

HENDRIK WILLEM BAKHUIS ROOZEBOOM
1854-1907

Bakhuys Roozeboom, usually known as Bakhuis Roozeboom, was born in Alkmaar on 24 October 1854. He was the son of Jan Hendrik Bakhuijs Roozeboom, who was a bookkeeper, and Maria Rensen. From 1868 to 1872 Bakhuis Roozeboom attended the HBS in Alkmaar and afterwards studied Greek and Latin, until in 1874 he passed the examination for admission to the university of Leiden. In the meantime, he had also assisted J.M. van Bemmelen, who was director of an HBS at Arnhem, in his chemical research on the soil of the new IJpolders near Amsterdam. Since Bakhuis Roozeboom did not have the financial means to study at Leiden, he became an analytical chemist in The Hague. In 1878 however, Van Bemmelen, who had become professor of chemistry at Leiden, was able to appoint him as his research assistant and so offered him the opportunity to study chemistry after all. A year later Bakhuis Roozeboom married Catharina Elisabeth Wins, who gave birth to four sons and two daughters. In 1882 Bakhuis Roozeboom passed his doctoral examination and in 1884 received his doctorate with a dissertation of only 20 pages *Over de hydraten van zwaveligzuur, chloor, broom en chloorwaterstof* (On the Hydrates of Sulphurous Acid, Chlorine, Bromine and Hydrochloric Acid). In this dissertation he studied the relationship between the three states of matter at different temperatures and pressures. From 1881 to 1896 he earned a living as a teacher at an HBS for girls in Leiden.

In 1886 J.D. van der Waals drew his attention to the work of J. Willard Gibbs in thermodynamics, especially his phase rule of 1876, which defines the conditions of equilibrium as a relationship between the number of components of a system and the number of coexisting phases. This rule provided Bakhuis Roozeboom with a theoretical basis for his experimental work on heterogeneous equilibria, which he had begun to study in 1882. The first result was his article 'Sur les différentes formes de l'équilibre chimique hétérogène' (1887). Because of his admission as a *privat-dozent* in 1889 and his appointment as lecturer in physical chemistry in 1893 at Leiden, he had the opportunity to study all kinds of equilibria with his students, among whom F. A. H. Schreinemakers was the most important. In 1890 he was elected as a member of the Royal Academy Arts and of Sciences.

In 1896 Bakhuis Roozeboom succeeded Van 't Hoff as professor of chemistry at Amsterdam, where he continued the research on heterogeneous equilibria he had begun at Leiden. But he also continued the research school Van 't Hoff had founded at Amsterdam. As Van 't Hoff did before, Bakhuis Roozeboom stimulated his Ph.D. students to work out the details of his theory and each year two or three of them took their degree under his supervision. The results were summarized in *Die heterogenen Gleichgewichte vom Standpunkte der Phasenlehre*, the first and second volumes of which appeared in 1901 and 1904. After his death some of his pupils and collaborators (E.H. Büchner, A.H.W. Aten, F.A.H. Schreinemakers) continued this publication. In addition to his theoretical work, Bakhuis Roozeboom was also active in practical science: for example, he analyzed drinking water and developed a chemical method to clean paintings that were affected by vapours from the canals in Amsterdam. Since most scientists in the late nineteenth century separated science from religion, it was remarkable that Bakhuis Roozeboom openly confessed to be a Christian scientist. In 1895 he was one of the founders of the Christelijke Vereeniging van Natuur- en Geneeskundigen in Nederland (Christian Association of Scientists and Physicians in the Netherlands). Bakhuis Roozeboom died in Amsterdam on 8 February 1907.

Primary works

Poggendorff, vol. 4, 1267-1268; vol. 5, 1062; vol. 6, 2214. A complete bibliography of Bakhuis Roozeboom can be found in *Berichte der deutschen Chemischen Gesellschaft* 40 (1907) 5170-5174; *De wetenschappelijke beoefening der chemie en hare uitkomsten* (The scientific study of chemistry and her results) (Amsterdam, 1896); *Die heterogenen Gleichgewichte vom Standpunkte der Phasenlehre*, 3 vols (Braunschweig, 1901-1918); *De tegenwoordige stand van de problemen der chemie* (Current problems in chemistry) (Amsterdam, 1904).

Secondary sources

J.M. van Bemmelen, W.P. Jorissen, W.E. Ringer, *Berichte der deutschen Chemischen Gesellschaft* 40 (1907) 5141-5170; A.F. Holleman, in: *Che-*

Chemisch Weekblad 4 (1907) 119-132; J. M. van Bemmelen in *ibid*, 249-285; W.P. Jorissen, W.E. Ringer in *Mannen en vrouwen van betekenis in onze dagen* 37 (1907) 155-218; M.W. Stortenbeker in *Recueil des Travaux Chimiques des Pays-Bas et de la Belgique* 27 (1908) 360-402; H.R. Kruyt, J.L. Meyering, D.J. Hissink, J. Olie Jr. in *Chemisch Weekblad* 50 (1947) 749-761; R. Hooykaas in *Geloof en wetenschap* 53 (1955) 68-77; H.A.M. Snelders, *De geschiedenis van de scheikunde in Nederland. Van alchemie tot chemie en chemische industrie rond 1900* (Delft: Delftse Universitaire Pers, 1993) 147-158; G.J. Somsen, "Wetenschappelijk Onderzoek en Algemeen Belang". *De chemie van H.R. Kruyt (1882-1959)* (Delft: Delft University Press, 1998), esp. ch. 1.
H.A.M. Snelders, in: *DSB*, vol. 11, 534-535; *idem* in: *BWN*, vol. 1, 22-23.

[K.v.B.]