of thin discs (*Porphyridium aerugineum*; Gantt, Edwards & Conti, 1968). The phycobiliproteins of *Rhodochorton Rothii* are also of the latter type.

In *Batrachospermum virgatum* (Giraud & Lichtle, 1970) a different arrangement can be observed. The phycobiliproteins appear in the form of parallel cylinders 300–350 Å in diameter. This appearance can be modified to a series of V-shapes when the orientation of the lamellar surfaces on section is changed.

This arrangement is not found in the related genus *Lemanea*, in which typical globules are visible.

Gantt & Conti (1968) have shown that in the Cyanophyceae the phycobiliprotein globules may face each other between two lamellae (*Tolypothrix tenuis*). In *Chroococcus minutus* and in *Oscillatoria brevis* the globular accumulations form 'bridges' between lamellae and the zone has a reticulated appearance.

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Study of Porphyrins Present in Hepatoma Tissue

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Acquired photosensitizing porphyria arising from a benign liver tumour has been described by Tio, Leijnse, Jarrett & Rimington (1957). A similar case, but involving a malignant tumour, has been described by Thompson, Nicholson, Farnan, Whitmore & Williams (1970). Porphyrins from the liver of the latter patient were compared with those from normal human liver.

Porphyrins from the tumour were separated into a fraction F₁, extractable into ethereal acetic acid but not extractable therefrom into 3% sodium acetate, a fraction F₂ extracted from the ethereal acetic acid into 3% sodium acetate and then into butan-1-ol, and a fraction F₃ strongly adherent to the residual tissue but removed by conversion of the porphyrins into methyl esters with methanolic 5% sulphuric acid, dilution with water and extraction into chloroform.

Countercurrent analysis (Smith, Belcher & Mahler, 1970) of fraction F₁ showed that the peak 1, which normally contains only coproporphyrin, contained also two-carboxyl and three-carboxyl aetio-type hydrophilic porphyrins with Soret maxima (1.5 M-HCl) at 405 and 407 nm respectively.

These were possibly hydroxylated and were reduced (Pd/H₂) to a porphyrin with a Soret maximum at 402 nm. Peak II contained two-carboxyl and three-carboxyl porphyrins spectroscopically identical with those found in normal liver and with Soret maxima at 405 and 405.5 nm respectively. Peak III contained only protoporphyrin.

Radioautography of the abnormal F₁ porphyrins after treatment with 1-fluoro-2,4-dinitro[U-¹⁴C]-benzene showed the three-carboxyl material of peaks I and II to be radioactive. Inertness of these products to Ag₂SO₄ indicated an abnormal protein binding (Rimington, Lockwood & Belcher, 1968) or the presence of other fluorodinitrobenzene-reactive groups.

Fraction F₂, purified on Sephadex G-25 (Rimington & Belcher, 1967) and resolved on lutidine t.l.c., gave two-carboxyl and three-carboxyl porphyrins with Soret maxima (1.5 M-HCl) at 405 and 405.5 nm respectively. Hydrolysis and chromatography of the fraction F₃ esters also showed the presence of two-carboxyl and three-carboxyl porphyrins.

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Specificity of Biliverdin Reductase

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The specificity of the enzymic reduction of biliverdin to bilirubin has been in dispute ever since the first demonstration of the activity in mammalian tissues by Lemberg & Wyndham (1936). These authors attributed the activity to non-specific side effects of a variety of reductase activities. More recently Singleton & Laster (1965) found hepatic biliverdin reductase activity to be mainly NADH-dependent with a variable proportion of NADPH-dependent activity, whereas Tenhunen, Ross, Marver, & Schmid (1970) considered the activity to be entirely NADPH-dependent.

By using the general assay procedures of the above authors, we confirm the presence of both NADH- and NADPH-dependent biliverdin reductase activity in guinea-pig liver extracts. However,