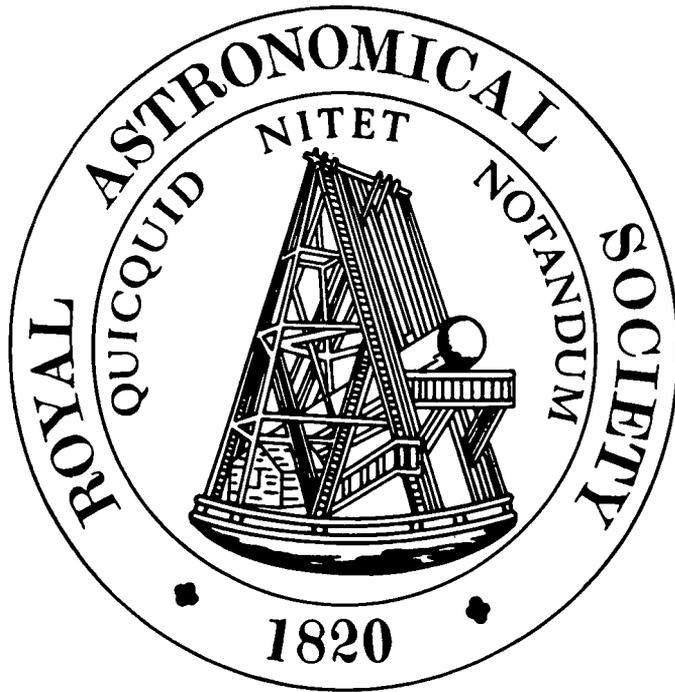


INTRODUCTION



Crest of The Royal Astronomical Society. The instrument shown is Sir William Herschel's 40 foot telescope. Herschel was the first President of the R.A.S.

The Latin tag reads "Whatever shines is to be noticed".

URANUS AND THE OUTER PLANETS
INTRODUCTORY REMARKS

by

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It is a pleasure to write this short Introduction to the joint RAS/IAU Meeting on "Uranus and the Outer Planets". Sir¹ William Herschel, who discovered the planet Uranus two hundred years ago in the city of Bath, was the first President of the Royal Astronomical Society. We are continually reminded of his work by our crest (Frontispiece) which shows Herschel's giant telescope - some forty feet in length and containing a four foot diameter mirror. It is a remarkable fact that this giant instrument came into use only eight years after he had taken up full time work in Astronomy and it remained the world's biggest for many years.

The important role of the amateur in the advancement of science has been well demonstrated, and Astronomy has had more than its share of gifted amateurs, but Herschel's contribution was quite outstanding. By concentrating effort on producing instruments of quality far above those available to contemporary amateurs (and, as it transpired, superior even to those used by professionals), and by having a lack of preconceived ideas as to what the Heavens should contain, Herschel was able to make what in modern jargon we would refer to as a quantum leap in the subject.

Herschel was 42 when he discovered what was later to be known as Uranus. Plate 1 shows him at a somewhat later age (56).

Some small idea of Herschel's constructional skill can be gained from Plate 2 which shows the telescope, currently in the Science Museum, London, which is a near-contemporary copy of the instrument used in the discovery of Uranus. Of course, the quality of the telescope was conditioned largely by the speculum mirrors, hand-ground and polished; it was these mirrors which even the Astronomer Royal of the time, Nevil Maskelyne, acknowledged to be superior to his own.

Later papers will deal with Herschel's contributions to planetary science in detail; here I will consider some other aspects of his work.

Although the majority of the credit for Herschel's discoveries must go to the man himself, some is due to his sister Caroline (Plate 3). Miss Herschel joined him in 1772, initially as a house-keeper, and, after tuition, became a painstaking and highly proficient observer in her own right. The RAS acknowledged Caroline's researches by the award of its Gold Medal in 1828 and I should like to refer to the address by the Vice President of the R.A.S. at the time (J. South) on the occasion of the announcement of the award. South mentions the key role played by Caroline Herschel in noting the measurements made by her brother at the telescope, of her reduction of the observations and of her planning of the surveys. The Vice President refers to

"the discovery of the comet of 1786, of the comet of 1788, of the comet of 1791, of the comet of 1793, and of the comet of 1795, since rendered familiar to us by the remarkable discovery of Encke. Many also of the nebulae contained in Sir W. Herschel's catalogues were detected by her during these hours of enjoyment. Indeed, in looking at the joint labours of these extraordinary personages, we scarcely know whether most to admire the intellectual power of the brother, or the unconquerable industry of the sister."

Finally, South gives the following description of what was Caroline's most important contribution.

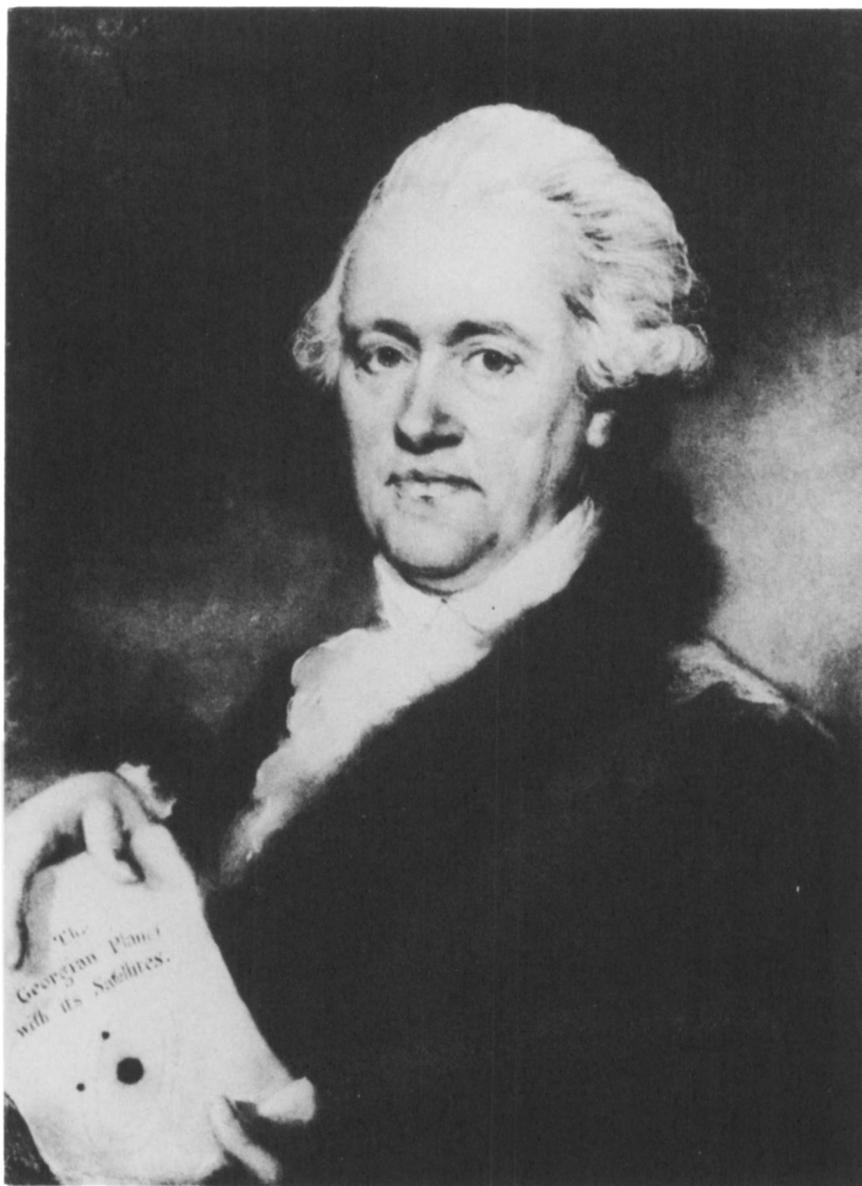
"Unwilling, however, to relinquish her astronomical labours whilst anything useful presented itself, she undertook and completed the laborious reduction of the places of 2,500 nebulae, to the 1st of January, 1800, presenting in one view the results of all Sir William Herschel's observations on those bodies, thus bringing to a close half a century spent in astronomical labour."

It was on these grounds then that Caroline Herschel was awarded the Gold Medal.

Returning to William Herschel, himself, it is important to stress that his contributions to Astronomy were by no means limited to nearby objects. There were analyses of double stars and the motion of the solar system with respect to the local stars, but Herschel's achievement of greatest significance was in his development of theories to explain 'the construction of the heavens', theories largely based on his own comprehensive observational data. Observations of nebulae were crucial in this work and Herschel's systematic 20-year observing programme gave rise to the list of 2,500 such nebulae, some 25 times the number previously known. The incomparable quality of his telescopes led to the resolution of many nebulae into individual stars and the realisation that some comprised incandescent gas. Inevitably, there is a tangled web of fact and interpretation but there can be traced in this work the beginnings of contemporary views about the life history of star clusters, the shape of our own Galaxy, the multiplicity of galaxies and, not least, possible modes of generation of galaxies.

ACKNOWLEDGEMENTS

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Sir William Herschel, F.R.S. (at the age of 56). From a pastel by J. Russell R.A. 1794 (reproduced in "The Royal Society/Royal Astronomical Society Collected Scientific Papers of Sir Wm. Herschel").



A contemporary copy of the 7 foot telescope with which Herschel discovered Uranus on 1781 March 13 at Bath (Science Museum, London).



Caroline Herschel (at the age of 79). From the portrait in oils by Tielmann in 1829 (reproduced in "The Royal Society/Royal Astronomical Society Collected Scientific Papers of Sir Wm. Herschel").