

BOOKS

THE PLANETS

by Harold C. Urey

Yale University Press

\$5.00

Reviewed by Robert S. Richardson
Mount Wilson and
Palomar Observatories

IT IS ALWAYS HARD to explain to people why the field in astronomy which has the greatest popular appeal—the study of the planets—is the one most consistently neglected by astronomers. When Mars is bright in the sky, people picture astronomers busily scanning its disk for signs of life, and it always comes as a shock when they are told that telescopes at large observatories are seldom turned on the planets except for the benefit of visiting firemen.

Astronomers have preferred to range far afield, to the neglect of bodies in their own backyard, probably more through expediency than indifference. The stars present us with problems relating to matter

in an elementary state which we can attack theoretically with some hope of success. But when we come to the planets, we are confronted by matter in the form of solid compounds for which our best theories are often little more than conjectures.

Furthermore, study of the planets demands a borderline knowledge of several subjects which few astronomers possess to any degree. Undoubtedly the question most often asked an astronomer is, "Do you believe there is life on Mars?" But how many astronomers are equipped to give an intelligent opinion on this all-absorbing topic? The person to whom the question should really be directed is a biologist; or better still, a biologist and an astronomer working as a team. Recently an effort has been made in this direction, with the result that important advances in planetary research have already resulted.

The Planets is a discussion of the origin and development of the solar system, especially the terrestrial planets, from the standpoint of the physical chemist. The author starts with the assumption that the solar

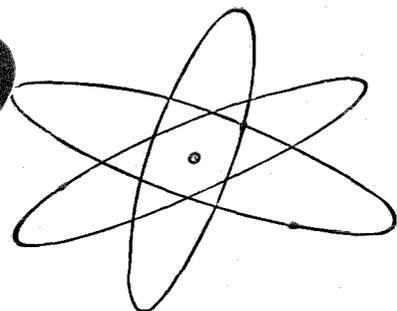
system consisted originally of a "dark globule" about 10^4 astronomical units in diameter, and evolved along the lines postulated by Weizsäcker, ter Haar, Kuiper, and others. The globule contracted with an increase in temperature until at length a star surrounded by a discoidal mass of gas and dust emerged. Turbulence within the mass led to the formation of protoplanets which increased their temperature by contraction. Planetesimals were also formed about this time and grew into larger bodies which moved in and out through regions of varying temperature. Toward the end of this stage most of the lighter elements had escaped, leaving the system nearly devoid of gas.

The terrestrial planets grew from accretion by impact with the planetesimals. In the absence of gas the bodies lost heat rapidly by radiation, until the temperatures of the planets were about the same as those that exist at present. This is one of the most important conclusions of the book: that the earth and other terrestrial planets were formed at

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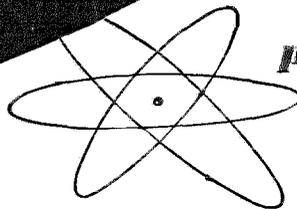
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much lower temperatures than has been generally supposed. This is so contrary to our previous way of thinking that many will probably find it hard to accept at first. Undoubtedly the molten globe hypothesis is due for a lingering death.

The origin of the surface features of the moon is discussed at considerable length. Urey believes with Baldwin that both the craters and maria were formed by the impact of meteorites and planetesimals. From inspection of the surface features it is possible to draw a surprising amount of information about the collisions that produced them. The Mare Imbrium, for example, is due to the impact of a planetesimal 100 km in radius which approached the moon at a low angle from the northeast with a velocity of 2.4 km/sec. The pressure developed at contact was 170,000 atmospheres, enough to make the material flow like a liquid and splash to great distances.

The book is written in the form of a scientific paper with no attempt at popularization whatever. Anyone

who picks it up with the idea that he can obtain a quick fill-in on the latest thought on the evolution of the solar system will be quickly disillusioned. Some sections are so detailed that they can hardly be "read" at all. They are almost like tables in sentence form.

That many will disagree with the arguments and conclusions drawn is inevitable. As the author remarks, every important argument has to be qualified with numerous "possibles" and "probables" and other adjectives and adverbs expressive of doubt and uncertainty. But there can be no disagreement as to the value of the stimulating and thought-provoking material which Dr. Urey has contributed to a field in which few qualified researchers have dared to venture in the past.

ELECTROLYTIC MANGANESE AND ITS ALLOYS

by Reginald S. Dean
 Ronald Press, New York \$12.00

*Reviewed by Donald S. Clark
 Professor of Mechanical Engineering*

DR. R. S. DEAN is recognized as an authority on the subject of manga-

nese. He has been associated with developments in the production of manganese in the United States for a long period of time. Much of this experience was gained through his connection with the United States Bureau of Mines, where he was chief metallurgist and assistant director, and responsible for the direction of the Bureau's program for utilization of mineral resources—particularly manganese.

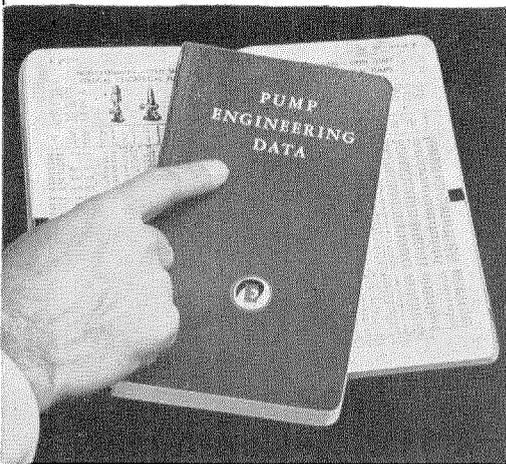
A book of this character is one of reference. It will not find widespread use because of its degree of specialization; hence the cost of the book is high. However, for those who wish to have a reliable book containing extensive data on manganese and its alloys for reference, together with an extensive bibliography on the subject, the book is worth the price.

A little more than one-third of the book is concerned with the production and properties of electrolytic manganese, while the remainder deals with nonferrous and ferrous alloys of electrolytic manganese. The book is well filled with tables and curves by which the quantitative information on manganese alloys is presented.

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