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Use of Pyridine in the De-ionization of Solutions for Paper Chromatography

Partridge¹ and Westall² have stressed the need for the complete removal of electrolytes in preparing solutions for paper chromatography when the subsequent development of the chromatogram involves the use of ammoniacal silver nitrate. The use of ion-exchange columns—'Zeo-Karb 215' and 'Deacidite E'—for this purpose in the routine analysis of dilute solutions of sugars in Ringer phosphate incubates proved slow and uncertain in our hands. The following procedure, however, based on the solubility of sugars and the insolubility of inorganic salts in pyridine, has given a consistent elimination of salt effects in our chromatographic studies, and is well suited to routine investigations.

The solutions to be examined (in our work the volumes were about 5 ml.) are dried on a boiling-water bath and the residues extracted with dry, redistilled pyridine (5 ml.) for 10 min. at 100° C.; any solid adhering to the sides of the vessels is ground into the pyridine with a glass rod. The stoppered solutions are allowed to cool and then filtered from the salt residue. The pyridine is removed by distillation under reduced pressure at a temperature not exceeding 40° C., and the residue containing the sugar is dissolved and washed from the flask with the minimum volume of water and afterwards suitably concentrated for application to the paper. Under these conditions we have observed no loss of sugars such as was found by Jermyn and Isherwood³ when heat-drying paper chromatograms prepared with ethyl acetate-pyridine-water mixtures, processed solutions giving reduction spots of intensity comparable with those from standard untreated control solutions of the same strength.

The method has proved most useful in demonstrating the formation of lactose from glucose and glycogen in *in vitro* studies on incubates of mammary gland tissue. The full results of this work will be reported elsewhere.

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Interaction of Iodine with Aromatic Hydrocarbons

A RECENT communication by Bayliss¹, commenting upon the spectroscopic evidence for specific, 'chemical' interaction between iodine and benzene obtained by us², quite properly includes the remark that such spectroscopic evidence should be "interpreted with caution", and he advanced a formula for the shift of the ultra-violet absorption band of iodine toward the red in terms of its polarizability, dipole-strength, and the refractive index of the solvent. We ourselves, at the outset of our investigation, were prepared to find the influence of the solvent to be general or physical rather than specific; but the evidence we obtained later³ has all been in favour of a definite 1 : 1 molecular complex. Excellent constancy was obtained for the constant of the equilibrium, $I_2 + A \rightleftharpoons I_2 \cdot A$ in a 'violet' (neutral) solvent, where *A* denotes an aromatic hydrocarbon. Moreover, the interaction is stronger in the case of the more basic mesitylene than in benzene, whereas, according to the formula of Bayliss, it should be weaker.

We have recently determined the solubility of iodine in mesitylene and find it to be greater than in any other solvent (on a mole fraction basis), and that the enhancement over what would be expected for a regular solution is in good accord with the degree of chemical interaction deduced from the spectral data. Finally, the entropy of solution, as revealed by the temperature coefficient of solubility, is very different from the regular solution entropy.

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Toxic Action of some Simple Gases at High Pressure

IN the course of an extended study of the action of 'physically toxic' substances¹ on the grain weevil, *Sitophilus granarius*, we have determined for this organism the median lethal doses of a number of simple gases such as hydrogen, nitrogen, argon, etc. To attain the required lethal concentrations in these cases, it was necessary to apply the gases at pressures much above atmospheric—for example, up to almost 900 atmospheres in the case of hydrogen.

The L.D.50 values were determined by exposing the insects, in batches of 100, to the action of the compressed gases in a bomb of 200 c.c. capacity, containing also air at a partial pressure of one atmosphere. The time of exposure at each pressure tested was 5 hr., excluding the periods required to compress and decompress the insects; these latter periods were roughly proportional to the logarithm of the final pressure attained, and did not, for the highest pressures used, exceed twenty minutes. The temperature was maintained at 25° C. The numbers of survivors were counted after recovery periods of seven days. A minimum of five points was used to construct the probit-log dose curve from which the L.D.50 values were obtained by inspection.