

On the Employment of Aloes as a Dye-Stuff.

ALOES, the dried bitter juice of the leaves of a plant of the same name, was formerly used only in medicine; perhaps we should rather say abused, as it is a very drastic cathartic, and inflammation and hemorrhoids are the not uncommon results of the use of patent pills containing this substance, a fact which is unfortunately not suspected by the too confident public.

The investigations of modern chemists have discovered the curious fact that aloes, by the action of nitric acid, undergoes a change similar to that sustained by benzole from coal-tar, and numerous other substances. Aloes when subjected to the action of nitric acid forms a peculiar acid, which has been called chrysammic acid, from which are derived a number of dye-stuffs of different shades of color and of great value.

These dyes were first applied by Lindner, in Germany, and the investigations which led to these discoveries were undoubtedly induced by the incidental observations continually made by chemists, as well as by the writer of this article, that when bottles which had contained certain resinous, oily, or tarry substances, the remains of which were still adhering to the glass, were cleansed with nitric or certain other strong acids, there remained sometimes exhibited very intense red, brown, or other coloring; a peculiarity which always strikes the chemist, since such a large number of compounds, principally of the class in question, are totally colorless.

Chrysammic acid is thus prepared: In a suitable glass vessel place one part of aloes with sixty parts of nitric acid, and warm it in a water-bath as long as red fumes escape—these red fumes being the result of the decomposition of the nitric acid, which gives off part of its oxygen to the aloes. Take it from the fire and add slowly by small portions nine other parts of aloes; when this is all added and no more vapors arise, pour the liquid into an evaporating dish, place it on a sand-bath and evaporate to the consistency of a mush. Then place it again on a water-bath and evaporate to dryness. The object of this is to remove all remaining free acid, and to separate the foreign coloring matter dissolved by it. In this manner is obtained nearly one per cent chrysammic acid from the aloes employed. This acid, when pure and dry, consists of greenish yellow scales, not very soluble in water, but coloring it red and making it intensely bitter. It is soluble in alcohol, ether, and in strong acids. When heated, it melts and explodes with great violence.

To use this acid for dyeing wool, boil five parts of this powder in a sufficient quantity of water, allow it to cool to some extent, then add sixty parts of wool, and boil again for an hour. A beautiful *brown* color is the result; double amount of chrysammic acid giving a peculiar *black*. Three parts of the acid with four parts of calcined soda, treated in the same manner for sixty parts of wool, gives, after half an hour's boiling, a very fine *grayish blue*. Six parts of the acid for four of soda gives to sixty pounds of wool a *blue* similar to that obtained by copper compounds.

The same treatment which colors wools a dark brown with this acid, will color silk a purplish brown; cotton and linen, a pale pink.

When this acid is to be used for printing calico, one part of chrysammic acid is dissolved in thirty parts of alcohol, well mixed with four hundred to five hundred parts of gum-water, and used as the ordinary printing compounds. Steam is used to make the printing permanent, but this changes the pink into a violet. The steam is unnecessary, if the material is first treated by one of the usual preparations of tin.

Textures dyed with litmus, archil, cudbear, or other colored extracts from licheneous plants, are very unstable and will not stand washing. To make them permanent, chrysammic acid is dissolved in a solution of caustic soda, and one part of this is added to twenty parts of archil or cudbear. It has been introduced in the trade under the name of "liquid archil" and is a very stable dye.