

PETRUS VAN MUSSCHENBROEK
1692-1761

Musschenbroek was born in Leiden on 14 March 1692. He belonged to a family of brass founders and instrument makers who had turned to the construction of scientific instruments in the middle of the seventeenth century. His father Johan, his uncle Samuel, and his brother Jan all earned solid reputations in this field, Jan working closely with the Leiden natural philosopher Willem Jacob 's Gravesande. Petrus, five years younger than Jan, studied at the University of Leiden and in 1715 earned his doctorate in medicine. After a visit to England (where he met Desaguliers) he practiced medicine in Leiden for a few years, but after receiving a second degree in philosophy he accepted a professorate in mathematics and philosophy at Duisburg in 1719. In 1721 he also became extraordinary professor of medicine.

In 1723 Musschenbroek moved to Utrecht, where he held the position of professor of natural philosophy and mathematics. The following year he married Adriana van de Water (who died prematurely in 1732). From 1732 onwards, Musschenbroek also was professor of astronomy at Utrecht. Here Musschenbroek became well known for his lectures in experimental philosophy, in which he followed the new guidelines set forth by Newton and 's Gravesande. His textbooks became famous far outside the lecture halls of Utrecht. In 1726 he published *Epitome elementorum Physico-mathematicorum conscripta in usus academicos*, followed by *Elementa physicae* in 1734. Musschenbroek refused offers from Copenhagen (1731) and Göttingen (1737), but he accepted a call from Leiden in 1739, where he lectured on philosophy from 1740 until his death.

In 1742 he succeeded the deceased 's Gravesande as professor of experimental natural philosophy. His lectures, which attracted many foreign students, were published as his *Institutiones physicae* (1748) and his *Introductio ad philosophiam naturalem* (posthumously published in 1762 by Lulofs). During his lectures Musschenbroek used instruments that more often than not were devised by himself and constructed by his brother Jan (except for the barometers and thermometers, which were made by Fahrenheit and others). Compared to 's Gravesande, Musschenbroek paid more attention to the experimental gathering of facts and less to the mathematical formulae to which these facts had to be reduced. Accordingly, Musschenbroek's re-

search was concerned with other topics than 's Gravesande had considered important. Whereas 's Gravesande extensively discussed mechanics and astronomy, Musschenbroek gave much attention to, for instance, the effects of heating and to meteorology and electricity. He constructed the pyrometer and is credited with the invention of the Leiden jar (1746). Because of his experimental approach, one of his biographers characterized Musschenbroek as a Newtonian scientist with a Baconian bent. Petrus van Musschenbroek died on 19 September 1761.

Primary works

Disputatio medica inauguralis de Aëris praesentia in humoribus animalibus (Leiden, 1715); *Oratio de certo methodo philosophiae experimentalis* (Leiden, 1723); *Epitome elementorum physico-mathematicorum, conscripta in usus academicos* (Leiden, 1726); *Physicae experimentales, et geometricae, de magnete, tuborum capillarium vitreorumque speculorum attractione, magnetudine terrae, cohaerentia corporum firmorum dissertationes: ut et ephemerides meteorologicae Ultrajectinae* (Leiden, 1729); *Tentamina experimentorum naturalium captorum in Accademia del Cimento ... quibus commentarios, nova experimenta, et orationem de methodo instituendi experimenta physica addidit P.v.M.*, 2 vols (Leiden, 1731); *Elementa physicae, conscripta in usus academicos* (Leiden, 1734); *Be-ginselen der natuurkunde, beschreeven ten dienste der landgenooten* (Leiden, 1736; second ed. 1739); *Essai de physique, avec une description de nouvelles sortes de machines pneumatiques et un recueil d'expériences par M.J.v.M[usschenbroek]*, 2 vols (Leiden, 1736-1739); *Oratio inauguralis de mente humana semet ignorante* (Leiden, 1740); *Institutiones physicae conscriptae in usus academicos*, 2 vols. (Leiden, 1748); *Institutiones logicae, praecipue comprehendentes artem argumentandi* (Leiden, 1748); *Compendium physicae experimentalis conscriptum in usus academicos*, ed. J. Lulofs (Leiden, 1762); *Introductio ad philosophiam naturalem*, ed. J. Lulofs, 2 vols (Leiden, 1762). Many of Musschenbroek's works have been translated into French, German and English. C. de Pater's monograph on Musschenbroek (see below) contains a complete bibliography.

Secondary sources

C. Dorsman and C.A. Crommelin, 'The invention of the Leyden

jar', *Janus* 46 (1957) 275-280; F.A. Meyer, 'Petrus van Musschenbroek. Werden und Werk und seine Beziehungen zu Daniel Gabriel Fahrenheit', *Duisburger Forschungen* (1961) 1-51; E.G. Ruestow, *Physics at seventeenth and eighteenth century Leiden. Philosophy and the new science in the university* (Leiden, 1973); C. de Pater, 'Experimental physics', in: Th.H. Lunsingh Scheurleer and G.H.M. Posthumus Meyjes, eds, *Leiden university in the seventeenth century. An exchange of learning* (Leiden: Universitaire Pers Leiden; E.J. Brill, 1975) 308-327; *idem*, *Petrus van Musschenbroek (1692-1761), een newtoniaans natuuronderzoeker* (Utrecht, 1979); P. de Clercq, *At the sign of the Oriental Lamp. The Musschenbroek workshop in Leiden, 1660-1750* (Rotterdam: Erasmus Publishing, 1997) (with an extensive bibliography of secondary literature).
D.J. Struik, in: *DSB*, vol. 9, 594-597; J.J.M.H. Verzijl, in: *NNBW*, vol. 10, 659-660.

[K.v.B.]