

BOOKS

It can be said at once that *Science Survey*, 3 (London, Vista Books, Ltd., 1962; 30 s.) is an excellent example of its kind. Edited by A. W. Haslett and John St. John, and planned in co-operation with the British Association for the Advancement of Science, its main aim is to provide the enquiring layman and the top classes of schools with an authoritative record of scientific progress.

To cover the whole field nowadays would be a formidable task and result in a prohibitively expensive book. Instead, emphasis has been given to the 'growing points', with contributions by a number of experts grouped under various main headings. Thus, of the twenty-two articles contained in this volume, four come under the heading 'Radiation and matter' and there are two on 'High-energy particles', four on 'The solar system', two on 'Cells and viruses', two on 'The human body', four on 'Animal behaviour' and three on 'Science for industry'.

As can be seen, the field is very wide. Moreover, this is the third volume in a series, which, as indicated by the contents lists of the previous two volumes, is being planned as a whole. In fact, the final article, by A. W. Haslett, is in the form of a 'postscript' to the first two volumes, giving notes on any important further advances since earlier articles were written.

The standard of writing is, almost without exception, very high throughout. The articles are reasonably short and the specialist vocabulary is kept to a minimum. Prof. Frisch's opening article on 'Radiation and matter', for instance, is a model of clarity. At the same time, the authors' interest and enthusiasm is strikingly clear, and there is as much emphasis on the problems remaining to be solved as on what has already been discovered. This is particularly noticeable in J.O. Laws account of 'The origin of cancer', while Patricia Lindop's article on the 'ageing' of living matter is almost solely concerned with the immense field here waiting to be explored.

Too much space would be needed to refer to all the topics dealt with in such an interesting way, but two articles closely concerned with the work done at CERN should be mentioned. T. G. Pickavance (Director of the Rutherford High-Energy Laboratory, in England) describes the various types of accelerator that have been developed to provide particles, from a few million up to thirty thousand million electronvolts, for experiments on the structure of matter. H. R. Allan deals with particles of even higher energy, and shows how their study is now beginning to provide information on interstellar space. In doing so, he provides an interesting example of the essential unity of science: the same natural phenomenon that gave so much information about the smallest parts of the universe now helps to increase our knowledge of the biggest. Reading 'Science Survey', one can sense this unity, though there is no deliberate attempt to expound it. The editing, however, has been well done, and there are a fair number of cross references from one article to another, in contrast to many other collections of this kind. Most of the articles are illustrated by clear line diagrams, and there are many excellent photographs, notably a series of particularly clear photomicrographs of cell biological structure at magnifications up to 150 000.

News from abroad

ZGS IN OPERATION

During the accelerator conference at Dubna in August it became known that the first beam had been accelerated in the 'Zero gradient synchrotron' at the Argonne National Laboratory, near Chicago, U.S.A. Less than a month later came the news that on 18 September protons were accelerated to 12.7 GeV, a little above the design energy of 12.5 GeV.

The zero-gradient synchrotron is a ring-shaped proton accelerator approximately 61 metres in diameter, with the unusual feature of having a uniform magnetic field rather than one whose strength varies with radius, as in the CERN proton synchrotron (PS). The circular magnet of the Argonne machine, which is divided into eight sections, has a 'picture-frame' cross-section and weighs a total of some 4000 tons. Focusing of the proton beam circulating in the vacuum tank inside this magnet is achieved by the special shape of the ends of each of the magnet octants, the chief advantage of this kind of design being that 'multiturn injection' can be used. Thus, if the pulse of protons injected from the auxiliary linac is thought of as a continuous ribbon, in the case of the PS it cannot be longer than the circumference of the ring whereas in the Argonne machine it can be perhaps as long as 100 turns round the ring. In this way, the ZGS is expected to produce very intense beams of particles, up to 10^{13} protons/pulse. The repetition rate is 15 pulses per minute.

The accelerator and its auxiliary buildings occupy an area of 47 acres (19 ha) and the total cost was some \$50 million (215 millions Swiss francs). Apart from its use by scientists at the Argonne laboratory, which is operated for the U.S. Atomic Energy Commission by the University of Chicago, the accelerator will be available to the 'Argonne Accelerator Users Group' which unites physicists from more than 50 universities and research laboratories in the 'middle West' of the United States ●

A short review cannot possibly do justice to this excellent book. It should really be read. As mentioned at the beginning, it is addressed primarily to the interested layman, but, to quote from Sir John Cockcroft's foreward, it can also be commended 'for the scientist taking a busman's holiday or for the student who may wish to postpone too narrow specialization.

A.G.H.

Electronics for scientists, by H. V. Malmstadt, C. G. Enke and E. C. Toren, Jr. (New York, W. A. Benjamin, Inc., 2nd printing 1963; \$12.65).

The title of this book is somewhat misleading, since on examination it turns out to be essentially a handbook intended for use with a series of specific laboratory experiments. Each chapter deals first with a number of related

subjects on an elementary level, giving a few references to more detailed publications and a number of problems for calculation, and then goes step by step through the relevant experiments. The references are often to U.S. Government publications, not always easily available to the general reader on this side of the Atlantic; the experiments are to be carried out with particular equipment designed for the 3-week course and manufactured by a well-known U.S. firm. A supplement of some 60 pages describes this equipment in detail, complete with photographs for identification and part numbers for easy ordering!

Successive chapters cover simple measurements, power supplies, amplification and amplifiers, oscillators, comparison procedures, servo systems, and digital circuitry. Vacuum tubes (radio valves), transistors, tunnel diodes, are all mentioned, but the later chapters of the course refer mainly to vacuum-tube devices. Little attempt seems to have been made to point out important laws or circuits, though the book is uneven in this respect (Ohm's law is mentioned in an aside in an early chapter, but the reader is referred — incorrectly as it happens — to a supplement for details). Where a law or formula does appear, it is often only a statement, with little or no explanation, although two supplements, on d.c. circuits and on electrical signals and reactive circuits, are a little better in this respect.

The illustrations are good. As a laboratory handbook accompanying the experimental equipment, the book may be of some use to those 'engineers, chemists, physicists, medical researchers, and other students and research workers... who need to gain a working knowledge of electronic devices and circuits', for whom it is said to have been expressly written. Otherwise there appears to be no great merit in publishing by itself a book which has such a specific and limited application.

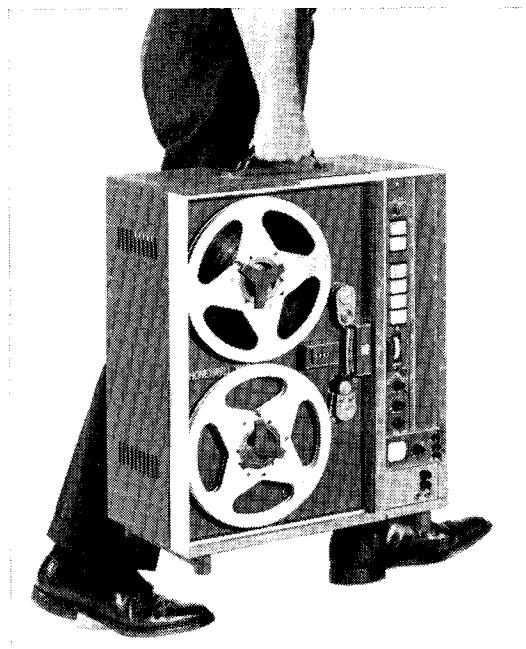
'Pel'

In any undertaking involving hazard to man or his environment, it has now become fundamental to consider seriously the risks involved, and then to work for their reduction until an acceptable standard of 'calculated risk' is achieved. For the economic exploitation of nuclear energy, the problem of radiation is outstanding in this respect.

Control of hazards in nuclear reactors, by T.C. Sinclair (London, Temple Press Books, Ltd., 1963; 15 s.), another in the series of '**Nuclear Engineering**' Monographs, discusses the problem as applied to nuclear reactors. It presents in a short, precise manner the basic information required for judging the risk to man of the radiations produced by reactors and how these risks arise. One section is concerned with the safe operation of reactors and includes basic information on the effects of radiation on reactor components. Valuable information concerning these effects is also summarized for reactor fuel elements and their cans, pressure circuits, and cooling systems. The book concludes with a chapter on the safety aspects of reactor siting.

Even though it is quite short (71 pages), this book contains in a concentrated, precise, and easily understandable manner the basic knowledge and the questions to be considered with regard to reactor safety. It is, in my opinion, a very valuable introduction to the subject ●

J. B.



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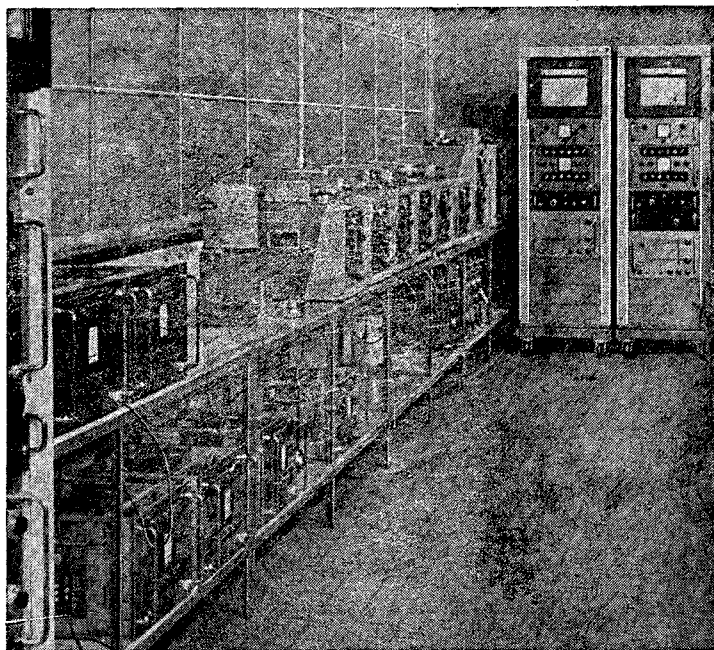
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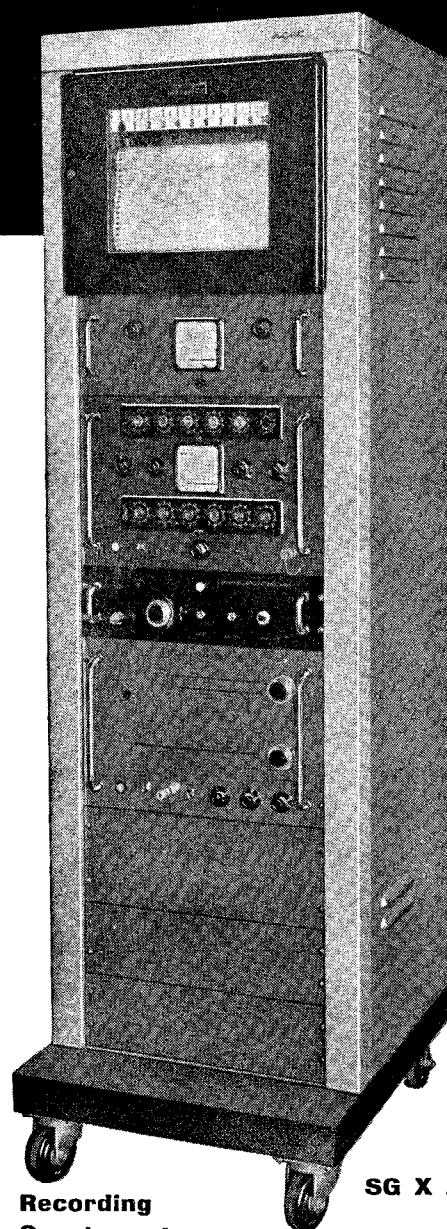
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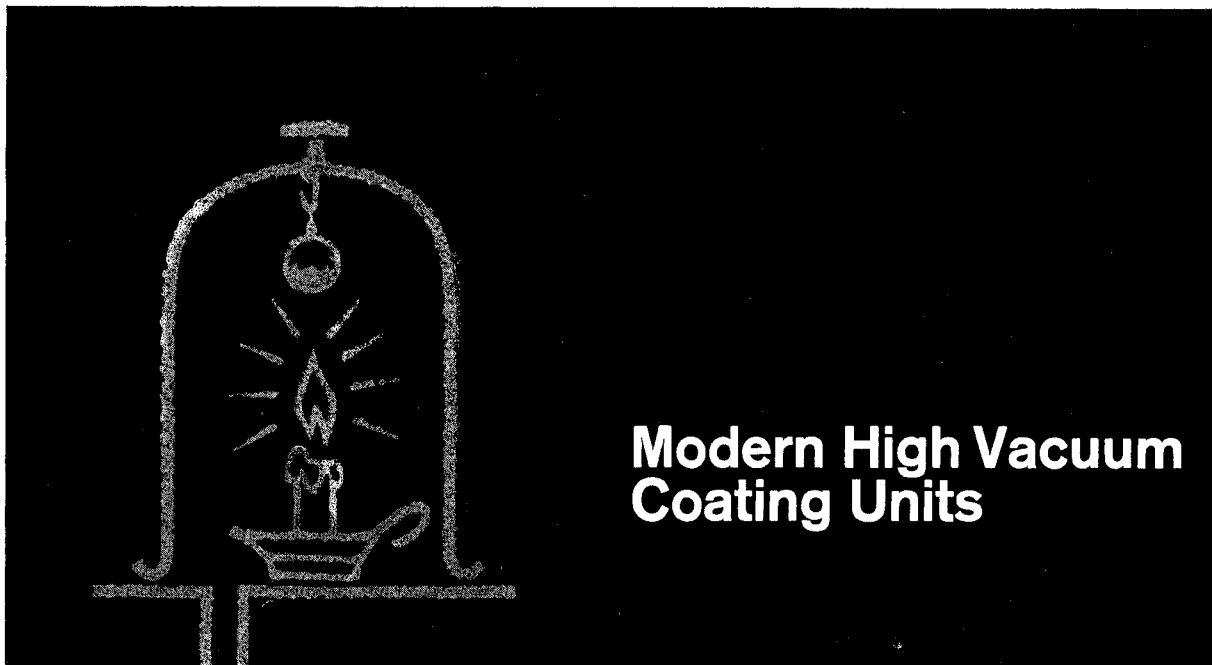
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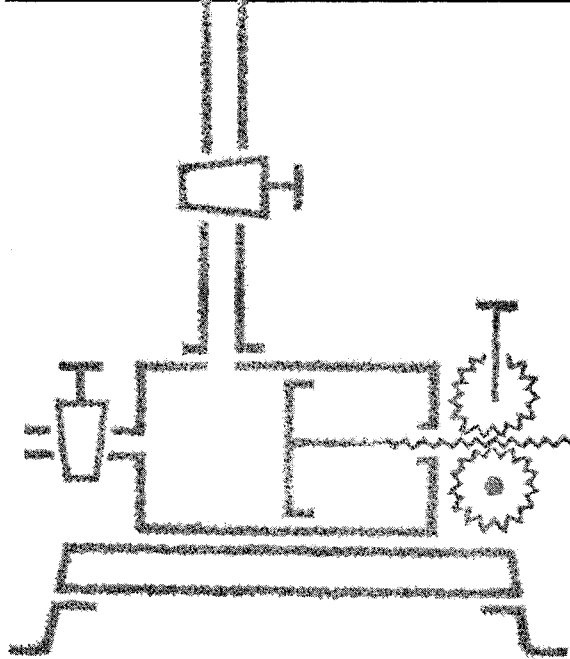
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