

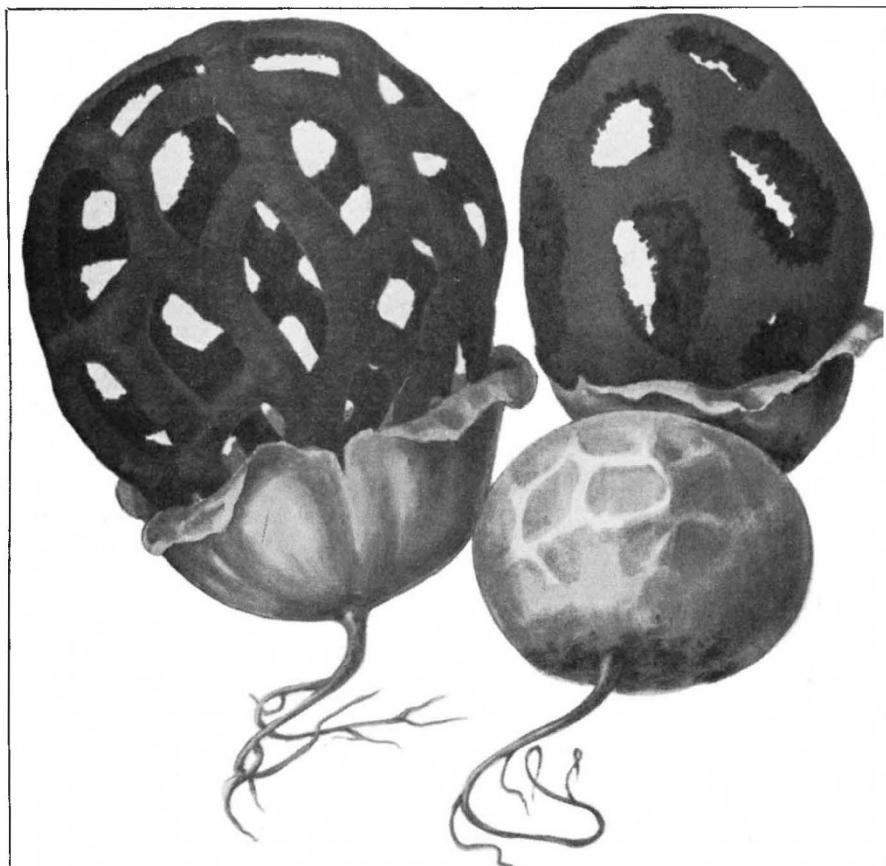
## Gradient liquid chromatography

*Gradient Liquid Chromatography*. By C. Liteanu and S. Gogan. (Elli Horwood Series in Analytical Chemistry). Pp. xii+358. (Ellis Horwood; Chichester, Distributed by John Wiley. Halsted Press: New York, July 1974.) £10.50.

THIS work reviews the principles, practice and application of liquid chromatography using various types of gradients in eluent and stationary phase composition, and in temperature. The review is comprehensive up to 1969 or 1970 but the authors have unfortunately failed to react fully to the recent development of high performance liquid column chromatography and the practical parts of the book are somewhat dated although still useful as a basis for development.

In reviewing the theory the authors are too uncritical and by quoting numerous mathematical results, often without adequate explanation, they have failed to explain the principles of the subject as clearly as they could have. This is unfortunate in an otherwise useful work for it limits its value to practising analytical chemists who badly need a clear and simple exposition of this important topic.

John H. Knox



*Clathrus cancellatus*. One of hundreds of illustrations in *Mushrooms and other Fungi*. By Augusto Rinaldi and Vassili Tyndalo. (Translation by Italia and Alberto Mancinelli.) Pp. 333. (Hamlyn: London and New York, November 1974.) £6.95.

The author's thesis about atomic particles means, in fact, the rejection of quantum physics itself. If the reciprocal limitations in the applicability of the space-time concepts and the momentum-energy concepts expressed by Heisenberg's indeterminacy relations are not fundamental, but can eventually be overcome by improvements in observational techniques and theoretical methods, then there exists no universal quantum of action and no quantum physics. T. Bergstein

## Molecular chemistry

*Internal Rotation in Molecules*. Edited by W. J. Orville-Thomas, Pp. xvii+606. (Wiley-Interscience: New York, 1974.) £13.50.

THE last thirty years have seen considerable activity in the study of internal rotation and related ring puckering motions in molecules. Orville-Thomas' extensive volume is timely, containing a chapter on all of the main techniques and the results which can thus be obtained. It is, unfortunately, an edited volume with separate authors for each chapter, a scheme which leaves a few gaps and introduces some duplication and variation of style. It is a pity that the editor

did not impose a *fiat* on the question of units for barrier heights: the choice of kcalorie mol<sup>-1</sup> dominates over the more favoured kJ mol<sup>-1</sup> by about 2:1. It is perhaps inevitable, but many of the chapters take space to introduce fundamentals, so that the volume includes unnecessary introductory accounts of nuclear magnetic resonance (n.m.r.), gas microwaves, electron diffraction and acoustics.

Gas microwaves provide the single most valuable technique for gaining information about the gas phase and the topic is covered by N. L. Owen in a fairly short but effective chapter. Electron diffraction, described by A. H. Clark, is valuable chiefly for identifying the dominant conformation, and in some cases for evaluating the trans-gauche ratios. Acoustic work, described by S. M. Walker, covers the kinetics of the transformation, although the size of dispersion also indicates energy and volume differences between the interconverting systems. There is also a helpful chapter on theoretical work, covered by A. Veillard, from which it is clear that elaborate *ab initio* calculations can evaluate the barriers effectively although it is not easy to extract simple qualitative information about the origin of the

barrier from such complex wave functions. Simpler functions are ineffective in predicting the barrier heights.

One of the difficulties in this field is the major influence of solvents, and in liquid phases the effective barriers and potential minima may be quite different, a point strongly emphasised by R. J. Abraham and E. Breitschneider. The regular tools for liquid-state studies include n.m.r. and dielectric methods.

Other chapters complete the picture which, overall, amounts to a great deal of work by many research workers. There is sufficient knowledge to allow most unknown barriers to be inferred by analogy and interpolation, at least in the organic field. References to completely inorganic molecules are very sparse and there did not seem to be any reference to the intriguing motion which makes all the fluorine atoms indistinguishable in PF<sub>5</sub> at higher temperatures. A formulae index would have added greatly to the usefulness of the book.

Clearly, most specialist science libraries will need this volume, but the overall picture is neither sufficiently clear nor sufficiently intriguing to warrant individual purchase.

D. H. Whiffen