Fig. 2. Products of β -indolyl-3-ethylamine with copper and cobalt catalysis

The metal-catalysed reaction differs from the enzymic reaction since indole is also produced from β -indolyl-3-ethylamine and indolyl-3-glycine, which are not degraded by the enzyme. In the case of β -indolyl-3-ethylamine, an important difference occurs, copper being more than twice as effective as cobalt and also causing a much higher indole production than from the equivalent amount of tryptophan (Fig. 2). Acetylene or primary amines could not be detected in the distillate, indole and ammonia being the only products identified and determined. We have but a single observation for copper with indolyl-3-glycine, the behaviour of which was similar to that for tryptophan.

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Synthesis of β -Isomaltose Octa-acetate

RECENTLY, crystalline derivatives of isomaltose, 6- α -D-glucopyranosyl-D-glucose, have been prepared by controlled hydrolysis of dextran and by application of the chromatographic techniques¹. It is proposed to outline here a synthetic method of preparing isomaltose derivatives.

Pacsu's² method of converting β -glycosides into the corresponding α -glycosides with the aid of titanium tetrachloride has, hitherto, been used only for alkyl glycosides. Studies of the velocity of such transformations showed that electron-attracting

groups in the aglycon strongly retard this reaction. This is the reason why β -alkyl cellobiosides can be transformed into α -alkyl cellobiosides without any appreciable formation of maltose derivatives. In cellobiose there are two oxygen atoms in the α -position to the glycosidic oxygen, while in gentiobiose there is only one. It might, therefore, be possible to transform gentiobiose derivatives into the isomaltose series. This view is further supported by the fact that Pacsu², when he prepared gentiobiose chloride hepta-acetate from β -gentiobiose octa-acetate and titanium tetrachloride, obtained a product which had a higher specific rotation and a lower melting point than reported by other authors for that substance. Pacsu's value for the rotation is also not in agreement with that calculated by the application of Hudson's rules of *iso*-rotation. His substance probably contained considerable amounts of isomaltose chloride hepta-acetate.

β -Isomaltose octa-acetate was prepared in the following manner. α -Gentiobiose octa-acetate in absolute chloroform was boiled with a large excess of titanium tetrachloride. The resulting mixture of gentiobiose and isomaltose chloride hepta-acetate was treated with mercuric acetate in acetic acid. By this reaction the β -octa-acetates were obtained. When the mixture of these was recrystallized from methanol, β -gentiobiose octa-acetate separated. The residue was concentrated and, when seeded with β -isomaltose octa-acetate (kindly supplied by Prof. Wolfrom), a second yield of crude β -isomaltose octa-acetate was obtained. It was purified by two further recrystallizations (m.p. 143–144°, $[\alpha]_D^{20} + 98^\circ$ in chloroform). It is identical with the β -isomaltose octa-acetate prepared by Wolfrom, Georges and Miller¹.

A detailed report will appear in *Acta Chemica Scandinavica*.

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Estimation of Epoxides

EPOXIDES occur among the products of the autoxidation of unsaturated fatty acids¹ and drying oils², and it has been suggested that they may be formed as intermediates in certain biological oxidations. Their accurate estimation is therefore a matter of considerable importance.

Oleic and elaidic acid oxides react smoothly and quantitatively with hydrogen chloride in dry ethereal solution to form chlorohydroxystearic acids, and can be estimated by this means³. This method was adapted by Swern *et al.*⁴ to the determination of oxirane oxygen in general, and has been used to investigate the autoxidation products of methyl oleate and the drying oils⁵. For this purpose, a weighed amount of material is dissolved in an excess of a 0.1–0.25 N solution of hydrogen chloride in dry ether and the excess of hydrogen chloride determined at the end of three hours.

During work on the halogenohydroxystearic acids⁶, it became clear that the absorption of hydrogen chloride by epoxides takes place equally well under conditions which are not strictly anhydrous, and from solvents other than ether; further, that the absorp-