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## COSMOLOGY

Isaac Newton's demonstration in his *Principia* (1687) that all motion in the solar system took place according to immutable, absolute, abstract laws that could be calculated and understood by humankind had tremendous philosophical and theological implications. Hitherto, the course of history and human destinies had been assumed to lie in the hands of a divine providence. In Newton's wake, such beliefs became seriously overshadowed by doubt, and throughout the eighteenth century explanations of the creation and mechanics of the universe at large were to become the province of science rather than religion.

A picture of a vast, sublime, and seemingly infinite universe was being pieced together by the observations of astronomers such as William Herschel, while philosophers such as Immanuel Kant developed theories to explain the births of star systems and their grouping into galaxies. Even the possibility of exotic celestial features, such as what are now called black holes, were imagined by theorists in the late eighteenth century: for example, John Mitchell mooted the idea of light being unable to escape from sufficiently massive and dense stars in *Philosophical Transactions* (1784). The early nineteenth century saw the opening of the first fully equipped observatory in the southern hemisphere on the Cape of Good Hope in 1821. Thus the era of exclusively European-based astronomical observation came to an end, and for the first time the wonders of the Milky Way visible only from the other side of the Earth were revealed.

However, it was the controversial implications of works such as *Exposition du Monde* (1796) and *Mecanique Celeste* (1799–1825, translated into English by Nathaniel Bowditch) by French astronomer and mathematician Pierre Laplace that were to most arouse Romantic sensibilities. Laplace pointed out that the Newtonian universe must be an entirely deterministic one in the purest mathematical and logical terms. In a universe set in motion by some primordial first cause, and continuing its movement according to rigid and calculable laws, he argued, it was theoretically possible for a powerful enough intelligence to calculate and predict every event in the future, each one of which was scientifically inevitable. "Nothing would be uncertain," he said, "and the future, as well as the past, would be present to our eyes."

Ironically, it was the remaining perceived necessity for a first cause to set such a universe in motion that was to offer the church its only hope. Indeed, demotion of God to the status of divine clockmaker in a mechanistic universe was to be a source of salvation for the theological cause. Church scholars such as William Paley in *Natural Theology* (1802) developed "the Argument from Design," whereby it was argued that such a perfectly

ordered system was, paradoxically, evidence of the design of a divine creator rather than a denial.

Jean D'Alembert had raised further questions in his *Traité de Dynamique* (1758), proposing that the matter of which the universe was made might possess inherent properties of its own, irrespective of the influence of any natural laws or a god. He added that matter and its creation might in some way have existed prior to the advent of natural laws, and God and universal influence thus continue to remain separate for eternity.

This radical standpoint was taken to what was probably its furthest atheistic extent by Baron D'Holbach in his work *Système de la Nature* (1770), one of the key textual foundations of Romantic cosmological philosophy. In this work, Holbach took Newton at his word in attributing properties such as mass, momentum, inertia, and gravity entirely to matter, and extrapolated this to deduce that there was thus no need for a divine prime mover or first cause, as matter possessed its own inherent ability to move. As matter had also existed for all eternity and had no beginning in a universe infinite in terms of both space and time, nor was there, he said, any requirement "to have recourse to supernatural powers."

However, the prevailing cosmological beliefs of most educated people during the Romantic era remained essentially deistic, and are typified by the philosophical commentator Sir William Drummond in *Academical Questions* (1805), who wrote, "The boldest atheist, who ever hurled defiance against heaven, may not consider, unawed, the comparative insignificance of the whole earth with the suns and the planets of a thousand systems. It is surely, when we survey the order, and meditate the motions and the magnitude of the celestial bodies, that we obtain the most sublime notions of infinite power, and most readily confess the existence of a supreme Intelligence." This book, and other popular digests such as the best-selling *Astronomy Explained upon Sir Isaac Newton's Principles* by James Ferguson (1773), brought the latest scientific discoveries to the notice of the reading public at large. Equally popular were public lectures on astronomy and natural philosophy by figures such as Adam Walker, who appeared regularly at the Drury Lane Theatre and who taught Percy Bysshe Shelley at Eton College.

Even so, Romantic thinkers were always to have a problematic relationship with ideas of the universe at large; on the one hand its overall appearance of beautiful, benign simplicity; on the other, its awesome size and incomprehensible complexity. Imagery of the cosmos would gradually begin to replace the sea and other earthbound features of the natural world as preferred metaphors for concepts of the sublime.



In a manner similar to present-day postmodernist thought, Romanticism had a tendency to distrust objective scientific concepts of totality, synthesis, and empiricism. Eventually, subjective Romantic perceptions of the nature of matter, ontological idealism, and the primacy of human consciousness were to lead to a rejection of the mechanistic Newtonian universe, in favor of a more organic and holistic model.

Despite Newton, it was to be many years yet before the Western mindset would shrug off the ghost of the Aristotelian universe so beloved of Geoffrey Chaucer, John Milton, and William Shakespeare. Indeed, the lingering influence of classical tradition is illustrated by the fact that when astronomer William Herschel

discovered a new planet in 1781 (the first in recorded history) names suggested for it, including Herschel or Georgium Sidus ("the Georgian Planet"), were rejected in favor of Uranus, a mythological deity.

CHRISTOPHER GOULDING

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## COTMAN, JOHN SELL 1782-1842

### British watercolorist

John Sell Cotman was an artist committed to recording nature in an immediately identifiable personal style. He also had artistic interests in the antique architecture of England and in the picturesque aspects of ancient ruins. At the time of his early career, oil paintings of the British countryside had become firmly established in the public taste; but it was Cotman, and a handful of other British artists, who established the watercolor as a Romantic medium.

There is a tendency to think of Romanticism as a movement of emotional and intellectual expansiveness, of the grand gesture in art. Cotman is of the British school of restraint and modesty, and the British watercolor was the perfect medium with which to express this quiet Romanticism. In the early nineteenth century, however, the watercolor did not have the kind of public credibility that the oil painting possessed, despite the fact that major artists, such as John Constable and J. M. W. Turner, occasionally used it.

Cotman's work exemplifies one aspect of Romanticism influenced by aesthetic theories developed in the eighteenth century by several theorists, culminating in Sir Uvedale Price's *An Essay on the Picturesque as Compared with the Sublime and the Beautiful* (1796). Price suggested that the attempt to paint nature need not necessarily involve the wide-open landscape, but could be expressed in the intense contemplation of the smallest details of nature, and that such focus could suggest an implicit significance, a metaphysical comment upon the nature of all life. This focus upon the most unprepossessing natural scenes is a mark of Cotman's work, and particularly so of watercolors made early in his career. Greta Bridge in North Yorkshire, the subject of his most famous watercolors, was painted on two occasions, once in 1805 and again in 1810; these paintings are examples of the quiet, muted, stylized apprehension of country beauty. On occasion, the point of view can be more intensely focused, manifesting the close scrutiny suggested in the Uvedale Price thesis (*The Study of Burdock*, c. 1813).

A general enthusiasm for nature was a Romantic commonplace of English middle- to upper-middle-class society, and it was often expressed by laymen not only in serious nature walks and in landscape gardening, but also in drawing and painting from nature. This enthusiasm was to be both a help and a hin-

drance to Cotman. The artist might make a modest living as a teacher of drawing and painting, and Cotman spent much of his life as such. However, he wanted to concentrate on working as a watercolor painter of topographical and architectural scenes, although he occasionally worked in oil. If it is Romantic to contemplate the artist's struggle, Cotman qualifies as something of a tragic figure, since his life was a continual battle to make a living. When his work as a watercolorist failed to support him, he branched out into etching, taking as his subject, in the main, antique architectural ruins. He published several volumes of this material that included studies of sites in England (*Norman and Gothic Architecture in the County of Norfolk*, 1816-18) and in Normandy, a main source of architectural influence on English churches. Much of this work with the ruins of churches and country houses has a medieval aura about it, consistent with the Romantic enthusiasm for Gothic themes (*Crosby Hall*, 1831). None of this work was sufficiently popular to keep him and his family on solid monetary footing. He was always in financial difficulty, a situation complicated further by his tendency to slip into deep depression as one enterprise after another failed. Eventually he found steady employment as the drawing master at King's College in London. He was well respected in artistic circles, but his work never sold well; when it did sell, it sold cheaply. Some forty years later, watercolors had become popular and Cotman was recognized as a major Romantic artist; there was a brisk trade not only in his work, but in imitations of it. A handful of his early watercolors, such as *Greta Bridge*, with their highly stylized, balanced masses of light and dark, their simplicity, their harmony of softened colors, and their Poussin-like *gravitas* seemed to express truths about nature that transcended the particular and became the visual poetry prized by the Romantic movement.

Cotman had a wide range of interests, many of them thematically Romantic and rendered with a focused emotional tonality. In his Yarmouth days, he produced seascapes (*Barmouth Estuary*, 1801), and there are touches of the sublime in his mountain scenes (*Snowdon, with the lake of Llanberis from Dolbaddern Castle, North Wales*, c. 1802). But the best and most popular examples of his quiet tenderness and gravity are in his honey-toned watercolors of church ruins and his close, sumptuous, spiritually