

I have recently re-examined the calculations of Lewis and Knapp, and have reached the conclusion that no balance between electrical and capillary forces is possible at a particle surface where there exists an electrical double layer in equilibrium with the environment. Knapp, like Lewis, assumed that the charge on a particle remains constant during changes of radius, and in effect this means that he compared the solubility of a charged particle with that of an uncharged plane surface. For equilibrium in an ionic environment, however, both surfaces must have the same charge density, and the total free energy of a particle surface (capillary + electrical) will be proportional to the surface area. It will not reach a minimum value for a critical radius of particle as deduced by Knapp, and equation (1) no longer follows.

In considering the growth of an oil globule in a supersaturated solution, Lewis ignored the decrease in free energy of the environment on transference of an (uncharged) oil molecule to the globule. His argument implies that the free-energy change is confined to the globule surface, and hence that the surface free energy required for enlargement of the globule must be provided by the electric charge. As a generalization this is certainly incorrect, and it is unnecessary to invoke the electric charge at all for a highly supersaturated system. The conditions under which energy of supersaturation enables liquid globules to originate and grow in such a system have been discussed elsewhere⁴, in connexion with emulsions formed by distilling oil vapour into an aqueous solution, and need not be elaborated here.

A more extended discussion of the Lewis Knapp theory will be published elsewhere. I am indebted to Mr. N. Wookey for valuable assistance in the mathematical examination of the papers cited.

C. G. SUMNER

Group Research Department,
Scribbans-Kemp, Ltd.,
London, N.W.2.
Feb. 22.

¹ Lewis, *Koll. Z.*, **4**, 211 (1909).

² Knapp, *Trans. Farad. Soc.*, **17**, 457 (1922).

³ Lewis, *Trans. Farad. Soc.*, **28**, 597 (1932).

⁴ Sumner, *J. Phys. Chem.*, **37**, 279 (especially pp. 295-98) (1933).

An Exchange Reaction Involving Alkyl Oxygen and Sulphur

INCIDENTAL to the preparation of some sulphur analogues of the synthetic female sex hormones¹, we have been studying the relative stability of anisole and thioanisole to various acidic and basic reagents.

In one experiment we heated anisole (1 mole), thiophenol (1 mole) and an alcoholic solution of potash (1.5 mole) at 200° for six hours and obtained a quantitative yield of thioanisole and phenol.

This result is surprising for at least two reasons: first, because the demethylation of anisole in the absence of thiophenol, under the same conditions, was of the order of 5 per cent; and secondly, the reaction was carried out in the presence of ethyl alcohol, and apparently no thiophenetole was formed. (Later, the migration was found to occur equally well in aqueous medium.)

The reaction also has its interest because it may be used in demethylating other ethers, such as hexoestrol and stilboestrol dimethyl ethers at a lower tempera-

ture in a shorter time than previously reported. For example, hexoestrol dimethyl ether was quantitatively demethylated in four hours at 200° C., whereas Dodds, Golberg, Lawson and Robinson² advised sixteen hours at 228° C.

This work will be published in more detail elsewhere.

G. K. HUGHES

School of Chemistry,
University of Sydney.

E. O. P. THOMPSON

Chemistry Department,
Sydney Technical College.
Feb. 25.

¹ Hughes, G. K., and Thompson, E. O. P., *J. Roy. Soc. N.S.W.*, **82** (in the press).

² Dodds, E. C., Golberg, L., Lawson, W., and Robinson, R., *Nature*, **141**, 247 (1938).

Metabolic Studies with 3-Methylglucose

SINCE the chemical and physical properties of 3-methylglucose closely resemble those of glucose, it was of interest to determine how the introduction of a methoxyl group into the glucose molecule affected its metabolism in the body.

50 per cent aqueous 3-methylglucose was fed to starving rats by stomach tube, and estimation of the liver glycogen and carcass glycogen-level carried out and compared with that of similar rats fed glucose or water. It was found that the liver and carcass glycogen-level of the 3-methylglucose-fed rats was not significantly greater than that of the water-fed rats. In addition, the methoxyl content of the acid hydrolysates of the glycogens of the 3-methylglucose-fed rats was no greater than that of the water-fed rats. It is concluded from these experiments that 3-methylglucose is not glycogenic in the rat and does not give rise to a methylated glycogen.

It was possible to account for an average of 92 per cent of the administered sugar in the urine of rats which had received an intraperitoneal injection of a 6 per cent solution of 3-methylglucose. That the sugar present in the urine was 3-methylglucose was shown by preparing the osazone, which has a crystalline form differing from that of a similar derivative of glucose.

By estimating the loss of reducing power of a glucose solution during fermentation with bakers' yeast in the presence and absence of 3-methylglucose, it has been shown that the latter does not affect the rate of fermentation of glucose by yeast. It has also been shown that 3-methylglucose does not competitively inhibit the synthesis of a polysaccharide from glucose-1-phosphate with a crystalline muscle phosphorylase preparation as does glucose¹.

In spite of the apparent non-utilization of 3-methylglucose in the rat, it is absorbed from the small intestine of the rat at a rate only 16 per cent lower than that of glucose².

It is hoped to publish these results more fully elsewhere.

P. N. CAMPBELL

Department of Biochemistry,
University College,
London, W.C.1.
March 10.

¹ Cori, C. F., Cori, G. T., and Green, A. A., *J. Biol. Chem.*, **151**, 39 (1943).

² Campbell, P. N., and Davson, H., *Biochem. J.*, **43**, 426 (1948).