problems of life and our whole environment, so essential to human welfare and progress, because of their very familiarity have met with only limited inquiry and certainly have received little support in comparison to that accorded other fields of scientific investigation.

Dr. Stetson has done a service to geophysicists, astronomers and laymen in this attempt to present in popular form what we know of the physics of the earth and how that knowledge fits with, relates to and expands interpretation of observations in the, as yet, inaccessible regions immediately around the earth and in space. His book should enlist the attention of thoughtful readers and give them a new view of and insight into the familiar everyday phenomena occurring around us and unobserved by almost all.

Dr. Stetson's expressed purpose "to bring together recent conspicuous developments in astronomy and its related fields which may suggest a more intimate relationship between man and his cosmic environment, than has perhaps been generally supposed" is thus well justified. For this study of the relations of the earth to the cosmic scheme he suggests the name *cosmecology,* implying the notion of ecology as used in a biological or botanical sense.

It has been little realized until late years how intimate are the relations which exist between astrophysics—the physics of limitless space—and geophysics—the physics of the earth. The task presented is a large one, involving scientific minutiae and technique of astronomy, of geophysics (as represented by meteorology, oceanography, terrestrial magnetism, volcanology, seismology, hydrology, geodesy, geology), of wireless telegraphy and of all their interrelations—some quite patent, others hidden in the hazy boundaries of our finite understanding.

Naturally the heterogeneity of the materials to be presented and digested in a popular style derived from so many diversified and specialized fields constitutes a herculean task. In this the author is to be complimented upon his general success. At times apparent interrelations suggested by various persons and noted in the book are not susceptible of rigorous scientific scrutiny. One might have hoped that an expert like Dr. Stetson would have more frequently made clear-cut distinctions between interrelations based upon generally accepted materials in these fields and ideas of a more or less speculative nature. However, limitations of space and the brevity demanded by the average reader do perhaps condone omission of digressions of this kind.

The chapters describing tides of the ocean and earth, of variations in latitude and longitude, are excellently treated. The subject of the earth's interior is treated from conclusions based on the investigations and progress made by seismic methods. In the four chapters dealing with the effects of the sun on human affairs, on the earth's magnetism, on radio reception and on the ionized regions, our limitations of knowledge are perhaps more clearly indicated. Much space is devoted to the discussion of radio in relation with the moon, solar eclipses, meteors and the stars. It is perhaps still open to question whether the published investigations of the author and his associates have been sufficiently rigorous to discriminate between the effects of the lunar cycle and the solar cycle, the proof of which requires an extremely detailed statistical study over a longer period of time than yet available.

Under the chapter on illuminations of the night sky, attention is given chiefly to considerations of the aurora and zodiacal light. In discussing the former the results of recent work, particularly by Norwegian investigators, are briefly sketched. In introducing the subject the author states that "Relatively careful observations show that in general these strange illuminations center about the Earth's magnetic poles." It is not clear just what "relatively careful observations" are referred to, but the statement is not in accordance with generally accepted data. It might better be said that the line of maximum auroral frequency in the northern hemisphere is roughly symmetrical about the axis of the earth's uniform magnetic field, the north end of which is approximately in latitude 78° 32′ north and longitude 69° 08′ west.

Two of the final chapters of the book deal briefly with cosmic clouds and cosmic rays. The subject-bibliographies arranged according to chapters are well selected. The indexes for both name and subject show an appreciation of the usefulness of such features to the reader and student.

The publishers have presented Dr. Stetson's text and numerous diagrams in attractive form.

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ASTEROIDAL AND COMETARY ORBITS

The Calculation of the Orbits of Asteroids and Comets. By KENNETH P. WILLIAMS. Principia Press, Inc., Bloomington, Indiana. Pp. vii + 214. $3.25.

THE author's chief purpose in writing this book was to provide the mathematics student with a mathematical exposition of the methods for the computation of preliminary asteroidal and cometary orbits. There can be no doubt that this purpose is well achieved. The general introductory chapters serve to provide him with the basic ideas of what astronomical positions mean, the systems of coordinates used and the corrections to be applied. Very little of the observational side is presented, but that is not necessary in this type of treatment. The introduction of a chapter

on interpolation enhances the value of the book considerably, especially for the student who wishes to compute. The mathematical foundations of the Laplace, Gauss and Olber methods are clearly presented, especially in the case of the last. The historical sketches, though brief, add greatly to the interest and value of the book. These, coupled with the rather complete bibliography, make the book of considerable value for reference purposes.

The chief criticisms apply to the treatment of practical details necessary for the student who wishes really to learn to compute orbits. The formulas for computation are in some portions very detailed and in others somewhat sketchy. They are, however, designed for machine computation, which is a definite advance. The omission of plus signs in the numerical examples is in bad form for the student learning machine computation, but, of course, the instructor should watch over such details.

One would rather expect Moulton's "Celestial Mechanics" to be used as a standard of notation in an English text, but one finds ξ, η and ζ representing the direction cosines when usually they represent geocentric coordinates in orbit theory. Other changes in notation may cause confusion. The failure to identify explicitly the well-known f and g series in the modified Laplacian method may possibly save computation time, but the treatment almost completely masks these most important series. Their omission as definite entities prevents the student from appreciating the tremendous flexibility of the modified Laplacian methods, such as Leuschner's, when applied to the many problems that the orbit computer will meet.

I can find no mention of Bengt Strömgren's modification of Olber's method, though his nomograms for the solution of the geocentric distance are of great value in computation, both by Olber's and Leuschner's methods.

One may say of the book generally that, in spite of certain deficiencies in the practical treatment of orbit computation, it affords the most complete text on the subject available in the English language. This book should stimulate activity in a part of astronomy somewhat neglected at the present time.

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QUOTATIONS

A MESSAGE FROM THE PRESIDENT OF THE AMERICAN CHEMICAL SOCIETY

WITH the American Chemical Society entering a new year, the fifth of the depression, a circumspection of its affairs may well be made. The society is in a strong position. On account of the interest and efficiency of its permanent officers, the editors of the journals and their staffs, the American Chemical Society is in the front as one of the outstanding scientific organizations of the world. With the cooperation of the members it will always remain so. The society has weathered the last five years without serious impairment of its functions, and there is every indication that the next years will present easier sailing.

The high standard of excellence of the society's journals is accepted by all. The national conventions and intersectional meetings of the society are a tremendous stimulation and inspiration to the members, and at the same time attract public attention. It is difficult to suggest basic improvements in these two interests of the society. There is still a third function of the organization, the improvement of the professional standing of the chemist, which may very briefly be discussed. That the chemist should be pictured in the minds of the public in the same category as the physician, engineer or lawyer, is the desire of all who understand chemistry. There are at least two viewpoints as to how this may be best accomplished, and only time will crystallize the policy which the society as a whole should support. Without mentioning all of the various factors which have aided the professional standing of the physician and of the engineer, only the one which is perhaps the most influential need be cited —the necessity of state examinations and registration. Is the chemist, in order to attain a greater professional standing, willing to accept state examinations and registration before he can practice or become a properly qualified chemist in the eyes of many business executives? Although such a plan will effectively assist the chemist in gaining public recognition, nevertheless years would pass before a system satisfactory to the chemist and to the states could be evolved and before this plan might accomplish its purpose.

The alternative is to educate the public gradually in the manner that has been taking place during the past ten or fifteen years. The industries have manufactured more and more products which touch directly the layman and which are advertised to him as the result of chemical investigations. With such products steadily increasing in number and with the numerous interesting press reports of discoveries involving intricate pure and applied chemistry, the professional standing of the chemist with the laity is bound to improve.

The trained chemist is truly in a favored position to-day. The past decade has seen his services first greatly in demand, and has then seen them diminish, until three years ago a current topic of conversation