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Jacobus Cornelius Kapteyn around 1910 (Kapteyn Astronomical Institute)

Pieter C. van der Kruit

# Jacobus Cornelius Kapteyn

Born Investigator of the Heavens

 Springer

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*Cover illustration:* Jacobus C. Kapteyn in an undated illustration from the biography by Henriette Hertzprung-Kapteyn.

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**To Adriaan Blaauw**  
**To Corry**



# Preface

*In science, moreover, the work of the individual is so bound up with that of his scientific predecessors and contemporaries that it appears almost as an impersonal product of his generation.*  
Albert Einstein (1879–1955)[1]

In the September 1925 issue of the British journal *The Observatory*, Willem de Sitter, director of Leiden Observatory, wrote a short ‘letter to the editor’ in the section ‘correspondence’ [2], in which he announced a plan to write a biography of Jacobus Cornelius Kapteyn. The text of the note reads as follows:

## *A Biography of Kapteyn*

GENTLEMEN, –

May I, through your columns, make an appeal to friends of Kapteyn, and to astronomers generally, for their help in carrying out a plan which, I like to think, will have the sympathy of all interested in our science?

My friend J. Huizinga, Professor of History in this University and myself intend as joint authors to write a biography of Prof. J.C. Kapteyn. Kapteyn has undoubtedly occupied a position of great prominence and influence in the astronomical world in the last quarter of a century, as well by his scientific attainments as by his personal qualities of character and mind. It will be our endeavor to set forth the development of his remarkable personality from both the scientific and the general human point of view, and especially to show the fundamental unity of this two sides of his personality.

We shall be greatly indebted to any friends of Kapteyn, or other astronomers, who may be willing to assist by communicating to us any detail they may happen to know, or any important point of view or material they

may have at their disposal, regarding Kapteyn's many national and international connections with astronomers and institutions all over the world, or his personal relations with his many friends and acquaintances, or any information, even of anecdotal character, which may help us to make the picture of the man as complete as possible. Letters written by Kapteyn will, of course, be most valuable.

Any letters or documents entrusted to us will be very carefully preserved, and will be returned after use. Communications should be sent to the undersigned at the University Observatory, Leiden, Holland.

Leiden.  
1925, August 24.

Yours faithfully,  
W. DE SITTER

Willem de Sitter (1872–1932) was the first PhD student of Kapteyn and was appointed professor of astronomy at Leiden University in 1908. Johan Huizinga (1872–1945) was a prominent Dutch historian, appointed professor of history in Leiden in 1915; he was the son of Dirk Huizinga (1840–1903), professor of physiology in Groningen and great friend of Jacobus C. Kapteyn. They were ideally positioned to write a comprehensive and authoritative biography of Kapteyn, but as it turned out the biography, for reasons unknown, was never written.

## Sources

Three years after de Sitter's appeal, in 1928, Kapteyn's daughter Henriette Hertzsprung-Kapteyn published a biography in Dutch of her father: *J.C. Kapteyn; Zijn leven en werken* [3]. This work, by an admiring daughter, contains many details on Kapteyn as a person, although undoubtedly colored by the love and admiration for her famous father. Very little astronomical details are described in the book, as could not really be expected. Henriette Mariette Augustine Albertine Kapteyn (1881–1956) had studied law and English at the universities of Groningen and Amsterdam. Some more background on her and the biography can be found in Appendix B. I refer to this volume as the *HHK biography*.

This biography has been translated by the American historian Erich Robert Paul, first as a journal contribution [4], later as a book *The life and works of J.C. Kapteyn by Henriette Hertzsprung-Kapteyn: An annotated translation with preface and introduction by E. Robert Paul* [5]. It contains a list of publications about Kapteyn and remarks about astronomy in his day. E. Robert Paul was definitely an authority on the subject of Kapteyn and the astronomy of his time and he published a few authoritative papers on the subject: *The death of a research programme – Kapteyn and the Dutch astronomical community* [6]; *Kapteyn and statistical astronomy* [7] and *Kapteyn and the early twentieth-century Universe* [8]. He also wrote a scholarly book *The Milky Way Galaxy and statistical cosmology, 1890–1924* [9]. This is an excellent source for information and I refer to this in the following as *Paul's Statistical Astronomy*.



In 1999 a ‘Legacy’ symposium has been held in Groningen, entirely devoted to Kapteyn with the title *The Legacy of J.C. Kapteyn: Kapteyn and the development of modern astronomy*. The proceedings [10] were published by myself and K. van Berkel (editors). This volume contains a number of very important articles about Kapteyn; it will be referred to below as the *Legacy*. The quality of Paul’s translation of Henriette Hertsprung-Kapteyn’s biography has been seriously criticized in that volume (see its appendix B for more details). I have recently produced a new, improved translation that I have posted on a special Web-page dedicated to Kapteyn, that I am maintaining [11].

De Sitter and Huizinga seem to have moved most of Kapteyn’s archive of papers and correspondence to Leiden in preparation of the biography they were planning to write, but it was never returned to Groningen; so most of Kapteyn’s letters are no longer present here. In contrast to this, the archives at the University of Groningen do hold the letters of Sir David Gill to Kapteyn. These were apparently not included in the material that de Sitter and Huizinga took to Leiden, or had been returned to Groningen later. This important set of letters from Gill fortunately has survived and I have used it extensively. What happened to the rest? It is assumed that at a later time de Sitter’s son Aernout was planning to write the biography and had been transporting Kapteyn’s correspondence – maybe together with other papers – in a big crate to Indonesia, where he had become director of Lembang Observatory. This crate was then supposedly lost in the bombing of Rotterdam in May 1940, while it was awaiting shipment. Some more discussion of this can be found in Petra van der Heijden’s contribution to the *Legacy*. The story remains speculative; in particular, there is no good reason why the letters of Gill, and only those of Gill, were left in (or returned to) Groningen.

The unavailability of much of Kapteyn’s correspondence might have played a role in the fact that no further attempts at a thorough biography have been undertaken. As part of the activities around the ‘Legacy symposium’ of 1999, Petra van der Heijden has made an extensive inventory and collected selected copies of letters from Kapteyn and drafts of letters to him from archives around the world, to a large extent correcting this lack of correspondence. Her chapter in the *Legacy* proceedings details this exercise.

The remains of the Kapteyn archives reside at Groningen University. It has been described in some detail in Adriaan Blaauw’s chapter in the *Legacy*, where he presents the ‘Kapteyn Room’ in the Kapteyn Astronomical Institute. This room contains furniture and printed works from Kapteyn’s (and later van Rhijn’s) office. Actually this room has since been relocated in the Institute, while a fair fraction of the books, notes, letters and other publications has now actually been moved to a repository of the University of Groningen Archives, which like the Kapteyn Astronomical Institute is located on the Zernike Campus, to ensure more protection and safe storage under controlled climate conditions. Among this is also the set of ‘Kladboeken’ (see Adriaan Blaauw’s chapter in the *Legacy*), which are bound volumes in which Kapteyn and his staff made all sort of notes (compiling tables, drafting letters or publications, record measurements or results of calculations, etc.). Often they were used from both ends. As Blaauw notes, the staff discarded the oldest ones (numbers

1 to 100) before he assumed the directorship of the Kapteyn Laboratory (as it was then called) in 1957 and when it moved to its present location on the Zernike Campus of Groningen University (in 1983) only a selection was kept that was judged to be sufficiently important for historical purposes. As a result, what is available is all of Kapteyn's notes in the Kladboeken between 1907 and 1912 and about half of them up to 1921. In this book I will use the notation that Blaauw adopted in the *Legacy*, so that 'KB-no.104, inverted, p.6 (1907)' means Kladboek number 104, page 6 starting from the back and the notes involved are from the year 1907. Some examples of pages have been reproduced in the *Legacy* in the chapter *Meeting Kapteyn in the Kapteyn Room* by Adriaan Blaauw. Although fascinating to browse, I have found the amount of useful information in the Kladboeken limited; there is little that is not known otherwise.

Recently a collection of 'Love letters' that Kapteyn wrote to Catharina Elisabeth (Elise) Kalshoven has been published under the title *Lieve Lize: De minnebrieven van de Groningse astronoom J.C. Kapteyn aan Elise Kalshoven, 1878–1879* [12] by Klaas van Berkel and Annelies Noordhof-Hoorn, referred to below as the *Love Letters*. These were written in 1878–1879, when Ms Kalshoven was still Kapteyn's fiancée and future wife, while Kapteyn himself already had moved to Groningen as a young professor.

Other important sources of information, especially for the later parts of Kapteyn's life, are two very well-written history books. The first is the biography of Henry Norris Russell (1877–1957) by David DeVorkin, *Henry Norris Russell: Dean of American astronomers* [13], hereafter referred to as *DeVorkin's Russell biography*. The other is the history of the Mount Wilson Observatory, written by Allan Rex Sandage (1926–2010), *The Mount Wilson Observatory: Breaking the code of cosmic evolution* [14]. I will refer to this below as the *Sandage's Mt. Wilson History*.

The present book describes Kapteyn's scientific work in detail and for this it relies heavily on Kapteyn's publications, many of which are available as reprints in the Kapteyn Room. Some of these are copies for his wife with regularly compliments written on them, but there are also leather-bound volumes in which Kapteyn collected his publications (see Appendix A). In addition to this and the archive of letters, which have been a major source of information, much on Kapteyn as a person can be gleaned from his daughter's biography and from the set of letters he wrote to his future wife. Further personal information is contained in an article in Dutch by journalist and amateur astronomer Cornelis Easton regarding his personal memories of Kapteyn. Cornelis Easton (1864–1929), a Dutchman in spite of his last name, was a prominent Dutch journalist and newspaper editor. He had no formal training in astronomy but still did original research in that field and in climatology. In recognition of his contributions, he received an honorary doctorate in 1903 from the University of Groningen with Kapteyn as his 'promotor' (supervisor). This interesting source on the Kapteyn as a person has been added to this book in the form of excerpts in English translation as Appendix C. The full text in English (and much other material on Kapteyn) is available on a special Website that I am maintaining at [www.astro.rug.nl/JCKapteyn/](http://www.astro.rug.nl/JCKapteyn/). And of course the studies in the *Legacy* are of great value and extremely useful.

## Aim of This Book

I am an astronomer, not a historian; actually my professional career is closely related to Kapteyn. I have worked at the Kapteyn Astronomical Laboratory of the University of Groningen since 1975 and have led the process of formalizing its status as a recognized research institute within the University of Groningen under the name Kapteyn Astronomical Institute. I have been its scientific director for two separate periods, together adding up to more than 10 years. In 2003, I was appointed distinguished Jacobus C. Kapteyn professor of astronomy [15] by the University of Groningen upon nomination of the Faculty of Mathematics and Natural Sciences. Finally, my research has been much along the lines of Kapteyn's (see my 'valedictory lecture' *It all started with Kapteyn* [16]).

So, the aim of this book is to discuss the astronomical work of Kapteyn, and put it in two contexts. The first is the astronomy of his day; after all the development of our knowledge about the stars and universe is a background against which we can judge his contributions. In this process I will try to separate as much as possible his contributions from those of his predecessors and his contemporaries, keeping in mind the difficulty pointed out by Albert Einstein in the quote at the beginning of this preface. The second context is his personality and personal life. We have some information about that in reminiscences about him in obituaries and other articles that address his personality. Much can be learned from his daughter's (Henriette Hertzsprung-Kapteyn) biography, as long as we concentrate on parts that are not too much influenced by the writing about him by an admiring and loving daughter. I have therefore chosen for a structure of the book in which for sections concerning his personal life I make extensive use of the text in the *HHK biography* in my new English translation. I could have paraphrased Henriette Hertzsprung-Kapteyn, but I rather chose to use her own words and at the same time provide an improved English translation of those words. She must have consulted her mother many times, since they lived in the same street in Hilversum while she was writing it (see Appendix B), the Oude Amersfoortsche Weg, respectively on numbers 66 and 29, which according to *Google Maps* is only 230 meters and 3 minutes walking apart. The information contained in the biography is almost certainly reliable, although colored. I have then left out parts that are affected too much by the time in which it was written or by the relationship between father and daughter. Parts from the *HHK biography* that have been quoted have been typeset in a sans serif font to distinguish them from my own texts; I have added sometimes explanatory remarks in the texts in the regular font and then enclosed these in square brackets. I have done the same thing also whenever I quote from other sources.

## Nicknames, References, Notes and Currencies

In what follows, whenever I refer to 'Kapteyn' I will mean J.C. Kapteyn, the subject of this book, and when to 'Mrs Kapteyn' I will mean his wife C.E. Kapteyn-Kalshoven. Other Kapteyns will be identified by using their first name(s).



**Fig. 0.1** This book is dedicated to Professor Adriaan Blaauw, former director of the Kapteyn Astronomical Laboratory, and to my wife Corry. This picture was taken during the reception after the symposium ‘Challenges’, celebrating my 65th birthday (Photograph Elmer Spaargaren [19])

An important point concerns the use of nicknames, etc. Many authors refer to Kapteyn’s oldest daughter as ‘Dody’, the second as ‘Hetty’ and his son as ‘Rob’, which were indeed the way they were addressed by family members and friends. They signed letters to those who knew them well in this way. I will refrain from using these nicknames, as I feel this should be reserved to intimates, which I am not. Reading the *Love Letters* feels like enough of an infringement on other people’s privacy.

The audience I have in mind while writing this book encompasses historians and astronomers, but I particularly kept those in mind that are interested in Kapteyn without having a formal training or professional expertise in any of these two disciplines. I will therefore explain fundamental astronomical and astrophysical matters, and when these are too technical, use separate boxes. I also assume that readers are not familiar with the Netherlands and Dutch society, traditions and structure (I chose the English language and foreign publisher to make the book accessible to an international audience). Mathematical equations can be very enlightening for those familiar with their use and I will not shy away from using them. However, I put them also in separate boxes, such that those not so apt in working with mathematics and equations can continue the main text.

I use two kinds of notes in this book. Remarks or information, that may be of immediate use to the reader, but which does not seem suitable for inclusion in the main text, will be given in footnotes to the text. I have kept these to an absolute

minimum and the use of footnotes is only by exception. All information concerning details of how to locate publications and other sources referred to – and exclusively that – is collected at the end of the book in Appendix D (page 661), items being numbered like references, enclosed in square brackets. Publications by Kapteyn and his collaborators have been listed in Appendix A; when in the text I refer to e.g. Kapteyn (1899), then this reference can be looked up in that appendix.

Then there is the question of the conversion of currencies. In this book I convert quoted amounts of money to current values using the ‘Historic Dutch Currency Calculator’ on the Dutch Ancestry Magazine site *How much did you say?* [17] when it concerns salaries or other income. I prefer this site for this, because it expresses the sums of money in terms of the ‘income of an unskilled worker’. I will use that without quoting an amount of €. In other cases, costs of equipment, general budgets, etc., I use the converter of the ‘International Institute of Social History’ of the Royal Netherlands Academy of Arts and Science [18], which aims at comparing ‘cost of living’ or ‘purchasing power’ and this I will express in current €.

## Title and Dedication

The (sub)title of this book derives from the statement made by Simon Newcomb, in his book *The Stars: A study of the Universe* [20], published in 1901:

‘This work [the Cape Photographic Durchmusterung] of Kapteyn offers a remarkable example of the spirit which animates the born investigator of the heavens. Although the work was officially that of the British Government, the years of toil devoted to it were, as the writer understands, expended without other compensation than the consciousness of making a noble contribution to knowledge, and the appreciation of his fellow astronomers of this and future generations.’

This book is dedicated to Professor Adriaan Blaauw (1914–2010), third director of the Kapteyn Astronomical Laboratory between 1957 and 1970, who brought it back to the national and international forefront, and who encouraged me over a long period to write this biography after my formal retirement and – last but not least – to my wife Corry for her love and support and for her understanding that active professional life should not end at 65.

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Beijing, China / Canberra, Australia/  
Groningen, The Netherlands /  
La Laguna, Spain / Pasadena, USA  
Spring 2010 – Summer 2014  
(northern hemisphere seasons)

Pieter C. van der Kruit



**Fig. 0.2** Photograph from Kapteyn Astronomical Institute

Kapteyn lived at the address ‘Ossenmarkt 6, Groningen’ from 1910 to 1920. In 1999, three of his great-great-great-grandchildren unveiled this memorial on the occasion of a special ‘Legacy Symposium’ in Kapteyn’s honor during the celebration of the 385th anniversary of the University of Groningen. The plaquette is placed on the facade of that house. In English translation it reads: Here lived and worked [incorrect years] Professor Jacobus Cornelius Kapteyn, inspiring Groningen astronomer. The quote translates into English as:

*When you don’t have what you love,  
you have to love what you have.*

It has been attributed to French memoirist Roger de Rabutin, Comte de Bussy (or Roger Bussy-Rabutin) (1618–1693); see page 496.

# Acknowledgments

I am grateful to many individuals for help, advice and assistance and institutions for support. In no special order, except that it is more or less chronological, I like to mention the following persons and institutions.

Prof. Klaas van Berkel, professor of History of Science at the University of Groningen for much advice, help and insistence I write this book. The staff of the Library of the University of Groningen, especially those at the branch of the Faculty of Mathematics and Natural Sciences, and in particular Harri Preuter for scanning Kapteyn's and his brother Willem's theses. Gerard Huizinga and Alf Tent of the archive repository of the University of Groningen. Kor Holstein, expert on architecture in Kapteyn's times. Wija Friso for help to locate information on Kapteyn in various archives. Prof. Leen Dorsman, professor for university history at Utrecht University, and Dr. Paul Lambers, curator of natural history, University Museum Utrecht and his retired predecessor Dr. J.C. Deiman. Dr. David Baneke for help with archives in Leiden. Dick Veldhuizen of the municipal archives of Barneveld. The staff of the 'Groninger Archieven', of the section Special Collections of the Leiden University Library and of the National Archives in Den Haag for cheerfully assisting me in my archival research. Adam Perkins, curator at the Royal Greenwich Observatory archives, Cambridge University Library, Cambridge, UK. Frank Bowles and the staff in the Manuscript Room have been very helpful when I consulted the Gill-Kapteyn correspondence kept there. Paul Haley of 'The Share Initiative' of Herefordshire ([tsieuropean.co.uk](http://tsieuropean.co.uk)) in Hereford, UK, who sent me complete transcripts of all letters of Gill to Kapteyn from 1906 onwards (as kept in the Royal Geographical Society archives), and who together with his wife Ann and daughter Clarissa have been very hospitable, receiving my wife and myself in their home for a delightful day of discussing Gill, Kapteyn and the history of astronomy. Dr. Juha Hannikainen and Jouni Nikula of the Keskusarkisto (Central Archives) of the Helsingin Yliopiston (University of Helsinki), Finland for providing scans of letters between Kapteyn and Anders Donner. O.J. Nienhuis, archivist at the municipality of Tynaarlo, for locating the summer house of the Kapteyns in Vries. Dr. Stephan P.C. Peters, my last astronomical PhD student, but also oracle and technical assistant in

computer matters, for installing Linux (Ubuntu) on my laptop and flatfielding some photographs I had made in archives. Dan Lewis and Molly Gipson of The Huntington Library, Art Collections, and Botanical Gardens, San Marino, California for help with accessing Hale, Seares and Adams correspondence with Kapteyn. Charlotte (Shelley) Erwin and Loma Karklins of the Archives at the California Institute of Technology, Pasadena, California for support with the examination of the Hale papers. John Grula, Librarian of the Carnegie Observatories for help with the use of the library. Larry Webster of the Center for High Angular Resolution Astronomy for showing me and my wife around the telescopes and the Kapteyn Cottage on Mount Wilson. The staff of the Pasadena Public Library and of the Research Library and Archives of the Pasadena Historical Society at the Pasadena Museum of History for help locating the December 19, 1908 issue of the Pasadena Star. Susanne Elisabeth Nørskov, AU Library, Fysik & Steno, Institut for Fysik og Astronomi, Aarhus Universitet, Denmark for scanning all over 100 letters between Hertzsprung and Kapteyn free of charge and providing a photograph of a very young Hertzsprung. Rolf ter Sluis and Jan Waling Huisman of the University Museum Groningen for being so helpful in many respects. Professors Jan Borgman, Harm Habing and Tjeerd van Albada, emeritus colleagues, for giving descriptions of what they remembered from the insides of the Astronomical Laboratory at the Broerstraat in van Rhijn's time. Prof. Joan Booth and Prof. Manfred Horstmanshoff, emeritus professors of respectively Latin and ancient history at Leiden University, translated the Latin text on the postcard found in the album for Kapteyn's 40th anniversary as professor. Dr. Dirk van Delft, director of the Boerhaave Museum in Leiden and Paul Steenhorst, head of the conservation department, who kindly showed me the Universal Instrument of Leiden Observatory that Kapteyn used. Jan Willem Noordenbos, great-grandson of Kapteyn, helped me with information, photographs and other matters concerning Kapteyn's relatives and descendants. Prof. Eckhard Limpert of Zürich, first author of a paper on skew frequency distributions and Kapteyn has patiently explained his work and why he and his co-authors dedicated his paper to him. Annie and Johan Weelink, current owners of the second home that the Kapteyns owned in Vries for providing information and photographs of the house. Dr. Inge de Wilde, author of a PhD thesis on women at Groningen University in Kapteyn's day, for help to find the photographs of Kapteyn's oldest daughter Jacoba. F.A.M. (Frans) van den Hoven of the University Museum Utrecht for searching archives for these photographs. Dr. Inge de Wilde for supplying the photograph in Fig. 8.1, when it could not be located by Mr van den Hoven. Tony Misch, director of the Lick Observatory Historical Collections for providing scans of the original plates containing Nova Persei 1901. And I thank my contacts at Springer Publishers: Harry Blom for his continued interest over a number of years to publish a biography of Kapteyn, Prof. Butler Burton for suggestions and his enthusiasm to publish this book in the Astrophysics and Space Science Library, of which he is editor-in-chief, and finally my editor, Jennifer Satten, for her efficient help, assistance and pleasant interaction.

A few persons have read drafts of (sometimes parts of but in a number of cases the complete) manuscript of this book. I am extremely grateful for the large amount





**Fig. 0.3** For archival or library research a number of passes need to be acquired. Here are the most colorful examples that I received during my research for this book

of time they invested and the advice they provided. They are Klaas van Berkel, professor of history after the Middle Ages in Groningen, Wessel Krul, professor of modern history of art and culture, also in Groningen, David Baneke, assistant professor of the history of modern natural sciences in their cultural and social context (with special attention to astronomy) at the Free University Amsterdam, Jan Willem Pel, emeritus professor of observational astronomy in Groningen, Scott Trager, professor of astronomy and astrophysics in Groningen, François Schweizer, staff member of the Carnegie Observatories, Pasadena, California, Albert Jan Scheffer, emeritus associate professor of molecular biology and virology in Groningen, Ton Schoot Uijtenkamp, emeritus professor of chemistry and environmental science in Groningen, Jan Willem Noordenbos, retired biology teacher and great-grandson of Kapteyn, Gerard van den Hooff, dear friend and emeritus teacher of English and currently professional translator, who did a very thorough and time-consuming job checking my use of the English language, and last but not least my wife Corry. It goes without saying that the blame for any mistakes is due to me and responsibility for any inaccuracies is definitely mine.

The preparations for this book started in February 2010 with a conversation on how to proceed with Klaas van Berkel, after infrequent and friendly, but persistent encouragement to write the biography by Adriaan Blaauw and sometimes Klaas. I first made an inventory of what to do during a conference on ‘Galaxies and their Masks’ in Sossusvlei, Namibia in April of that year, especially during the five days afterwards, that I found myself stuck in Johannesburg when the Eyjafjallajökull volcano in Iceland disrupted almost all air traffic to and from Europe.

Most of the work for this book was performed at my home institution, the Kapteyn Astronomical Institute of the University of Groningen, where I have profited from the support of its staff, especially the computer and administrative staff and in particular Hennie Zondervan, Jackie Zwegers and Wim Zwitter. In my two successors as director, Prof. Thijs van der Hulst and Prof. Reynier Peletier, I grate-

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Many of the unpublished sources used for this book are available at [www.astro.rug.nl/JCKapteyn](http://www.astro.rug.nl/JCKapteyn).

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