the Old Americans shared with a community of English families and with Pennsylvania Germans and Germans from the fatherland. Before all the forest land had been taken up, the new steel plow made the prairie available, and families from New England, New York, Pennsylvania and Germany joined forces in the rush to enclose it. Here and there a group of Irish took root on the prairie, but most of them were relegated by their poverty to the rougher forest lands which no one else had wanted. By the time the Irish and the Scandinavians were coming in force, they had to purchase farms from the children of earlier settlers, since little land remained in the hands of the government. Many of them settled in the towns. Before settlement was complete, all these racial threads were being interwoven into a harmonious fabric of Americans. This process still goes on, with Italians and Lithuanians as the chief strands of later origin. Most of them are city dwellers.

While there was abundant land the different groups clustered in tight neighborhoods, each linked to a different place of origin. As soon as clannish feeling diminished with the passing of the first generation, and all the land came to be occupied, the lines between settlements began to fade. Before 1900 the disappearance of stumpage in the forest and the planting of shade trees on the prairie had minimized the striking contrast in aspect of the landscape which had guided settlement. Intermarriage and interlopers were speedily obliterating the social lines which had formerly distinguished neighborhoods. But just as the natural vegetation has left tell-tale traces in the soil, so relicts of the original settlement—denominational churches, varying styles of farmstead architecture, the predominance of surnames belonging to this or that language—indicate to the observing eye something of the origins of settlement on what is now a typical piece of Midwestern America.

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OCTOBER 3, 1934

A NEW OUTLET FOR UNABRIDGED SCIENTIFIC PAPERS

THIRTY years ago it was not uncommon to find scientific papers forty pages long or even longer. Because of the increase in the number of papers submitted, editors nowadays are compelled to impose strict limitations on the length of each. Yet, because of increased specialization, the need for an efficient medium of interchange of detailed information, between workers in the same or related fields, is greater than it was ever before.

Several solutions of this problem have been proposed in the past.[1] They have a drawback in common—they require the concerted action of many scientific bodies, as well as a radical change in the present methods of publishing scientific papers. These features in a plan make it highly improbable that the plan will be adopted in the near future.

I should like to have the opportunity of presenting through the medium of your journal a suggestion for the partial solution of this problem. This suggestion eliminates the difficulty mentioned in the preceding paragraph and allows of experimentation on a small scale.

The proposed procedure is somewhat as follows: Let the investigator write a paper of a length sufficient to make it useful to his fellow workers. Let him mimeograph his work and send copies to twenty-five key libraries of the world. Let him then present a condensed summary for publication. The summary is to contain a complete list of the libraries in which the unabridged paper is to be found.

I wish to emphasize that the present plan introduces no startling or new ideas. It represents a synthesis of several separate old ones. It seems to me that it is practical and that it will make unabridged papers equally as accessible as short papers published in the less widely circulated journals.

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SCIENTIFIC BOOKS

EARTH, RADIO AND THE STARS

Earth, Radio and the Stars. By HARLAN TRUE STETSON, Ph.D. New York, Whittlesey House, McGraw-Hill Book Co., Inc., 1934; pp. xvii + 336; figs. 88; one colored plate.

A PUBLICATION describing and coordinating the intriguing phenomena of astronomy and those of the earth sciences, more familiar but unfortunately the object of less interpretation, has been a desideratum for some time. The wonders of the heavens and the enchantment of the great unknown represented by the distant celestial bodies have long been the subject of discussion both scientific and popular. It is surprising that the even more complex and certainly equally fascinating physical phenomena evidenced by the experiments performed daily by nature in her great laboratory—the earth and its atmosphere—enlist, in general, little interest from layman and scientist alike. In astronomy there has been no lack of interest from its early beginning. But the intimate relations to the

[1] See, for instance, SCIENCE, 56: 197, 1922; 80: 70, 1934; 80: 245, 1934.

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