## Wilhelmus Hendrikus Keesom
## 1876-1956

Keesom was born on 21 June 1876 on a farm in the southern part of the island of Texel into a devoutly Catholic family with no tradition of learning. He attended elementary school in Den Burgh, Texel, and, starting in 1889, the HBS in Alkmaar. In 1894 he matriculated at the university of Amsterdam, where he took his doctorate in 1904 (with honors) under Van der Waals, on a dissertation entitled *Isothermen van mengsels van zuurstof en koolzuur* (an elaboration of the 1903 gold-prize winning answer to a prize question issued by the Leiden faculty of Mathematics and Physics).

In 1900, Keesom had become an assistant to Kamerlingh Onnes at the Physics Laboratory at the university of Leiden. In 1904 he married Anna Maria Aleida Moorman, and the couple had two sons and six daughters. Although Keesom was promoted to conservator in 1909, his salary was not sufficient to provide for his rapidly growing family, and he therefore taught part-time at several secondary schools and gave lecture courses at the University of Utrecht. During this first Leiden period, Keesom published about 40 papers, a number of which were co-authored with Kamerlingh Onnes, who relied heavily on Keesom's theoretical abilities, especially in studies leading up to the liquefaction of helium in 1908. In his Nobel Lecture, Kamerlingh Onnes wrote: 'Den hervorragenden theoretischen Kenntnissen von Herrn Keesom verdanke ich weiter viel wegen der gründlichen und einsichtsvollen Weise, in welcher er die mit der Zustandgleichung zusammenhängenden theoretischen Fragen deren gleichzeitiges Studium ihm vorwiegend zu Teil fiel, bearbeitet habe'.

Although by this time Keesom had established himself at home as well as abroad as a brilliant theoretical physicist, upon the retirement of Lorentz he was passed over for the chair of theoretical physics, which was awarded to Paul Ehrenfest. He was passed over as well for several other chairs, and there is little doubt that his Catholicism was the cause. In 1917 he accepted an appointment at the National Veterinary School at Utrecht, and when that school achieved university-level status, the following year, Keesom became professor of physics. He finally returned to the university of Leiden in 1923, when upon the death of Kuenen he was appointed to the chair of physics. The following year, upon the retirement of Kamerlingh Onnes, Keesom became co-director of the physics laboratorium with De Haas. Over

the next two decades, he produced over 200 scientific papers with a number of co-workers. He used increased pressure to solidify helium and by 1932 had cooled helium to 0.7 °K; in 1927, with M. Wolfke, he discovered that there is a change in the form of liquid helium at 2.19 °K, and in 1936, with his daughter P. Keesom, he discovered the then called 'warm superconductivity' (superfluidity) of one of these; he investigated the caloric properties of superconducting metals and the structure and properties of liquid and solid helium, neon, hydrogen, nitrogen, oxygen, etc. In 1940, work at the laboratory ground to a halt. Keesom retired in 1945 for health reasons.

Keesom was active in the profession. He was chairman of the Institut International du Froid, chaired the 1936 Cold Congress in The Hague, and served as president of the Nederlandsche Vereeniging voor Koeltechniek for many years. Because up to World War II his laboratory was the leading site for cryogenic research in the world, many foreign scientists came to work there. Keesom gave his weekly seminars in German or English when necessary.

Keesom remained a devout Catholic his entire life, even though in the first decades of this century this was definitely not a help for one trying to make a career in science. Shortly after the turn of the century, he became active in the Vereeniging tot het Bevorderen van de Beoefening van de Wetenschap onder de Katholieken in Nederland (Society for the Promotion of the Practice of Science among Catholics in the Netherlands) and personally encouraged Catholics to pursue a career in science. 1936 Keesom was among the first group of appointees in the new Pontifical Academy of Exact Sciences. He died in Leiden on 3 March 1956. He was survived by his second wife, Seraphina Josephina Francisca Maria Gieliam, whom he had married in 1927, four years after the death of his first wife.

### *Primary works*

*Poggendorff*, vol. 5, 619-620; vol. 6, 1295-1296; vol. 7B, 2409-2413. *Isothermen van mengsels van zuurstof en koolzuur* (Leiden, 1904); *Die Zustandsgleichung*, in: *Enzyklopaedie der Mathematischen Wissenschaften* (Leipzig, 1912, vol. 5, part 1, no. 6, 615-945, with H. Kamerlingh Onnes; *Helium* (Amsterdam, New York: Elsevier, 1942, 1959); *Théorie thermodynamique de la rectification* (Louvain, 1939); Keesom's scientific

papers are listed in *Lijsten van Geschriften van de Leden van de Vereeniging tot het Bevorderen van de Beoefening der Wetenschap onder de Katholieken in Nederland*, 1922, 1931, 1941. Keesom's papers are in the Museum Boerhaave at Leiden.

*Secondary sources*

J.E. Verschaffelt, 'W.H. Keesom, 25 jaar Doctor', *Physica. Nederlandsch Tijdschrift voor Natuurkunde* 9 (1929) 3-6; obituaries: C.J. Gorter, *Jaarboek der Koninklijke Nederlandse Akademie van Wetenschappen* (1956-1957) 225-230; P.H. van Laer, *Annalen Thijmgenootschap* 44 (1956) 117-119.

P.H. van Laer, in: *BWN*, vol. 1, 289-291.

[A.v.H.]