

## Nuclear techniques

*Techniques in Nuclear Structure Physics.* By J. B. A. England. Part 1, Pp. viii+1-312; Part 2, Pp. viii+313-697. (Macmillan: London and Basingstoke); (Halsted Press, distributors, USA, July 1974.) £10.00 boards; £4.50 paper.

In recent years a wide variety of experimental techniques has been developed which allow measurements of increasing sophistication on the products of nuclear reactions. The techniques are well known to a few specialists but descriptions of them are often only available in scattered articles in specialised journals. The two volumes by Dr England thus fill a real need by providing a comprehensive summary of the more important techniques in a readily accessible form.

The first chapter is devoted to detectors and covers the photographic method, solid dielectric track detectors, gas ionisation chambers, scintillation and semiconductor detectors, spark chambers and Cerenkov and neutron detectors. There follows an account of instrumentation in general, including particle beam detection, measurement and handling, scattering chambers, electronics and on-line computers. The final chapter of Part 1 summarises various types of accelerators: the Cockcroft-Walton voltage doubler, the dynamitron, the Van der Graaf generator, insulating core transformers, linear accelerators, cyclotrons and cyclograffs.

The second volume covers magnetic spectrometers and spectrographs, and particle identification techniques. Among the latter are time-of-flight techniques, techniques of single detector identification by telescope, and problems associated with passing detectors. Then comes a summary of coincidence measurements, angular correlations and lifetime measurements with accounts of the general theory of angular correlations, gamma-gamma and particle-gamma techniques, and correlations with oriented nuclei and nuclear lifetimes. The final chapter is devoted to polarised beams and polarised targets.

So numerous are the techniques today that even in a pair of volumes of some 700 pages it has been necessary to restrict the coverage by omitting the Mössbauer techniques, the techniques of beam-foil spectroscopy and the study of the capture  $\gamma$  rays produced by the interaction of polarised thermal neutrons. In other cases where good review articles are available, as in the subject of angular correlations, the discussion has been curtailed accordingly.

The level of the discussion is suitable for senior undergraduates and for first

and second year graduate students, and gives a clear account of the basic physics underlying each technique, together with many references to papers and monographs in which more detailed accounts can be found. There is a comprehensive list of references at the end of each chapter but, unfortunately, no alphabetical list of authors. The subject index is inadequate, so that it could take some time to find the account of a particular subject.

P. E. Hodgson



Taken from the frontispiece of the *Atlas of Human Anatomy*. Ninth English edition. By Frank H. J. Figge. (Original author: Johannes Sobotta.) Vol. 1: Regions, Bones, Ligaments, Joints and Muscles. Pp. xv+275. Vol. 2: Visceral Anatomy. Pp. xii+247. Vol. 3: Central Nervous System, Autonomic Nervous System, Sense Organs and Skin, Peripheral Nerves and Vessels. Pp. xii+354. (Urban and Schwarzenberg: Munich, Berlin, and Vienna, 1974.) No price.

## Energy spectrum

*Energy: Demand, Conservation and Institutional Problems.* Edited by Michael S. Macrakis. Pp. xxvii+556. (MIT Press: Cambridge and London, 1974.) \$25.00.

To undertake the comprehensive reporting of 38 conference articles requires dedication, particularly when the modelling of energy systems is the subject of a major part of the work. The fact that Michael S. Macrakis achieved this objective in a hard backed volume of 530 pages within about a year is noteworthy.

The editor can be excused for rele-

gating another 28 articles, in abstract form, to an appendix for reasons of space, delayed submission, or because they were "addressed to solar energy". To add variety and interest the best of the articles on sunshine could have been included in full and the somewhat heavy going sections on aggregate and disaggregate modelling could have been reduced without great loss.

The sections of the book which include supply and demand, transportation, and conservation, provide helpful subdivisions for experts who wish to confine their reading. Even the energetics enthusiast would not, however, be impelled to read the book from cover to cover as it merits periodic random selection of a few passages for short perusal.

The reader interested in the prospects and problems facing a world trying to supply future energy needs can find half a dozen relevant papers. Another dozen contain useful data and can thus reduce searches elsewhere. A great deal of the data and subject matter is, however, of relevance purely to the United States.

Readers of this volume will quickly appreciate that national concern in the United States is having a positive effect.

Improved methods for energy production and application planning have been developed. There is a greater awareness of the factors affecting energy economics and the interrelation of the subject with environmental and real resource costs. There is also an appreciation of the need for a wider variety and depth in energy assessments, and there has been more concentrated research to improve energy technology.

It was good to note that a few European authors were able to contribute to the conference. A team from Queen Mary College, London, were very active in providing some interesting papers on world energy modelling, the implications of national policies on world energy, oil transportation studies, energy economics and atmospheric pollution. Several of these deal with components of the mathematical model being built up by the Energy Research Unit at Queen Mary College, which should become an increasingly useful tool for policy assistance in Britain.

But there are many practical technological problems to be solved and policy decisions to be made before the editor's introductory question is answered for each country operating within its own unique limitations. "How quickly", he asks, "with what set of energy sources, and at what prices can a supply of energy be secured, which satisfies environmental and safety constraints while accommodating prescribed economic paths?"

G. R. Bainbridge