HISTORY OF SCIENCE

Romantics in the English Manner

Robert J. Richards

The Age of Wonder
How the Romantic Generation Discovered the Beauty and Terror of Science

by Richard Holmes

Harper, London, 2008. 600 pp. £25, C$55.95. ISBN 9780007149520. Pantheon, New York, 2009. $40. ISBN 9780375422225. Paper, Harper, London, 2009. £9.99, C$21.95. ISBN 9780007149537. Vintage, New York, 2010. $17.95. ISBN 9781400031870.

The designation "Romantic science" might refer to a special kind of science or to the particular personalities who engage in science. In *The Age of Wonder: How the Romantic Generation Discovered the Beauty and Terror of Science*, Richard Holmes succeeds admirably in pursing the latter meaning, though he has ambitions also to explore the former. Holmes, a biographer of Shelley, Coleridge, and Dr. Johnson, has woven together several tales of English scientists who ventured to exotic lands, flung themselves into love affairs, and wrote sonnets to science. The likes of Joseph Banks, William and Caroline Herschel, Mungo Park, and Humphry Davy displayed, in the calmer English manner (even if the Herschels stemmed from Hanover), the kind of personalities that discovered the "beauty," if not exactly the "terror," of science. Holmes dishes up the faux terror in his chapter on Mary Shelley's *Frankenstein*, although the wilder opinions of Samuel Taylor Coleridge, who passes through his pages in a drug-induced ramble, are unsettling enough. The lives of the individuals whose accomplishments Holmes depicts are bracketed by James Cook's first voyage to the South Pacific (1768–1771) and Darwin's *Beagle* adventure (1831–1836). With dexterity and considerable but unobtrusive scholarship, Holmes goes far to reveal "the scientific process by which a mind of acknowledged power actually proceeds in the path of successful enquiry." That last line comes from David Brewster's *Life of Sir Isaac Newton* (1831). The minds Holmes depicts, however, stand deep in the shadow of the standard by which Brewster gauged scientific power.

Joseph Banks, botanist and long-time president of the Royal Society, serves Holmes as his Virgil, helping to link together the lives of his other protagonists. Banks gained his scientific reputation as a botanist on Cook's first voyage, though Holmes only touches lightly on the botanical work. He rather lingers, as a deft biographer might, over the scientist's shedding of English inhibitions while in the Tahitian islands, where he danced naked with native women and took as his lover one of the queen's servants. The young Banks stands in sharp contrast to the very image of John Bull that he later assumed as president of the Royal Society.

The story of the astronomical work of William Herschel and his sister Caroline forms the spine and intellectual pith of Holmes's narrative. In 1766, William came to Bath, England, where he had been appointed organist and choirmaster at the Octagon Chapel. Between giving music lessons and composing, he began reading astronomical works and mathematics. His passion for astronomy led him to construct his own reflecting telescopes. In 1773, he built a five-foot reflector, for which he cast and ground his own mirror, a six-inch concave "metal speculum," the first of its size and precision. As his ambition grew, so did the size of his telescopes, which he began manufacturing for other astronomers. In the spring of 1781, with his seven-foot reflector he watched a new planet swim into his ken. This discovery of Uranus (the first new planet observed since the time of Ptolemy), along with his numerous papers on original sightings of comets and nebulae, won Herschel election to the Royal Society and its Copley Gold Medal.

Herschel brought his sister Caroline to Bath principally to emancipate her from the vapid life in Hanover but also to act as his housekeeper and general secretary. Gradually she was inducted into the manufacture of telescopes, and then to sweeping the sky with her brother and aiding him in the necessary calculations. Two individuals were needed when Herschel deployed his 20-foot and then his 40-foot telescopes, from the towers of which he would shout his observations to his sister. These dazzling instruments allowed them to resolve nebulae into individual stars and to speculate that these clouds were the "laboratories of the universe," the cradle of new stars and their planets. Holmes obviously means to secure due recognition for Caroline's extraordinary talent, which she exercised well into her nineties.

As an agile writer, Holmes understands that an extended narrative about the work of the Herschels might grind down the less committed reader. He thus lightens his story through an interlude on competitive ballooning, with the English and the French vying to be first to cross the channel. The chapter

The First Balloon Crossing of the English Channel, 7 January 1785. E. W. Cocks's painting (*c*. 1840) depicts the hydrogen balloon flown by Blanchard and Jeffries leaving the Dover coast.

CREDIT: SCIENCE MUSEUM PICTORIAL

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devoted to Mary Shelley's *Frankenstein* serves a similar function, dividing up two long chapters on Humphrey Davy, one on his search for therapeutic gases (and his use of nitrous oxide for pain relief), the other on his invention of a miner's lamp that would not ignite coal gases.

Davy probably comes closest to developing something like a distinctive Romantic conception, or at least his poetry had the kind of dark, melancholic tincture that sometimes passes for romantic. He had a gift for lecturing on the delights and utilities of science to public audiences at the Royal Institution. Nearly 500 people attended his final lecture of the London season in 1801. As he wrote a friend: "There was Respiration, Nitrous Oxide, and unbounded Applause. Amen!" But as a grounded Englishman, he did not expect the advance of science to bring mankind to the state sought by the French Revolutionists. He would not entertain "delusive dreams concerning the infinite improveability of man." Nitrous oxide, mediocre poetry, and English good sense, it must be said, do not a Romantic make.

In order to suggest that the English science of this period is Romantic science, Holmes has to construct walk-on roles for Keats, Coleridge, Percy Shelley, and Mary Shelley's monster. The latter did seem to have a notion of the Romantic: at least one of the books by which he became schooled in human feeling and with whose main character he identified was Goethe's *Sorrows of Young Werther*.

Early German Romanticism stands in the background of the scientifically anemic English brand. Friedrich Schlegel, one of the architects of the German movement, declared: "all art should become science and all science art; poetry and philosophy should be made one." Goethe, Humboldt, Herder, Novalis, Ritter, Schelling, the brothers Schlegel, and the femme fatale Caroline Böhmer-Schlegel-Schelling forged, in the framework provided by Kant and Fichte, the union of science and art and demonstrated that nature still retained the kind of moral and aesthetic values evacuated from an English mechanical universe. Their organic conception of nature had a decided impact on that scientist who could stand up to the measure of Newton, namely Charles Darwin. Holmes's *Age of Wonder* displays more the skill of the accomplished biographer than the beauty and fear of an English Romantic science.

10.1126/science.1181808

HISTORY OF SCIENCE

Far More Than Mere Transmission

Laurel Brown

In *Science and Islam: A History*, Ehsan Masood presents a clear, interesting, and nonspecialist account of a much-overlooked piece of the history of science. Although not perfect, the short book excellently portrays the importance of Islamic science.

Written to accompany a BBC television series of the same name, the book focuses on "the scientific revolution that took place during the empires created by Islam, between the 8th and the 16th centuries." During this period, science flourished and grew from mostly Greek origins into a system of unprecedented accomplishment. Despite several centuries of important advances, modern scientists and historians have long overlooked the contribution of the Islamic world to the sciences.

The book begins with a solid overview of the "classical narrative" of science in Islam, according to which scientists of the Islamic world focused on the translation and transmission of sciences that remained Greek in all essentials. This narrative further holds that, after a brief period of activity terminated by the triumph of religion over reason, Islam simply passed on the Greek sciences to a ready and willing Europe. Although several decades of historical research have laid siege to this interpretation, Masood rightly notes that it continues to hold sway. Insisting that the classical narrative cannot be the whole story, he offers instead a rich history of innovative Islamic science.

Science and Islam
A History
by Ehsan Masood

Icon Books, London, 2009. 264 pp. £14.99, C$30. ISBN 9781848310407. Paper, 256 pp. £8.99, C$20. ISBN 9781848310810.

Still, Masood (a London-based science journalist and writer) does not appear to have had the historical resources required to break free of the classical narrative. He gives examples of scientific advancements (including the development of algebra and trigonometry, the discovery of the lesser circulation of blood, and the overhaul of Greek astronomy) but frequently falls back on the classical perspective when specific evidence is lacking. Masood mentions, for example, the work of al-Razi, a ninth-century physician who drew attention to particular problems with Galen's medical system. Despite discussing later physicians who shared al-Razi's qualms and advanced further arguments against Galen, Masood states, "No-one really followed up al-Razi's doubts about the entire system of humours, … and it was another thousand years before it was seriously challenged." Such an insistence that Islamic science continued to rely only on the original Greek tradition stems directly from the classical narrative. The narrative reoccurs throughout the book in the face of the concurrent challenge of Masood's evidence for scientific advancement and originality.

Masood follows his prologue on theories and misconceptions with a concise but excellent overview of the political, religious, and intellectual history of early Islam. This serves as a springboard for surveying the early achievements of Islamic science, especially the rapid translation of Greek scientific texts into Arabic and the flowering of scientific centers such as Baghdad and Muslim Spain.

The book's central section, "Branches of Learning," may be its strongest. Masood adeptly details breakthroughs and advances of Islamic scientists in the areas of medicine, astronomy, mathematics, chemistry, and engineering. Considering that some of these discoveries—including astronomical techniques later used by Copernicus and surgical tools we still use—are integral to the history of our modern science, Masood's work is particularly welcome.

The final section, "Second Thoughts," proves somewhat problematic. Its first chapter inexplicably covers optics, the formation of universities, the European reception of Islamic science, and theories of evolution in rapid succession. Masood discusses each topic clearly and carefully, but, with no explanation given for this grouping, readers may find it difficult to keep matters straight.

The last two chapters deal primarily with Islam's loss of scientific preeminence from the 1500s on. Masood covers the possible influences on the "decline," including economic woes, self-identity crises within Islam, and European colonization. Given the dearth of studies on later-period science, it is not surprising that he offers little on scientific continuity within the Islamic Ottoman and Mughal empires after the 16th century.

Masood makes good use of recent scholarship in the area of Islamic science. Interested readers will find the book an excellent first foray into the field. *Science and Islam* definitely does not shut the door on the unfortunate classical narrative. But it does provide the tools that may begin to move the history of science in the Muslim world in a different—and hopefully more productive—direction.

10.1126/science.1187158

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