

'The Scientific Papers of Sir William Herschel' at 100

The German-born William Herschel is well-known through his fundamental contributions to many fields of classical astronomy. He discovered and observed thousands of celestial objects: ordinary and double stars, nebulae and star clusters and, in 1781, Uranus. His thoughts about the "construction of the heavens" were revolutionary and influenced many 19th-century astronomers. But Herschel also was a practical man, building the largest reflecting telescope of its time.

One hundred years ago, in 1912, Herschel's lifework was published, filling two large-format volumes with, in total, 1441 pages (Dreyer 1912). The driving force behind the edition, *The Scientific Papers of Sir William Herschel*, was no less than John Louis Emil Dreyer, Director of Armagh Observatory and author of the famous *New General Catalogue* (NGC) of 1888. The date begs the question of why William Herschel's collected papers didn't appear until 90 years after his death in 1822. Of course, there were earlier plans, advanced by his son John Herschel. But, despite the scientific reputation of Herschel and of his son, the matter was not successful. The main reason was, as so often, money.

Bulky material

No serious publisher could be found to undertake the risk of such an extensive work. Eventually, early in 1910, a joint committee of the Royal Society and the Royal Astronomical Society was appointed to move things forward. Dreyer was a member, together with the Astronomer Royal Frank Dyson, William Huggins, Joseph Larmor, David Gill and others. The project was supported by Herschel's grandson William John, who left letters and papers from the estate to the committee. It became the task of the 58-year-old Dreyer to edit the bulky material, because he had the greatest experience with Herschel's methods and was familiar with the results. Dreyer had observed many nebulae with Lord Rosse's 72-inch reflector at Birr Castle, revised John Herschel's *General Catalogue of Nebulae and Clusters* (GC) of 1864 and eventually compiled a new one (NGC) under the authority of the RAS. Moreover, Dreyer was an expert in the history of astronomy and had a profound knowledge of the scientific literature. The committee was left in no doubt that he was the right man for the job.

Dreyer was then confronted with a large number of papers, spread over about 40 volumes of the *Philosophical Transactions of the Royal*

Wolfgang Steinicke celebrates the centenary of a famous publication.

Society. Their highlights include Herschel's three catalogues of nebulae and star clusters, published in 1786, 1789 and 1802; his revolutionary observations of double stars; the discovery of Uranus; the later discovery of the sixth and seventh satellites of Saturn; the papers on the "construction of the heavens", including the analysis of the Sun's proper motion and a graphic presentation of the Milky Way (based on extensive star counts); and reports about the construction of large telescopes. Dreyer also investigated unpublished material: the London archives of both societies and the documents provided by William John Herschel. A major source was the observing journals, covering many years of work in Bath, Datchet, Old Windsor and Slough. Though the handwritten notes are detailed, the presentation is rough (particularly in the first journals). Fortunately, Caroline Herschel, assisting her brother until his death, had sorted the data and made neat copies. With the original documents, Dreyer was able to compare the three Herschel catalogues with the more modern NGC. This led to a major and enhanced revision, with the result that the catalogues in Dreyer's edition differ from the original published in the *Philosophical Transactions*. Moreover, he contributed a scientific biography of William Herschel, in the first 56 pages of Volume I. It is followed by the "Unpublished Papers" (most of them read before the Philosophical Society of Bath or communicated to the Royal Society). In the appendix of Volume II we find another outcome of Dreyer's work: a collection of Herschel's observations of Messier objects. He also included 27 figures. When the task was finished within two years, Dreyer transferred the material to the committee, who initiated the layout and print (his preface is dated February 1912).

Today the original *Scientific Papers* can only be bought second-hand – and one must reckon to pay £500 for a good exemplar. However, scanned versions of both volumes can be found

on the internet (see reference for Dreyer 1912).

In recent years, Herschel's three deep-sky catalogues have undergone a new revision. It is based on my own research, using historical and modern sources. During this project, I was able to verify many nebulae and star clusters by visual observations that simulated the historic situation. The result is a database of 2515 objects (Steinicke 2012), bearing the designation H (of which a handful were added by Dreyer to the original catalogue). This is part of my larger study of the observation and cataloguing of nebulae and star clusters in the 19th century (Steinicke 2010). Another recent presentation of Herschel's papers on the structure of the cosmos and the evolution of its objects – including

the original publications – is *The Construction of the Heavens – William Herschel's Cosmology*, by Michael Hoskin (2012). I and the Cambridge astronomer David Dewhirst examined the deep-sky objects mentioned in Herschel's papers from an astrophysical point of view.

Although the *Scientific Papers of Sir William Herschel* now fit on a memory stick, it is still useful to take in hand the original publica-

tion. Its size and weight leaves a lasting impression of what really was a life's work! It would be difficult to find anyone, either now or in the past, who contributed so much to astronomy in so many different fields. Finally, it should be noted that the two volumes cover only the second half of Herschel's career. The first was dedicated to music – where he was also a master. It is a curiosity that his first paper is dated 1780, when Herschel was 42 – and had exactly 42 years to live. ●

References

- Dreyer J L E 1912 *The Scientific Papers of Sir William Herschel*, 2 Volumes (Royal Society, London)
Vol. 1 <http://tinyurl.com/herschelv1>
Vol. 2 <http://tinyurl.com/herschelv2>
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