

sults as must be secured in the height of the honey harvest.

It is evident to me that the amount of honey consumed in producing a pound of wax varies greatly, even in favorable circumstances, just as the amount of corn or cereals needed to produce a pound of fat in our domestic animals varies under different circumstances. This comparison is supported by most scientists. Cheshire compares the conditions necessary to produce wax to those needed by chickens to fatten—confinement, bodily inactivity, warmth and high nourishment.

But must the bee produce a certain amount of beeswax whether she is willing to do so or not? In other words, must an amount of wax be produced, which, if not used to build combs, will be thrown away or plastered over the walls of the hive?

When the bees are filled with honey, and have no comb in which to deposit it, there is no doubt that they hang in clusters, "in warmth and inactivity," until this honey is changed into wax. It was once believed that a certain part of the bees were "comb builders," and that their sole occupation was to build combs; that they differed from the field workers in appearance, being larger in the abdomen and less active than the others. This was asserted by Huber, who, with the help of his faithful Burnens, made such accurate discoveries. But Huber had no means of discovering what was later ascertained by the introduction of the Italian bees, that those bees which he named "comb builders" are the young bees before their first flight, and that these bees become field-workers in their turn. They are wax-workers when wax producing is necessary at the time when they are too young to go to the field. But when the combs are full, from one end of the hive to the other, then all the bees must become wax producers, as there is no other way for them to get rid of their honey.

Huber and others since have ascertained that all the bees are capable of pro-

ducing wax when their honey-sac is full and cannot be emptied. It is also evident from the testimony of a number of writers that at the time when the adult bee is constantly carrying honey to the hive, the wax-producing organs are more or less active, and a small amount of honey is constantly being changed to wax.

In all my experience with bees, and while producing extracted honey, supplying the bees with supers full of empty combs already built, I have never seen the bees waste wax, except when the combs were full, and there was no more room to build other combs, and no full combs to seal. In one or two instances I have seen wax scales wasted, but in each of these cases there was room to spare; the waste was caused by a sudden change of temperature, and I ascribed it in each instance to the inability of the bees to keep up the warmth of the hive, the scales of wax becoming too tough to be manipulated and had to be thrown away. Such instances are so rare as to be hardly worthy of notice.

When the honey harvest begins, and there is plenty of empty combs for the bees to store the honey, there is very little wax produced. That which is brought forth is used to lengthen the cells which have been cut down during the winter and spring while consuming the sealed honey, for any of our apiarists know that the cappings are cut away and wasted when the honey is used. So the bees repair their combs and "whiten" them—a process well known to both comb and extracted honey producers at the opening of the crop. Should we consider this whitening of combs as a waste? No, for the wax is placed where it serves the bees, and it is sufficient to say that they always do it, whether they have room for new combs elsewhere or not. But they always place honey in the cells, and have them fairly well filled before this whitening goes on.

I have never seen the bees build brace-combs except in too open spaces (in their

judgment, otherwise by plan they had planned their reach.

It appears easily reason building. W stomachs are a few minutes find opportunity the digestive absolutely necessary. When it reaches over its load easily finds a there is no in to build comb-building. well on, or worker brings once goes back eagerness of a fortune, then filled. If the an extra supply filling all the their honey-sac possibly contain arriving from the wax-production involuntary, for of overcoming the

Every apiarist ed hive at the plentiful harvest all the bees loo pear, hanging t apparently idle, to change into build more com room for more have to be waste ed This waste long as there is corner to fill, a c in this condition with empty con will change. You new activity. They and rush to the t