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dynamical beginning. Mass is in the atomic sense the Newtonian quantity of matter.

The volume contains an appreciation of Hertz by his master, Helmholtz. Hertz was the Fermi of his time: brilliant experimenter, fertile theorist, dead of cancer at only 37. A short introductory essay prepared for this edition by Professor R. S. Cohen of Wesleyan is a meaty and provocative piece, setting the Hertz view into the context of the theory of knowledge, and into its place in the history of ideas. It deserves wide reading, even apart from Hertz's mechanical ideas.

Let the reader be warned that Hertz used p for the coordinate and q for its canonical momentum!

L'Origine des Planètes: Essai de Cosmogonie. By Alexandre Dauvillier. 221 pp. U. of France Press, Paris, France, 1956. Paperbound 800 fr. *Reviewed by S. A. Korff, New York University.*

In his book *L'Origine des Planètes*, the French physicist and astronomer Dauvillier faithfully carries out the promise of the title. He discusses at length all the various theories, and gives an excellent critique of each. The book would make excellent supplementary reading in a course in astronomy. He shows how each of the theories, popular in its turn, eventually has come to be discarded since each one fails in some important respect.

The author starts by reviewing what is known about the planets; their sizes, masses, and distances, and what may be inferred about their atmospheres from spectral studies. He includes comets and asteroids. Next, he starts systematically on the theories of origin, and first sets forth the accretion theory, then the Laplacian theory, the tidal wave calculations of Kant and later of Jeans, and of Russell and Lyttleton; the collision theory, and the twin-planet picture. He discusses the retrograde cases, and the rings of Saturn.

The book is excellently written, well documented, and is a good and a scholarly account of this difficult problem. This reviewer found it stimulating and thought-provoking. It is especially recommended to anyone who would like an intelligent, critical appraisal and résumé of all the various theories. It would be especially good if the enthusiasts for one or another of the hypotheses were to consider seriously whether his pet model meets the objection cited, for there appear to be serious difficulties for each one which some persons happily ignore.

Electron-Emission; Gas Discharges I. Vol. 21 of *Handbuch der Physik*. Edited by S. Flügge. 683 pp. Springer-Verlag, Berlin, Germany, 1956. DM 132.00 (if part of series DM 105.60). *Reviewed by L. Marton, National Bureau of Standards.*

There are enough volumes of the new *Encyclopedia of Physics* on hand now to show that on the whole this is a very successful undertaking. It is remarkable both from the point of view of its size and the quality of the individual volumes. The present volume is no exception and it is a pleasure to report on its contents.

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The volume starts with a monumental contribution on the part of Wayne B. Nottingham on thermionic emission. For quite a long time there have not been any good books or summarizing reviews on this subject. At least, the reviews that I know of are only partial ones and the latest book on the subject is by now obsolete. The author has succeeded in recasting completely the whole subject, and presenting it from a thoroughly modern viewpoint. The theoretical treatment is quite exhaustive. About half of the chapter, that is about 84 pages, is devoted to theoretical treatment. The experimental part contains not only data on pure metals, but a wealth of material on applied cathodes, such as oxide coated, and similar ones. Nottingham's chapter alone is perhaps worth being issued as a separate monograph both as regard extent and coverage of the field. There are some minor things which one may criticize, but the criticism is really negligible as compared to the total amount of information packed into the chapter. For instance, it starts with a very extensive glossary of the symbols used. It may be surprising to the reader that the author finds it necessary to use a grand total of 238 symbols for his treatment of thermionic emission. This is a staggering total and necessitates the use of the same symbols repeatedly for different purposes.

The following chapter is devoted to field emission, written by R. H. Good, Jr. and Erwin W. Müller. This is a very solid contribution on the part of these two authors. For a person who had the chance of reading the several excellent reviews written by Müller in the last 2-3 years, this chapter does not offer much new material. Nevertheless, it fits the volume perfectly and the fact that it has been covered adequately before doesn't make it a less useful chapter.

The next chapter by Rudolph Kollath is on secondary electron emission of solids. This is perhaps the weakest chapter of the whole volume. Its contents are essentially phenomenological, and it is marked by almost complete absence of all theoretical treatment. Its viewpoint is also about the least modern of all the chapters contained in the volume. This is followed by a chapter on photoionization in gases and photoelectric emission from solids, written by Gerhard L. Weissler. This contribution is really two chapters rolled into one. The two subchapters are about of equal length, each covering 40 pages, and contain much useful information. One small detail mars the usefulness of the second half; since it is entirely on photoelectric emission from solids, one would expect the page headings to be labeled so, but unfortunately all these pages are marked photoionization in gases. So, the reader who is not watching carefully may overlook completely the chapter on emission from solids.

William P. Allis has written the next chapter on motions of ions and electrons. This is a theoretical chapter on its subject in five parts. The first part considers the motion of the individual particle under a Lorentz force. Part 2 treats the case of collisions where the Boltzmann equation replaces the Newtonian equations. This leads

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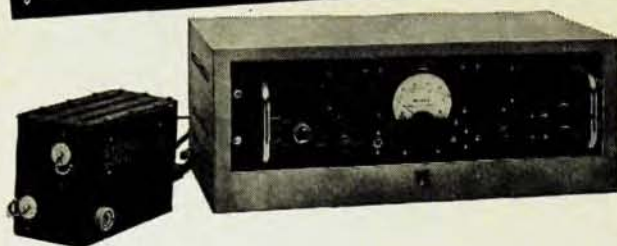
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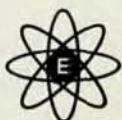
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to the Langevin equation. In part 3, the Boltzmann equation is applied to a "Lorentzian gas". In the fourth part mean free time and mean free path are studied by using the Boltzmann transport equation. In the final and fifth part the effect of Coulomb interactions is studied by using the equation of Fokker-Planck. This chapter has the high quality one would expect from its author. It is followed by two chapters written by Leonard B. Loeb. The first of these is on the formation of negative ions, and the second on recombination of ions. They are more experimental in character than the preceding one and contain much useful material on the subject.

The following chapter is on ionization in gases by electrons in electric fields, by A. von Engel. This too is a very remarkable chapter in its skillful combination of great wealth of experimental material and of theoretical considerations.

The final chapter is by P. S. Little. It is entitled "Secondary Effects". This short title left me at first a little bit puzzled; then I looked at what secondary effects are and found that they are the Townsend discharge, other discharges, and the direct measurement of ionization. In a manner of speech, these are just leftover subjects of gaseous electronics which didn't go in the preceding chapters. It is a fine scholarly chapter with ample references.

On the whole there is very little to be criticized in the composition of this volume. It contains so much important material that anyone interested in electron emission phenomena and/or in gaseous electronics will have to have it on his desk for many years to come.

Information Theory: Third London Symposium (London, England, Sept. 1955). Edited by Colin Cherry. 401 pp. (Butterworths, England) Academic Press Inc., New York, 1956. \$11.50. *Reviewed by William Fuller Brown, Jr., Minnesota Mining and Manufacturing Company.*

This was the third of a series of symposia on information theory. The first, held in 1950, dealt with the mathematical and philosophical bases of the theory. The second, in 1952, considered applications to telecommunications. The third was of broader scope. The papers are grouped under the five headings: fundamentals; coding, taxonomy, etc.; language analysis and mechanical translation; meaning and the human senses; behavior and its mechanism.

The subject allows a wide range of interests and of motivations. The needed unifying influence is usually provided by the concepts of information theory. There are exceptions; some papers report work that is interesting in itself but makes no explicit use of information theory—for instance, work on theories of hearing and of the behavior of the nervous system. We may hope, however, that the bringing together of information theoreticians and of persons interested in such problems may result in a fruitful interaction.

In reviewing the second symposium (*Physics Today*,