

# REVIEWS

## **The Dinosaur Hunters: A Story of Scientific Rivalry and the Discovery of the Prehistoric World**

By Deborah Cadbury

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Deborah Cadbury presents a study in circumstance and success of two men, both involved in the early days of dinosaur studies in nineteenth century England. Gideon Mantell (1790–1852), country doctor, epitomizes the enthusiastic avocational geologist. Richard Owen (1804–1892) foreshadows the professionalization of the discipline. In many ways, they had much in common. Both went through medical training, though Owen never became a practising physician. Both came from the tradesman class, though Owen's family was comparatively wealthy and Mantell's in reduced circumstances. Both were passionately interested in the emerging field of paleontology. There the similarities end. Owen was socially successful; Mantell lived in relative obscurity. Owen had a long and productive life; Mantell died horrifically in late middle-age. Owen appears to have had a happy marriage and family life; Mantell's marriage was troubled and he was alienated from three of his children. Mantell is a minor player, usually relegated to a passing mention in the history of geology, whereas Owen

coined the word "dinosaur" and is celebrated as a founder of dinosaur studies. And yet, in this highly readable account by Cadbury, Mantell sounds the more engaging character, whereas Owen seems quite obnoxious.

Mantell's major preoccupation was the elucidation of the stratigraphic sequence of Sussex and the Weald. However, his concern with the stratigraphy was secondary to his interest in the fossils recovered from the rocks. In his main collecting site at Whiteman's Green quarry, these fossils comprised animal and plant remains indicative of terrestrial conditions, in contrast to those found elsewhere up to that time, which were thought to be from marine creatures. Mantell's medical training stood him in good stead when looking at the bones, which were often only fragments. He could recognize when he was confronted by something new and different, such as the single tooth found by his wife, Mary, about 1820, which was the first hint of *Iguanodon*. Indeed, his greatest achievement was the recognition and description of *Iguanodon* read before the Royal Society in 1825, a description he continued to refine over the years as new specimens came to light.

Mantell lobbied for acceptance of his paleontological discoveries for many years. His motives were complex. Enthusiasm and interest certainly played a part. But, as the son of a non-conformist shoemaker, he also saw scholarly recognition as an avenue to social position and wealth. His setbacks came from his lack of social contacts and wealthy patronage, as essential for success in those days as research grants are today. Fossil studies had to take second place to the necessity of earning a living as a doctor. From all accounts, he was a conscientious and effective practitioner by the standards of the day. He lived most of his life in Lewes, a

Sussex town that was the essence of provincialism but fortunately was in an area that was yielding many fossils. Nevertheless, he was within reach of London, the centre of England's intellectual world, and was visited by many eminent scientists, such as William Buckland and Charles Lyell, and corresponded with others, such as Georges Cuvier. He struggled on with his studies of these fossils despite much discouragement and many disappointments. Finally, his work was recognized by membership in the Royal Society in 1825 and the awarding of the prestigious Wollaston Medal of the Geological Society in 1835.

Mantell's obsession affected his entire life. His house was crammed with fossils and all his spare time devoted to their study. His wife, at first a supportive partner in these endeavours, eventually left him; his three surviving children scattered to make their lives elsewhere. His younger son, Reginald, who went to the U.S. as an engineer, came back after Mantell's death to act as his executor and sold some of his fossil collection to the British Museum. The best tribute to Mantell's meticulous care for his collection is the fact that some pieces still exist, carefully catalogued in museum collections around the world. This is one of the most eloquent statements about the function and place of museums. Not only are they repositories for specimens, but those specimens may indeed be intrinsic to the history of science and be freighted with stories and meaning well beyond their biological importance. As Cadbury notes, better, in the sense of better preserved or more complete, *Iguanodon* specimens were found later but Mantell's cherished *Iguanodon* tooth, over which he lavished so much puzzled care, remains at the foundation of dinosaur studies.

Owen, in contrast, was the son of a wealthy north country draper. His parents held education in high regard but Owen was at first a reluctant student until he became fascinated by the study of anatomy. He had the advantage of social connections and at least one schoolmate, William Whewell, became influential in the scientific establishment as the Master of Trinity College, Cambridge. Owen, as Cadbury paints him, is not an attractive character. Although endowed with great talent and intellectual gifts, he saw his route to success as involving not only his own achievements but also the downfall of his colleagues. As a result, he was not above appropriating others' work (including Mantell's) for his own ends, and describing specimens as though he were their discoverer (though he never did primary geological field work). His studies in anatomy were facilitated in 1827 when he was appointed assistant to William Clift, the curator of the Hunterian collection at the Royal College of Surgeons in London, whose daughter he eventually married. Owen was later appointed the first Hunterian Professor of Comparative Anatomy and Physiology in 1836, a post he held until 1856. As a member of the Zoological Society Council, he also had access to the carcasses of rare and exotic animals that died at the Zoo, and used these to further his studies too.

Owen was at the centre of the scientific establishment and wielded great power in that world. In 1842, he was the first to use the term "dinosaur" in print and he published steadily, often re-examining specimens that had originally been found or described by others. At times, his plagiarism became so blatant that it outraged members of the Geological Society. At one point, he appropriated plates from one of Mantell's publications without attribution. He blocked publication of some of Mantell's work so that his own papers on similar subjects would take precedence. It is clear that these tactics did not endear him to many of his colleagues and his fall from power, when it came, was thereby rendered more complete.

Because of his social connections and Anglican convictions, Owen was

placed in the position of defending the orthodoxy (that divine order was manifest in the geological record) against the ferment of new ideas that culminated in the publication of Darwin's *Origin of Species* in 1859. It is in this context that he is best known, as one of the opponents of Darwin's ideas locked in rancorous debate with Thomas Huxley. Owen became increasingly sidelined and irrelevant to the main thrust of paleontological and biological studies in the latter half of the nineteenth century. Nevertheless, dismissal of all Owen's work is too extreme because Cadbury makes clear that his technical and analytical skills were high. His failures were in personality defects that made it impossible for him to work in a collegial or cooperative manner. He attached his career and reputation to what became the losing side in one of the great scientific controversies of that time. He did not have the intellectual honesty to admit that he was mistaken and examine science from a new perspective.

In contrast, Mantell comes across as a highly sympathetic character. Of course, he also wanted recognition and prestige but he did appear to have more concern for truth. When his son, Walter, sent him a box of specimens from New Zealand, including bird bones of the giant moa, Mantell had the honesty to admit that others were better qualified than he to study them. In a remarkable gesture, he passed along the specimens to Owen. Owen's papers on these specimens helped consolidate his reputation as an anatomist. Mantell seems all his life to have been generous with access to specimens and sharing information with colleagues whereas Owen used his position to block access to specimens by anyone other than himself. Partly, this sympathetic portrait of Mantell may be due to Cadbury's desire to champion the underdog. Whether Owen's hostility to Mantell was so directly personal may be open to question; he seems to have treated all perceived rivals with similar animosity.

This is a fascinating account of a time of intellectual ferment and developing paradigms. When the account opens, the first glimpses of the

complexity of the geological record were beginning to emerge. In many ways, the science of geology was established during these hectic decades. Many other important characters play a part in the tale - William Buckland (the eccentric Oxford scholar who ended his days in an asylum for the insane), Thomas Huxley (then a young and ambitious scientist), and Mary Anning (the fossil collector from Lyme Regis whose efforts over many years provided the specimens that fuelled the scientific debates). This narrative, covering as it does mainly the first part of the nineteenth century, sets the context for the Darwinian Revolution. Cadbury shows that Darwin's ideas did not develop in a vacuum but were the crystallization and explicit formulation of concerns that had been gradually coalescing for decades. The upheaval in biology, catalyzed by Darwin, could not have taken place without the perspective of deep time that had been opened by the geological and paleontological discoveries of the previous decades. In this, the work of both Mantell and Owen played a part.

Regrettably, many tendencies described in Cadbury's account are still prevalent in sciences today, especially the backbiting and infighting, the way in which those in established positions use that power to damage the careers of others, the way some block publications by damning review, the way youngsters make their mark by trashing the work of senior scientists, the power of an "in" group to block advancement of outsiders, and the contempt of the professional for the avocational practitioner. Human nature, it seems, does not change much over the centuries. True, academic elites now are considerably more diverse and include women but, looking back to the nineteenth century, we cannot be complacent. Social status, class origin, and wealth remain a complex tangle, and erect barriers to scholarly achievement. We have still not reached the stage when only aptitude, intelligence, and hard work determine success. The greatest service that this fine book does is to sharpen our historical sense and illuminate our own times.