

MARTINUS WILLEM BEIJERINCK
1851-1931

Beijerinck was born in 1851 in Amsterdam, the son of a railway employee. He received his secondary education at the HBS in Haarlem and from 1868 to 1872 studied chemical technology at the Delft Polytechnic School. Together with his fellow students J.H. van 't Hoff and A.A.W. Hubrecht, Beijerinck was exempted, in 1872, from an additional examination in Greek and Latin required for university study. While he was teacher in various schools Beijerinck studied botany at Leiden from 1872 onwards. In 1877 he received his doctorate, *cum laude*, on a dissertation entitled *Bijdrage tot de morphologie der plantegallen* (Contribution to the Morphology of Plant Galls).

In 1884 Beijerinck became a member of the Royal Academy of Arts and Sciences in Amsterdam, and a year later he was hired as a microbiologist by the Nederlandsche Gist- en Spiritusfabriek (Dutch Yeast and Methylated Spirits Factory) in Delft. In this capacity he got his own microbiological laboratory, where he carried out many original studies, especially on the metabolism of various species of bacteria and lichens. He discovered the small nitrogen-fixing tubers at the roots of leguminous plants and a group of anaerobic bacteria that were important for the production of acetone and butyl alcohol.

In 1895 the Delft Polytechnic School appointed Beijerinck as professor of biology and bacteriology. Two years later a new microbiological laboratory, built especially for him and his students, was opened. Here Beijerinck continued his microbiological studies with great success. In 1896 he discovered the bacterium that was responsible for the bad smell of polluted canal water in Dutch cities; he and his students did important work on the microbes that were active in acetic-acid and alcohol fermentations; and in 1898 Beijerinck was the first to postulate the existence of a filterable living principle, a 'contagium vivum fluidum', responsible for the mosaic disease in tobacco plants.

A special feature of Beijerinck's research was the application of chemical methods to research on the metabolism of micro-organisms. He used chromatographic methods and hydrodiffusion of nutrients in gelatin. Before he retired from his chair, in 1927, Beijerinck had established a program of basic research in microbiology to which he was very devoted. His originality lies in the application of micro-organisms for the study of growth, variability, and evolution. He is

one of the examples of the shift from the descriptive to the experimental approach in Dutch biology of the time. The results of his studies were published in many journals.

Beijerinck was a loner who cared little for personal contact with colleagues, and therefore his image was that of a scientist working in isolation. Nevertheless, his views on the aims of scientific research and its role in society matched those of his contemporaries like H. de Vries, M. Treub and F.A.F.C. Went. After Beijerinck's retirement, a number of his students, among whom his successor A.J. Kluyver, organized a campaign to bring Beijerinck's work to a wider audience. They edited his collected works, and by doing so were responsible for many honors Beijerinck received toward the end of his life. Beijerinck died in 1931, scientifically active almost to the end of his life.

Primary works

Poggendorff, vol. 4, part 1, 162; *Verzamelde Geschriften van M.W. Beijerinck*, 6 vols (Delft: Delftsch Hoogeschoolfonds/The Hague: Martinus Nijhoff, 1921-1940). Bibliography in Bos and Theunissen, *Beijerinck*, 166-181 [see below]. A number of letters to and from Beijerinck are preserved in the libraries of the universities of Leiden and Groningen.

Secondary sources

'Gouden doctoraat van prof.dr. M.W. Beijerinck', *Chemisch Weekblad* 24 (1927) 330-337; J. Smit, 'Beijerinck's levenswerk', *Chemisch Weekblad* 28 (1931) 94-97; F.A.F.C. Went, 'In memoriam M.W. Beijerinck', *Verslag van de gewone vergadering der Afdeling Natuurkunde. Koninklijke Akademie van Wetenschappen* 40 (1931) 6-12; G. van Iterson, Jr., L.E. den Dooren de Jong and A.J. Kluyver, *Martinus Beijerinck: His life and his work* (Madison: Science Tech, 1983; reprint of the 1940 edition, with new introductions); A.C. Zeven, 'Martinus Willem Beijerinck. A hybridizer of *Triticum* and *Hordeum* species at the end of the 19th century and his investigations into the origin of wheat', *Euphytica* 19 (1970) 263-275; B. Theunissen, 'Het nut van autonomie: Een andere kijk op M.W. Beijerincks microbiologie', *Gewina* 17 (1994) 191-205; P. Bos and B. Theunissen, eds, *Beijerinck and the Delft*

school of microbiology (Delft: Delft University Press, 1995) [contents: C.B. van Niel, 'The "Delft school" and the rise of general microbiology', xiii-xxvii (reprint from 1949); Van Iterson et al., *Beijerinck*, 1-181 [reprint from 1940, see above]; B. Theunissen, 'Martinus Willem Beijerinck and the beginning of the "Delft" tradition in microbiology', 183-192; O. Amsterdamska, 'Beneficient microbes: The Delft school of microbiology and its industrial connections', 193-213; and S. Spath, 'C.B. van Niel's conception of the "Delft school"', 215-220]; B. Theunissen, 'The beginnings of the "Delft tradition" revisited: Martinus W. Beijerinck and the genetics of micro-organisms', *Journal of the History of Biology* 29 (1996) 197-118.

H.A.M. Snelders, in: *BWN*, vol. 2, 32-34; *DMB*, 130-131.

[L.C.P.]