

Wolfgang Steinicke

William Herschel: discoverer of the deep sky: the epochal work of the greatest visual observer and his talented sister Caroline

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The name of William Herschel is one of the most famous in the history of astronomy. Everyone knows that he discovered Uranus, and that—once he no longer had to work for a living as a busy professional musician—he went on to build gigantic telescopes used to discover double stars, work out the construction of the Galaxy, and sweep up thousands of nebulae which were imagined as milky ways in their own right. (As Fanny Burney, the novelist and Second Keeper of the Robes to Queen Charlotte at Windsor, exclaimed, “Herschel has discovered 1500 universes!” However, he was still adding more. By the time he published his third catalogue of nebulae and star clusters in 1802, he had discovered 2500.)

There you have the usual index card view of Herschel. In recent decades, Herschel scholarship has grown exponentially—especially since his sister Caroline Herschel’s vast contributions have been belatedly recognized and she has become a cottage industry in her own right. (For too long, historians have tended to take Caroline at her own estimation: “I did nothing for my brother, but what a well-trained puppy-dog would have done: that is to say, I did what he commanded me. I was a mere tool which he had the trouble of sharpening.”) One still hears trotted out that the discovery of Uranus was a lucky accident, and imagines that that lucky moment—like winning the lottery—led Herschel on to fame and fortune; that after he became the King’s Astronomer (at the age of 44) his later investigations were pursued as a kind of hobby to fill his leisure hours between spotting celestial wonders to the King and royal family when called on to do so. There’s a tendency among us lesser mortals to prefer to think of genius as, if not a matter of luck, then of god-given, mysterious and effortless inspiration (as in the movie “Amadeus”), which is also a kind of luck. Only by delving into the matter fully does one realize just how hard a Mozart—or a Herschel—worked. They were gifted, no

doubt, but they also worked incredibly hard. They were also able to get by on precious little sleep!

Dr. Wolfgang Steinicke is highly accomplished German astronomer and researcher who has published ten books in German and English and more than 300 scientific papers, many of them related to different aspect of Herschel's researches on the deep-sky. His dissertation (completed in 2008 at the University of Hamburg) was on 19th-century deep-sky observations, and has been published as *Observing and Cataloguing Nebulae and Star Clusters: from Herschel to Dreyer's new General Catalogue* (Cambridge: Cambridge University Press, 2010), which lays the groundwork for the present work. He has also maintained a web site which includes constantly updated versions of important deep-sky catalogues, which can be accessed at: www.klima-luft.de/steinicke. He has personally observed and photographed apparently all of the Herschel objects, canvassed the world for Herschel manuscripts (those of William and Caroline) and single-handedly solved many hitherto unsolved mysteries of Herschel scholarship.

The result of all this research is a monumental achievement, which will remain the definitive work on Herschel's pioneering studies of the deep sky for the far foreseeable future. It is almost dauntingly thorough. I admit that after I happily agreed to review it, it took me over a month to finish—but there was no question of skipping pages or browsing. Very few books make so many demands on the reader but few offer so many rewards. As a result, this book will be for a "fit audience though few." One does not clamber up a mountain of achievement of Herschelian scale in an afternoon; one has to set up one's base camp, and at every stage, check one's ropes and secure one's pitons. At the end, one feels exhausted. One also feels exhilarated, and forever changed on looking down from impossible heights.

As is well known, even before he discovered Uranus, Herschel was a very busy and prosperous musician (and some of his music has experienced a revival in recent years; it certainly deserves better than being regarded as Patrick Moore once said, "like Mozart "gone stale"). He was also busy reading books on musical harmony, which led to books

on optics, which led to building his own telescopes, which led to interesting projects such as measuring the heights of lunar mountains and finding evidence of inhabitants. There was, at first, something of a “wild side” to William Herschel that is not always recognized; nor did that “wild side” ever go away. Throughout Herschel’s career he continued to move from divergent idea to divergent idea—though always avoiding the speculation that could easily have overtaken him by grounding his ideas in empirical research and remaining tethered to the ground (or the sky in his case, if that isn’t too mixed a metaphor). For Herschel, theory and observation went hand in hand, as indeed they must. “If we indulge a fanciful imagination and build worlds of our own,” he once said, “we must not wonder at our going wide from the path of truth and nature; but these will vanish like the Cartesian vortices, that soon gave way when better theories were offered.” (One wonders what he would have made of string theory.)

Perhaps no astronomer has pulled himself up by his own bootstraps as Herschel did. No other observational astronomer has shown such practical skill and ingenuity as an instrument-maker (not only was his 48-inch reflector a marvel of the age, and not to be surpassed until Lord Rosse built the “Leviathan of Parsonstown” in 1845, but already the 7-foot telescope with which he discovered Uranus showed itself superior in head to head competition with any of the instruments available at Greenwich). He combined this with remarkable skill in observations and shrewd and creative analysis. It is as if Herschel combined in one person George Willis Ritchey, George Ellery Hale, and Edwin Hubble. We learn what star catalogs Herschel used, what objects he discovered and when. The compilation of his catalogs of double stars and nebulae and the star “gages” (and the labors Caroline expended on each one) required herculean effort and almost superhuman endurance, and Steinicke opens the curtain on all that. Like a general campaigning in the field against overwhelming odds, Herschel ranged his forces effectively, and mobilized every advantage; for instance, with the front-view optical system he was able to increase the light grasp of the speculum metal mirrors he used substantially. Steinicke describes Herschel’s different telescope designs, the ways they were modified to improve results, the care with which he preserved his dark-adapted

vision while working through the night, the faintness of some of the objects described (he found such elusive things as the the brightest parts of the North America Nebula and the Veil Nebula), the careful thoroughness with which the sweeps were carried out and positions determined, all of which all would have been impossible without the faithful and indefatigable assistance of Caroline (as well as unnamed workmen who labored through nights of tedium moving the telescope around). No project was finished before Herschel embarked on yet another one. Usually he was following several leads at once. He was one of the great multi-taskers of all time. As the hours of nocturnal vigil ended he would take on the work of writing up his papers or going to London to obtain supplies needed for the construction of the latest telescopes and supervising the workmen in every aspect of the work—not a screw was turned without his supervision—thus often sacrificing what little sleep he had. The work continued, moreover, in all kinds of weather; every scrap of night available was used (except when visitors interrupted), in what can only be called a magnificent obsession. (I had not realized, for instance, that the discoveries of Saturn’s satellites, which his son John would rightly list among William’s preeminent achievements, took place in intervals while he was carrying out his other sweeps, and not as a result of a dedicated investigation.)

Steinicke’s book runs to 568 pages, in large format 8x12, with many illustrations and diagrams and tables. This is a definitive achievement; it is hard to imagine how anyone will ever surpass it. Anyone who tried would only repeat what Steinicke had already done. Though not a native English speaker, Steinicke has produced a book with few errors and only occasional lapses from idiomatic English. The book is written at the level of a high-power eyepiece rather than a wide-field telescope; the field is narrow, and the closeness of detail fills the eye. The effect therefore is not that of a grand sweep but it is slowly cumulative. It builds up its picture particle by particle, like an artist producing a pointillist painting.

Instead of following the usual strategy of biographers of constructing a narrative, Steinicke produces what is almost a virtual museum, in which he includes a vast array of

documents from every period of Herschel's career in sufficient detail. He painstakingly details what telescope Herschel used and what he observed on almost a night to night, even an hour to hour, basis. To give some example of how rich the material is, he notes that the night of August 17, 1779 was a notable one, as it marked the beginning of Herschel's "second star review" (the first serious one), in which he discovered three double stars—of which the third was the Pole Star!—using the new Newtonian reflector of 6.2 inches aperture, of which he was later to say "I believe, that for distinctness of vision this instrument is perhaps equal to any that was ever made." Steinicke includes details that I may have read before but somehow missed; for instance, that the octagonal wood tube on a mahogany stand used in this telescope was of cocus wood, which was extensively used for woodwind instruments at the time; no doubt Herschel's still main career of musician (oboist no less) played a role in his choice of this particular wood for his purpose. My curiosity excited, I looked up more about cocus wood, and discovered it was a species of flowering tree found in Cuba and Jamaica, historically known as the Jamaican rain tree, and one of the first exports from the West Indies to Europe. This of course places it in the wretched era of colonies and plantations and the British slave trade—but all of those associations lie outside the margins here; though anyone who wishes to can expand the references to include them, and enter more fully into the complex world through which William Herschel, Caroline, and their patrons moved. He includes all sorts of intriguing detail; for instance, accounts of Herschel's many visitors (including the composer Joseph Haydn who visited Slough, though at a time when Herschel himself was away). Though he had hailed from Hanover, and members of his musical family remained there (and Caroline returned after William's death), Steinicke mentions that Herschel was actually rather disgusted with his native Germany, and so diligently avoided speaking in German even to Caroline—though with one notable lapse, when in his excitement he described to Caroline the vacancy in Scorpio near M80, "Hier ist wahrhaftig ein Loch im Himmel."

What we have, then, is nothing less than a tour-de-force, a work of scholarship so immensely accomplished that it can only be recommended with enthusiasm (and even

awe). The only flaw, if there is one, is that it is almost more comprehensive than an ordinary human mind can possibly take in. It is, as Joseph II, Mozart's patron, put it, a matter of "too many notes." One hopes that eventually Wolfgang Steinicke (or someone) with narrative skill can produce for more ordinary readers a scaled back version.

In the meantime, we have this, which one suspects is the work that Herschel himself would likely have regarded as closest to him in spirit. I would add that it is priced quite reasonably (for all it offers) at £63.

William Sheehan