Book Reviews

Gaseous Nebulae. vol. 3. International Astrophysics Series. L. H. Aller. Wiley, New York, 1956. 322 pp. Illus. $11.

This book is the third in the recently started International Astrophysics Series edited by Ellison and Lovell. It also happens to be the third monograph written by L. H. Aller to be published within a few years. Therefore the indication volume 3 on the back of the book is rather misleading because, if I understand it correctly, the volume 3 refers to the International Astrophysics Series and not to the series of books by Aller, as one might gather from the back of the book.

One has to be grateful to Aller for providing us with another volume containing a wealth of material, both observational and theoretical, presented in a clear and concise manner. After a brief introduction, the second chapter discusses in great detail various observational techniques for observing diffuse nebulae as well as planetary nebulae. The third chapter discusses distances, dimensions, and spectra of gaseous nebulae, and one is once again struck by the fact that the theoretical astrophysicist must have a much more elaborate *working* knowledge of atomic physics (and also of other branches of physics) than the ordinary theoretical physicist who can often get away with specializing in a rather narrow field.

The fourth chapter discusses physical processes in gaseous nebulae. The author restricts himself mainly to the discussion of a model of a planetary nebula which is a homogeneous spherical shell of hydrogen gas surrounding a very hot star, assuming a steady state to have been attained. As is well known from similar astrophysical problems, the situation is a good deal more complicated in such a state where there does not exist true thermodynamic equilibrium than in the usual situations discussed in statistical thermodynamics.

In Chapter 5 the author discusses the problem of forbidden lines. A slight point of criticism is that I feel that he might have said a few words illustrating why magnetic dipole, quadrupole, and higher order lines are usually not observed. Chapter 6 discusses the stars that illuminate the gaseous nebulae, and Chapter 7 describes the structure and internal motions of planetary nebulae. It may be added here that the main subject of the monograph is planetary nebulae, the diffuse nebulae being discussed very briefly, since they can be considered to be part of the interstellar medium, which will be discussed by Spitzer in another volume of the International Astrophysics Series. In the last chapter the author discusses some aspects of the diffuse nebulae.

"The aim of the International Astrophysics Series is to provide a collection of authoritative volumes dealing with the main branches of astrophysics. . . . The books will be suitable for both specialists and students. Some of the titles may have a wider and more popular appeal but this will be secondary to the main purpose, which is to assist in the teaching of astrophysics and radio astronomy and in the advancement of these subjects themselves." The present monograph falls beautifully into the category which the editors have had in mind, and it should provide one of the standard textbooks on the subject for some time to come. It seems, however, to me that it will be impossible for the general reader to get much benefit from this volume, unless he has a sound working knowledge of astrophysics.

D. TER HAAR
Clarendon Laboratory, Oxford

Encouraging Scientific Talent. A study of America's able students who are lost to college and ways of attracting them to college and science careers. Charles C. Cole, Jr. College Entrance Examination Board, New York, 1956. 259 pp. $3.50.

Those of us who were completing our formal education and were looking for academic or industrial posts in the early 1930's find it hard to believe our eyes and ears today. We probably would have labeled as insane anyone who had then suggested that, within 25 years, several pages of the Sunday *New York Times* would be devoted weekly to advertising for scientists and engineers, or that a manufacturer would dedicate his commercial time during a national telecast of a football game in order to suggest that persons in these fields make phone calls or send telegrams to his personnel officers. Yet the current shortage of scientific and technical people is so acute that these things are happening, and beginning salaries for men fresh from their A.B., B.S., or Ph.D. degrees are increasing year by year. If the trend continues, we may even expect that the average salaries of mature and experienced scientists will approximate those of other professions—in which case we shall really believe that the shortage is real and not a result of the necessity of hiring degree holders for work on cost plus contracts.

Encouraging Scientific Talent is the most recent book-length contribution to the growing literature on the shortage of scientists. After devoting three chapters to a discussion of the nature of science, the characteristics of the scientist, and the present manpower situation in science and engineering, Charles Cole devotes the rest of his book to one specific study. What are the reasons that a high-school student of high aptitude does or does not enter college? To what extent do teaching, the influence of parents, social pressures, and economic status determine his or her decision? What can be done to see that every student with ability wants to enter college and has the opportunity to do so? Most of the chapters are thoroughly documented by references to statistical studies, including a special survey of more than 32,000 students in 478 schools throughout the country. To the extent that questionnaires, tests, and psychological studies can give the answers to important questions, this book should form the basis of future discussions and planning on the part of colleges, universities, federal and state governments, and educational foundations.

The book will be provocative, if not completely satisfying, even to those who are not convinced that answers to all questions can grow from statistical studies. For example, the author shows that the percentage of college-age youths who actually attend college in each state correlates very well with the per capita income of the state, the annual state expenditures for public schools, and the percentage of workers who are engaged in professions within the state. One state, however, fails to fit the pattern. Utah stands head and shoulders above all others in sending students to college, although it is in the middle group according to the other measures. If the unusual happening is what offers challenge to a scientist, some of us should devote our energies to finding out what it is in the intellectual climate of Utah that produces this remarkable result.

Although it is never explicitly indicated, there seems to underlie Cole's treatment an assumption that education