the individual intuition of men of genius, able to leap beyond the confines of empirically well-founded ideas to frame original concepts of the greatest power. Science has its moments of revelation too. Galileo seems to have been very little concerned with the experimental verification of his ideas of motion. It is a sobering thought that "we cannot exclude from science, which is rational, the influence of factors which are irrational."

Analytical Experimental Physics (2nd Revised Edition). By Michael Ference, Jr., Harvey B. Lemon, and Reginald J. Stephenson. 623 pp. U. of Chicago Press, Chicago, 1956. $8.00. *Reviewed by Arthur Beiser, New York University.*

The new edition of *Analytical Experimental Physics*, like its well-known predecessor, has a refreshingly straightforward, no-nonsense approach to the teaching of physics. The authors neither skip nor slur unappetizing topics, and, in spite of this, have managed to produce what seems to be an unusually clear text. The two-column format of the book seems to help matters, except that the illustrations are consequently tiny and not always intelligible. (I might add that the book has been shrunk to only $10\frac{1}{4}'' \times 7\frac{1}{2}''$, and will now fit in many bookcases.) The conventional material in mechanics, heat, electricity and magnetism, and optics receives detailed treatment. Differential and integral calculus are introduced gradually and mks units are employed. Modern physics is emphasized: the radiation laws, elementary spectral theory, x-rays, the solid state, various aspects of nuclear physics and instrumentation, reactors, and cosmic rays are all discussed. Unfortunately, considering their efforts to be modern and complete, the authors' coverage of special relativity is both scanty and feeble. Still, they have done a first-class book, one that has few rivals as a pre-engineering text.

The Language of Modern Physics: An Introduction to the Philosophy of Science. By Ernest H. Hutten. 278 pp. (Allen & Unwin, England) The Macmillan Co., New York, 1956. $3.75. *Reviewed by Erich M. Harth, Duke University.*

Van Melsen, the philosopher and historian of science, once remarked that "man has endeavored to escape philosophic problems in many ways and with a considerable display of intelligence". Hutten's new book offers physicists and others interested in science a chance to mend their ways.

The book bears the subtitle *An Introduction to the Philosophy of Science*. In this field, which is beset by controversy and fairly invites going out on some limb at every turn, the writer has shown remarkable restraint. "Nothing that I have said, or tried to say," he concludes in a final paragraph, "implies that I have a doctrine to spread, or a new *-ism* to found."

Following a short introduction, Hutten deals with the requirements of logic and the linguistic formulation of

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physical theories. The thoroughgoing and, by the way, very authoritative treatment of this knotty subject matter does not make for light reading. Without thereby criticizing the author, the reader should be forewarned not to seek quick enlightenment in these pages.

In Chapters III, IV, and V the structure of physics is presented in the light of the theoretical concepts of logic and linguistics developed previously. It becomes evident that no part of physics is completely formalized in the sense that it satisfies all the requirements of logic, but the progress of science is disturbed but little by this shortcoming. Physical theories never start from *first principles*, we are reminded, and rarely find their way back to them. What is important is a clear understanding of the *language system* used and strict adherence to the *semantic rules* which form the framework of any theory.

The physical theories are grouped under the headings Classical Physics, Thermodynamics, and Quantum Physics. The sequence is not merely historical: thermodynamics, Hutten points out, is the "missing link" between classical and quantum physics.

The final chapter is entitled Scientific Method and Semantics. Hutten comes closest here to going out on a limb as indeed he must in discussing this subject. Traditional epistemology is attacked for "psychologizing" the analysis of the scientific method, i.e. asking questions like "how do we know" instead of attempting to reconstruct the logic of science. To "know" implies ontological assumptions about nature and a law-like operation of the universe. This, according to Hutten, is extraneous to the structure of science.

Physics of Reactor Design. Vol. 5 of Peaceful Uses of Atomic Energy; Proceedings of the Internat'l Conf. in Geneva, Aug. 1955. 545 pp. (UN) Columbia U. Press, New York, 1956. $9.00. *Reviewed by L. B. Borst, New York University.*

The present volume represents the first extensive discussion of the details of reactor physics on a truly international scale. As such it is particularly interesting to see that nothing seems to be held back by any party. The questions and discussions are entirely devoted to constrictive comparison of methods and results.

The subject matter covered includes the evaluation of the principal parameters for most reactor systems presently considered sound, and the methods used to convert these parameters to predictions for reactor systems. Data from exponential and critical assemblies are compared with the predictions and discrepancies are analysed.

The perturbations produced by high-level operation are discussed with greater completeness than previously. Generally speaking, no startling results were presented.

Perhaps the most unique and novel contributions were in the field of reactor kinetics. Time-dependent diffusion systems were described by representatives of the USSR and Sweden. The Russian experiments determined diffusion constants for a medium (H_2O, Be,