penetration and stopping power is given as an appendix; actually it is the introduction, since most of the reports use his notation and expand on his topics.

The title is a bit misleading: "charged particle" means one heavier than the proton, and "penetration" is concerned only with range and stopping power. Considerable stress is given to the passage of heavy ions. As a result, one is concerned with shell corrections, small-angle multiple scattering, and similar topics that are germane to massive-particle problems but not so much to electron scattering. Electron penetration, in fact, is represented only in the extensive range-energy tables of Berger and Seltzer. They contribute also range-energy tables for mesons, and a tabulation of the Vavilov distribution.

Fano, the subcommittee chairman, contributes several good things besides his appendix/introduction. He and Turner treat inner-shell corrections to the stopping-power formula, ending with some remarks toward a generalized equipartition theorem such as obtains in the electron gas. His other paper is a short discussion of open problems in the field.

State-of-the-art reports are by nature rather strictly circumscribed by the interests of the reporters. Hence one is usually annoyed not to find a treatment of a pet problem. Here I would say more weight could be given to electron problems, especially plural-scattering effects, spin transport, and the like.

Studies in Statistical Mechanics, Volume 3. By J. de Boer and G. E. Uhlenbeck. 388 pp. (North-Holland, Amsterdam) Interscience, New York, 1965. $14.75.
Reviewed by Kurt E. Shuler, National Bureau of Standards.

Probably the most concise and precise way to describe this volume is to quote here in toto the Editors' Preface to Volume 3.

> This third volume of the Studies contains in the first place a monograph by Dr. Bloch on the diagram or "graphological" techniques in quantum statistical mechanics. It complements the article of Dr. Huang in Volume II which was written more from the physical point of view, while Dr. Bloch emphasizes and treats in detail the formal methods which were developed in the last ten years, mainly inspired by the quantum field theory. It is well known that the application of field theoretical ideas and methods has produced a whole flood of articles in which all kinds of diagram expansions were used. We are grateful to Dr. Bloch for having given a systematic treatment of this difficult subject and it seems to us that a student can learn from this chapter what has been accomplished. And although the ratio of the amount of physical insight to the amount of formal machinery is perhaps smaller than one hoped for, there is no doubt that any serious student of statistical mechanics should learn these methods. It seems to us also very valuable that Dr. Bloch always shows carefully how the classical theory is contained in the quantum theoretical formalism, so that his article also complements the article on graphological methods in classical statistical mechanics which appeared in Volume I.
>
> The second article by one of the editors on the so called second quantization method is mainly intended as a preparation for the modern quantum mechanical treatment of systems of a large number of interacting identical particles. The student should perhaps be advised to study this article before starting with the articles of Dr. Bloch and Dr. Huang.
>
> The third article is a reprint of the dissertation of Dr. Boris Kahn on the theory of condensation. It follows our policy to make available older monographs for which there is still demand. We refer to the foreword written by one of us for further comments.

There is no question that the articles by Bloch and de Boer are clear, authoritative, and well written and that they serve a most useful didactical purpose. In particular, the paper by Bloch on "Diagram Expansions in Quantum Statistical Mechanics" which is some 200-odd pages is a most valuable broad review and commentary on "graphology" as applied to equilibrium quantum statistical mechanics. Professor de Boer's paper on "Construction Operator Formalisms in Many Particle Systems" is rather specialized and concerned primarily with the use of annihilation and creation operators in the construction of eigenvectors in many-particle systems of identical particles. B. Kahn's 1938 dissertation "On the Theory of the Equation of State", to which Professor Uhlenbeck has written a very moving personal foreword, still forms, as indicated in Uhlenbeck's foreword, a good introduction to the modern statistical theory of the nonideal gas. When read in conjunction with Bloch's and de Boer's papers it also forms an interesting commentary on the difference of approach to problems in statistical mechanics then and now.

It is to this last point that the reviewer wishes to address himself briefly even at the danger of being considered a reactionary prehistoric fossil. There is no question that new and powerful mathematical techniques need to be developed for the solution of some of the complex modern problems in statistical mechanics, particularly in the fields of many-particle problems (both classical and quantal) and in nonequilibrium statistical mechanics. The history of science is replete with examples where the development of new mathematical techniques or the extension and application of hitherto esoteric and "pure" mathematics has led to decisive advances in physics and chemistry. The proof of the pudding is, however, in the eating. To those of us interested in statistical mechanics as a discipline which describes, interprets, and predicts chemical and physical phenomena, a mathematical technique is a tool and not an end in itself. The development and refinement of such tools are necessary; it is undoubtedly lots of fun and great mental stimulation for its practitioners, but is it *statistical mechanics?*

The Habitable Earth. By Ronald Fraser. 155 pp. Basic Books, New York, 1965. $4.50.
Reviewed by Alan G. Henney, Naval Ordnance Laboratory.

Present knowledge of the physical properties of and forces acting on the earth are discussed in a clear and concise manner. Liberal use is made of diagrams and photographs. The composition and influence of the earth's core and mantle on the surface features and magnetic field are treated. Periods of mountain formation are analyzed.

A separate chapter is devoted to the ocean floor. The theory of continental drift is strongly supported with evidence obtained from a number of independent sources. Finally, the ocean and air currents are considered.