

mouth after it has undergone the necessary process therein.

5. The mandibles are auxiliaries of the tongue in gathering pollen, the tongue transferring it to the mouth for manipulation.

6. The bee has an auxiliary pollen store, or dry-pollen receptacle under the thorax, known and used by the bee as such, and all dry pollen placed there is as secure as in a closed basket.

7. The fore and centre legs are also auxiliaries, the pollen gathered by them being transferred to the dry-pollen store mentioned in rule 6.

8. The tongue removes the dry pollen from the auxiliary store according to requirements, and transfers it to the mouth for manipulation.

9. The process which the pollen undergoes in the mouth of the bee, with the help of the mandibles, appears to be the breaking or disintegration of some of the pollen grains, the possible elimination of some of the pollen husks, and giving the pollen a charge of saliva. It may also undergo some other process, because it remains in the mouth a comparatively long time.

10. The prepared pollen, as removed from the mouth by the tongue, is taken by the ends of the fore legs, which transfer it in turn to those of the centre legs, and these latter place the double handful thus held between the compressors at their furthest and lowest corner.

11. The work of the compressors appears to be to compress the pollen and expel the minute air-bubbles which gather while the prepared pollen is being mixed with the frothy saliva of the bee. Also, perhaps, to destroy minute insects or their eggs which the pollen may contain, and to pass the pollen up through the pollen passage.

12. The "pollen passage" above referred to is situated at the top of the compressors, and forms the opening of the joint between the planta or metatarsus and tibia: that passage, open on one side and joined by the articulation of the joint on the other, is similar in action to the mouth of a carpenter's plane, allowing the prepared pollen to pass from the face of the compressors to the pollen-basket cavities of the legs; just as when planing wood the shavings pass from one side to the other through the mouth of the plane; the pellets are thus formed at the commencement from their lowest side, and adding fresh prepared pollen from their under side between the pellets and the face of the pollen baskets.

The "pollen passage" described in rule 12 is that which the writer has discovered and already alluded to as supplying a most

indispensable missing link in our present knowledge of the honey-bee; and it has enabled him to determine and locate every movement performed by the bee in gathering pollen and in forming the pellets, as well as to frame the present indispensable system, the want of which has been the cause of so much error in the past.

13. The comb or pecten, which forms the extremity or lower end of the tibia, prevents the prepared pollen as it is forced up the passage by the action of the combined compressors, from running up the inner part of the leg or tibia, as sometimes happens with bees which have done much work and have some of the teeth or bristles of the comb broken or missing. In this case, it is brought below the comb again by the bee drawing up its leg against the body. This comb, therefore, we shall call the "pollen-preventer comb." It serves almost the same purpose as, and is somewhat analogous to, the iron which serves to guide the shavings up in the carpenter's plane.

(To be continued.)

Fire Heat.

Is this necessary, in a cellar where bees are kept? That depends upon whether it can be kept warm enough without it. The temperature must not be allowed to go below 40°. Dr. Miller practises keeping a fire, and last winter was experimenting to see if they could get along without it and attributes his great loss to the want of the heat. He uses small cylinder stoves and keeps a slow fire with anthracite coal. The bees in the Vermont cellar did not need any fire, but Dr. Miller's may. There is a difference in cellars, and the rooms above. The piercing prairie winds may force an entrance, while the still cold air at the foot of a mountain may not. So all who own bees must depend upon their own observation and judgment, as to what is the best plan for them individually to follow in wintering bees.—*Orange Judd Farmer.*

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