ment in *Microform Review*, **4**, 179–182; 1975) of 53 major publishing organisations representing 1,427 journals, roughly one third "expressed themselves in regard to how they would publish in microfiche." Of these about one half were considering publishing the entire journal in microfiche but with a hard-copy version of contents and abstracts. Many of these publishers were also thinking of publishing the experimental details, appendices and other source and supplementary material only in microfiche and the abstracts or shorter versions of the articles in a paper edition. There are clearly many advantages to a two-tier system, with a conventional journal containing full summaries of the results, and with details published in microform (which could be produced directly from manuscript, saving time and expense). With contemporary techniques paper copies can be supplied on demand from a central microform holding.

Quite apart from the increasing number of journals, the rising production costs for individual journals create problems. One response for many journals has been to levy page charges, and sometimes to discriminate (often by slower publication) against those who cannot pay the charges. Van Valen (*Evolutionary Theory*, **1**, 119–130; 1975) has recently made a tentative survey of various kinds of financial discrimination by journals catering to the broad area of ecology and evolution: of the various kinds of subtle and not-so-subtle discrimination he catalogues, the commonest is a mandatory charge for pages in excess of x (where x is typically around 10). Van Valen's figures suggest that of journals published in this general field in the USA, 69 of 112 manifest one or more discriminatory practices. The corresponding figures for Britain are 5 of 41; for the remainder of Europe 23 of 48; for Japan 6 of 8; for Canada 2 of 8. The average cost per 100 pages of the journal to the subscriber is roughly constant for the various countries (with commercial publishers based in Germany tending to be significantly higher), and for the various publishers.

Socially responsible readers of *Nature* will be relieved to know that Van Valen classes it as not discriminatory.

A hundred years ago

M. Berthelot, the celebrated chemist, is a candidate in the moderate Republican interest for the representation in the French Chamber of Deputies, of the district in which the Institute is situated.

from *Nature*, **13**, February 10, 297; 1876.

Myelin structure

from N. P. Franks

NEW freeze-fracture studies by Pinto da Silva and Miller (*Proc. natn. Acad. Sci. U.S.A.*, **72**, 4046; 1975) have questioned current concepts of myelin structure. Myelin is usually thought to be unlike any other plasma membrane. It has an unusually low protein content (about 20% by weight), very little enzymatic activity (Adams *et al.*, *J. Neurochem.*, **10**, 383; 1963) and a lipid composition likely to result in a particularly stable bilayer (O'Brien, *Science*, **147**, 1099; 1965). This is all consistent with the principal function of myelin being that of an electrical insulator of nerve axons.

The most widely accepted model of myelin structure is that of a basic lipid bilayer, with most of the protein distributed outside the hydrocarbon region. Support for this picture came from the freeze-fracture results of Branton (*Expl Cell Res.*, **45**, 703; 1967), which showed that the fracture faces of frozen myelin were relatively smooth (similar to those seen with lamellar phases of lipids alone) in contrast to the particulate appearance of the fracture faces of other membranes. Since most membranes are thought to fracture within the hydrocarbon region, and since in some cases the particles have been shown to be protein-containing structures, Branton's results were consistent with a bilayer of lipids relatively uninterrupted by protein. More detailed information about the protein distribution has come from the X-ray diffraction work of Caspar and Kirshner (*Nature new Biol.*, **231**, 46; 1971). Using an absolute electron density scale, previously established by Blaurock (*J. molec. Biol.*, **56**, 35; 1971), they interpreted their electron density profiles as showing that the concentration of protein in the aqueous spaces between bilayers was 15–20% by volume (possibly higher near the lipid headgroups) with less than 10% by volume at the centre of the hydrocarbon region. The electron density profiles of Caspar and Kirshner impose important constraints upon models of myelin structure and were taken to support the notion that there was little protein in the hydrocarbon region.

Surprisingly, Pinto da Silva and Miller now report a widespread distribution of particles on the freeze-fracture faces of myelin. They suggest that the previous observations of Branton were restricted to regions of high shadowing angle, where the particles were obscured. In untreated myelin, frozen shortly after dissection, the particle distribution was found to be uniform. If, however, the membranes were either fixed or glycerol impermeated then the particles aggregated and formed clusters in the plane of the membrane. Similar particle clustering has been observed in several other membranes, but what is remarkable about the photographs of Pinto da Silva and Miller is that the particle-rich regions in one membrane seem to line up with particle-rich regions in the adjacent membrane of the myelin sheath (this correspondence sometimes continuing across as many as 50 membranes). Furthermore, neighbouring membranes in the particle-rich regions seem more closely apposed than those in particle-free regions.

Although Pinto da Silva and Miller admit that the particle clustering itself is likely to be an artefact, they conclude that the correspondence between particle-rich regions from one membrane to the next does reveal an intermembrane interaction which exists *in vivo*. They argue, by analogy with other freeze-fracture studies on membranes, that the particles represent protein-containing structures which traverse the lipid bilayer. They suggest that these structures stabilise the myelin sheath by interactions across the cytoplasmic and extracellular spaces. Because the fracture faces are thought to represent an essentially hydrophobic environment, Pinto da Silva and Miller argue that the protein is likely to be apolar in nature and suggest the Folch-Lees proteolipid as a possible candidate. Indeed, the fact that about 80% of the myelin protein (Folch-Lees and Wolfgram proteolipids) can be solubilised in organic solvents argues for an apolar site for these proteins. It remains to be shown, however, that the particles observed by Pinto da Silva and Miller do represent protein-containing structures which are present *in vivo*. If this is the case then current models of myelin structure may have to be revised.

Chemical antagonism in plant communities

from Peter D. Moore

ALMOST a hundred and fifty years ago De Candolle observed that the growth