and Ionization of Atoms by Electron Impact" by D. W. O. Heddle and M. J. Seaton, "Inelastic Electron-Molecule Collisions" by C. A. McDowell, "Electron-Ion Recombination" by D. R. Bates, "Inelastic Heavy Particle Collision Processes" by A. Dalgarno, "Elastic Scattering of Atoms and Molecules in the Thermal Energy Range" by R. B. Bernstein, "Afterglow Atomic Collision Processes" by M. A. Biondi, "Collision Processes Leading to Optical Masers in Gases" by C. K. N. Patel, and "Muonium and Positronium Physics" by J. M. Bailey and V. W. Hughes. Taken together, these reviews cover a wide area of collision physics and provide many references.

The contributed papers are divided into twelve sections: slow electron scattering by atoms, resonances (in electron scattering), polarization of radiation emitted on electron impact, excitation and ionization of atoms by electron impact, further theory (mainly electron-atom collisions), electron-molecular collisions, recombination, negative ions, photo-processes, inelastic heavy particle collisions, elastic heavy particle collisions, collisions with molecules, and other topics. In several cases papers appear to be placed in the wrong sections. For example several papers which would logically be expected under "excitation and ionization of atoms by electron impact" appear under the headings "resonances" and "polarization of radiation emitted on electron impact".

Two discussion sessions were held at the conference and transcribed for the proceedings. The theoretical discussion session centered on various approximations used in scattering calculations. The session on experimental problems dealt with crossed-beam experiments involving charged-neutral, charged-charged, and neutral-neutral particle interactions. Some of the problems discussed were: detection of neutral beams, determination of excited-state concentrations in neutral beams, low-noise ion sources, and the perturbation of one charged beam by another.

As is often the case with conference proceedings, the papers are variable in quality, but taken as a whole provide a good cross section of the state of collisions research at the time of the conference. All serious workers in collision physics should have access to a copy of this volume, but because of its high price, it is likely that this access will be through library rather than individual ownership. For those with neither, it should be noted that reprints of many of the articles are available from the authors.

Space Physics and Radio Astronomy. H. Messel and S. T. Butler, eds. 174 pp. St. Martin's Press, New York, 1964. $4.25.
Reviewed by H. J. Hagger, Albiswerk, Zurich, Switzerland.

Space physics and radio astronomy are the fields of scientific research which are most admired by many people, and they also have the working medium in common, space. This book is a record of a series of lectures given for science teachers by world experts at the third Nuclear Research Foundation Summer School in Australia. Each section, written by a competent author from an Australian university, gives a very brief survey of its topic, but the book as a whole does not hold what one would expect under such a title. It is to some extent a collection of selected knowledge, with Leonardo da Vinci and Michelson as starting points and ending with the Australian radio telescopes and the first man-made satellites.

The first two chapters deal with some results of radio astronomy in general and the design of the 210-ft Australian radio telescope in particular. The third chapter shows some future projects of radio astronomical research both in Australia and elsewhere. The next two sections expose problems in resolving power of interferometers with some application to radio frequencies. In chapters 6 and 7 we learn some facts about meteor astronomy and about conclusions from observations of the physics of the upper atmosphere. Chapter 8 extends these remarks to the phenomenon of aurorae and its relationship to the Van Allen belts. Chapter 9, on elementary mechanics of flight, starts with the first tries in free flight and ends up with aerodynamical stability.

When dealing with air lift and drag, the author makes some remarks on orbital motion of satellites. In chapter 10, elements of propulsion are traced by just mentioning the principle of thrust. In the last section, the reader finds some words on the number of air molecules at ground level and a few data on the first man-made satellites and the mass ratio of rockets to overcome gravitational forces of the earth. A very detailed index of subjects is attached and some references for each section are given.

It is very difficult for the reviewer to find and specify a group of persons who may need this book, if we exclude the participants of that summer school. For them the book will certainly be very valuable as a record of the lectures they attended. Far more problems are mentioned than could have been considered with care and with success in a book of this size. One could say that less would have been more.

Elements of Acoustics. By J. Blitz. 136 pp. Butterworths, Washington, D. C., 1964. $4.25.
Reviewed by Walter G. Mayer, Georgetown University.

About a year before the present little volume appeared, another book by the same author became available (*Fundamentals of Ultrasonics*, reviewed in Physics Today, April 1964, p. 72). Comparing these two books one notices that about one-half of the material contained in *Elements of Acoustics* was taken from the earlier book, in many instances verbatim with the same figures and formulas. These "repeated" sections deal with the fundamental concepts of sound propagation, velocity, absorption, and reflection.

The other half of the book treats in a simplified manner assorted topics related to hearing, noise, building acoustics, sound recording, and acoustic measurements.

This little book seems to be intended for readers with a casual interest in acoustics. The serious student may find the simplicity of representation refreshing—but he will have to go elsewhere for detailed answers to specific questions.