A Legendary Debate

Controversy in Victorian Geology. The Cambrian-Silurian Dispute. JAMES A. SECORD. Princeton University Press, Princeton, NJ, 1986. xx, 363 pp., illus. $49.50.

During the 1830s researchers active in the Geological Society of London participated in one of the great conceptual breakthroughs of modern science, delineating the stratigraphic column on the basis of distinct fossil groups. The heroes of that era conducted legendary debates: the contest between Charles Lyell and his colleagues over uniformitarianism is especially well known, but historians have recently focused more attention on debates over stratigraphy. Martin Rudwick has described at length the conflicts that erupted over the Devonian, and now James Secord has published an account of the bitterest debate of them all, the prolonged contest between Roderick Murchison and Adam Sedgwick over the boundaries of the Silurian and the Cambrian.

Secord relates a dramatic story of temporary triumph undone by desperate resistance and the unexpected discovery of new evidence. Like so many disputes this one began as a friendly collaboration, when Sedgwick and Murchison set out in 1831 to survey the complex and poorly understood stratigraphy of Wales. On the basis of fossil evidence, Murchison established the existence of a new stratigraphic system, the Silurian, extending downward from the Old Red Sandstone. Sedgwick's rocks lacked good fossils, but on the basis of structure and lithology he confidently identified a Cambrian System below the Silurian. Unfortunately, Sedgwick was unable to produce a distinctive fossil fauna for the Cambrian, and fossils from a number of his formations proved essentially identical to those of Murchison's Silurian. Murchison moved to incorporate the whole of the older fossil-bearing rocks of Wales into his well-publicized Silurian System, and his colleagues in the Geological Society, impressed by the value of fossil-based classification, overwhelmingly supported his judgment in doing so.

The disappointed Sedgwick held out for the value of structure and lithology, at first quietly and then with increasing fervor. Despite his attempts to find a point of division in the Silurian, Murchison's view prevailed, confirmed anew by the more accurate mapping of Wales by the professional corps of the British Geological Survey. At most the surveyors were willing to grant Sedgwick an apparently non-fossiliferous formation just above the primary granite and gneiss. However, in 1852 Sedgwick's assistant Frederick McCoy uncovered an unconformity at May Hill that divided Murchison's Caradoc formation—and indeed his entire Silurian—into two distinctly identifiable fossil groups. Furthermore, Joachim Barrande was also discovering a new, distinctive fossil assemblage in the lower strata of the Bohemian Basin that could be correlated with Murchison's lowest divisions and even with the non-fossiliferous "Cambrian" of the Geological Survey. Murchison accepted no dimunition of his Silurian empire, but gradually other geologists began to accept Barrande's ancient fauna as the basis for an expanded Cambrian. To the end of his days, Sedgwick insisted on a Cambrian that would include all formations up to the May Hill unconformity. Only after his death was the Ordovician slowly accepted as a compromise designation for the disputed territory.

The description above in no way conveys the richness of Secord's narrative. He has entirely reinterpreted the story in the light of a painstaking review of published and unpublished evidence. As years passed both Sedgwick and Murchison proceeded to reinvent much of the history of the controversy, and these reinventions were passed on by their biographers and other followers. In the period before the May Hill discovery, Sedgwick was driven to great lengths to justify his claims, sometimes making statements clearly inconsistent even with his own previous publications. As a result of his vehemence, he found himself increasingly isolated, and he ended his career revered at a distance but cut off by his own self-imposed exile from activity in London. Ironically, the frequent polemics that so isolated him in life turned to his advantage after his death, making his side of the story better known. However, Secord's thorough research has not merely reestablished a balance between the two men, it has recovered the original complexity and difficulty of intellectual achievements smoothed out by passing time and the failing memory of the participants.

Secord does particularly well in analyzing the contrasting style and principles of the two men. Sedgwick gave up the possibility of marriage in order to keep his geological professorship at Cambridge. Since mathematics and the physical sciences had high prestige at Cambridge, he was encouraged to overestimate the significance of physical indicators in classifying strata. At the same time his role in teaching undergraduates mostly destined for the clergy gave him few opportunities to train professional followers who might have supported his doctrines and beliefs. Secord sees Sedgwick as a bluff dalesman, independent-minded, skeptical of authority, and with a fierce moral conviction of the rightness of his claim. At the same time he notes that Sedgwick's inability to complete a significant geological book left him frustrated, defensive, and more rigid in asserting his priority. By contrast Murchison, as a former soldier made independent by his wife's money, had very different attitudes. He decided early that fossils held the key to stratigraphic dating, and with his superb military sense of planning and organization he accomplished prodigies of geological surveying and mapping, which resulted in lush publications. Not only did he march with the professional consensus on dating, he knew the right people, entertained lavishly, and developed an expansive seigniorial attitude, both toward his profession and toward the formations he described. To top everything off he eventually assumed the directorship of the Geological Survey, which remained for long afterward a center of resistance to Sedgwick's viewpoint. Murchison fit the role of haughty establishmentarian quite as well as Sedgwick fit the role of angry rebel.

This book aims at serious goals and achieves all of them. It provides a fundamentally new interpretation of the Cambrian-Silurian dispute based on exacting research and thoughtful interpretation. It also relates the dispute both to the general social background of British geology and to the distinctive personal experiences of Sedgwick and Murchison. Secord writes clear, vigorous prose and provides plenty of helpful illustrations. One cannot ask for more.

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Non-Revolutions

Misunderstanding Media. BRIAN WINSTON. Harvard University Press, Cambridge, MA, 1986. xii, 419 pp., $22.50.

Brian Winston, who has worked in the worlds of broadcasting, journalism, and education, does not believe in the information revolution. He explains why in a book salted with provocative headlines: "Thomas Edison invents the telephone"; "The U.S. Navy invents television"; "Bing Crosby invents videotape." None of them did, of