

by the theories of the formation of chloral generally accepted, according to which the first reaction of chlorine upon alcohol is to produce aldehyde, which by the further action of chlorine is converted into chloral; the difference in the various theories being mainly confined to the manner in which the aldehyde is so converted. Pure aldehyde was therefore acted upon by dry chlorine, and when the reaction was completed and the product was purified, it proved to be entirely distinct from ordinary chloral, and was determined to be *croton-chloral*.

Preparation.—One hundred grammes of pure aldehyde (boiling point 69.8° to 71.6° F.) is placed into a capacious flask, to which a reversed condenser is fitted, and perfectly dry chlorine is passed through the contents for four days. In the beginning the flask is kept cool by a refrigeratory mixture; but as the reaction, which is exceedingly violent at first, slackens, the cooling mixture is substituted by a water-bath, and this is very gradually heated, and toward the end of the process brought to the boiling-point. The product—consisting of a clear supernatant liquid and a dark-colored heavy oil, which congeals upon cooling—is transferred to a flask and subjected to distillation. The distillate, which passes between 194° and 464° F., is then subjected to fractional distillation, when a product is obtainable which distils completely between 325.4° and 329° F., and is found to be pure croton-chloral.*

Properties.—Croton-chloral is a liquid possessing a peculiar odor, which reminds faintly of common chloral. It forms with water a hydrate, which is crystalline, and with alcohol an alcoholate, which is amorphous. Its composition is $C_8 H_3 Cl_3 O_2$.

Croton-chloral hydrate is produced when croton-chloral is dissolved in warm water. Upon cooling it crystallizes in white, silky, glistening leaflets, which are sparingly soluble in cold water, but freely soluble in hot water and in alcohol; and from its alcoholic solution it crystallizes unchanged. It melts at 170.6° F., and is readily vaporized with aqueous vapor; its vapor being exceedingly irritating upon mucous membrane, and especially upon the eyes.

Action of alkalies.—By the action of alkalies upon croton-chloral or its hydrate it is not, as might be expected, split into allylchloroform and formic acid, but forms instead dichlorallylen ($C_6 H_2 Cl_2$) and formic acid.

Dichlorallylen is a pleasantly odorous oily liquid, which boils at 172.4° F.; but is quite unstable, losing its pleasant odor, acquiring that of phosgene, and eliminating chlorine.

Relation to common chloral.—Croton-chloral bears the same relation to crotonic aldehyde and to crotonic acid that common

*My authorities omit to indicate the use of sulphuric acid to dehydrate and purify the croton-chloral hydrate formed primarily, such being undoubtedly the heavy oily layer which solidifies on cooling.