

## THE INTERNATIONAL HALLEY WATCH: A PROGRAM OF COORDINATION, COOPERATION AND ADVOCACY

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Through the ages comets in general and Comet Halley in particular have evoked greater awe in the average man than any other celestial phenomenon with the possible exception of total eclipses of the Sun. Halley has been of great significance historically to man and it remains important to us as scientists as the only comet whose return is predictable, showing all types of cometary behavior. This coupling of public enthusiasm and the scientific importance is a rare commodity that we must use as an opportunity for space science when we have our once per lifetime chance in 1985-86. The International Halley Watch (IHW) is an answer to this opportunity.

The IHW was conceived of by one of us (L.F.) as a small, core organization dedicated to advocating, assisting, coordinating, and ultimately achieving a large worldwide effort to study Comet Halley by every means possible and to help present these activities to an interested public. In particular it seems important that the large ground-based observing effort, that is sure to take place, be a coordinated one that is carried through to proper publication. In 1909 "The Comet Committee of the Astronomical and Astrophysical Society of America" attempted to obtain cooperation in 1910 studies. A very considerable body of data was acquired, but lack of cooperation and funding prevented the Committee from publishing any account of the results. A large body of data from Lick and Mt. Wilson Observatories was finally published in 1931, while the bulk of the observations remain unreported to this day. What can we do to prevent a repetition of 1910?

During FY80 NASA sponsored a study of the proposed IHW at the Jet Propulsion Laboratory and an independent Science Working Group chaired by John C. Brandt of Goddard Space Flight Center. From these efforts have come a number of recommendations. Each major study technique, such as spectroscopy for example, should be coordinated by a discipline scientist who, in consultation with other experts in his or her field, will recommend specific objectives, standards, data format, and priorities for observations in that discipline. Each should create a net of observers who agree to follow these recommendations in at least part of their work, while encouraged to undertake any other work that may seem desirable to them. After some reasonable period to allow individual publication, each scientist will be encouraged to contribute his or her results as well to a Halley Archive, a published set of books containing as complete a record as possible of the 1985-86 apparition. Provision should be made to supply standard observing aids such as ephemerides, plates, filters, etc. Provision should also be made to reduce data for those who haven't the interest or facilities to do so themselves.

The discipline specialists will be the real backbone of the Halley Watch, in that (s)he will be responsible for coordinating and, in some instances, enabling the scientific studies and data in his or her area.

Coordinating the activities of the discipline specialists there would be an IHW leader. As recommended, the leader will be the communications link among all elements of the IHW. He will set general goals and be responsible for publication of the Halley Archive. He will oversee preparation of information about Halley for distribution to amateurs, to planetaria, and to the news media, as well as to professional IHW participants. Cooperating with the discipline specialists he will set Halley Watch Days for coordinated observation by more than one

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\*We wish to acknowledge that these results represent one phase of research carried out at the Jet Propulsion Laboratory, California Institute of Technology, under NASA contract NAS7-100.

discipline. He will have ultimate responsibility to his primary funding agency NASA for the success of the IHW and will therefore be appointed by NASA. However, appropriate internationalization of the effort will require some flexibility in program and organization plans.

It has been suggested that the discipline specialists be selected jointly by the IHW leader and by an international Steering Group with members from COSPAR, the IAU, etc., perhaps in response to some form of international announcement of opportunity. Appointments would have to be mutually acceptable, with the added proviso that the national government of the selected discipline specialist be willing to support his or her office. Candidates should be sought who are noted for their enthusiasm and diplomacy as well as their scientific expertise in the field. If, in spite of everyone's best efforts, a discipline specialist is failing in his job because of poor health or for any other reason, then the IHW leader must have the authority to remove him or her for the sake of the overall success.

It is to be desired that, in the Space Age, study of Comet Halley will not be limited to ground-based observation. Although the IHW must proceed whether or not there are deep space Halley missions, it is recognized that such missions can provide the greatest science return during the coming apparition. No near-earth instrument will ever see the nucleus of Halley as anything but a point of light, leaving to hypothesis all questions of nucleus structure and morphology. Only those inner coma components having a strong spectral signature can be detected from Earth, and then with some spatial ambiguity, leaving to hypothesis the nature of most parent molecules and much coma chemistry. The magnetohydrodynamics of a comet's interaction with the solar wind would remain a subject for speculation without an encounter. Once a spacecraft quantitatively measures the physical conditions and mechanisms occurring in Halley at even a single point in time, there is hope for far better understanding of all of the other observations taken throughout the apparition.

While a strong advocate and supporter of various national space programs of Halley study, the IHW will not fund space hardware. It can and will act as a communications channel coordinating ground-based and space observations. It is suggested that each space project provide a representative to a committee to advise the IHW leader on special needs of the flight projects such as times for simultaneous observations from the ground.

Keeping the public informed will not be a simple job. The chairman of Hayden Planetarium in New York City told us that during the height of interest in Comet Kohoutek they received 1000 calls per day on two phone lines with recorded messages about the comet. In two weeks they received 20,000 letters requesting a one page information sheet that the media had noted was available. By keeping planetaria and newspapers properly informed we can hope to satisfy the public's legitimate right to information without jeopardizing IHW scientists' ability to carry out their research.

At this point in time (Oct. 1980) the IHW has been approved by NASA. Information has been given and advice solicited through a number of channels such as an IAU Newsletter, various international meetings, and numerous private letters and conversations. Effort has begun at JPL to initiate the Halley Watch organization, which ultimately will involve scientists and amateurs, government, industrial, and academic personnel all over the world. A more detailed account of the IHW concept is available in the form of the report of the IHW Science Working Group\* which is available from Dr. Brandt at GSFC or from the authors of this brief report at JPL.

\*The International Halley Watch, Report of the Science Working Group, NASA TM 82181, July 1980.