

Jan Hendrik Oort

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JAN HENDRIK OORT was born on the 28th April 1900 and passed away on 5th November 1992. According to Subrahmanyan Chandrasekhar, Oort was this century's most productive astronomer. During his research career spanning 70 years Jan Oort had an incredible impact and influence in many areas of research: Structure and Dynamics of our Galaxy, Interstellar Medium, Supernova Remnants, Dark Matter, Cosmology, Comets, and many others. Jan Oort entered the astronomical scene in the early 1920s as a student of Kapteyn. The most profound questions at that time were: 'What is the size and shape of our Galaxy?', 'Where are we in relation to the centre of the Galaxy?', and 'What is the size of the Universe?'. The key questions changed with time during the last seven decades but Jan Oort was always at the new frontiers. In this Symposium we shall recall some of his most outstanding achievements. As Lo Woltjer has remarked, 'Jan Oort's research career has been characterized by a deep-seated curiosity into the nature of the Universe, and by an infallible intuition as to the lines of research which were most promising. When necessary, Jan Oort developed the required mathematics for the solution of his problems, but he never developed theory for its own sake, preferring to stay as close as possible to the reality of observations. It is probably this characteristic of his approach that has made Jan Oort's articles of the distant past still largely valid today. When he started out, the rotation of our Galaxy was just beginning to be suggested and the expansion of the Universe was still to be discovered. Radio and X-ray astronomy were still a distant future. Seventy years later, Jan Oort was still in the forefront of contemporary research avidly studying the large scale distribution of galaxies in the Universe and still inspiring others to follow where he led.' (*Journal of Astrophysics and Astronomy*, 1993, 14, 3).

The most eloquent way to recall his intellectual leadership and undiminished creativity is to simply list the titles of a few of his later papers:

- Evidence for the location of quasars in superclusters
- HI fine structure in a high velocity cloud
- The galactic nucleus

Introductory remarks made at a special seminar convened in honour of Jan Oort. The author wishes to acknowledge that much of the material has been drawn from *Oort and the Universe—A Sketch of Oort's Research and Person* Edited by H. van Woerden et al., Reidel, Dordrecht, 1980.

- The evolution of large scale structures in the Universe
- Gas motions in the central region and their interpretation
- The nature of the largest structures in the Universe
- Superclusters
- Superclusters at large redshifts. Can proto-superclusters and the birth of 'Pancakes' be observed?
- The origin of structures in the Universe
- Orbital distribution of comets.

It is both a sobering and humbling thought to recall that the papers mentioned above, and many more, were all written by him between the age of 81 and 91!

Those who have followed the development of modern astronomy will know the pre-eminent status of the Netherlands in astronomy. Netherlands has produced many great astronomers: de Sitter, Kapteyn, Hertzsprung.... But it was Jan Oort who single-handedly turned astronomy in Holland into an observational science. In this context it is important to recall that both the Dwingeloo Radio Telescope and the Westerbork Synthesis Telescope were ideas conceived by Oort. He nurtured these ideas through very difficult post-war decades and saw them blossom into reality.

During 1953 when Walter Baade was visiting Leiden, Oort conceived the idea of a great European Observatory in the Southern Hemisphere. The European countries had sadly lost all their initiative to the Americans in observational astronomy. Oort invited a number of astronomers from Belgium, France, Great Britain, Sweden and Germany for a meeting at Leiden for discussions of a plan for the European Southern Observatory. This was the beginning that led to the creation of ESO. It took a long time till the treaty could be eventually signed in 1962. During this entire period Oort chaired every meeting, and with his clear view of the scientific goals and statesmanship he was able to make ESO a reality. After the establishment of ESO he presided over its Council for a number of years.

Oort's name also figures prominently in the history of the International Astronomical Union. He was always proud of the fact that he had attended 16 consecutive General Assemblies of the IAU, till the one in Grenoble in 1976. Oort became the General Secretary of the IAU in 1935. The Sixth General Assembly in 1938 was in Stockholm. Presiding over this meeting Sir Arthur Eddington said.

We cannot foresee what may happen before we meet again in Zurich (three years from now). On the astronomical side we can make some guesses. The 200" reflector will be completed... But on the international side no one dares to prophesy. If in international politics the sky seems heavy with clouds, such a meeting as this at Stockholm is as when the Sun comes forth from behind the clouds. Here we have formed and renewed bonds of friendship which will resist the forces of disruption.

With the outbreak of the war in the following year, all formal activities of the IAU came to an abrupt end. But Oort kept the IAU alive and carried on as the General Secretary during the difficult war years when Holland and many other European countries were occupied. It is a great tribute to Oort that three years after the war ended the IAU met in Zurich as planned. The war had left its scars and bitter feelings. However, Oort and others made sure that the German astronomers were invited to Zurich on a personal basis. To quote Otto Struve:

His efficiency and impartial conduct of the work of the Union during the difficult years of the war and especially during the past three years of reconstruction has not only won him the admiration, respect and affection of the vast majority of astronomers of all nations, but has created a lasting monument in the history of international science.

Oort served as the General Secretary of the IAU for 13 years. He was elected the President of the IAU in 1958. As the President of IAU he played an important role in many international projects such as the International Geophysical Year, and the Committee on Space Research. One of his most important contributions during this period—and whose importance is ever-growing—is the establishment of the International Union Committee on the Allocation of Frequencies (IUCAF). There was a crucial three-month long

meeting in Geneva in 1959 in which important frequency bands for scientific research were reserved and significant allocations made. Oort made sure that either he or one of the senior members of the IAU was present in Geneva during this entire three-month period.

Yes, Oort was an 'institution' in more than one way. He will be missed. His friends and colleagues will miss him most in the weekly colloquia. For almost 70 years one could take it for granted that Oort would be present at the Thursday 4 O'clock Colloquia in the Leiden Observatory.

Oort was undoubtedly the most prolific astronomer of this century. Bengt Stromgren said this of Oort on his 80th birthday:

Imagine a situation of a historian of natural science, working sometime during the 21st century, on a monograph describing Jan Oort's scientific importance. If successful, this historian would have covered in his monograph a very substantial portion of the history of astronomy in our century.

And imagine a historian of natural science, not a person working in the 21st century but someone working at a much later time. Suppose that he had first studied the development of mathematics in the 20th century, and that during these studies he would have discovered that the mathematician 'Bourbaki' was not a real person but a name covering a whole group of mathematicians. Working on the development of astronomy in the 20th century, and faced with the extent and importance of Jan Oort's contributions, this historian might well be tempted to advance a theory inspired by the 'Bourbaki' story!

Yes, Jan Oort was undoubtedly one of the most creative scientists of this century. Very few can look forward to a life of such undiminished creativity till the age of 90. As his eldest son said at Jan Oort's funeral, he was truly a fortunate man.

Jan Oort and radio astronomy

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To appreciate the very special role that Jan Oort played in the history and development of radio astronomy, one must go back to the very beginnings of this field. The subject was launched by two Americans with very non-Anglo-Saxon names, Karl Jansky and Grote Reber. Jansky is long gone and at peace. Reber is still with us, and in a way, in the same boat as today's speakers! Our editor tracked him down to his lair in

Tasmania very recently, and Reber too is presumably worrying about a manuscript that *Current Science* is waiting for.

Reber built a 36-foot-diameter paraboloid in his backyard with his own hands and money, and published the first 'radio map' of the galaxy in the *Astrophysical Journal* in 1940. The trauma involved in getting a radio amateur's nocturnal exercises accepted for publication