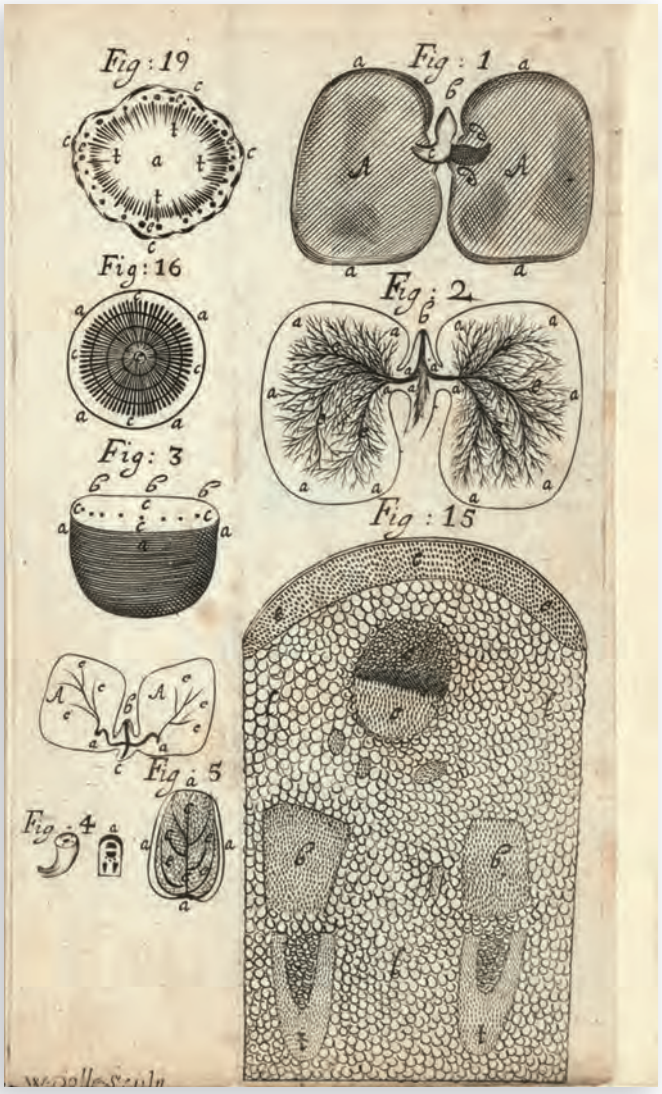
TWO WARWICKSHIRE MEN AND THE BIRTH OF BOTANY

Ian Dillamore



A detailed sketch of the anatomy of plants. *The Anatomy of Vegetables Begun* by Nehemiah Grew, 1672.

Planters, gardeners and plant breeders need to be able to describe and classify plants. In the sixteenth century, there were several attempts to produce classifications or taxonomies. Two largely unknown Warwickshire men, Nehemiah Grew and John Ray, made crucial contributions to understanding the sexuality and classification of plants.

Nehemiah Grew (1641 – 1712)

The younger of the two, Grew was born at Mancetter near Atherstone, the son of Obadiah Grew. Much of his youth was spent in Coventry, where his puritan father was minister of St. Michael's Church during the Commonwealth. He studied at Cambridge and Leiden before following the more famous Robert Hooke (1635-1703) in using the newly available microscope. His chosen study was the anatomy of plants.

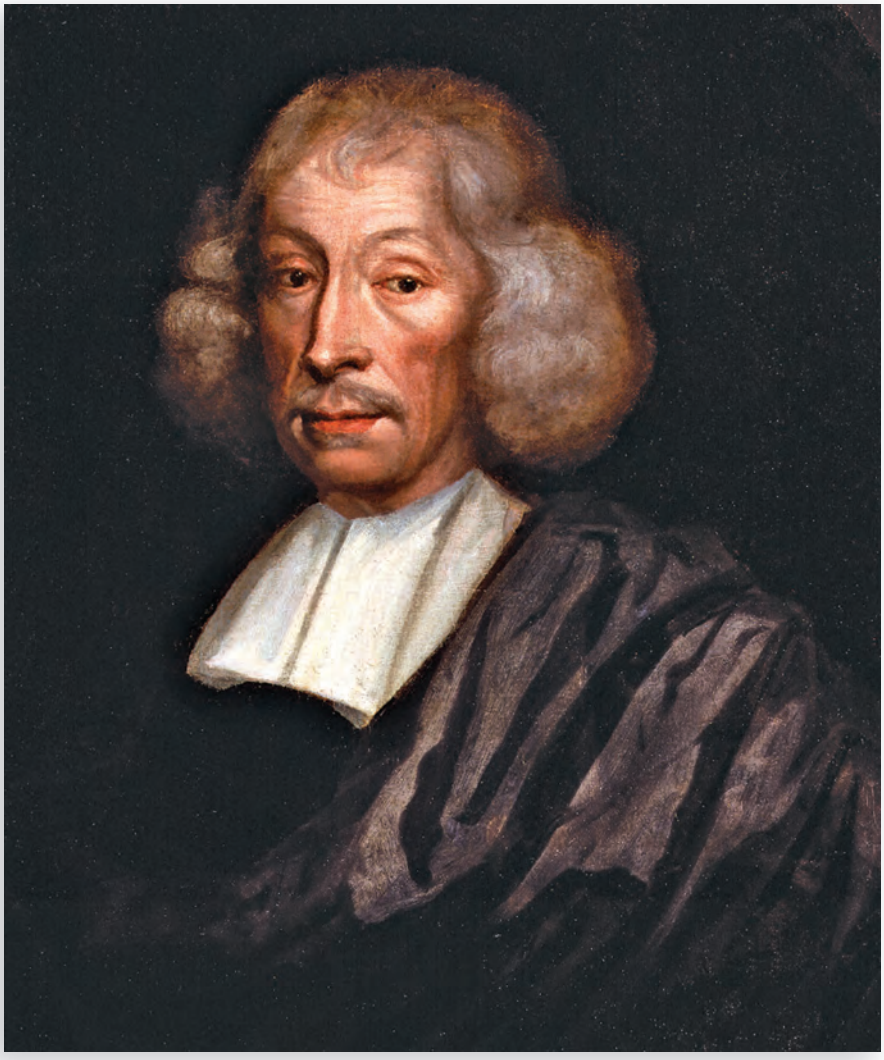
He was the first to identify the stamen, which he called the attire, as the male sex organ in plants. Pollen, likened to semen in animals, was recognised as the male contribution to propagation, but he did not correctly identify the female organs, presumably believing, as was also the case for the semen in animals, that it was an egg which the female incubated. Nevertheless, it became clear to the famous gardener, Thomas Fairchild (1667–1729) how he could make a new flower, a cross between a sweet william and a carnation pink and thus initiate the practice of plant breeding.

Grew worked as a physician in London and was thus well placed to become the secretary of The Royal Society, which he did in 1677 in succession to Henry Oldenburg (1619–1677), the first secretary of the organisation.

John Ray (1627–1705)

Known in his lifetime as 'The English Aristotle', Ray was a polymath who is credited by Tim Birkhead as the most important contributor to ornithology, by Anna Pavord as the greatest influence on the naming of plants, by Robert Huxley as the author of the essentials of the taxonomy in use today, and by Walter W Skeat (1835–1912), as the most significant English philologist before the nineteenth century. He taught mathematics, Latin and Greek at Trinity College, Cambridge, before losing his position, because he refused to sign the Act of Uniformity (1662), which required all clergymen, and these included tutors at Oxford and Cambridge, to swear an oath of loyalty to a set of Anglican doctrines.

On leaving Cambridge in 1662, Ray toured Europe for three years in company with his former student Francis Willughby and then settled at Willughby's home, Middleton Hall near Tamworth. He stayed in Warwickshire for 10 years, writing several of his books while there. He left shortly after Willughby's death, having been bequeathed £60 a year by Willughby, 'to be paid out of the New Park at Middleton'. It was thus the rents and tithes paid by the yeomen of Middleton that made possible his



Portrait of *John Ray* by an unknown artist after 1680.

continuing studies of the natural world. As the son of a blacksmith he did not have independent means.

The words genus and species entered the English language in the middle of the sixteenth century. Conrad Gesner (1516-1565) was perhaps the first to think of grouping plants in terms of a family and a given name, but there was no viable definition of a species, nor any sound basis for arranging individual species into families.

In 1674 Ray submitted a paper to The Royal Society describing the first major division in the plant world. Some plants develop from seed with only one leaf, such as grasses, lilies and orchids are called monocotyledons. The rest have two seed leaves and are called dicotyledons. It was not until 1686, in the first volume of his *Historia Plantarum*, that Ray gave the definition of a species. 'no surer criterion for determining species has occurred to me than the distinguishing features that perpetuate themselves in propagation from seed'. The groundwork was laid to develop a working taxonomy (classification) and make possible the binomial (two-terms) system of botanical names.

In developing his system of classification, Ray made it clear that he was building on the work of his predecessors. He always gave credit to them, even those who had insulted him; and he always credited the many correspondents who supplied samples. His special talent was in evaluating the available knowledge, much supplied by himself, and assembling it into a coherent system. He did not do so uncritically, generally checking the information carefully.

A significant feature of his work was that he rejected the universal belief that otherwise similar plants of different colour or size were different species. Colour and size are frequent descriptors in earlier plant lists. Ray said that these were not essential differences, but were due to natural variation. In recognising this he can be considered to have taken the first step in the development of a theory of evolution.

Ray classified mammals, birds (calling his book *Willughby's Ornithology* in tribute to his patron), fish, and insects, laying the foundations for modern systems of classification. Had Charles Darwin, who was no scholar, read Ray's work, he could have saved himself much effort! For instance, on page 181 of the *Ornithology* the many types of pigeon that their fanciers had bred were listed as varieties. It is also remarkable that Ray considered that all dogs were of one species.

Natural Science Begun

Earlier plant lists were mainly produced as herbals or for gardeners. Grew and Ray were among the first to study plants scientifically. There are many reasons why they are not better known, one being that they sought the truth, not celebrity. The science of botany was, in one sense, Ray's creation as he coined the name. In this respect, he is a major contributor to Enlightenment scientific thinking. ●

Professor Ian Dillamore is Honorary Professor of Materials, University of Birmingham and former Trustee of the Middleton Hall Trust.

Further Reading

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Robert Huxley (ed), *The Great Naturalists* (Thames and Hudson, 2007).

Anna Pavord, *The Naming of Names* (Bloomsbury, 2005).

C.E.Raven, *John Ray – Naturalist* (Cambridge University Press, 1986).

Walter W Skeat, *English Dialects from the Eighth Century to the Present Day* (Cambridge University Press, 1912). Online: www.gutenberg.org

Entries for Nehemiah Grew and John Ray in the *Oxford Dictionary of National Biography*, online edition. www.oxforddnb.com