

### Constructing the Comb.

*Concluded from Page 127, last issue.*

Necessarily, their first task was to begin the construction of the comb, in the cells of which they store their food and rear their young. For this purpose they had filled their bodies with honey before abandoning the parent hive, being able to manufacture from it the all-important wax for building. In the abdomen of each worker bee are four pairs of wax-secreting glands, from which the substance exudes between the plates that cover the belly of the insect. It hardens on the outside in delicate translucent flakes, which the animal pulls off by means of a pair of pincers which are formed for that purpose between the joints of its hind legs. She conveys the pieces of wax to her mouth, which is provided with jaws formed expressly for wax molding, and with them and her saliva she gives to the substance the proper consistency.

#### BUILDING DOWNWARD.

Because the comb is always suspended from above, the beginning of the structure must be made by placing a strong layer of wax along beneath the horizontal beam or what not from which the fabric is to depend. From this the latter is continued downward with a hanging wall, on each side of which the hexagonal cells face outward. Much wonder has been expressed at the absolute regularity with which these six-sided rooms are supposed to be made, but the fact is that they are not always perfectly regular and are very apt to be considerably out of the geometrical exactitude. They are not made hexagonal, but circular, and it is the interference with the form of each cell by the ones surrounding it that makes it six sided. The principle may be illustrated by putting several soap bubbles together, the walls by which they are united being invariably plane surfaces.

#### ECONOMY IN WAX.

Wax is a very costly product from the bee's point of view, requiring for its manufacture several times its own weight of honey, and therefore the utmost possible economy is pursued in its employment. The insects in building the comb carefully scrape away and thin the main dividing wall and the partitions of the cells to the furthest point that is consistent with the requisite strength. Thus they will so utilize a single pound of wax as to compose with it from 85,000 to 50,000 cells, which will afford accommodation for at least twenty-two pounds of honey. From this it has been estimated that the wax of a cell at the top of a full comb one

foot deep supports 1,320 times its own weight. Because of the greater strain upon them the top cells are made extra strong.

#### THE QUEEN'S CRADLE.

In making the cells which are to be cradles for young queens, however, no such economy of material is exercised. They must be very strong because they have to bear the weight of many nurse bees crowding around to feed the immature princesses with the rich food called "royal jelly." Accordingly the walls of these larger apartments are so constructed as to be forty or fifty times the ordinary thickness. For them scraps of old wax are chiefly utilized, it being the usual habit of bees to avail themselves for building purposes of whatever second-hand material is at their disposal. Often a new comb, seen under the microscope, will be found to be full of bits of old caps that once covered cells, fragments of the cocoons, and the cast skins of larvae.

#### ARTIFICIAL DIVIDING WALLS.

In order to make the bees produce more honey certain very ingenious methods of aiding them in their housebuilding are commonly practiced by beekeepers. Artificial dividing walls for combs are manufactured out of wax at a small price per square foot. These come in sheets about one-sixteenth of an inch thick or less, being stamped out in such a manner that both sides of each sheet are covered with hexagons slightly raised from the surface and formed exactly on the patterns adopted in nature by the bees. The bee man suspends a piece of this in a comb frame, which he places in the hive, and the bees use it as a foundation for building combs upon. Thus they are enabled to store away much honey which they would otherwise be obliged to utilize for purposes of construction. Furthermore, the foundation of the cells as stamped on the wax sheets are of the size adapted for the production of workers when the cells are employed for breeding.

#### PRODUCING WORKERS.

To make this clear, it should be explained that the kind of bees produced from the eggs laid by the queen in the cell have relation to the shape and size of the cells. Drone cells are somewhat bigger than the cells which serve as nurseries for workers, while the queen cells are much larger and cylindrical. In the manner described the beekeeper induces his bees to construct cells for breeding workers, which are the honey gatherers, instead of a large percentage of idle drones. The profit in this is obvious enough. During the four or five years of her life the queen bee lays about 1,500,000 eggs.