

have as high a melting point as beeswax proper; then of course we cannot arrive at the nature or extent of that adulteration by a mere determination of the melting point; we have then to go to chemistry, and what we have to do is a little difficult for me to explain and I would have to find out the amount in very ordinary language. Different waxes make different soaps. There are many different ways of doing it, but that is the way in which we detect the presence of waxes which have a high melting point.

Mr. Holtermann—You think it is possible that that statement is correct in Germany, that they do utilize these cheaper products in the place of wax?

Prof. Shutt—I would not like to say anything about the German practice because I really do not know. I think it is possible; it is something which I think is within the bounds of possibility.

Mr. Holtermann—They simply state such is the case, but we in this country have felt inclined to doubt the possibility of it. I am very much pleased to hear Professor Shutt's opinion that he thinks it is possible.

In regard to these experiments, I believe that the first experiments that were conducted, with various weights of comb foundation, were carried on by the Experimental Union of the Ontario Agricultural College, Guelph, and at that time I suggested these experiments, and the different weights that were taken were rather extreme; that is, we took as heavy a brand as we could get hold of, and we took the lightest we could get hold of and then one grade between, and something like twenty specimens were sent in which had been put into sections. Now, in every case, by holding up to the light, and even pressing on it with a dull knife, we could detect, without looking at the side of the section, which way the foundation had been put into that section. Following those experiments, as far as I know, this line of work was taken up by the Michigan State Agricultural College, and they wrote me at that time and sent me a full set of combs, saying that as I had been the first one to do anything in that line, they would like me to carry on some experiments in the same line, and, if I remember correctly, they corroborated those experiments; that is, that as a rule, with few exceptions, that it was in proportion to the weight of foundation supplied to the bees. I know a great deal about Prof. Shutt; he has the reputation of being exceedingly careful in all his experiments, and all the work he has

shown we can depend upon it has been done in the most painstaking way, and the only criticism we can offer is that Prof. Shutt does not profess to be a practical bee-keeper; and a point which is lost sight of and which is of great value to the practical bee-keeper is the amount of what we call fish bone left in that foundation. We want to supply a certain material, but we dare not go beyond a certain weight of foundation; if we do we get a certain amount of fish bone. Now, some of us claim, and I think justly, that under favorable conditions a good deal of comb foundation is utilized by the bees; but if a heavy flow comes on suddenly, then the bees do not utilize the wax in that foundation to the same extent; they begin adding to the wall of the foundation. I think, as practical bee-keepers, we may supply them with an article which under the most favorable conditions is not going to be too heavy. There is the only point which I think, in those experiments and in giving the results, has been lost sight of to a very great extent. I know there are many who profess that they use a heavy comb foundation, but let us try that comb foundation; I believe there are samples here on the table; let us test it and send it around and see the amount of base there is in that comb. If there is not much fish bone in it, that will be strong evidence that it is a good article. I am very much pleased that Prof. Shutt has carried on these experiments, and, as I said, the work he has done I am satisfied has been done in a painstaking way. I wish I had known this subject would come up. The first year in the Ontario Agricultural College experiments we carried on work in that line, and we went altogether perhaps in the other direction. We went to work and shaved down that comb, and then we had a very fine instrument for detecting the thickness of any substance, and we took these combs, shaved them down and put them upon ice, to make them offer the greatest possible resistance, and then tested them, and we found a very material difference, and that difference almost I think in every case—at any rate the report would show—varied in proportion to the weight of foundation given to the bees; and more than that, just to see how far they did utilize the wax given, we not alone took a dark colored foundation, but we colored it absolutely black, then we filled the empty comb with plaster of Paris; that made a solid comb; and then we shaved it off, and you could just see the inside of that with the naked eye, the difference in