sulphate in the presence of oxalic acid or arsenious acid using this indicator. It would be interesting to recall the observations of Pound[1] who arrived at similar conclusions regarding the effect of various reducing acids on the titration of ferrous sulphate using a different method of indication. Fuller details will appear elsewhere.

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1. Pound, *Chem. Eng. and Min. Rev.*, 1940, **32**, 418.

PREPARATION OF ETHOXY ACETONITRILE

JUST like methoxy acetonitrile the ethoxy compound is very useful for the synthesis of aromatic ketones. Several procedures[1] have been used for its preparation. The more important of these are the following :—

1. $Cl.CH_2.COOH \rightarrow EtO.CH_2.COOH \rightarrow EtO.CH_2.COOR \rightarrow EtO.CH_2.CONH_2 \rightarrow EtO.CH_2.CN$.
2. $Cl.CH_2.COCl \rightarrow Cl.CH_2.CONH_2 \rightarrow Cl.CH_2.CN \rightarrow EtO.CH_2.CN$.

They involve a number of steps and the preparation, therefore, takes time and is also expensive. Method I was adopted during wartime in this laboratory[3] when simpler alternatives could not be explored. Experiments have now been conducted for preparing this useful reagent by the simpler and quicker procedure commonly adopted for preparing the analogous methoxy compound[2] using diethyl sulphate instead of dimethyl sulphate.

$$HCHO + HCN \rightarrow HO{\cdot}CH_2.CN \xrightarrow{Et)_2SO_4} EtO.CH_2.CN.$$

It is found that the reaction is considerably slower and the conditions have consequently to be modified in order to obtain the best yields. The following are the full details.

Powdered potassium cyanide (26 g.) was dissolved in water (75 c.c.) and the solution cooled to $-5°$ C. in freezing mixture. Formalin (40 per cent., 35 c.c.) diluted with water (35 c.c.) was then added little by little with shaking. The temperature was not allowed to rise over 0° C. throughout this procedure. The mixture was left in the ice-bath for an hour with occasional stirring. Diethyl sulphate (55 c.c.) previously washed with ice-cold water was added all in one lot to the cold solution of formaldehyde cyanhydrin. The mixture was vigorously stirred with an electrical stirrer. As there was no visible reaction in the cold, the mixture was slowly heated to 45° in a water-bath. The heavy layer of diethyl sulphate at the bottom disappeared in about ten minutes and a lighter layer of ethoxy-aceto-nitrile appeared at the top. It was rapidly separated and diluted with anhydrous ether. Some more water separated out and was removed. The ether solution was then dried over anhydrous sodium sulphate. After evaporating the ether, the residue was distilled under reduced pressure (15 mm.) and the fraction distilling below 80° C. was collected. The yield was 6-7 c.c., and the product was pure enough for use in the Hoesch condensation directly. With phloroglucinol it gave a good yield of ω-ethoxyphloracetophenone, and the ketone was identical with the sample already described.[3] The nitrile could, however, be distilled again at atmospheric pressure and collected between 133° and 138° C.

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1. Sommelet, *Ann. Chim. Phys.*, 1906, **9**, 493. 2. *Organic Synthesis*, **13**, 56. 3. Row and Seshadri, *Proc. Ind. Acad. Sci.*, A, 1946, **23**, 140.

BACTERIAL SYMBIOSIS IN A *MARGARODES* SP.

To avoid confusion it may be mentioned that the Polish Cochenille insect, *Margarodes polonicus* L., has a red dye, as in the lac insect, and its symbiosis was being studied by Prof. Jakobski of Poland. Another speceis, feeding on grass roots, has been discovered by Sulc, at Brünn, and is evidently new to science. It is blue coloured, resembling unripe bilberries but free from any dye within its body.

When a mature specimen of Sulc's Margarodes is dissected each ovary is found to contain a tumour-like growth which is carmine coloured and therefore conspicuous. This tumour has been called mycetome, but should now be designated bacteriotome. It has been illustrated by Sulc[1] and further mentioned by Buchner[2] in more than one treatise, as it would appear to represent a type of bacteriotome by itself. I had good opportunities of studying Sulc's Margarodes. In full-grown individuals the two ovaries have each a bacteriotome; but in immature insects the ovaries are connected by a bridge-like tumour with a constriction in the middle. This central narrow portion indicates that the bacteriotome subsequently separates into two exactly as Sulc has illustrated them.

Smears from the tumours belonging to immature insects were stained with Giemsa, the symbiotes proved to be delicate bacteria which have evidently escaped Sulc's observation. Even in thin sections, which are usually 5 μ thick, the granule-like bacteria would not be clearly seen. The technique of making a smear —a technique not employed by Sulc—enables the identity of the bacteria. The symbiotic bacterium was successfully cultivated a number of times. The smears from cultures always compared well with those from the bacteriotomes.

Even apart from the fact that Sulc[1] has overlooked the existence of the bacterium, his interpretation of the symbiote as an yeast involves some confusion. On p. 16, Fig. 9 (1), he gives a section of the tumour attached to the ovary; a portion of this illustration is offered as Fig. A here with six tumour cells. Their cell inclusions are apparently some kind of yeasts. For this reason Buchner[2] calls the tumour in the Margarodes sp. a "Pilzorgan", although Sulc