whole is now raised to the boil and kept stirred. When the effervescence ceases, the vat is filled up with cold water, until the temperature is lowered to about 65 degrees C

After being exposed to the air, the goods are plunged into boiling water containing hydrochloric acid, in order to brighten the color. The following proportions are given as the best, in every case the amount of water being taken at 7,000 litres:

Indigo	Indigo Paste.	Soda Ash.	Zinc Powder.	Bisulphite 60° Tw.
0.2	1	0.25	7.4	44.5
2	10	2.5	11	66
4	20	7	15	90
5	25	8	17	102
8	40	16	23	138
10	50	18	27	162
20	100	45	47	282

The goods to be dyed are well wetted and immersed in the clear liquor, and as there is no objection to their sinking to the bottom of the vat, the field of action is increased, and in this way the indigo is completely exhausted in the one operation.

FROG SKIN LEATHER.

Not long ago, says an exchange, we referred to the use of large frog skins for glove-making, the skin being exceedingly tough and elastic; it is now being used for book-binding in the highest class of work. It makes a very fine soft leather and takes the most delicate shade of dyes. There is here a hint for the maker of pocket books and purses, tobacco pouches and cigarette cases, and also an opening for Mr. Talati, who has already made a specialty of the lightest class of leather at his Bandra works. There is no lack of frogs in India, in many places they are too numerous, but if the frog skin should take on for small work it might some day lead to a new industry in the breeding of frogs for the sake of their skins. The collection of frog skins would find profitable occupation for some of the half-wild hill and forest folk, whose struggle for life is usually a severe one. This would open up a new industry for Canada.

CHEMICAL DETECTION OF TEXTILE FIBRES.

The recognition of the textile fibres by means of the microscope is an operation which, although entirely accurate, is beyond the resources of the average textile chemist, as microscopy is distinct from chemistry, and a sufficiently fine instrument is not always at hand. A writer in the Textile Colorist claims no originality for any of the methods here given, but has collected them from various researches of the most noted authorities on the subject. As the operations are conducted in different manners and in variable quantities, according to the fancy of the investigator, it has been thought best not to attempt to tabulate, but give each in its order.

The reagent used is 1 grm. potassium iodide in 100cc. water, to which is added as much iodine as will dissolve, leaving a small excess undissolved in the bottom of the vessel Two grms. of pure glycerine mixed with its own volume of water is cooled and three times the volume of glycerine in concentrated sulphuric acid added.

A drop of the iodine solution is touched on the fibre, and after a few seconds removed by a bit of filter paper and a drop or two of the acid glycerine solution applied to the same spot. Pure cellulose (free of lignin) does not swell or give a clear blue color. Vegetable fibre of a woody nature gives a yellow color.

Instead of the above-mentioned solutions, an iodine solution containing zinc chloride is occasionally used. Von Hohnel gives the method of preparing this solution—1 grm iodine, 5 grms. potassium iodide, 30 grms. zinc chloride, and 14 grms. water; total, 50 grms. This solution colors cellulose reddish and bluish shades of violet.

Woody fibres are colored red by an aqueous solution of indol and afterwards hydrochloric acid. Sulphate and chloride of aniline, to which hydrochloric acid is afterwards applied, give a yellow coloration to woody fibres. Under the same conditions chloroglucin or pyrrol gives a red color, and alpha-naphthylamine hydrochloride an orange color. Jute gives no reaction with these later reagents, but with the iodine and acid glycerine is turned yellow.

Cuprammonium solution, made by dissolving freshly-precipitated copper hydrate in an excess of ammonia and agitated in a stoppered flash in the dark, is used as a solvent for vegetable fibres, and according to the rapidity with which they dissolve they may be recognized. Cotton dissolves immediately; cellulose containing lignin—flax, for instance—swells and slowly dissolves, but fibres containing much lignin or woody matter scarcely swell at all and show no signs of solution.

Alpha-naphthol in a 20 per cent. alcoholic solution is used as follows: 1 centigramme of the fibre is placed in 1cc. of water containing two drops of the alpha-naphthol solution, and 1cc. conc. sulphuric acid is added. Vegetable fibres give a deep violet solution upon agitation. Animal fibres give a russet brown, but the fibre does not dissolve. Thymol, in place of alpha-naphthol, gives a red solution.

The following scheme of detection of the presence of cotton, wool and silk, is carried out by means of this reaction:

1. A violet color results: (a) The fibre dissolves entirely if vegetable (may contain silk); (b) the fibre dissolves partially if composed of vegetable fibre and wool.
2. Weak color or absence of color: (a) The fibre dissolves immediately if silk; (b) it does not dissolve if wool; (c) the fibre dissolves partially if wool and silk.

Caustic soda of potash of sp. gr. 1.04 dissolves animal fibre, whereas vegetable fibres are scarcely affected. Wool dissolves in five minutes and silk in fifteen minutes at the temperature of the water bath.

The following process has been adopted for the determination of the quantity of wool in a mixture with cotton. In a porcelain beaker of 1000cc. capacity is placed 5 grms. of the fabric, 200cc. of a 10 per cent. solution of caustic soda poured over it, and the liquid heated gradually, so that it comes to a boil in no less than twenty minutes. A gentle simmer is maintained for fifteen minutes longer. The wool is then entirely in solution, and this is filtered through asbestos in a Gooch crucible, washed with water, then with dilute acid, next with more water, then dried and weighed as cotton. A solution of rosaniline containing ammonia is heated, and pieces of cotton and wool yarn dipped in it for a moment. The wool is dyed a magenta color and the cotton remains undyed. (Rosaniline is prepared by decolorizing a solution of fuchsine with ammonia and filtering hot.)

Boiling dilute nitric acid colors wool yellow, silk less markedly, whereas the vegetable fibres remain uncolored. Concentrated nitric and sulphuric acids in equal volumes form a nitrating mixture which changes cotton to pyroxylin or gun cotton (recognized by its explosive character when washed and dried, and by its solubility in a mixture of ether and