

PREFACE

The Colloquium

The IAU Colloquium n. 83 "Dynamics of Comets: Their Origin and Evolution" (Rome, Italy, 11-15 June 1984) took place well over a decade after the first IAU meeting devoted to essentially the same subject, i.e. IAU Symposium n. 45 "The Motion, Evolution of Orbits and Origin of Comets" (Leningrad, USSR, 4-11 August 1970). During the time interval separating the two meetings cometary astronomy has made big steps forward from the point of view of both the physics and the dynamics, and further progress is expected in the near future, with the coming of the many space missions aimed to P/Halley. However, the scientific meetings totally devoted to comets held in the seventies and early eighties (IAU Colloquium 25 "The Study of Comets", Greenbelt, U.S.A., 1974; IAU Colloquium 61 "Comets: Gases, Ices, Grains and Plasma", Tucson, U.S.A., 1981) emphasized the physical aspects, and did not cover satisfactorily matters related to dynamics, origin and early evolution. These were confined to individual sessions in meetings on the minor bodies of the solar system (IAU Colloquium 22 "Asteroids, Comets, Meteoric Matter", Nice, France, 1972; IAU Colloquium 39 "Relationships between Comets, Minor Planets and Meteorites", Lyon, France, 1976; "Asteroids, Comets, Meteors", Uppsala, Sweden, 1983). It was therefore felt necessary to organize a meeting centred on the dynamics, a field which still comprises such a large fraction of all what is known about comets. This idea was extensively discussed with L. Kresák, B.G. Marsden and E. Everhart, who strongly supported it.

Sponsored by Commission 20, and co-sponsored by Commission 7, the meeting was approved by the Executive Committee of the International Astronomical Union as IAU Colloquium 83. The Scientific Organizing Committee consisted of P. Babadzhanov (U.S.S.R.), N.A. Belyaev (U.S.S.R.), A. Carusi (Italy, Chairman), E. Everhart (U.S.A.), J. Kovalevsky (France), Y. Kozai (Japan), L. Kresák (Czechoslovakia), B.G. Marsden (U.S.A.), H. Rickman (Sweden), E. Roemer (U.S.A.), G.B. Valsecchi (Italy, Secretary), and the Local Organizing Committee of A. Carusi, E. Perozzi (Secretary), G.B. Valsecchi (Chairman).

The Colloquium was financially supported by the Consiglio Nazionale delle Ricerche, by the Provincia di Roma, Assessorato alla Cultura, and of course by IAU; the Accademia Nazionale dei Lincei hosted the meeting in its beautiful historical complex of buildings in the centre of Rome; the last session was held in CNR headquarters.

A total of 64 scientists from 16 countries attended the meeting, giving 9 Invited Reviews and 31 Contributed Papers. Another three In-

vited Reviews and six Contributed Papers were initially to be given by Soviet scientists, but later they could not participate to the Colloquium; the abstracts of some of these presentations were read during the corresponding sessions by other participants. It is sad that, independently of their will such a large fraction of the invited reviewers, not mentioning the authors of Contributed Papers, were unable to come from the Country that more than many others has given significant contributions to the birth of modern cometary dynamics.

The Colloquium has been structured in seven sessions: Origin of Comets, The Oort Cloud of Comets, Meteor Streams and Interrelations with Minor Planets, Dynamics of Comets: Numerical Modelling, Dynamics of Comets, Nongravitational Forces, Comet P/Halley and Future Missions to Comets, whose Chairmen were respectively A.H. Delsemme and J.M. Greenberg, C. Froeschlé, B.A. Lindblad, I.P. Williams, B.G. Marsden, J.C. Brandt, P.R. Weissman.

Half day of the meeting has been devoted to a visit to the Vatican Observatory in Castelgandolfo and its beautiful collection of meteorites - one of the richest in the world. We want to thank very much Father G.V. Coyne S.J., the Director of the Specola Vaticana, for his warm hospitality.

A special thank also to Dr. E. Perozzi, currently at ESOC, Darmstadt (W. Germany), for the valuable help as a member of the Local Organizing Committee, and to Dr. S. Pozio, to J. Vannozzi and to G. Sabatino for their assistance at the Registration Desk and at the slide projector.

The Proceedings

This book contains papers presented at the IAU Colloquium 83 "Dynamics of Comets: Their Origin and Evolution"; each paper, either invited or contributed, has been submitted to two referees. This choice has been made to increase the value of the book itself, especially considering that a comparable collection of papers may not appear for another decade, given past experience.

We therefore thank the referees M.E. Bailey, S.V.M. Clube, A. Coradini, A.H. Delsemme, E. Everhart, P. Farinella, J.A. Fernández, G. Forti, C. Froeschlé, M. Fulchignoni, R. Greenberg, A. Hajduk, L. Kresák, M. Kresáková, B.A. Lindblad, Rh. Lüst, A. Manara, B.G. Marsden, F. Mignard, A. Milani, W.M. Napier, E.M. Pittich, H. Rickman, V.S. Safronov, H. Scholl, P.R. Weissman, I.P. Williams, S. Yabushita, D.K. Yeomans, P. Zadunaisky for their cooperation; we are of course responsible for the final appearance of the book, since in some cases we have decided to include papers not too warmly recommended by the referees, in order to

avoid an excess of orthodoxy. Special thanks are due to the British and American referees, who substantially improved many papers from the linguistic point of view.

The material is divided in seven sections, corresponding to the seven sessions of the Colloquium; some of them, like for instance those on the Origin and on the Oort Cloud, are deeply related, and the inclusion of some papers in either of them would have probably been equally reasonable.

The book should have contained papers presented at the Colloquium, possibly in complete form; however the authors of two communications have preferred to publish them in the form of extended abstracts. Another exception has been made for those Soviet colleagues who could not attend, but were able to send their papers early enough (in fact, before the end of May 1984) to allow their refereeing together with all the others. Two papers were added at the end of the session on non-gravitational forces, and two papers at the end of that on the numerical modelling of cometary dynamics. Of these, one is of a particular nature, being centred on the outstanding contributions of E.I. Kazimirchak-Polonskaya to this field of studies; the second, by herself, is a review of her work on the role of Neptune in the dynamical evolution of comets. We have been very pleased by the opportunity to publish these papers since, as already said, E.I. Kazimirchak-Polonskaya has been a pioneer in the subject, and IAU Colloquium 83 has followed the footsteps of IAU Symposium 45, whose organization was due in great part to her efforts.

Last, but not least, we want to say that, throughout all the phases of our work, from the organization of the colloquium up to the editing of these proceedings, we have been continuously encouraged and helped in many ways by Lubor Kresák. Our most sincere thanks to him.

Rome, 29 April, 1985

Andrea Carusi
Giovanni Battista Valsecchi