(Devonshire and Kent), young Henry had no need to trouble himself with earning a living, and as he grew older he grew richer, thanks to family legacies, a frugal lifestyle and secure investments. He became, as the French physicist Jean Biot put it, " the wisest of the rich and the richest of the wise".

But he came from an aristocratic élite whose long survival owed much to the fact that they generally understood that privilege had to be balanced by some form of service. The most common form taken by such civic duty was to enter politics, as Henry's father had done. But such a course was closed to Henry by a chronic shyness that led to him literally fleeing if he was button-holed at a social gathering and by a morbid fear of female company.

So, with paternal blessing, Henry turned to science and, in particular, to experimental science of the kind cultivated by his father. He also continued his father's tradition of service to the Royal Society and other learned institutions such as the British Museum. Indeed, it is one of the paradoxes of Cavendish's career that such an extremely introverted character should have been a good committee man. Not only did he serve the Royal Society in various capacities, but he was also a manager of the Royal Institution and a member of the Royal Society of Arts and the Society of Antiquaries. In an age when the characteristic institution of British learned society was the club, the seemingly unclubbable Cavendish was a ubiquitous presence — although one that might rapidly disappear if he was singled out for attention.

Cavendish's chronic shyness was evident, too, in his marked reluctance to publish unless he was totally satisfied with the results — a rare event. The consequence was that, over a lifetime devoted to experimentation (since the bachelor had few domestic distractions), he published fewer than 20 papers. The world, then, saw only some outworks of a majestic edifice that covered most of science as it was then understood. What gave his work unity was his devotion to continuing the Newtonian enterprise of attempting to understand the world in terms of attractive and repulsive forces. It underlay his pioneering work in electricity, which demonstrated both the insights and limitations of the Newtonian concept of force when applied to electrical activity. Although he did publish two papers in this area, largely based on the analogy between the fluid-like behaviour of air and electricity, much of his work, such as his laws of electrical attraction and repulsion, were virtually stillborn as they were never published.

The Newtonian world-view also informed his elegant (and published) 1798 experiment using lead weights on a torsion bar to estimate the strength of the Earth's gravitational attraction which, in turn,

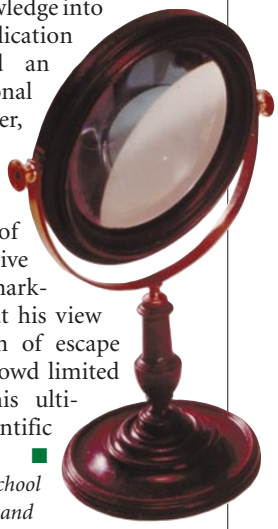
Tools of his trade: lenses used by Cavendish, who viewed science as a form of escape.

enabled Cavendish to calculate the Earth's density and weight.

Cavendish's work was also informed by the view that, to some degree, all natural phenomena could be explained in terms of the behaviour of fluids. This was evident both in his electrical experiments and in his pioneering work on what he called 'factitious airs', that is, forms of air that can be released from other bodies — of these, the two most notable were 'inflammable air' (hydrogen) and 'fixed air' (carbon dioxide). The very fact that he distinguished between such forms of air was an indication of the withering of the traditional view that the four elements earth, air, fire and water were the irreducible building-blocks of the world. This ancient understanding of the elements was to be further undermined by Cavendish's experiments in 1784 demonstrating that water was a compound of two airs, 'inflammable' and 'common'. Fortunately, he was sufficiently satisfied with his conclusions to publish them and they were instrumental in prompting Antoine Lavoisier to develop a totally new understanding of the concept of an element.

In this lengthy work, the authors clearly and systematically describe Cavendish's scientific achievements as well as providing a portrait of the élite world in which he and his father developed their scientific interests. This new edition also publishes Cavendish's surviving scientific correspondence.

After such Herculean labours, it is natural enough for the authors to place their subject on a very high pedestal. Their view that Cavendish "was the preeminent mathematical and experimental scientist in Britain in the century and a half between Newton and Thompson and Maxwell" may be defended, although others might yield such laurels to Thomas Young or Michael Faraday. More contentious is their claim that "Cavendish is one of the greatest scientists ever, as he is one of the most unusual personalities of science". That claim is perhaps based on an assessment of the whole corpus of his work, with insufficient allowance for the fact that scientific eminence can generally accrue only from published work. For the aristocratic Henry Cavendish, spared the financial pressures to turn knowledge into career capital, publication may have appeared an optional and occasional interruption. However, science is, by its nature, a social activity which depends on the sharing of knowledge. The reclusive Cavendish made a remarkable contribution, but his view of science as a form of escape from the madding crowd limited his influence and his ultimate place in the scientific pantheon. ■



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