who has a partial understanding of such subjects.

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