

by the source of rank r is proportional to $1/r$ if r is greater than a certain limit—an empirical law which applies to many other social contexts. More recently, Goffman has shown that the dissemination of new ideas is closely analogous to the spread of infectious diseases with endemic outbreaks preceding the take-off to epidemic growth. He has considered the conditions that have to be satisfied before take-off can occur and also the conditions under which scientific communication begins, to break down under the weight of its own documentation.

It has also been noted that scientific literatures not only grow at different exponential rates but decay exponentially at comparable rates, with half-lives of four to 16 years, so that the 'information explosion' worries only those who wish to keep everything—alive or dead. Work has also been done, mainly in the United States, on 'bibliographic coupling'—a technique of tracing who cites whom to identify networks of scientific interaction. There is therefore a varied and comprehensive task to be done by the author of the first monograph describing these techniques and their applications to information system economy.

Unfortunately, a great opportunity has been missed. The author makes a personal selection from the techniques. He inadequately and uncritically discusses only the Bradford law, the epidemiological model and some cross-citation techniques. He makes idiosyncratic selections of illustrative material drawn wholly from American sources and bibliographically ill defined. The numerical conclusions and graphs are firmly expressed though they are based on modest samples with no intimation that sampling errors might arise. The 100-page monograph reduces to 70 pages of text and 30 pages of singularly uninformative graphs. Thus the price of this modest introductory essay of 20,000 words is highly inflationary.

B. C. BROOKES

Neutron generators

Activation Analysis with Neutron Generators. By Sam S. Nargolwalla and Edwin P. Przybylowicz. Pp. xvii + 662. (Chemical Analysis: A Series of Monographs on Analytical Chemistry and Its Applications.) (Wiley Interscience: New York and London, January 1974.) £16.25.

It is often very important to be able to take one's microanalytical kit with one around the Universe. This has not been easy with neutron activation analysis, since fission reactors are heavy and one does not take them easily down a mine or to the moons of Jupiter. But small generators of fusion

neutrons (say using the D-T reaction) can be made, although they have some problems such as the stability of their neutron yield.

This book attempts to summarise the uses of generators and can be described as "nearly a handbook" on the subject. A handbook normally leads you through mazes of research material easily, smoothing out the little wrinkles in the patchwork of data. In parts of this book, I feel the authors have indeed essayed such a task of inspection of pedigree and smoothing of data. In others, the reader is not sure whether a table of figures on, say, a type of neutron reaction is raw from one man's research or represents the sum of knowledge. The intent of many of these tabulations, which could have been properly signalled in only a few words, is sometimes left unclear. Thus, this book is perhaps best described as a research review which nearly achieves handbook status.

The authors certainly attempt completeness of coverage; they have used the prodigious documentation services of the US National Bureau of Standards (NBS) at which institution they once worked together, to compile the knowledge of the bureau and others on the use of neutron generators and the course of nuclear reactions activated by fusion neutrons.

The techniques for the generation of neutrons and the exposure of samples are lovingly described, with detailed engineering drawings and dosimetric maps. A section follows on the treatment of the diverse types of systematic error which can interfere with the analytical accuracy of the method and this section certainly convinces that, for certain important elements, neutron activation can surpass X-ray fluorescence or atomic absorption methods. It is, however, this first half of the book, which is somewhat littered with tables of doubtful intent, that will neither help the student nor satisfy the man in search of a handbook; by contrast, the second half of the book consists of a 300-page chapter that takes in turn each element which will succumb to activation analysis. The authors tabulate the nuclear reactions which work with fast neutrons, and then give for each a set of comments and data useful to the analyst, including a uniform set of computer-generated curves for buildup of radioisotope against time, decay against time and so on. Here, the reader's confidence in completeness and uniformity can be high. Finally, there are several appendices giving tabulations, by other workers, of those nuclear reactions which are useful in analysis. These are doubtless useful to have to hand but are, again, insufficiently clear in intent.

The impression left is that neutron activation analysis is a formidable subject to venture into unless armed with much knowledge and time. This is not the expressed intention of the authors, who wish to stimulate the broader use of the method and fairly state the advantages and disadvantages of the method compared with those of the rival techniques. They have certainly done a great service in dragging out and starting to organise the files of the NBS on this subject: however, it will take a firmer hand to encourage the hesitant to embark on this technique or to construct a true handbook out of all that information. On the other hand, a scientist already committed will learn all about the special techniques needed to maintain analytical accuracy and all the rest of the practical issues in this undoubtedly useful field of work.

A. G. HOLMES-SIEDLE

Stars for students

Introduction to Stellar Atmospheres and Interiors. By Eva Novotny. Pp. xii + 543. (Oxford University: London and New York, September 1973.) £7.00.

THIS book is intended as a textbook for senior undergraduates and commencing graduate students. It is a generally well written and well produced book but in my opinion the balance of the book is wrong for a textbook. The basic concepts of the subject tend to be described very briefly and important fundamental results are often quoted without proof, whereas many pages of tables and diagrams are devoted to the detailed results of particular solutions of the equations of stellar structure and evolution.

Two examples will serve to illustrate what I mean. About fifteen pages are devoted to tables of the monochromatic absorption coefficient in stellar atmospheres and a further ten pages to tables of the properties of model stellar atmospheres, but there is no detailed discussion of the form of the equations which must be solved to obtain a model stellar atmosphere, except in the case of a grey atmosphere in local thermodynamic equilibrium. It is mentioned that there is a maximum mass for white dwarf stars and a reference is given to where a physical explanation of the existence of a maximum mass can be found. The book would have been much improved if one page of tables had been sacrificed so that a brief explanation of the existence of the maximum masses of cold bodies of various types and of the near inevitability of the existence of black holes could have been included.

One danger of including too many