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.

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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.

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