fever by Sawyer; typhus fever by Dyer; leprosy by McCoy; syphilis by Chesney; yaws by Butler; trachoma by Julianelle; tularemia by Francis; clonorchiasis by Strong; schistosomiasis by Faust; filariasis by O'Connor; beri-beri by Vedder; malnutrition and undernutrition by Cook; and chemotherapy by Leake. These special discussions add much to the scientific worth of the book and include short but excellent presentations of the distribution of the various diseases considered.

The labor involved in the collation of the data furnished in this work can be realized only by one who has edited similar publications, and the author is to be congratulated upon a volume which should prove of great value to all public health officers and to all who are interested in the geography of disease. As already stated, the book is of special interest to workers in tropical medicine. The medical profession and the sanitarian owe Dr. McKinley a debt of gratitude for having made available for the first time in many years a real geography of disease.

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ASTRONOMY

The Realm of the Nebulae. By EDWIN HUBBLE. xiii and 207 pp., 1936, $3.00. New Haven: Yale University Press.

Two outstanding characteristics of this account of the Metagalaxy are the wealth of scientific material involved and the breadth of outlook. There are minute and frequently technical descriptions of the steps needed to establish, for example, the distances of the nebulae, or the magnitude effect of the red shift, or the velocity-distance relation. But we do not lose sight of the fact that the goal is an integrated picture. We are shown exactly why each separate problem is raised. The forest remains in sight, despite the trees.

One could wish that, for the sake of the scientist more than for the layman, some of the researches were more fully discussed. The consideration of uniform distribution of nebulae seems to be left in a tentative state; concentrations within clusters certainly must have a more direct bearing on both practical and theoretical problems than the author indicates. A mystery still rests also in the calibration of the velocity-distance relation. The coefficient derived on the basis of the brightest stars in nebulae is almost exactly that derived previously from the mean absolute magnitude of the galaxies. But, curiously enough, the mean absolute magnitude is now found to be 0.4 magnitudes brighter than before. We may hope that detailed publication of the work involved will explain the apparent inconsistency.

Such criticism, however, is a matter of detail. The importance of the work lies in the clarity and fulness of its account of a complex scientific problem. The style is smooth and clear; the author's habit of referring to the same subject in different contexts tends to unify the work. The material is both inciting and exciting, and the volume is a valuable contribution to knowledge of the Cosmos. J. M.

Theoretical Astrophysics. By S. ROSSELAND. Oxford: The Clarendon Press, 1936. Pp. xix + 355. Figs. 47. $8.00.

THE study of astronomy is handicapped by the scarcity of satisfactory texts, and this has been especially true in the field of theoretical astrophysics. Therefore the appearance of "Theoretical Astrophysics," by S. Rosseland, is an event very much to be welcomed—the only complete modern treatise on astrophysics (with the exception of the same author's "Grundlagen der Astrophysik"). The author is professor of astronomy at the University Observatory, Oslo, and director of the Institute of Theoretical Astrophysics, and is well known for his contributions to the fields covered in this treatise.

For about a third of the book, astronomy is not considered at all, while Professor Rosseland presents the fundamental ideas of quantum physics, beginning with the classical equations of analytical dynamics and statistical mechanics. The object here is to give the student a self-contained and logical development—including the Schrödinger equation and its application to a few elementary problems, simple spectra, the periodic system, complex spectra and the theory of absorption and emission of radiation. With few exceptions, the methods of quantum mechanics are adhered to, and while they are condensed and clarified remarkably (104 pages), the reader feels that he has a working outline of theoretical physics and a background from which he can proceed to astrophysics, or to further work in theoretical physics, with confidence. Discussions of certain additional topics in physics—such as the Zeeman and Stark effects, and molecular spectra—are included in the corresponding applications to stellar atmospheres.

The remainder of the book takes us from the analysis of normal stellar atmospheres to extended atmospheres, nebulae and interstellar gases. Professor Rosseland states in the preface that his aim is the formulation of a program of theoretical astrophysics. This is accomplished by detailed critical reports on important researches of the past few years and by the accompanying theoretical exposition of methods.

A considerable amount of attention is necessarily devoted to the equations of the transfer of radiation, leading to the interpretation of the continuous spectrum and the profiles and intensities of absorption

lines, in normal stars, and then the special cases of expanding and rotating stars. These chapters on a subject which especially needed to be brought up to date and set in order, are particularly valuable. In addition ample space is given to the increasingly important study of band spectra and dissociative equilibrium of stellar compounds.

The chapters on stars with extensive envelopes and on nebulae are also worthy of being mentioned separately, for they include the interpretation of Wolf-Rayet stars and novae as stars which are continually ejecting matter, the new developments in the identification of lines arising from forbidden transitions and the explanation of nebular bright lines in terms of Rosseland's theory of cycles.

Both the student and the experienced astronomer will find this book a necessity for their libraries. For the former it provides a remarkably complete system of modern theoretical physics and its astrophysical application. The latter will find in it a coordinated picture of stellar atmospheres and the methods of analysis heretofore available only in piecemeal. It is a pleasure to know that "a second volume is planned to give a similar view of the internal structure of stars, analyzed in terms of nuclear physics and hydrodynamics." C. J. A. R.

REPORTS

THE WORK OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

EXPANSION of educational activities and enlargement of facilities for student welfare calling for a fund of $12,500,000 were proposed in a program of objectives presented by Dr. Karl T. Compton, president of the Massachusetts Institute of Technology, at the autumn meeting of the corporation on October 14.

The program of development outlined by Dr. Compton will require a capital expenditure of $2,750,000 for new buildings and equipment and a capital fund of $9,750,000 to produce an annual income of approximately $390,000.

The major objectives of the plan, which will be brought to fulfilment as soon as possible, include a new dormitory to house 100 students; a large gymnasium or an addition to Walker Memorial, the student recreation center; a biological engineering laboratory; funds for research and fellowships, extension of the institute's high voltage research projects; a new aeronautical wind tunnel and a naval towing tank.

Expressing his belief that the country is now in a period of transition from depression to at least relative prosperity, Dr. Compton said:

> We should now pay active attention to the needs and opportunities with which we find ourselves confronted—needs and opportunities which have in part been disclosed by our intensive study in the past few years, in part have arisen through progress in science and engineering, and in part have sprung from the creative work of our own staff. Some of these opportunities show such promise that their neglect would be no less than educational sabotage.

Speaking of the increasing emphasis on graduate work and research as reasons for new facilities, he said that "graduate work in engineering was almost negligible in the period before the erection of our present educational plant. Graduate work in science did exist but only to a small fraction of its present importance. The plant, conceived as it was with great generosity and remarkable vision, and in spite of additions, has nevertheless become inadequate to the demands now made upon it by increased enrolment, graduate work and research."

The need for a more adequate development of Technology's research program was emphasized by Dr. Compton.

> No educational institution in my knowledge has ever approached its possibilities for contributing to public welfare by giving attention to the efficiency of its research program comparable to that which it gives to its teaching. No institution has such great possibilities in this direction as the Massachusetts Institute of Technology. I can imagine no investment for public welfare so likely to secure large returns as one which would permit the latent creative powers of this institution to become really active.
>
> If the Massachusetts Institute of Technology will really grapple with the opportunity here outlined, it will perform a new order of public service along the lines of its charter, which directs it to "aid generally by suitable means the advancement, development and practical application of science in connection with arts, agriculture, manufactures and commerce."

Dr. Compton's proposals were submitted to the corporation with his annual report in which he reviewed the operation of the institute in the past year and the successful solution of the many economic problems confronting educational institutions during the depression. In setting forth his proposals for the future, he divided the program into two parts, one dealing with educational activities and the other with student welfare.

STUDENT WELFARE

Outlining the urgent need for additional housing accommodations, he directed attention to the fact that there is a present unsatisfied demand for rooms for at