which demonstrated the existence of ultraviolet light. Like many Romantic scientists, Ritter was particularly interested in phenomena that fell beyond the scope of classical Newtonian physics, such as electricity.

The area on which German Romanticism and *naturphilosophie* had the most impact in the early nineteenth century was the biological sciences; indeed, the word "biology" was coined by a German scientist of the period, Gottfried Reinhold Treviranus, in 1802. Like many German Romantic biologists, Treviranus was not a *Naturphilosoph*. He drew on Immanuel Kant rather than Schelling and favored a less transcendental approach to scientific practice. But the vitalism of early nineteenth-century German biologists, with its refusal to reduce living beings to a series of mechanical interactions at the expense of a spiritual component, was deeply Romantic.

After approximately 1830, a reaction against Romantic science set in. New leaders of German science, such as the organic chemist Justus von Liebig (who famously referred to *Naturphilosophie* as the "Black Death"), and the physiologist and physicist Hermann Helmholtz, asserted the primacy of mechanical and reductionist science over Romantic vitalism.

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SCIENCE OF THE PAST

The natural philosophy of classical antiquity still loomed very large during the Romantic Era, in Britain at least, largely due to the continuing predominance of the classical system of education in schools and universities. Indeed, for many young men, a reading of Pliny's *Historia Naturalis*, or Lucretius's *De Rerum Natura* might well have been their only exposure to natural philosophy during their formal education.

The theories relating to matter and its nature in *De Rerum Natura* were to exert a lasting influence on the physical sciences that would last well into the eighteenth century. Erasmus Darwin's verse epic *The Botanic Garden* drew upon Lucretius's influence in using poetry as a medium for the expression of scientific ideas, and became an inspiring text for many Romantic poets. In his preamble to the poem, Darwin notes that much of the "heathen mythology" of ancient Egypt, Greece, and Rome, along with more recent alchemic and Rosicrucian lore, was an early precursor to science, and thus he does not hesitate to make use of such imagery in his work. The influence of both Lucretius and Darwin is apparent throughout the poetry of Percy Bysshe Shelley, whose early exposure to classical science at Eton College had also included Pliny.

The eternal verities of mathematics held as true as they had two millennia earlier, but no less influential was the imagery of the geocentric cosmos of Aristotle and Ptolemy. Notwithstanding Galileo Galilei and Issac Newton, the harmony of the Aristotelian universe still held as much fascination for the Romantic poets as it had for John Milton and William Shakespeare. When William Herschel identified a new planet in our solar system—the first discovered in recorded history—the contemporary nomenclature of "the Herschel planet" or "Georgium Sidus" quickly gave way to that of Uranus, one of the earliest senior deities of classical Greek tradition. This reflected a lingering tendency among astronomers still to nod unconsciously toward a mythologically based cosmology, also evident in their frequent referral to heavenly objects such as the sun, moon, and planets in terms of "he" and "she."

In the realm of ontological philosophy, the phantom cosmos of Plato still cast its metaphoric shadow over Romantic metaphysical notions of the nature of existence and of human perception of the external world. Elements of Platonism lingered within contemporary theories of philosophical idealism and influenced the formation of concepts such as that of the Hegelian "world soul."

Alchemic terminology remained in use among some chemists well into the nineteenth century, with more traditional names such as "brimstone" still preferred by some to the modern nomenclature of sulphur. In literature, alchemic imagery that would have been recognizable to Geoffrey Chaucer persisted, whereby the archaic elements such as gold, silver, and iron were perceived as retaining certain supernatural characteristics, and were each related to a planet and its corresponding god from classical mythology. Attempting in 1812 to impress his future father-in-law with details of his philosophical interests, Shelley told William Godwin that he had "pored over the reveries of Albertus Magnus and Paracelcus" alongside his reading of David Hume and John Locke. Even recently discredited scientific concepts such as the Phlogiston theory (propounded in the seventeenth century and consigned to history by Antoine-Laurent Lavoisier in the late eighteenth century) lived on in popular scientific digests long after their time.

Medicine had only begun to release itself from the grip of Hippocrites and Galen during the seventeenth century. Advances in medical knowledge during the eighteenth century had given rise to quasi-Newtonian concepts of the human body as a machine in Paul-Henns-Dietrich d'Holbach's *Systeme de la*

Nature (1770). The rejection of such mechanistic views found a voice in Mary Shelley's *Frankenstein: or, The Modern Prometheus* (1818), while for the reemergence of a holistic view of the human mind and body at one with an organic universe, Romanticism called upon aspects of the herbalism of Paracelsus and the alchemic search for an elixir of life, in which doctors were viewed more as Promethean healers. Upon the death of the idealistic young poet in his poem "Alastor," Percy Shelley yearned "O, for Medea's wondrous alchemy."

Johann Wolfgang von Goethe sought to reunite metaphorically the arts and sciences in his novel *Die Wahlverwandtschaften* (*Elective Affinities*, 1809). This novel attempted to explore emerging scientific theories of chemical action, affinity, and reaction as influences upon human behavior, and at the same time placed them within the context of the pre-Renaissance concept of sympathia, whereby the universal order, from human thoughts and actions to the movements of the stars, operated by means of a unifying alchemic force pervading the cosmos.

The Bible remained a staunch opponent of modern science, most notably with reference to the creation of the universe, the formation of the earth, and the origins of life. However, biblical orthodoxy was occasionally able to lend support to contemporary scientific debate. One such case was the support lent by the legend of Noah's flood to the "Neptunist" faction in the fledgling science of geology, who held that the earth's features owed their formation to the actions of a great ocean that had once covered the planet (as opposed to the "Plutonist" theory, which ascribed the shaping of land masses to volcanic and seismic activity).

There was, nevertheless, a rejection of many of the protoscientific values of the past, particularly those that had been precursors of empiricism and the Enlightenment. By and large, Romanticism sought to reject the desire for sovereignty over nature implicit in the writings of Francis Bacon and René Descartes, preferring a holistic approach more attuned to transcendental unity with the natural world.

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SCOTT, SIR WALTER 1771–1832

English novelist

Sir Walter Scott is little read today, but he was one of the few Romantic writers to achieve world historical importance in his time. Scott gave the world a literary form—the sociohistorical novel—used by generations of imitators and readers around the world to enable their formation of liberal constitutional states. Such states are based on an ideology of sovereign subjects expressing their interests through representative democratic institutions, usually prescribed in a written constitution. In different discourses, the liberal constitution and the historical romance embody social, cultural, and economic interests of the middle-class reading publics, who enthusiastically consumed the novels of Scott and his numerous imitators, from Honoré de Balzac and Alessandro Manzoni through James Fenimore Cooper and George Eliot to Lev Tolstoy and beyond, while engaged in liberal state formation.

Scott's world-historical fictions appeared during the revolutionary and Napoleonic cataclysm that produced the first liberal constitution (at Cádiz, Spain, in 1812), a model invoked repeatedly through the nineteenth century. Politically Scott was a Tory, or conservative; nevertheless, his novels, like the Cádiz constitution, were designed to address a series of critical contemporary challenges while advancing the interests of those who both read novels and wrote new constitutions. These issues were both particular and general. The most immediate challenges were particular ones: plebeian revolutionary mobilization and Napoleonic imperialism. Yet the liberals, and Scott to a lesser extent, adopted key elements of the French revolutionary and Napoleonic systems while resisting revolutionary and Napoleonic imperialism. They did so mainly because old forms of court monarchy and aristocratic government were clearly unable to manage the forces unleashed by the broader challenge of modernization, which the revolution and Napoleon Bonaparte claimed to embody. In his novels, Scott provided, in comprehensible yet authoritative narrative form, a forceful vision of mediation between unmodernized past, modernizing present, and modernized future, without the necessity of revolutionary cataclysm or Napoleonic totalitarian empire.

Modernization is historians' term for transformation of customary and feudal social structures, economic relations, modes of production, cultural practices, and political institutions into "modern" ones: open and egalitarian social structures, "civil society," capitalist modes of production, "rational" and "enlightened" cultural forms, and more broadly representative state institutions. Modernization challenged the ancien régime, and itself produced further challenges. As the French Revolution demonstrated, modernization provoked both lower-class resistance and middle-class claims to share in modernization's benefits. In re-sponse, the defensive ancien régime relied more than ever on state churches to meet opposition from both dissident religious groups and Enlightenment religious skeptics. Partly entangled in these religious differences were historic regional, national, and imperial differences now exacerbated by the French