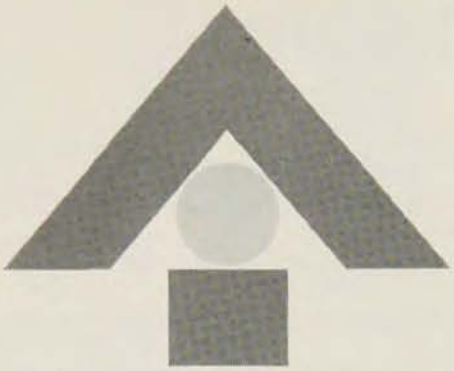

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erably greater emphasis on microscopic methods than Spitzer. The first six chapters lay the foundation by introducing the basic concepts of kinetic theory. The major tool of this analysis is the velocity distribution function whose moments in velocity space are related to the macroscopic variables. The next three chapters are devoted to the analysis of weakly ionized gases in which the only collisions to affect the motion of the electrons are those with neutral atoms. Going to larger electron densities collective phenomena are briefly discussed and the remaining two chapters deal with the microscopic and macroscopic description of the strongly ionized gas.

The presentation is generally clear but suffers somewhat from questionable translation of some of the French idioms. A favorite phrase of the author "au contraire" should not, for example, be translated as "on the contrary" but rather as "on the other hand". Similarly, the frequently occurring word "nevertheless" might generally have been replaced by "however".

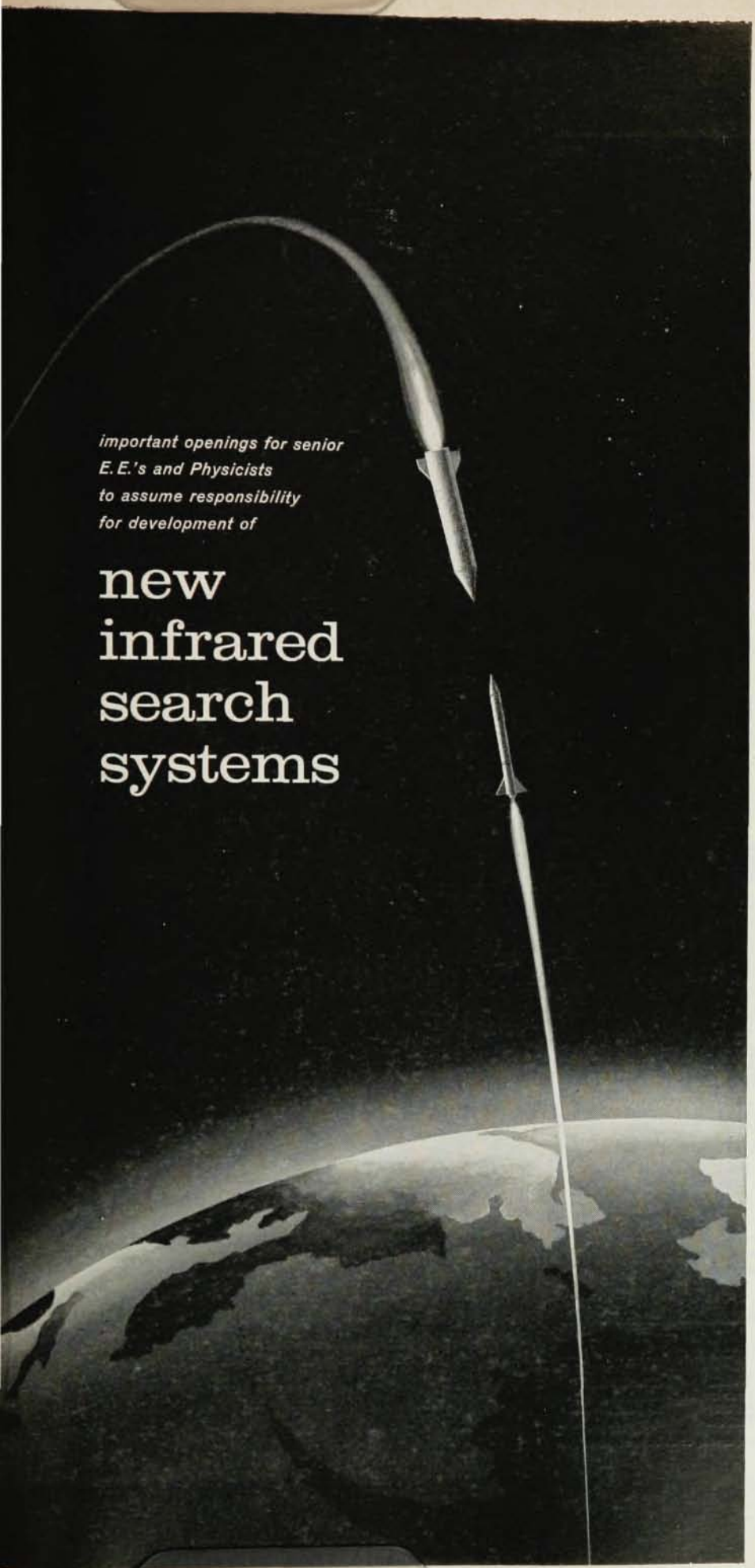
The book is a good first introduction to the theory of ionized gases. It touches on most of the important concepts but without going deeply into any of them. For mathematical details the reader is frequently referred to original articles of Delcroix and his colleagues and at times to Spitzer's book.

Nuclear Physics and Instrumentation. Vol. 14 of Proc. of 2nd UN Internat'l Conf. on the Peaceful Uses of Atomic Energy (Geneva, Sept. 1958). 491 pp. $17.00. **Physics in Nuclear Energy.** Vol. 15 of Proc. of 2nd UN Internat'l Conf. on the Peaceful Uses of Atomic Energy. 478 pp. $12.50. United Nations, Geneva, 1958. *Reviewed by Joseph G. Hoffman, University of Buffalo.*

AMONG the 33 volumes of the English language edition of the Second United Nations Conference Proceedings, 1958, Volumes 14 and 15 are especially interesting for physicists. The highly technical discussions and reviews of fundamental work both in theory and in experiment will appeal to nuclear specialists and engineers in each of the many phases of nuclear physics considered.

Volume 14 has eighty papers in ten major subdivisions, the first of which deals with nuclear theory, nuclear models, and nuclear energy levels. Elaborate charts and tables make the section a comprehensive and useful summary of basic nuclear knowledge. There are, for instance, large folding tables of nuclides summarizing a vast amount of theoretical and experimental work. The second section describes nuclear reactions while the third goes on to special nuclei. The last six sections describe nuclear instrumentation and techniques such as spectrometry, counters, coincidence analyzers, bubble chambers, etc. The explicit detail given in most of these technique papers is amazing. For instance, one paper on pulsed neutron sources has six pages of shop diagrams for the mechanical construction of fast choppers.

Volume 15 has five main subdivisions on basic physics as related to energy, of which the first three deal



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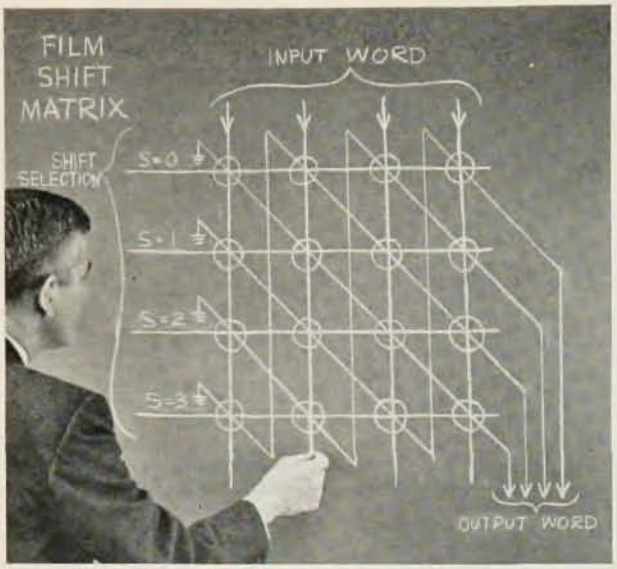

This logic array has been developed in the Remington Rand Univac Mathematics and Logic Research Department. In simplified form, each circle represents a film element that AND's the bits from the horizontal and vertical lines to produce an output on the diagonal line. The input word is therefore left-circular shifted **S** places in passing to the output. Such matrixes can produce arbitrary right or left shifts, either circular or open-ended, in a single clock period for full length computer words. Film logic arrays open a new field of high speed, high density logic devices.

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with fast-neutron cross sections, neutron capture, and nonneutronic fission. The last two sections are on general fission processes and fission-fragment studies. A total of 66 papers makes this an important review of the basic physics of neutron and fission processes of ultimate interest to engineers as well as physicists.

The format of these volumes is conducive to easy reading (pages measure 8″ × 11″ and are of heavy glossy stock that enhances the many photographs which are included). It should be noted, too, that each paper has only a minimum number of references; the documentation is not obtrusive, yet there is such a wealth of information imparted as to make the work encyclopedic. These are highly desirable volumes and are recommended as standard source material in nuclear physics.

Impact. The Theory and Physical Behavior of Colliding Solids. By Werner Goldsmith. 379 pp. (Edward Arnold, London) St Martin's Press Inc., New York, 1960. $17.50. *Reviewed by J. M. Walsh, General Atomic Division, General Dynamics Corporation.*

A SUMMARY of the literature, both experimental and theoretical, on the subject of solid-solid collisions is given in *Impact*. The subject is reviewed in its successively more refined approximations, beginning with the elementary case in which all of the deformation and vibrational aspects of the collisions are replaced by a single empirical (and tremendously simplifying) coefficient of restitution. Elastic vibrations arising from impact are then discussed, followed by a chapter on local deformation in the contact region. Collisions that involve extensive plastic deformation are the subject of Chapter 5, which is some thirty percent of the book. Two final chapters are devoted to a more complete coverage of the experimental data from impact tests; special attention is given to the evidence that dynamic strengths surpass the static analogs.

The appearance of this substantial contribution by Professor Goldsmith hardly means that the subject is a well-developed field of applied physics. Rough approximations are still needed to interpret collisions involving large plastic deformation, and areas of extensive experimental study, such as many aspects of bullet-plate interaction, yield only to descriptions which are admittedly phenomenological. Reasons for this seemingly modest level of understanding are not hard to find. The simplest laboratory collision experiments (once the limits of linear elasticity are exceeded) should be analyzed as nonlinear time-dependent flows in two or more space variables. Such calculations are only recently being accomplished for fluids, where one has a nonrelaxing scalar equation of state. For solids, a tensorial equation of state must be used if material strength is to be retained, and this stress-strain relation must be taken as irreversible if plastic deformation is to be explained. Finally, the evidence indicates that a time-dependent equation of state may be desirable in