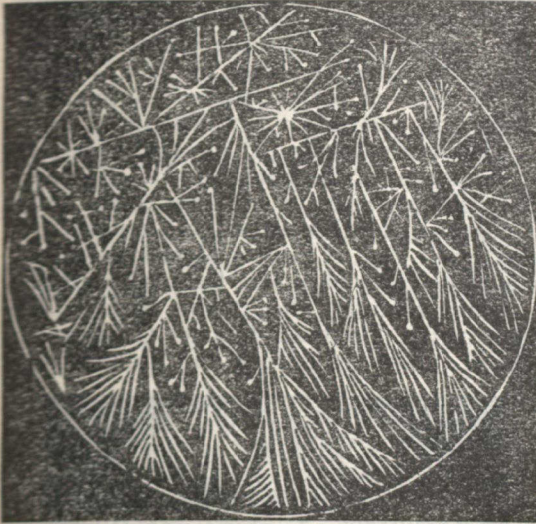


Borax, a substance used widely in soldering, consists of a compound of boric acid and soda, and if this composition is mixed with hot sulphuric acid pure boric acid is yielded, as the sulphuric acid extracts



No. 2—After warming a little solution of boric acid on a glass slide until a crusty ridge forms around it, the inner area becomes filled with filigree of this kind. Shown magnified in a $\frac{1}{16}$ in. pinhole.

the soda as sulphate of soda, and leaves the boric acid free as at first. Borax is sometimes used as a substitute for boric acid.

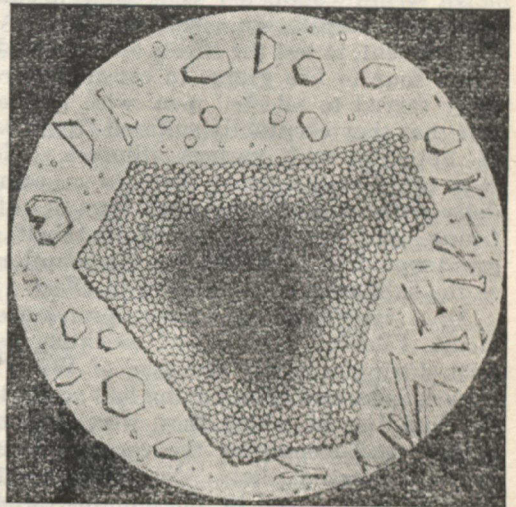
Borax has been imported from the East Indies under the name of tincal. It is found as a biborate of soda (which, when purified, produces boric acid) in certain lakes in Thibet and Persia, and elsewhere. Although it has acid properties it gives an alkaline reaction with test papers. The latter are, by the way, used for distinguishing acids from alkalies by their change of color. A blue litmus paper will be converted to a red color in contact with acid; and a red paper will become blue by impregnation with an alkali, such as soda.

Commercial boric acid appears as a salt-powder, being then glistening and granular. It will melt to a liquid that cools and hardens exactly like molten glass, and is very difficult of removal from the slides when in this condition. In its heated state it will melt the oxides of metals, of which common iron rust is one. Suppose, then, a rusty knife spreads some boric preserved butter on hot toast; or boiled milk encounters a few specks of rust in the saucepan—what will be the effect on the human body? Upon being impregnated with absolute alcohol borax will disclose a brilliant

green flame upon being ignited.

We will consider its microscopical features later on.

With regard to its use in milk, butter, and so on, Mr. Scott thinks, after having well studied all phases of the arguments for and against it, that it should be irrevocably condemned; but that it may be advisable to review some valuable opinions on various points. Dr. Wiley, the eminent food expert, considers that "it is easy to show by mathematical data that no matter how small the quantity of an injurious substance or preservative is, it will still produce an injurious effect." Now it is admitted on all sides that boric acid is injurious in excess of certain small amounts; but it is claimed that while those lesser quantities retard natural decomposition, they are quite innocuous to the human system, and should, therefore, be permitted in food. Such an acknowledgment is risky because, in the minds of ignorant manufacturers and vendors, it would, presumably, be regarded as equivalent to saying that boric acid is harmless in food. It is notorious that laymen do not understand the value of the strength of chemical solutions. There is a tacit belief that a poison is a poison, and a harmless substance a



No. 3—Melted boric acid resembles molten glass, and when water comes into contact with it in that state it splits up into cakes that are opaque for a while, and then divide into tiny hexagons. A magnified $\frac{1}{16}$ in. pinhole.

harmless one under any circumstances. Such confidence would result in people who were legally allowed to use a few grammes of boric acid adding thereto according to their own impressions, whereas by total