THE LEGACY OF J.C. KAPTEYN

Studies on Kapteyn and the Development of Modern Astronomy

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and
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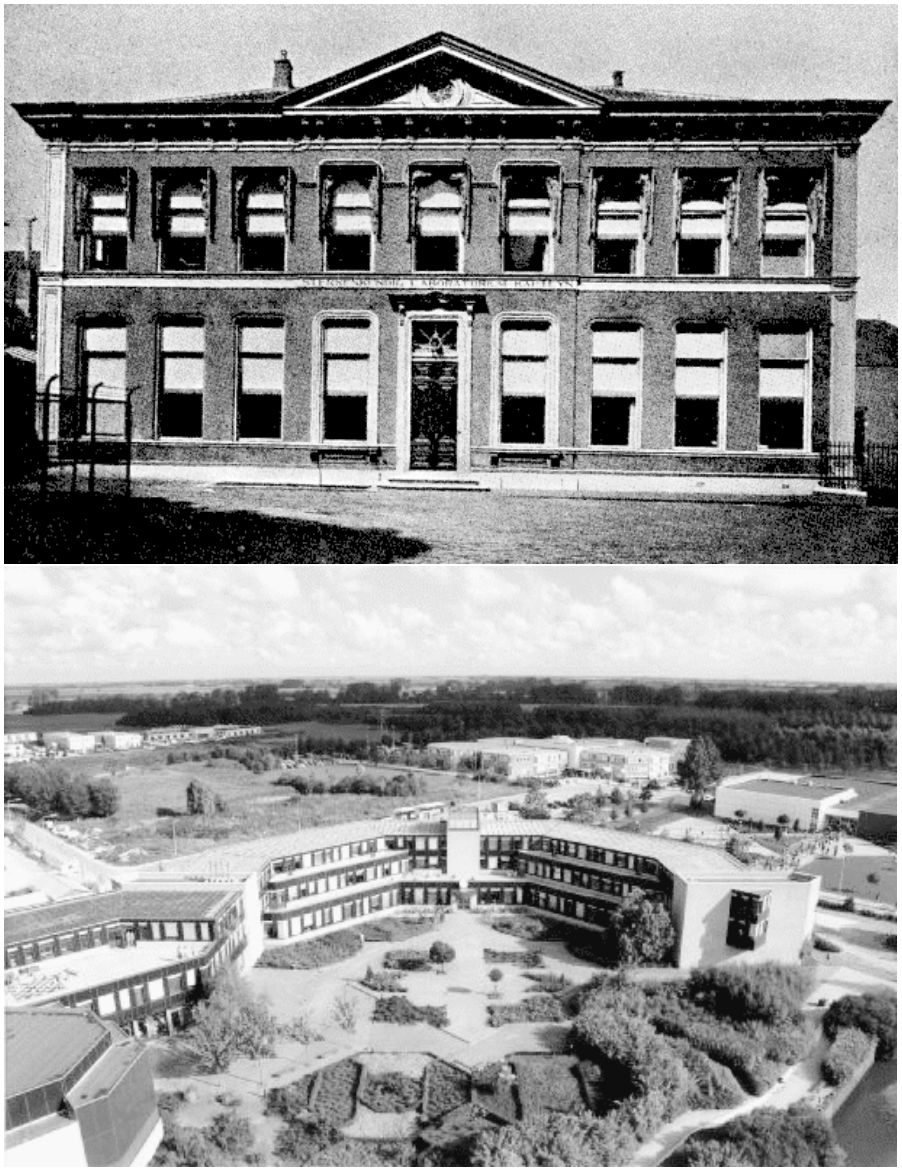
Jacobus Cornelius Kapteyn (1851 – 1922). This picture was taken in the Monastery (the residence of visiting astronomers) at Mount Wilson in the summer of 1908. Kapteyn is holding a copy of the literary magazine *"The Dial"*. (Photograph supplied by T.D. Kinman, courtesy of the Observatories of the Carnegie Institution of Washington.)



The original Kapteyn Astronomical Laboratory in the center of Groningen (top) and the current location (bottom) of the Kapteyn Astronomical Institute in the Zernike Building (middle and part of top floor) on the Zernike Complex on the north side of Groningen.

Preface

The University of Groningen was founded in 1614 and consequently celebrated in 1999 its 385^{th} anniversary. In the course of that year we were less than two years away from the end of the twentieth century and the beginning of the third millenium. The twentieth century started immediately after the completion of Kapteyn's co-publication (between 1896 and 1900) of the *"Cape Photographic Durchmusterung"*, a work that established his international fame and leadership. Kapteyn's influence on astronomy in the Netherlands is still alive; in fact it may be safely stated that the success of Dutch astronomy in this century has for a major part been derived from Kapteyn through his work, his students and his strong commitment to international collaboration.

The symposium *"The Legacy of J.C. Kapteyn"* was part of Groningen University's celebration of its lustrum and was jointly organized by the Kapteyn Astronomical Institute and the History Department. An important aim was to address issues related to the sociology of Kapteyn's influence and to try to trace the continuation of Kapteyn's initiatives in research, campaigns and organisations by concentrating on both *persons* and *themes*. Points addressed in these contexts were:

• Kapteyn had a unique style and personality that inspired everyone around him. Not only did this lead to a revival of Dutch astronomy in his day, eventually giving rise to its prominence during the twentieth century, but Kapteyn's personal influence and persuasion enabled him to play a major role internationally in the conduct of astronomy. How did this happen?

• Kapteyn strongly influenced Dutch astronomy, starting with the founding of his Astronomical Laboratory that had no telescopes of its own. In the first decades of this century his Laboratory overshadowed the observatories at Leiden and Utrecht and Kapteyn's "school" continued to play a leading role in Dutch astronomy with van Rhijn in Groningen and

Figure 0.1 Some speakers, chairpersons and members of the Scientific and Local Organising Committee. From left to right: Smith, Schmidt, de Sitter, van der Heijden, van der Kruit, DeVorkin, Gingerich, Feast, Gilmore, Mrs. de Sitter, Woltjer, van Berkel, Blaauw, – , Kinman, – , Jones, North. The picture is made in front of the restaurant where the conference dinner was held.

with de Sitter and in particular Oort in Leiden. How did this occur? Kapteyn pioneered international collaboration not only through his contribution to the *Cape Photographic Durchmusterung*, but subsequently also through his proposal of the *Plan of Selected Areas* and his organisational efforts to coordinate this project. Another aspect is his association with Mount Wilson Observatory. This has led to a stream of astronomers to the USA (continuing up to the present time). It would be interesting to make an inventory of who went where and when, and through this trace and study the 'internationalisation' of Dutch astronomy.

- Following Kapteyn, Dutch astronomy has throughout the century played an important organizational role in the international context, sometimes as intermediaries (e.g. between Germany and the Western World during the First World War in the form of de Sitter's introduction of Einstein's work to Eddington) and sometimes as initiators of international projects and organisations (*Plan of Selected Areas*, the International Astronomical Union, the European Southern Observatory, the advent of radioastronomy, etc.). How did this happen?
- What is still identifiable as Kapteyn's influence on contemporary astronomy?

The symposium concentrated on the personality and the influence of Kapteyn as one of the great scientists that the University of Groningen has produced and in that respect is an appropriate part of the last lustrum celebrations of the University in the twentieth century.

The symposium was mainly made up of invited contributions, concentrating on the following issues:

- reviews on Kapteyn as an individual, an astronomer, a teacher and an organisor;
- reviews concentrating on persons and institutions (e.g. Gill and Cape Town; Kapteyn and Groningen; de Sitter/Oort and Leiden; Hale and Mount Wilson);
- reviews concentrating on themes or topics (international organisations, such as the *Plan of Selected Areas*, the *Carte du Ciel*, the IAU, etc.);
- reviews concentrating on current astronomy (in particular Galactic structure, counts of stars and faint objects, etc., as present day equivalents of Kapteyn's work).

Figure 0.2 At the conference diner. From left to right: Piet van der Kruit, Prof. D.A. Wiersma (Dean of the Faculty of Mathematics and Natural Sciences), Prof. D.F.J. Bosscher (Rector Magnificus of Groningen University), and seen partly from the back Lodewijk Woltjer. Tjeerd van Albada appears only just at the leftside of the picture and Mrs. Anneke van Albada is seen from the back.

The symposium took place from June 9 to 11, 1999. The main venue was the Zernike Complex, near the Kapteyn Astronomical Institute, but on the first day the meeting took place in the Senate Room of the main building of the University in the center of Groningen – near to the original housing of the Kapteyn Astronomical Laboratory and near the University Museum, where a large part of Kapteyn's original equipment is kept.

The symposium was attended by an international audience of about 80 participants, consisting of both astronomers with an historical interest and historians of astronomy and natural science.

The Scientific Organising Committee consisted of Prof. P.C. van der Kruit (co-chair), Prof. K. van Berkel (co-chair), Prof. A. Blaauw, Prof. M.W. Feast, Prof. O. Gingerich, Prof. K. H. Kuijken, Prof. J.D. North and Prof. D.E. Osterbrock (who, due to other commitments, was unable to attend).

The Local Organising Committee consisted – in addition to the Groningen members of the S.O.C. – of Prof. T.S. van Albada, Mr. E. Schuil (in

Figure 0.3 Reinold de Sitter and Adriaan Blaauw.

the final stages), Mr. D.H.N. Staal (initial stages), Mr. J.P. Terlouw, Mrs. H.P. Zondervan–Kimsma (all of these from the Kapteyn Institute), Mr. T.A. Jurriens (Faculty of Mathematics and Natural Sciences) and Dr. P.R. Wesselius (Space Research Laboratory).

The L.O.C. was ably assisted by many members of the Kapteyn Astronomical Institute, in particular Mrs. J.I. Zwegers–Morris.

In the course of the preparation of the scientific program, it came to our attention that the grandson of Willem de Sitter was involved in a study of de Sitter's papers and we invited Reinold de Sitter to present a review. Also, it was considered timely to make a more comprehensive inventory of existing letters and other documents that Kapteyn wrote (as detailed elsewhere in this volume, most of Kapteyn's archives have been lost), that are still present in archives around the world. To this end, Petra van der Heijden was attracted on a short-term appointment at the Kapteyn Astronomical Institute and funds were provided to organize this and to travel to a number of places for a first-hand look at the material. Klaas van Berkel initiated and supervised this. The project is described in Petra's contribution to this volume. Also, through lucky circumstances a set of "love letters", written by Kapteyn to his future wife in 1877 – 1878, were found.

Figure 0.4 Klaas van Berkel entering the central building of the University of Groningen.

This volume contains the full set of invited reviews. Two remarks should be made. At the meeting Michael Perryman presented a demonstration of his slide show with three-dimensional views of the stellar distribution in a number of areas in the sky, based on data from the HIPPARCOS satellite. His chapter in this book deals with his assigned subject, but was not actually read at the meeting itself. An Appendix with a translation of Oort's public lecture in 1926 has been added to the book, but was also not part of the proceedings. A second appendix addresses the question of the accuracy of the translation by E.R. Paul of the biography of Kapteyn, originally written in Dutch by Kapteyn's daughter Henrietta.

During the Symposium a memorial tablet was unveiled on the house where the Kapteyns lived in Groningen between 1910 and 1918, at the Ossenmarkt 6. The unveiling was performed by three of Kapteyn's great-great-grandchildren (through Prof. and Mrs. Kapteyn's oldest daughter Jacoba Cornelia, who married Willem Noordenbos). We are endebted to the current owners of the house, Prof. and Mrs. P. Nieuwenhuis, and

Figure 0.5 The house on Ossenmarkt 6, Groningen, where the Kapteyn's lived. They occupied the upper floor. They entered the house through a door at the righthand side of the house, accessable through a narrow corridor.

to the Kapteyn/Noordenbos family (some of whom attended part of the sessions) for their enthousiasm to make this possible.

An afternoon trip was made to the former university town Franeker in Friesland, where the Eise Eisinga Planetarium is located. This planetarium consists of a moving model of the Solar System in the ceiling of

Figure 0.6 The memorial tablet in the Kapteyn House on the Ossenmarkt. This tablet was unveiled during the Kapteyn Legacy Symposium in June 1999. The text reads: *Here lived and worked, 1910 – 1918, Professor Jacobus Cornelius Kapteyn, inspiring Groningen astronomer. "Quand on n'a pas ce qui qu'on aime, il faut aimer ce qu'on a"* (When one has not what one loves, one has to love what one has). *January 19, 1851 – June 18, 1922.*

his living room. The planetarium, which was constructed between 1774 and 1781, is the oldest still working. Also, the house where Jan Hendrik Oort was born, stands in Franeker. The conference diner was held at the *Schathoes* (the treasure house) at *Borg Verhildersum*, a former estate and residence, near the village of Leens, not far from Groningen, and was attended by the University's Rector Magnificus and the Dean of the Faculty of Mathematics and Natural Sciences.

The symposium was attended by persons from a variety of backgrounds. Both the style and the format of presentation that astronomers, historians and others are used to, differs between these various groups. In the editing of this book we have not tried to make the chapters ho-

Figure 0.7 Three of Kapteyn's great-great-grandchildren after unveiling the memorial tablet.

mogeneous in those respects, preserving in this way some of the flavour of the meeting in the proceedings.

We are grateful to Mr. W. Zwitser of the Kapteyn Astronomical Institute for "scanning" many of the illustrations in this book. Erik Schuil took a number of pictures during the symposium, some of which are reproduced in this book.

The Kapteyn Legacy Symposium was financially supported by the Kapteyn Astronomical Institute, the Governing Board (College van Bestuur) of Groningen University, by the Groninger Universiteits Fonds, by the Stichting Nicolaas Mullerius Fonds and by the Area Boards of Humanities and of Physical Sciences of the Netherlands Organisation for Scientific Research (NWO).

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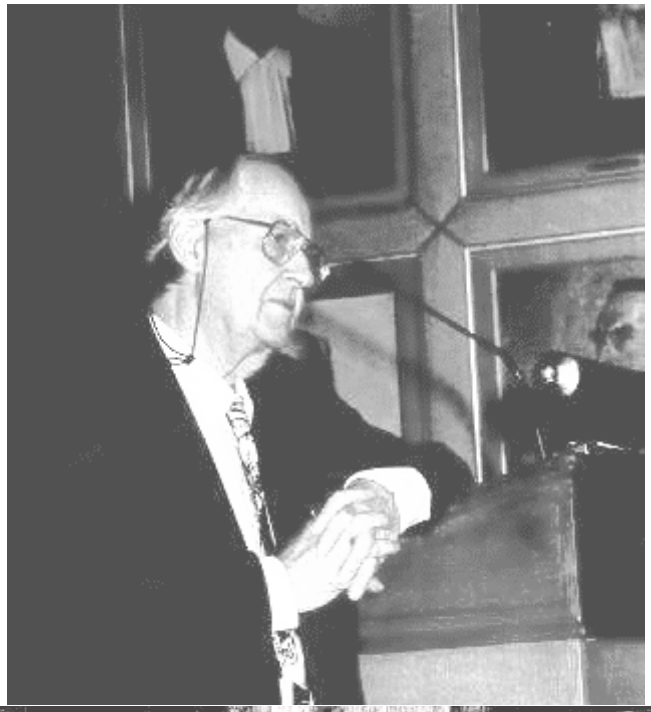

Adriaan Blaauw delivering his lecture in the Senate Room.