butions to analytic geometry were not printed during his lifetime; hence, it is difficult to estimate their influence. There was an essential difference of emphasis between the works of Fermat and Descartes: Descartes usually started with a locus problem and then obtained an equation of the locus; Fermat, conversely, had the habit of beginning with an equation from which he derived the properties of the curve.

Chapters VI ("The age of commentaries"), VII ("From Newton to Euler"), and VIII ("The definitive formulation," which leads into the second part of the 18th century), show how slow, relatively, the further progress in analytic geometry was: it was some time before negative abscissas were admitted, before two axes in the plane were systematically used, or before solid analytic geometry was developed. The author calls Euler's *Introductio in Analysin Infinitorum* (1748) the most influential textbook in modern times and, in particular, considers this work a turning point in the development of analytic geometry.

Finally, chapter IX, "The Golden Age," is devoted to the great and original advance in the first three-quarters of the 19th century. The remarkable contributions of the German mathematicians Möbius and Plücker and of the English mathematician Cayley, among others, are stressed: barycentric and homogeneous coordinates, symbolic notations, line coordinates and line geometry, the theory of algebraic curves, and the more dimensional analytic geometry. The last quarter of the 19th century and our 20th century are not taken into consideration by the author.

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Pion Physics. vol. 2 of *CERN Symposium on High Energy Accelerators and Pion Physics, Proceedings.* European Organization for Nuclear Research, Geneva, 1956. 444 pp. Illus. F. 40.

This is the second volume of the papers submitted to the European Organization for Nuclear Research (CERN) Conference, held at Geneva 11–23 June 1956. After the meeting, the proofs were checked by the editors against corrected preprints. In general, the speakers who took part in the discussions also had an opportunity to correct the text of their remarks.

There is a group of eight papers on bubble chambers, including a review of the field by Brown, Dodd, Glaser, and Perl (University of Michigan) and Rahm (Brookhaven), followed by a series of discussions of experimental work at the University of California, the University of Chicago, Duke University, the U.S.S.R. Academy of Sciences, the University of Padova, the University of Pisa, and the Centre d'Etudes Nucleaires. The fact that bubble chambers are far from having taken over the fundamental particle experimental field from cloud chambers is shown by a series of five papers on more standard chambers, from sources almost equally well distributed geographically.

A group of nine papers on fast counting techniques, most of which are related to Cerenkov counters, includes one paper on neutron time of flight techniques in the 100 Mev region, by Stafford (Harwell). Two papers are included on antiproton physics, including reviews, by Segrè, of the Berkeley work and, by Amaldi, of cosmic-ray work. Papers on nucleon-nucleon scattering are presented, primarily from the U.S.S.R.

A group of papers on the theory of pion physics includes a review by Wick, an article on the generation of mesons in nucleon collisions by Blokhintsev, a discussion of radiation during the collision of pions and nuclei by Landau and Pomeranchuk, and a simple treatment of meson-nucleon scattering, using the Yukawa potential and the Born approximation, by Edwards and Matthews. Wick's review nicely points out that "features of meson theory included in the cut-off model have something to do with reality."

A paper by Kallén discusses the mathematical consistency of quantum electrodynamics. Kallén carefully points out that his ideas do not constitute mathematical proof but are intended to serve as a basis for further discussion.

Papers on pion nucleon scattering include a review by Yuan (Brookhaven); data at six energies from 200 to 300 Mev from the U.S.S.R.; data at 150, 170, and 220 Mev by Ashkin, Blaser, Feiner, and Stern (Carnegie Institute of Technology); data at 70 and 130 Mev by a group from Bologna; a discussion of phase shifts by Orear, at Columbia University; and two papers on the very low energies of 20 Mev and 18.7 Mev, respectively, from Liverpool and Chicago.

On the subject of photoproduction of pions there is a review by Bernardini (Illinois) and there are about ten papers, including photoproduction from bound nucleons and complex nuclei as well as from protons and deuterons. This section of the conference includes an announcement, by Pauli, of the telegram received, 15 June, from Reines and Cowan at Los Alamos, stating the detection of neutrinos in the inverse beta decay of protons.

A section on pion production by nucleons includes an introductory talk by Merrison (Liverpool) and a group of papers, including bombarding energies from 383 Mev at Liverpool, 600, 650, and 929 Mev at Birmingham, 660 Mev in the U.S.S.R., and various energies up to 2.75 Bev at Brookhaven.

A few papers on mesonic atoms were introduced, with a review by Roberts (Rochester). These include the beautiful proportional counter work of West and Bradley at Harwell, the absolute yields by the two Stearns at Carnegie Institute of Technology, and the work on the lifetime of muons by Lederman and Weinrich at Columbia.

This volume provides a useful review of the state of the art, both theoretical and experimental, in pion physics as of the time of the meeting. The authors and editors have done an excellent job in presenting up-to-date, accurate material in a form very useful for reference. The drawings of experimental equipment and the curves presented are remarkably clear and accurate for a publication of this nature.

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Handbuch der Physik. vol. XXI, *Gas Discharges I*; vol. XXII, *Gas Discharges II.* S. Flügge, Ed. Springer, Berlin, 1956. 683 pp.; 652 pp. Illus. DM. 105.50; DM. 128.

At certain epochs of advance in the field of physics, there have appeared in Germany notable *Handbucher*—or, better, encyclopedias—of physics. I gratefully recall Winckleman's *Handbuch,* which was so useful to me in my student days. Nearly coincident with the development of the modern outlook on physics —ushered in by the age of atomic structure and quantum mechanics in 1926— there appeared a truly monumental and invaluable work in 26 volumes, the famous Geiger and Scheel *Handbuch der Physik,* from the presses of Springer. Now, 30 years later, following the post-World War II advances, there appears, under the editorship of S. Flügge, the timely new *Encyclopedia of Physics* of international scope, from the same publishing house. Volumes XXI and XXII comprise summaries of most of the material in the fields of electronics and gaseous electronics. The increasing demands of an adequate modern knowledge of these fields, so vital to technologic and experimental advance, make the publication of these two volumes, by many authors, an invaluable addition to the modern literature, since the scope of recent advances makes it impossible for any one person to summarize expertly this material.

Flügge is to be congratulated on having secured contributions from a group of authors so competent in their respective