BOOK REVIEWS

NUCLEAR WORLD

Die grosse Maschine

Auf dem Weg in eine andere Welt. By Robert Jungk. Pp. 272. (Bern: Scherz Verlag, 1966.) 19.80 francs.

THE big machine of the title is the proton synchrotron of the European Organization for Nuclear Research (CERN) in Geneva and the way ahead into another world is an attempt at siting high energy physics and the men and women who "play this fascinating game" in the context of our industrial civilization. The author is a journalist who became widely known in 1958 through his *Brighter than a Thousand Suns*, in which he told his version of the inside story of the atomic bomb in terms of the scientists who were responsible for its creation.

In this book Robert Jungk explains that he has tried to write a "Reportagebuch" which would make the complex world of nuclear dimensions and the gigantic instruments for probing it accessible to the educated layman. This is certainly very necessary because "little science" has become "big science", and the man in the street must foot the bill, and a large bill it is. Jungk uses the approach and the technique of the special correspondent—our man in Meyrin.

To write live history, particularly contemporary history, it is necessary to talk to the people involved and in addition a careful study of the official documents and the annual reports must be made. Jungk has had the advantage of detailed discussions not only with a very large number of CERN scientists but also with most of the founding fathers. This is a privilege, because scientists in general are diffident in relation to the Press and it certainly enhances the value of the book. Inevitably, the purely scientific is sometimes only partially understood, rather like a photograph that is slightly out of focus. But he usually succeeds in conveying the authentic quality of CERN's achievement, scientifically, culturally and internationally. The background of physics is sketched in by reporting the verbatim and lengthy answers of a considerable number of research workers both inside and outside the laboratories at Meyrin. The effectiveness of this communication tends to vary with the individual interviewed and sometimes suffers from the additional hazard of translation from the original English or French into German.

On the other hand, much of the excitement and spirit of adventure of high energy physics is very well caught in some effective pieces of direct reporting (occasionally in language that is perhaps too romantic for some tastes). A good example is the description, a page of careful observation, of the cycle of the bubble chamber process with its "erregenden Ballett von Geburt, Tod und Verwandlung der Elementarteilchen". Another example is the minute by minute reconstruction of the final stages of that famous day in November 1959 (six months ahead of schedule) when the proton synchrotron so dramatically reached the beam strength of 24 GeV.

Apart from the scientific and technical aspects there are the sections which deal with CERN's success in pioneering real collaboration between more than a dozen European nations. In the chapter entitled "The Europeans" he has recorded with insight the peculiar circumstances at the beginning of the fifties, which made so viable an international organization possible. In the last chapter he deals with the significance of the future of high-energy physics, and more particularly the implications of the proposed 300 GeV machine. The amusing couplet of the American physicist, Professor Arthur Roberts, composed for an earlier situation, is still very relevant:

> "Take away your billion dollars,
> take away your tainted gold,
> take, oh, take your billion dollars,
> let's be physicists again!"

Another aspect of this heart searching among scientists is illustrated in a quip from the Soviet physicist, Artsimovich, "Scientific research is a method whereby private curiosity is satisfied at public cost". Here we are at the very centre of the widespread concern with the social relations of science.

On the whole, Jungk has managed to present an admittedly involved subject in a popular form in a way that makes it good reading for scientists, even for physicists in the know. This book should be translated into English and that might be the occasion to remove a few blemishes—for example, the varied spellings of Cockcroft, "J. J." written as Thompson, with father and son confused. More serious is the absence of an index in a book that is so full of facts and names.

HERBERT COBLANS

BETWEEN TWO FLUIDS

Surface Tension and Adsorption

By R. Defay and I. Prigogine. With the collaboration of A. Bellemans. Translated by D. H. Everett. Pp. xxxii + 432. (London: Longmans, Green and Co., Ltd., 1966.) 100*s*. net.

THE title of this book is misleading, for adsorption of a gas at the surface of a solid is not included and adsorption at a liquid–solid interface is scarcely touched on.

As a treatise on interfaces between two fluid phases this is a formidable production. It includes 1400 formulae. I have no reason to doubt that every relation is formally correct, but I am quite sure that there are not 1400 facts worth knowing about interfaces between two fluids. I doubt if as many as 200 formulae are useful. What then is the content of all the other formulae which I regard as superfluous?

In the first place there is an extravagant use of alternative thermodynamic functions; for example, two different kinds of Gibbs function and two different kinds of chemical potential and also an antiquated quantity called "uncompensated heat". Many of the consequent relations are effectively identities or repetitions.

Secondly, the complexity as well as the number of the relations is enhanced by exaggerated generality; for example, systems with indefinite numbers of bulk phases, of interfaces, of chemical species, and of chemical reactions between several species.

Thirdly, there is a tremendous number of formulae concerned with interfaces not in equilibrium with the bulk phases. When an interface is in equilibrium with the bulk phases the state of the interface is determined by the state of the bulk phases. When the interface is not in equilibrium with the bulk phases, it is assumed in this text that its state is determined by the state of the bulk phases and by the composition of the surface layers. This assumption, however, is quite unrealistic as may be seen from a simple example. Consider the liquid–vapour interface of methanol. At equilibrium a definite fraction of the molecules in each layer of the interface will have