By a happy innovation the opening address was delivered by the president of the South African Association. Mr. Jan Hofmeyr, speaking in the City Hall after the association had been welcomed and Sir Thomas Holland, the new president, had been installed, made good use of his opportunity. He had many advantages. He comes of distinguished South African parentage, and as one of the earlier Rhodes scholars he has experience of the distinctive culture of an English university. He is a young man, still under forty, who has grown up during the efflorescence of science and university life which he attributed in some measure to the stimulus of the first visit of the British Association to South Africa in 1905. As head of the Witwatersrand University at Johannesburg he has had experience in the organization of a new teaching institution adapted specially to the needs of a new country. As administrator of the Transvaal he has seen the need of applying science to the practical problems of life. The fact that he is not himself a worker in science has enabled him to take a broad view, realizing the need of the advancement of knowledge for its own sake as well as for its applications to the material benefit of mankind. He had a remarkable story to tell yesterday of the progress of science in South Africa during the last quarter of a century. In 1905 there was only one university with thirty-three professors scattered over seven different institutions, and in that year only twenty-seven students qualified for degrees in science. Now there are three single-college teaching universities and a federal university with six constituent colleges. All are well equipped, and there are 134 professors and 295 others teaching the various branches of sciences. In 1928 no fewer than 275 students graduated in the various branches of science. The two observatories of 1905 have been increased to six. The Civil Service has established one of the finest stations in the world for Veterinary Research. The government and the mining industries have established and maintained an institute for medical research, the number of scientific societies has increased very greatly, and in the opinion of Mr. Hofmeyr there is now in South Africa a pride in science and a belief in its power. The record is gratifying to South African patriotism, to the British Empire generally, and to all who are interested in the advance of civilization.

Mr. Hofmeyr, possibly out of his experience as a successful publicist, used the intriguing phrases that the chief character of the progress of science in South Africa during the last quarter of a century had been its "South Africanization," and that the note of the future should be the "Africanization of science in South Africa." Even if the phrases be stripped of their patriotic coloring they retain a valuable plain meaning. Science, or any other branch of learning, is in an unhealthy state in any country in which it remains an exotic. Its principles, no doubt, are international, but, if they are to be taught effectively and exercised productively, they must receive their inspiration from a local environment and be attuned to local needs. Take botany or geology, engineering or astronomy, and it will be found that the local examples explain the principles most suitably and that the local conditions give the best stimulus to discovery. In this sense, as Mr. Hofmeyr showed, science has become "South Africanized." The seeds brought from Europe have taken root in a new soil, have produced luxuriant foliage and blossoms and fruits different in flavor from those of the original plant. Possibly Mr. Hofmeyr went farther than all his audience would be ready to follow in suggesting that the next stage should be the "Africanization" of what has now been "South Africanized." There are other "portals of entry," even south of the Equator, than those of South Africa, and from the north and by the west and the east science and civilization are creeping into the dark continent. But Africa has problems to solve and discoveries to yield more than sufficient for all the scientific enterprise that can reach it. There is no Monroe doctrine in science, and it is a gain and inspiration to the whole world that South Africa, having accomplished so much, should be ready and anxious to undertake so much more.—*The London Times.*

SCIENTIFIC BOOKS

Johannes Kepler, Neue Astronomie, überstezt und eingeleitet von MAX CASPAR, mit XIII und 68 Figuren. Verlag R. Oldenbourg, München-Berlin, 1929. Pp. 1*–66*, 1–416. In Leinen geb. M. 38.50; Büttenausgabe in Interimsband M. 52, in Schweinsled. geb. M. 100.

THE book under review is the first complete edition in a modern language of Kepler's "Astronomia nova," 1609. Brought out in one large volume, the printed page measuring 15 x 22 cm and appearing in large size Latin type, the present publication constitutes a fine exhibition of book manufacture. We deplore, however, the absence of a good alphabetical index.

Kepler's writings possess unusual charm. He permits the reader to share not only his scientific findings, but also his feelings, his hopes, his disap-

pointments. Throughout he exhibits an exuberant imagination and a rich display of imagery. In the introductory dedication to King Rudolph II and in the epigrams, one finds a profusion of mythological and astrological lore. Kepler begins his preface thus:

> It is now-a-days a difficult task to write mathematical books, above all astronomical. If one does not observe due precision in the theorems, explanations, proofs and conclusions, the book is not mathematical. If one does observe these, the reading becomes heavy. . . . How many mathematicians go to the trouble of reading to the close the conics of Apollonius of Perga? And yet its subject-matter is of a kind which admits of being represented by figures and lines much more easily than the astronomical.

Kepler resorts to the device of aiding the reader by writing a full introduction to his book and giving also a synopsis of the contents of each chapter. It is a fortunate circumstance that this great book of Kepler, in which he sets forth the first two of his three laws of planetary motion, is now available to the modern scientific reader who has a mastery of the German language, but perhaps not of Latin. The modern reader can follow Kepler through his many trials and failures, through his numerous hypotheses and the computations which led to their downfall, and finally will see him, after five years of intermittent effort, arrive at the true hypothesis—the orbit of Mars is an ellipse! Quaint to a modern reader is the question which Kepler raises, whether certain subtle phenomena in planetary motion "are something natural or something produced by an intelligence, a work of nature or of an angel. . . . I would gladly have held this force to be natural, because of its similarity to that force which resides in a magnet," yet it would seem almost due to a "soul which, if not drawing rational inferences, is surely at least endowed with instinct." Kepler's decision rather favors natural agencies.

The editor, Max Caspar, has done his work with care and thoroughness. For the convenience of the reader he has prepared a sketch of planetary theories before Kepler, and the history of the circumstances under which Kepler wrote his "Astronomia nova"—circumstances full of discouragement due to financial worries, sickness, disagreements with Tycho Brahe, suggestions that he would better devote himself to medicine as a more useful occupation than his astronomical computations, and dissipation of his energy upon astrology and other tasks.

In preparing this translation and commentary Caspar has rendered a real service to the modern student.

FLORIAN CAJORI
UNIVERSITY OF CALIFORNIA

The Pageant of the Stars, A Handbook of Astronomy. By WILLEM J. LUYTEN. Doubleday, Doran and Company, Garden City, N. Y., 1929. 300 pages. $2.50.

THIS is a book for all friends of astronomy and it can be read by the layman. The writer plays an eager game with numerous problems of astronomy which he presents in an easy and elegant way. Frequent use has been made of clever verbal illustrations which stimulate the reader's imagination more than mere astronomical numbers could do. This is especially true of the chapter on stellar motions, which we consider the best in the volume. For instance, on page 165:

> Imagine that, one night, we put a dime on the sidewalk of lower Broadway, in New York City, and place a docile firefly in the center. Suppose further that we ascend to the top of the Woolworth tower, and, taking for granted that the dime as well as the firefly are still in place, observe them from this distance of 800 feet. If we are able to distinguish the firefly and to see it crawl from the middle of the dime to the edge in one year, we have observed a motion just as fast as that of Alpha Centauri in the sky.

This is one out of a number of passages that will strike a professional astronomer even more forcibly than the general reader.

In the fascinating description of the origin of the planetary system, somewhat too much concession has been made to the taste of readers who desire 100 per cent. truth in a case for which science can at best give only 50. Granted that the planets originated from some kind of an encounter between two stars, it is by no means necessary that an actual collision took place. On page 255: "Kapteyn's ideas concerning the structure of the galactic systems were admittedly only rough and approximative." This is a rather unfortunate statement and somewhat at variance with what is said on page 251. Every method in astronomy is, as a matter of course, approximative, the limits being set by the number and accuracy of the observations. Kapteyn intended and succeeded in giving a first approximation to the structure of the stellar system, and the impressive point is that a general second approximation has not yet been given. That "the 'Kapteyn Universe' is little more than the local cluster" is very doubtful. In fact, astronomers disagree largely about the existence of such a local cloud.

The "Pageant of the Stars" contains sixteen beautiful plates, reproductions of the very best photographs available, and sixteen original figures which are all very clear and well chosen.

JAN SCHILT
YALE UNIVERSITY OBSERVATORY