similar oxidation states occur in any reactions of physiological importance, however, is not known.

J. F. GIBSON
D. J. E. INGRAM

Department of Electronics,
University of Southampton.

P. NICHOLLS

Molteno Institute,
University of Cambridge.
March 7.

[1] Gibson, J. F., and Ingram, D. J. E., *Nature*, **178**, 871 (1956).
[2] George, P., Ingram, D. J. E., and Bennett, J., *J. Amer. Chem. Soc.*, **79**, 1870 (1957).
[3] George, P., and Irvine, D., *Biochem. J.*, **60**, 596 (1955).
[4] Theorell, H., and Ehrenberg, A., *Arch Biochem. Biophys.*, **41**, 442 (1952).
[5] George, P., and Irvine, D., *Biochem. J.*, **52**, 511 (1952).
[6] Chance, B., and Fergusson, R. R., "The Mechanism of Enzyme Action" (The Johns Hopkins Press, Baltimore, 1954).

A New Transaminase of *Corynebacterium diphtheriae*

ACCORDING to Shemin *et al.*[1,2] δ-aminolævulinic acid is not only utilized for porphyrin synthesis, but has also to be considered as an intermediate in the formation of purines. Very little is known at present about the enzymes responsible for this conversion. Shemin suggests the deamination of δ-aminolævulinic acid. Recently, Kowalski *et al.*[3] succeeded in demonstrating a δ-aminolævulinic acid transaminase system in mammalian tissues.

During our studies on the porphyrin metabolism of *Corynebacterium diphtheriae* we demonstrated transaminase activity in some cell-free bacterial extracts on δ-aminolævulinic acid/α-ketoglutarate and also on δ-aminolævulinic acid/pyruvate systems.

The cell-free extracts were prepared by grinding the cell mass mechanically, with glass powder in a Potter–Elvehjem homogenizer, followed by extraction with 0·05 *M* phosphate buffer (*p*H 7·6) and dialysis overnight against the same buffer.

To 1·7 ml. of this buffered cell-free extract, containing 2–4 mgm. protein per ml., were added 0·1 ml. phosphate buffer (*p*H 8·0), 0·2 ml. of 0·2 *M* δ-aminolævulinic acid, and either 0·2 ml. of 0·3 *M* α-ketoglutarate, or 0·2 ml. 0·5 *M* pyruvate. The mixture was incubated at 35° C. and then deproteinized with ethanol.

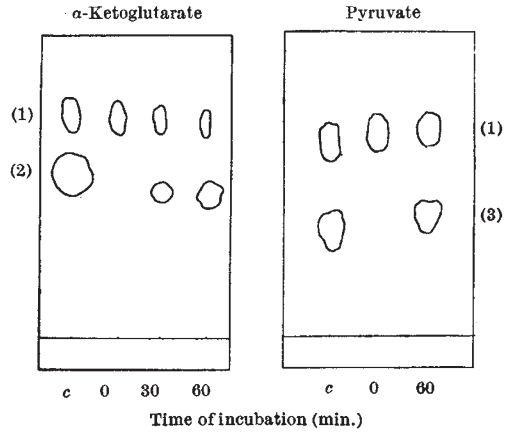

Fig. 1. Paper chromatograms of 75 μl. portions of an alcoholic extract of the incubation mixture, on Whatman No. 1 filter paper, chromatographed in *n*-butanol/acetic acid/water, 4 : 1 : 5. (1) δ-Aminolævulinic acid; (2) L-alanine; (3) L-glutamic acid; *c*, control

The reaction products were separated by paper chromatography and the spots were located by spraying with 0·2 per cent alcoholic ninhydrin solution.

The results are shown in Fig. 1. The transamination takes place with both α-ketoglutarate and pyruvate as amino-group acceptors; glutamic acid and alanine are formed respectively.

These findings suggest that there are at least two ways in which certain micro-organisms can utilize δ-aminolævulinic acid: one, the condensation to porphobilinogen, catalysed by a dehydrogenase which Gibson *et al.*[4] found to be very active in *Corynebacteria*; the other, by transamination, catalysed by a hitherto unpurified enzyme. So far as I know no such enzyme has been described in any bacteria hitherto.

MICHAEL BAGDASARIAN

Department of Biochemistry,
Research Institute of Mother and Child,
Warsaw.
Feb. 25.

[1] Shemin, D., and Russel, C., *J. Amer. Chem. Soc.*, **75**, 4873 (1953).
[2] Nemeth, A., Russel, C., and Shemin, D., *J. Biol. Chem.*, **229**, 415 (1957).
[3] Kowalski, E., Dancewicz, A., and Szot, Z., *Bull. Acad. Pol. des Sci.*, II, **5**, 223 (1957).
[4] Gibson, K., Neuberger, A., and Scott, J., *Biochem. J.*, **61**, 618 (1955).

Changes in Vat Dye Systems

WHEN certain vat dyeings on textile substrates are given an after-treatment, such as boiling in water or dilute soap solution, there is a change in the colour of the dyeing[1]. We have found that when changes of this kind occur with dyed 'Cellophane' the absorption spectrum becomes very similar after treatment to that of the corresponding solid-dye film on quartz, prepared in the manner already described[2]. In our experiments 'Cellophane' (deplasticized, British Cellophane, Ltd., *PT*300, 0·00085 in. thick) was dyed in the normal way from a solution of the vat dye in caustic soda and sodium hydrosulphite. The leuco dyeing was oxidized in air, washed in cold water for 5 min. and dried flat in air. The absorption spectrum of the air-dry dyeing was measured before and after subsequent aqueous treatments.

The results for 1 : 5-dibenzoylaminoanthraquinone (prepared from the monobenzoyl derivative and recrystallized from nitrobenzene) on 'Cellophane' and in the solid state are given in Fig. 1. On storing the dyed 'Cellophane' in water at room temperature for one month, or on boiling with a soap solution for 30 min., the visible absorption band is displaced bathochromically in the direction of the band in the solid state. There is also the appearance of a new band near 240 mμ which is present in the solid state but not in the original dyed 'Cellophane'. Results of a similar type were obtained with 1-benzoylaminoanthraquinone (purified by recrystallization from ethyl alcohol, melting point 254° C.). The visible absorption band was observed at 410 mμ in 95 per cent ethyl alcohol, at 450 mμ in the solid state, and the dyed 'Cellophane' at 444 mμ before treatment and at 464 mμ after aqueous treatment. From the reasoning of Weinstein and Wyman[3], it would seem