

plasma phenomena in both weak and strong applied magnetic fields. The fundamental measurements associated with the study of these phenomena are not treated in Hasted's book. Again it is presumably the limitations of size which led to their omission, but many workers in the field will be disappointed not to find this area included in the author's otherwise very complete treatment of modern developments.

One of the features of Dr. Hasted's book is his careful inclusion of the laboratory methods and evaluation of the experimental details as an integral part of his discussion of the collision processes. This not only adds a great deal to the completeness of his treatment, but also aids the reader in understanding the relative merits of the experimental data he presents.

The bibliographies are arranged by chapters which makes them both useful and convenient. The scholarly approach to the world's literature on the subject will prove invaluable to both experts and beginners in plasma physics because of its relevance as well as its completeness. The book will surely take its place as one of the standard reference works in this field.

Nucleon Structure. Conf. Proc. (Stanford University, June 1963). Robert Hofstadter and Leonard I. Schiff, eds. 421 pp. Stanford University Press, Stanford, California, 1964. \$12.50.

Reviewed by D. B. Lichtenberg, Indiana University.

It is testimony to the unity of particle physics that a conference on nucleon structure contains, in addition to the traditional subject of electron-nucleon scattering, a wide variety of topics concerning the strong and weak interactions. This book summarizes much of the current progress in these areas.

The individual contributions show a wide range in quality. Many have been published elsewhere (paraphrased), and some of them do not deserve to appear in print more than once. The extent of documentation also shows wide variation. For example, Breit, in his paper on nuclear forces, gives more than two pages of references and apologizes to the authors he does not quote. Some other

authors cite no references at all. In this review, I shall follow the prudent policy of Breit, and apologize to those physicists whose work I do not have space to mention.

Although the discussions are missing, the proceedings retain much of the flavor of the original talks. As an example of the flavor, I quote from a talk by Low: "At present, factoring of the Born approximation must be considered a miracle." Despite the talk of miracles, Low's paper describing work done with Gell-Mann, Goldberger, and Zachariasen is an important contribution to the theory of Regge poles.

From the proceedings, one gathers that the conference began and ended with philosophy. The introductory talk by Chew is appropriately entitled, "What is the nucleon?" Chew's tentative answer is that the nucleon is a pole of a strong-interaction S matrix which is as analytic as it can be, having only those singularities required by unitarity. These restrictions may be so severe that (except for the unit S matrix) the observed S matrix may be the only possible one satisfying the requirements. Salam was sufficiently impressed with this picture to comment in his closing summary talk that some present-day theoretical physicists have amended the eighteenth-century philosophy of Leibnitz. Whereas Voltaire, parodying Leibnitz, has Pangloss say that this is the best of all possible worlds, Salam puts in the mouths of theoretical physicists the statement that this is the only possible world. But Chew does not go quite so far. He admits the possibility of the unit S matrix—the completely empty world. The controversy as to whether there are still other possible worlds has not yet been settled by the theoreticians!

At the heart of the conference were the papers dealing with the charge and magnetic form factors of the nucleon. The importance of these form factors (or the linear combinations known as the Dirac and Pauli form factors) was first brought out by Rosenbluth. A conference paper by Yennie discusses the Rosenbluth formula, pointing out the assumptions on which it is based, how it can be treated, and possible corrections to

it. The experimental data on the proton form factors and on the magnetic form factors of the neutron are becoming increasingly precise. However, there is still controversy about the charge form factor of the neutron, the Stanford and Cornell groups obtaining quite different results.

In an important paper, Lindenbaum gives results of high-energy proton-proton and pion-proton scattering experiments. The data contradict the predictions of the simplest Regge-pole model. Thus, Salam's summary contains the statement, "The Regge-pole model of high-energy scattering is dead." Since theoretical papers on the subject continue to appear, Salam's remark may have been somewhat premature.

Papers by Rosenfeld and Miller summarize the experimental information about the masses and quantum numbers of the baryons and mesons. In an excellent paper, Ne'eman discusses the regularities in this wealth of data. He considers the representations of all simple Lie groups of rank two and shows that the representations of the "eightfold way" version of the group SU_3 give best agreement with experiment.

I have high praise for the editors, who did a careful job of organizing the material and weeding out the errors. I also commend the publisher for having brought out a very handsome book.

Cinématique des Réactions nucléaires By A. Michalowicz. 176 pp. Dunod, Paris, 1964. 25 F.

Reviewed by H. H. Barschall, University of Wisconsin.

The nuclear physicist working either at low or high energies has to carry out many kinematic calculations and welcomes collections of formulae and tables which help him with this task. In this pocket-size book he will find formulae, both relativistic and non-relativistic, for elastic collisions and inelastic processes involving two outgoing particles. The quantities discussed are angles, velocities, momenta, energies, and cross sections, and their transformations between the laboratory and the center-of-mass systems. After the equations are derived, they are collected in convenient tables.