

The difference lies in the weight of the foundation submitted. For instance, in that process of 12 feet square and 15 feet square per pound, we found very small per centages of the wax utilized by the bee; they did not weaken the base of the cell; there was not the extra amount of wax for them to utilize in building cell walls. In the choice wax of the Root mill and in a number of others we found 49.54 per cent. of that foundation wax utilized in this way by the bees; the same is true of the choice wax by the Given Process; we find there as much as 45 per cent. of this wax was drawn. However, as a matter of fact, on an average we found somewhere between 30 and 38 per cent. was the percentage of wax that the bees utilized from the foundation; that is practically, in round numbers, that from all foundations of ordinary weights there was in the neighborhood of one-third drawn out and utilized in comb foundation, while in what I may term excessively heavy foundations there was more largely in the neighborhood of 50 per cent. When we supplied the bees with only a light foundation, such as the patent process, the percentage was less than ten per cent. that was so utilized. If the main object in furnishing the bees with wax is to provide them with material for comb building you can see the economy of supplying them with foundations of not less than 8, 9 or 10 square feet to the pound, I doubt very much when you exceed that if you are really furnishing the bees with anything they make use of. That is the deduction I make from these results.

There is a tendency on the part of the bees to build up a cell which is fairly uniform in weight; that is to say, storing the same kind of honey; and if the bee does not find it furnished to him in foundation then the bee supplies it; when you furnish it the bee uses it as far as it can; and I think I have shown how it is that they cannot use it after a certain stage; and that is one of the reasons why we could not furnish enough to build the whole cell. Again, we find this very large difference in connection with the storage of buckwheat honey. There is at least fifty per cent. more wax in the comb in which buckwheat honey is stored over that in cells containing clover honey.

Mr. Holtermann—Do you happen to know if the flow from buckwheat is greater than that from clover?

Prof. Shutt—I cannot answer that question. The more honey they make the more wax they must make. I think

probably we shall have more data in time to come to bear out that idea.

With regard to the milling temperature as exercising an influence with regard to the ease with which it can be drawn out, again we found that that wax milled at 89 Fahrenheit was more easy to draw out than that milled at 105. When we get the same results in three years I think there is something in it. There are instances which do not lend any corroboration to that view. It may be, in fact, I am inclined to think that there is more in the weight that you furnish the bees than the temperature at which it is milled. However, these data stand on record in that matter. The results of that third year, on being calculated, show that the per centage of wax added by the bees in seventy per cent. of the trials made, was between thirty and forty per cent. That is what I say roughly we may suppose from our ordinary foundation, about one third of the wax is utilized in comb cell building. In five instances there was less than thirty per cent. and those were a very light wax. Now, the average weight of the foundation after the removal of the cells is considered fairly constant. There is another important point. It cannot be constant; that is to say, taking foundations of different weights, after we remove the superstructure of the cell. When we take waxes very closely in weight, we shall find that the result is that the remains of the foundation in the centre is fairly constant, but it cannot be quite constant in cases of very heavy waxes and light waxes because, as I have shown, the bees can only utilize the wax to a certain stage in the building of the cell, and on the other hand, with very light wax, they do not wish to weaken the base of the cell. But, there is a tendency on the part of the bees to build up a cell of a constant weight. The greatest weight of that foundation, after the removal of the cells, was in the choice wax by the Given process; that is, as I have already said, the heavy foundation that we employed in our tests. The lightest one was not the one that we might have supposed, with its fifteen square feet to the pound, but the choice wax of the Root mill milled at 89 degrees is more ductile and more easily drawn out by the bees, than the wax milled at a higher temperature. I think that is an important point. This choice wax by the Root mill process was by no means the lightest employed in the trials. With regard to the others, I have not been

(To be continued.)