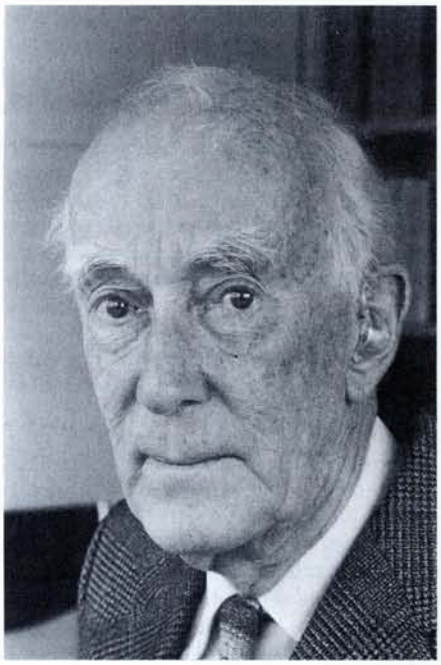
A Remarkable 90 Years



Some 400 colleagues, relatives and friends of the Dutch astronomer Jan Hendrick Oort gathered at Duivenvoorde Castle near Leiden, last April to pay homage to one of the 20th century's leading scientists on the occasion of his 90th birthday. At 90, Professor Oort can look back on a lifetime of astronomical research that has brought about important changes in our view of the Universe and in the way we investigate it. His contributions to these developments have been deeply significant because of his intuitions into the physical processes underlying astronomical observations, a special sense for knowing where opportunities lie for important advances, and strong organizational talents.

In the 1950's Oort attempted to determine the density of the Universe by counting galaxies. He returned to this subject in the 1980's by studying irregularities in the density contribution of galaxies, especially clustering of galaxies that has become one of Leiden Observatory's main research areas. Professor Oort at 90 remains central to the work, actively interested in the new information being acquired using modern, high resolution observational techniques.

J.H. Oort joined the staff at Leiden University two years before he defended his doctoral thesis at the University of Groningen in 1926. Except for several extended sabbatical leaves in the USA, he has remained at the University of Leiden for his entire career. Appointed Professor of Astronomy in 1935, he was the Director of the Leiden Observatory from 1945 until 1970 when he became Emeritus Professor. The period since his formal retirement has been especially productive.

J.H. Oort's first major contribution developed from his thesis research. By 1927 he had completed an investigation of high velocity stars (these are stars that travel more than about 60 km/h faster than the Sun and are found in only one hemisphere). All of the stars in the Universe were believed at the time to form a flattened system with a maximum dimension of about 10 - 20 thousand light years, with the Sun at or near the centre. It had proved impossible using this picture to explain high velocity stars and other aspects of stellar dynamics. B. Lindblad of the Stockholm Observatory had published a theory of galactic dynamics where the Sun is located quite some distance from the centre of a much larger system around which it rotates. The analysis was obtusely mathematical so few saw its practical implications. However, Oort realized that the high velocity stars provided observational confirmation for Lindblad's theory of galactic rotation. He was able to derive simple expressions which remain the fundamental description of the kinematics of our Galaxy.

The structure of our Galaxy continued to be a central theme of Oort's interests for decades. He exploited extensively radio data from the 21 cm spectral line of interstellar atomic hydrogen, discovered in 1951 following the prediction by H.C. van der Hulst that the line should be observable. Studies at radio wavelengths have remained a feature of much astronomical work in The Netherlands since the early 1950's.

Another of Oort's important contributions is his theory for the origin of comets (1950). He postulated the presence of a cloud of debris surrounding the Sun and extending about halfway to the nearest star, and showed that gravitational perturbations to this cloud caused by passing stars would send bits and pieces of it into the solar system. If account is taken of subsequent disturbances by the massive planet Jupiter, the observed distribution of cometary orbits is explained. The cloud of debris has become known as the Oort cometary cloud.

In the mid 1950's, Oort together with Th. Walraven and L. Woltjer made investigations of the radiation from the Crab Nebula that had significant consequences for astrophysics. They demonstrated that the light originates in a synchrotron process, where emission at optical wavelengths indicates very high energies are involved. It was later shown that the synchrotron process plays an important rôle in sources of cosmic radiation and is fundamental to interpreting radio sources.

We should also not forget that Professor Oort has been very active in coordinating and stimulating astronomical work on an international scale. He was the General Secretary of the International Astronomical Union from 1935 until 1948, and its President from 1958 to 1961. Together with W. Baade, Oort took the first initiatives which led to the formation of the European Southern Observatory. At the national level, he was the driving force behind the construction of the 25 m radio telescope in Dwingeloo, inaugurated in 1956, and the Synthesis Radio Telescope at Westerbork, inaugurated in 1970.

1970 was also the year in which H.J. Oort became Professor Emeritus. Thus freed of many administrative burdens, he was able to turn his full attention to astronomical research. With the opening of the WSRT there was plenty of new observational material available on the structure of normal galaxies and on activity in the nuclei of galaxies, both our own and distant ones (see page 143). Oort also used the opportunity to reconsider problems of long standing, as in his paper with L. Plaut on the derivation of the distance of the galactic centre using new data for RR Lyrea stars.

The 1980's and 90's have clearly brought new scientific opportunities to a very remarkable scientist.

J.K. Katgert-Merkelijn
W.B. Burton
Leiden Observatory

Lunar Physics

A study coordinated by Professor R.M. Bonnet, Director of ESA's Science Programme, to explore the possible role of Europe in the exploration and exploitation of the Moon has been launched by ESA. The Lunar Study Steering Group, supported by ESA experts, consisting of 15 European scientists and chaired by Professor H. Balsiger of Bern University met for the first time in June 1990.

As a first step, the Group will assign priorities to the scientific activities that could be performed at a lunar base. In parallel, it will identify which of these activities are well-represented in Europe and would thus offer Europe the opportunity to play an important part. A preliminary report is planned for mid-1991.

In subsequent phases of the study the Group will aim to identify the role of personnel stationed on the Moon and the optimum site or sites. Specially constituted subgroups will advise the Steering Group on other aspects including technology, exploitation of resources, infrastructure requirements, policy issues and the implementation strategy. It has been agreed with Professor Bonnet that the EPS should work towards acting as a forum for discussions by collecting and evaluating information about topics in physics research for which the lunar environment represents an invaluable asset.

M. Jacob, the EPS Secretary, has asked each of the Division and Group Chairmen to prepare at least a preliminary report within the next six months outlining the scientific interest in physics research on the Moon.

The aim is to submit a collated report to the Steering Group; Members wishing to contribute are asked to contact their Chairmen. The main disciplines that have been identified so far are astronomy and astrophysics, geology and geophysics, selenogeophysics, fusion, chemistry and mineralogy, solar wind and plasmas, solar physics and high energy physics.