

gas-chromatographic methods; namely phase changes which occur in materials used as stationary phases, polymer structures and interactions (by inverse gas chromatography), the determination of the formation constants of complexes, and the kinetics of chemical reactions (by using the chromatographic column as a reactor). Finally, there is a timely, well balanced and dispassionate account of gas chromatography on the production (as distinct from the preparative) scale. This particular package may seem at first sight to have a rather narrow appeal, but I found it both satisfying and curiously homogeneous: it certainly provides a stimulating and very up to date introduction to the wider aspects of gas chromatography.

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## Physics with computers

*Computational Physics.* By David Potter. Pp. xi+384. (Wiley-Interscience: London and New York, October 1973.) £5.50 cloth; £2.50 paper.

THE widespread use of computers in problems of physical science is enabling investigations to be carried out which are not subject to some of the restrictions of mathematical analysis. As a consequence some, who have not given adequate attention to the difficulties of interpreting the voluminous output of computers, have consigned analysis to the back room. It is therefore pleasant to welcome a book which shows that good analysis and sound physical thinking must go hand in hand with numerical technique if computational results are to have any validity and reliability. The introduction, at least, should be compulsory reading for any physical scientist before he embarks on an extensive and expensive computer program. He will also find much that is well worth reading in the rest of the book but he must not expect to find a discussion of every problem of interest to him.

Although the book is called *Computational Physics* it really deals only with difference methods. There is no mention of finite elements or integral equations at all. Numerical analysis, as such, is confined to three chapters so that some topics are discussed more cursorily than desirable. Some places where fuller treatment is required are: interpolation and its difficulties; the fast Fourier transform; Poisson's equation when the boundary condition is not of Dirichlet type; eigenvalue methods. In general, the reader seeking the whys and wherefores of numerical techniques for ordinary and partial differential equations will have to consult other texts such as those of Lambert and Mitchell.

The book is not really suitable for

undergraduate teaching, partly because there are no exercises and partly because so many ideas creep in unannounced; for example, spectral radius, tensor inner product notation, Poisson brackets, sodium chloride mesh (note also that the definition of spectral norm is unsatisfactory).

Nevertheless, postgraduate workers will find this an extremely useful book to have for several reasons. It collects together material on numerical attacks which is not readily accessible elsewhere and provides an extensive bibliography covering many fields of application. Throughout there is careful discussion of the physical and mathematical approximations undertaken in reaching a stage where the computer has a reasonable chance of supplying a satisfactory answer. The relative merits of alternative approaches are also described.

Chapters 5 and 6 are devoted to the motion of numbers of particles, with and without field averaging, as in the collisionless case in plasmas and astrophysics while compressible hydrodynamics is an example of collisions. Long range quantum forces appear in chapter 7. The distribution function approach and Vlasov's equation occupy chapter 8. Chapter 9, dealing with hydrodynamics is the longest. It shows how the particle-in-cell method can display the development of Helmholtz instability and the creation of a von Karman vortex street; the marker technique for moving surfaces and breaking waves is also given (though the absence of Zabusky's work on the non-linear interaction of waves is a notable omission).

The complex nature of compressible flow is clearly brought out, and, in chapter 10, the related problems of magnetohydrodynamics are emphasised. Evidently, some new good ideas are going to be necessary before the computer can cope adequately with the diverse phenomena of shock waves and other large amplitude disturbances.

Well printed, the book is good value and will be appreciated by researchers.

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## Life in glacial Mexico

*Das Mexiko-Projekt der deutschen Forschungsgemeinschaft. 6: Geologische und paläontologische Untersuchungen im Valsequillo bei Puebla, Mexiko.* By E. W. Guenther, with H. Bunde and G. Nobis. Pp. 177; 14 plates. (F. Steiner Verlag: Wiesbaden, 1973.) DM. 69.

THE Mexico project of the German Research Association is a regional study of the Puebla-Tlaxcala Basin, with man in his local environment, from the Stone Age to the present, as its central theme. The present work concerns the geology and palaeontology of a small area some 10 km south of the City of Puebla.

## Bird's eye view



PHOTO-mosaic of the west coast of Schleswig-Holstein. Taken from *The Earth from Space* by J. Bodechtal and H.-G. Gierloff-Emden, translated by H. Mayhew and L. Evans (David and Charles: Newton Abbott, January 1974; £6.50), this is in fact one of the few illustrations in the book not taken from space. The importance of this kind of mosaic is that a series of photographs on a scale of about 1:20,000 can be combined and reduced in size to give a picture with scale corresponding to satellite photographs; it is just possible to bridge the gap between satellite photographs and ordinary aerial photography.

Valsequillo owes its importance, in this context, to finds of undoubted stone implements in association with remains of extinct mammals, at horizons which though still not securely dated, suggest dates of the order of 40-50 thousand years BP. If this is the case they might be of an age some 10 thousand years earlier than any other evidence for the presence of early man in the New World. The present work contributes new facts and considered judgments of their implications to the basic disciplines of geology and palaeontology, on which any final decision as to the date of the human occupation must ultimately rest.

The palaeontological finds, apart from those of equids and elephants, have been dealt with elsewhere by other authors, but their results are summarised by Guenther in the introduction. Carnivores represented are coyote, dire wolf, a sabre-toothed cat and a very large bear, *Arctodus simus*. One fragment of a tapir is the only perissodactyl other than the horses. Remains of a peccary, *Platygonus cf. compressus*, were found in several examples. Camelids were not uncommon and two species of *Camelops* and one *Tanu-*