

PREFACE

We are now on the threshold of a new era of asteroid studies. There was a previous period of great activity on minor planets in the nineteenth century when time and effort of astronomers were devoted to discovery and orbit determination, and this work has been pursued by some until the present time. Physical studies, however, have not been popular, at least not among astronomers. The lack of appreciation is coming to an end with the presently growing realization that asteroids, comets, and meteoritic matter are basic building blocks of the original solar nebula. Their exploration gives data for the study of the origin and history of the solar system.

To promote new and increased exploration, including that with spacecraft, five people wished to hold an international conference and, when they became aware of their common idea, a joint Organizing Committee was formed; the members are H. Alfvén, G. Arrhenius, A. Bratenaht, T. Gehrels, and C. J. van Houten. Endorsement and partial support were given by the International Astronomical Union and it became the 12th Colloquium of the IAU entitled "Physical Studies of Minor Planets." The National Science Foundation and the National Aeronautics and Space Administration gave substantial financial support to make the attendance of 34 of the participants possible.

The meeting was held in Tucson, Ariz., March 6-10, 1971. On the first two days there were excursions to the Kitt Peak and Catalina Observatories, and a hike to Seven Falls in the Catalina foothills. The scientific sessions were held in the mornings and evenings of March 8, 9, and 10; the afternoons were open for informal meetings. Luncheon speakers were S. F. Singer on the environmental problems of the supersonic transport (SST), F. L. Whipple describing the Mt. Hopkins Observatory, and A. B. Meinel speaking on synthesized telescopes and also giving a brief description of his new proposal for the usage of solar energy. The scientific meetings were held in Meinel's Optical Sciences Center; they were opened with a welcome address by the Provost of the University of Arizona, A. B. Weaver. The Chairmen were, in order of the sessions, M. Dubin, J. L. Weinberg, G. P. Kuiper, H. C. Urey, C. F. Hall, and W. E. Brunk.

The interest in this colloquium was much greater than we had expected. There were about 140 participants. (See list at the end of this book.) The program was crowded, with closely timed presentations and discussions, as can be seen from the large number of papers in this book. Some otherwise valuable papers were turned down as being outside the scope of this colloquium; for instance, those on orbit improvement.

On the other hand, there are some papers and discussions included in this book even though they were not presented at the meeting. In some respects, therefore, the book is independent of the colloquium. Several papers had been invited long beforehand with the request to publish them as review papers. The lack of a modern textbook on minor planets is keenly felt, and the proceedings of this meeting, with these additions, should provide a good reference book. The book could be especially useful if published promptly, and the request was therefore made to bring manuscripts to the meeting. After the meeting some of the papers and discussions have been improved, and we thank the referees for their help.

The organization of the book is the same as that of the colloquium, which had discussion of observations on the first day, of the origin of asteroids and interrelations with comets, etc., on the second, and of space missions and future work on the third day. The papers are preceded by a general "Introduction," which keeps in mind the interests of people not previously familiar with asteroids; as a partial summary of the book, it may be of interest also to insiders. This "Introduction" was not presented at the meeting. Gill and Haughey had a manuscript "Mission to an Asteroid" written for a program study at NASA Headquarters; I had a first draft of an introduction for this book, and we combined the two manuscripts. Finally, to optimize this as a textbook, Mildred Matthews compiled the index.

Thanks are due to Mildred Matthews and to the editorial group at NASA Headquarters for their careful work in preparing the manuscripts for publication, to Shirley Marinus and several local assistants for the smooth organization of the meetings, and to the agencies and individuals mentioned above that supported the colloquium and set the pattern for an effective and pleasant exchange of ideas and information.

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