

forth, and I would like to show you these, but I will leave these out in the envelopes and you will agree for the most part we have been very unsuccessful. I think possibly that which has given the nicest wax is one per cent. nitric acid. This wax was all taken from one sample which was an exceedingly black looking mass. We have filtered it through charcoal and it would be very hard to suggest anything that we have not tried. The upshot of it all is we have obtained the best results by keeping it in warm water which is practically at the boiling point and straining it and repeating the operation and finally allowing the water to cool and pouring off the wax and then exposing it to the sunlight until it is bleached. In these two little glass jars we have the same wax, but this one was put in the light of a window for about two weeks, while the other was put in the dark. You will readily see that we have reduced the color very much. I have no doubt myself if you were to wash the wax in this way, and expose it to the atmosphere, and the sunlight that it would bleach it. On looking up the literature on the subject that this method has been used and used successfully, and has probably been found the best method that can be devised. We have treated it in a great many ways, but we have not had anything like the success as we have had by simply putting it in this way and then having it bleached in the atmosphere. I don't know what your experience is on the subject. I didn't bring all the samples down because it would serve no purpose. However, I have one or two with me which are very good. I was surprised to find that nitric acid gave us better results than sulphuric acid which tends to darken the wax rather than to bleach it.

Question—Did you try how much acid it would take to destroy the wax?

Professor Shutt—Yes, we have boil-

ed the wax in thirty per cent. sulphuric acid. It begins to darken then if boiled for any length of time. But you can use five per cent with safety. It begins to decompose the wax. There are many of these chemicals which bleach at the expense of a certain part of the wax. You can't use strong sulphuric acid. I have some here which was boiled in thirty per cent., but I think about five per cent. is the limit. Here is some that was boiled in about twenty per cent. sulphuric acid. But that is a matter which the bee-keeper is not very much interested in, because you can't boil it in metal vessels at all. You can't use iron.

Mr. Hall—You can use tin when you boil in water.

Professor Shutt—Certainly, I am speaking about the acid. Here is a sample, ten percent nitric acid. (Professor Shutt here shows the different samples of wax produced by the different methods.)

Mr. Hall—In using water the color comes out with the water?

Professor Shutt—Yes, a great deal of the coloring matter washes out with the water. The nitric acid tests were very much more promising than the sulphuric acid.

Question—Did it injure the texture of the wax to bleach it?

Professor Shutt—I don't think so. You are probably a better judge on that than I am.

Mr. Holtermann—The way you suggest is the same as the large bleaching establishments use, I think.

Professor Shutt—Here is one we used hydrogen peroxide on. I felt rather surprised that we didn't get something more definite in the way of results. We put a good deal of time on that.

When I speak of acid I mean acid and water. When I speak of five per cent acid it means five parts acid to ninety-five parts water. Of course,