

# Book Reviews

## ATOMS . . .

**The Atomic Nucleus.** M. Korsunsky; trs. by G. Yankovsky. (FLPH, 412 pp., 65 figs., 45 pl., 8/-). Available from Collet's Holdings.)

IN an era of exciting developments in many branches of science and its application, none has assumed greater importance in its political and economic implications than the growth of our knowledge and understanding of the atomic nucleus. An elementary knowledge of the significant basic facts of nuclear physics has become essential for the ordinary citizen who wishes to take an intelligent interest in public affairs. The application of these basic facts to the development of nuclear weapons has brought far-reaching and disturbing changes in military strategy and in international politics. Their application to peaceful purposes will have an increasingly important impact on the economics of very many countries. And clearly the extent of these exciting applications can still only be perceived in barest outline. With the successful solution of the problem of the control of thermonuclear reactions there will undoubtedly be opened up an immeasurably greater field of application.

Many books have now appeared in English in which the basic facts of nuclear physics have been described for the non-specialist reader, and some have been very successful. One is aware of the high importance attached to the question of the popularisation of science in the Soviet Union, and it is of particular interest, therefore, to see how a branch of science that has assumed such far-reaching importance is presented to Soviet readers.

One must say at the outset that the writer has succeeded admirably in maintaining the interest of the reader. He uses simple terms which should be intelligible to the reader without specialised knowledge, but at the same time his treatment is accurate and he does not vulgarise the subject in the attempt to make it comprehensible.

It is a fascinating story, and the work has not always been carried out under the glare of publicity and with the wealth of resources that has characterised the position since the end of the second world war.

The most significant and crucial developments were carried out by a few dedicated people, driven on by an insatiable curiosity about the structure of matter and with only the faintest glimmerings of the likely applications of their work. By adopting the historical approach the book is able to recapture something of the romance of the development of the subject. It is no ordinary catalogue of facts.

The reason why each particular experiment was carried out at just that particular time is made clear. The problems posed by the interpretation of the results of decisive experiments are discussed, and the numerous false trails that had to be explored on the road to an understanding of the atomic nucleus are clearly set out. The discovery of each new phenomenon is not regarded as an end in itself, but as a step towards a fuller understanding of the problem as a whole; its importance is to be judged largely in terms of the further experiments it suggests.

We are taken from the early discovery by Becquerel of the phenomenon of radioactivity, through the classic researches of Rutherford that led to an understanding of the nature of the radiations emitted. We get a glimpse of the painstaking effort that led Pierre and Marie Curie, with the barest of resources, to process many tons of pitchblende, leading to the separation of a fraction of a gram of the new and highly-important element of radium. We are introduced to the penetrating analysis of Rutherford and his Manchester school, who interpreted the experiments on the scattering of alpha particles by matter, to show quite conclusively that the positive electric charge was concentrated in an extremely small nucleus inside the atom; and we are shown how this led, through the insight of Niels Bohr, to a revolutionary model of the atom that has completely transformed not only the science of physics but that of chemistry as well. We are shown Rutherford as head of the most famous physics laboratory in the world, the Cavendish Laboratory at Cambridge, ceaselessly probing the structure of the nucleus, using fast atomic missiles to disintegrate a wide range of nuclei; and the consummation of all this work in the experiments of Rutherford's students, Cockcroft and Walton, who in 1932 carried out such disintegrations with artificially accelerated particles, thus paving the way for the development of the subject of nuclear physics as we know it today.

The year 1932 saw the beginning of the golden era of nuclear physics. In rapid succession we saw Chadwick's discovery of the neutron; the discovery of artificial radioactivity by the Joliot-Curies in Paris, and the many basic developments in this field as a result of the work of Fermi in Rome; the discovery of the positron independently by Anderson in America and by Blackett and Occhialini in Cambridge; and the culmination of this era by the discovery of nuclear fission by Hahn and Strassman in Germany, and of the interpretation of its implications by Meitner, Joliot, Bohr and others.

Since the second world war the pace of the development of nuclear and high-energy physics has quickened. This has been the era of the meson, first predicted by Yukawa, and discovered by Powell and his colleagues in Bristol, and of nuclear power and thermo-nuclear reactions. All these developments are discussed in Korsunsky's book, which particularly draws attention to the important role played by Russian physicists—especially in the later stage of the story—leading up to the construction, by Veksler and his colleagues in Dubna, of the largest high-energy particle accelerator in the world, capable of producing particles of energy ten thousand million electron volts.

One could not, of course, expect a book of this size to give a complete popular record of all aspects of the subject. It would have been interesting to see, for instance, the way in which the author presented the basic ideas of quantum mechanics to the non-specialist reader, particularly in their application to the understanding of the phenomenon of the decay of the alpha particle, as developed by Gamow. And it is characteristic of the feverish rate at which the subject is developing that the section on heavy mesons and hyperons is already out of date.

However, these are minor, and to some extent unavoidable, defects. The simplicity of the explanations, the way in which the continuity of the development of our knowledge of the subject is always kept before the reader, the numerous diagrams and plates, all contribute to the high quality of the work, which can be thoroughly recommended to schoolboy and adult alike.

E. H. S. BURHOP.

### ... AND METEORS

**Meteors.** V. Fedynsky. (FLPH, 1959, 126 pp.)

**METEORS**, commonly known as shooting-stars, are the junior members of our solar system. We see them only when they rush into the earth's atmosphere from outer space, and glow brilliantly for a second or two before being destroyed. Yet they are both interesting and significant, and in this book V. Fedynsky provides a clear and concise introduction to meteor astronomy.

Starting with a brief historical survey, Fedynsky deals with modern methods of studying meteors; meteors themselves, with some comments on their effects upon future interplanetary travel; meteorites, the solid pieces of material which sometimes fall to the ground and which are therefore available for study in our laboratories; and associated bodies, such as comets and minor planets. The book ends with a discussion of how meteors may have been formed.

This is in every way an excellent book.

It contains a great deal of information, and is easy to read, which is a tribute not only to the author but also to his translator (G. Yankovsky). The illustrations are adequately reproduced and the print is good. As an introduction to the study of meteors it is to be strongly recommended.

PATRICK MOORE.

### CHESS IN THE USSR

**The Soviet School of Chess.** A. Kotov and M. Yudovich. (FLPH, 390 pp., 13/6. Available from Central Books.)

**A**MONG a good many remarkable points about this book (and even more about its background) a fairly remarkable one is the price; a significant point too when considering the utter impossibility for a commercial publisher here to issue at 13/6 a well-produced and well-indexed book of 390 pages, containing 184 diagrams, twenty-eight illustrations, and some erudite chapters on chess history, chess openings and chess endings, as well as substantial pen-portraits (each with a game or two) of nineteen Soviet grandmasters, twenty-four "ordinary" masters and eight women-masters.

It all goes to prove a fact which for some decades now has needed no further proof—the fact that chess enjoys an enormous amount of encouragement and material support from the authorities in the USSR (and some other countries which, using geographical rather than political nomenclature, might be called eastern).

I am often asked to explain why Soviet grandmasters bestride the chess world with seemingly unchallengeable supremacy. The answer is that Dostoevsky has nothing to do with it; nor indeed have the mysterious depths of the Slavonic soul; nor even the long Russian winter nights. All of this (or some of it) may well have had something to do with creating a traditional interest in the game, going back 100 years to Tchigorin and farther still to Jaenisch and Petrov. The Soviet authorities are very proud of that tradition, which, indeed, provided the title of the book under review. But here I beg to differ, my only grudge against this most informative and entertaining book being its title. I do not think there is a "Soviet school of chess", but there certainly is the simple and undeniable fact that on the very vast territory of the USSR very many persons are very generously encouraged to spend very much time in playing very good chess.

In one of the book's nine large chapters Lenin is quoted as asserting that "preserving a heritage does not at all mean limiting oneself to it". Well, the Soviet players certainly know no limits to their boundless enthusiasm for breaking new ground in opening theory, for studying