

Illustrated Scientific News.

Printing Ink.

A few years ago the preparation of printing ink was considered a part of the printer's trade; now there are very few printers who have more than a remote idea as to the composition or preparation of the inks they use.

The manufacture of such inks has of late years developed into a distinct industry, employing hundreds of thousands of dollars capital, and turning out hundreds of tons of ink annually.

The basis of all ordinary printing inks, from the cheap poster and news to the finer lithographic and plate inks, is a varnish, prepared from oils, chiefly linseed, although nut oil is sometimes used, and rosin oil frequently introduced in the cheaper grades.

Where linseed oil is used this *varnish* is practically anhydride of linoleic acid, the fatty constituents of the oil—glycerine, palmitine, etc.—having been volatilized by heat. For the better class of inks cold oil is preferred. It is usually purified by heating it for several hours by injected steam or otherwise, with oil of vitriol (sulphuric acid) diluted with about three times its weight of water. The acid solution having been drawn off the oil is washed by agitation with boiling water, and, after standing to allow the latter to separate, is run off into storing vessels. From these the oil is transferred to iron caldrons provided with stirring apparatus and covers. A moderate fire in a small furnace beneath gradually heats the oil, which only half fills the vessel (to prevent accident by foaming) and the stirring apparatus is set in motion. The moisture in the oil is gradually dissipated, and as the temperature approaches 570° Fah., an inflammable vapor or smoke begins to escape from the boiling oil; a scrap of burning paper secured to the cleft of a long stick is thrust into the smoke, which is thereby ignited. The fire below is drawn and smothered; the oil, or rather the gases given off by the oil, are allowed to blaze, the combustion being kept within bounds by partly covering the pot if necessary. Samples of the oil are taken out from time to time and tested by cooling a few drops on a plate of glass or tile. When the drops thus chilled glaze over quickly and draw out into strings of about half an inch between the fingers, the flame is extinguished by putting the cover tightly over the pot. The oil is then again heated over a moderate fire to the boiling point, and the

heat and stirring kept up for several hours, small quantities of drier being introduced by some manufacturers.

Varnishes of several degrees of thickness—from greater or less boiling—are prepared in this way to satisfy the requirements of the different kinds or grades of ink, and to modify their consistence to suit the climate where used, thinner ink being required in cold than in warm climates.

For black letter-press ink the color and character are usually imparted to the varnish by the incorporation with it of lampblack or carbon black, Prussian blue, indigo, resin and soap. The proportion of these varies according to the purpose for which the ink is intended. The following will serve as an illustration of the composition of good letter-press ink: Varnish (prepared as above), 1 gallon; resin, 4 pounds; brown resin soap, 1¼ pounds; purified lampblack, 5 pounds; Prussian blue and indigo, each 1¼ ounces.

In compounding the ink the resin is finely powdered and gradually stirred into the varnish, made hot enough to melt and dissolve it. The soap, previously cut into thin slices, dried, and rubbed into fine crumbs, is next introduced, a very little at a time, as the moisture it still retains is apt to occasion a violent commotion as it is driven out by contact with the hot varnish. The addition of soap to printing ink increases the sharpness of the print and tends to prevent smearing or clouding of the work. The mixture, after cooling somewhat, is poured over the lampblack, and finely powdered blue pigments placed in the bottom of a suitable vessel, and the whole is well stirred together and then ground in a paint mill until reduced to a very fine, smooth, and uniform paste.

The quality of such inks depends largely upon the thoroughness with which the pigments are incorporated with the paste by grinding.

Lithographic inks are simply very fine printing inks made somewhat more fluid than required for letter-press or cut work. The ink used for engraved or plate work is usually a heavy printing ink made with ivory black, or ivory and carbon blacks, instead of lampblack.

Colored printing inks are made from fine, clear linseed oil, boiled into a varnish as above described, and appropriate pigments. The pigments used are carmine, lakes, vermilion, red lead, Indian and Venetian reds, chrome yellow