INTRODUCTION

Dinosaurs in Transition

Not so very long ago a Dinosaur was regarded as a terrible reptile, indeed, whose very name was sufficient to deter us from wishing further acquaintance with him.

Now the name is as familiar in our mouths as household words; the discovery of a Dinosaur is announced by the daily press as a matter of news, and the Sunday edition depicts him at full length. Sometimes, it is true, the portrait is least recognizable by those best acquainted with him, but it shows the public interest in these creatures of a far distant day and a general desire to know something about their lives and times. Thus observed naturalist Frederic Augustus Lucas in 1912. As director of the American Museum of Natural History in New York, Lucas was well placed to differentiate between palaeontologically documented dinosaurs and the monsters depicted in the sensational Sunday newspapers. He would also have been confident that responsible popular science writing, working in conjunction with the displays in his own museum, constituted the front line of attack against Sunday press palaeontology. Lucas’s words appeared in the introduction to Mighty Animals, a book for children by the journalist Jennie Irene Mix. The director gave his blessing to Mix, who proceeded to vividly describe the peculiarities of the most famous dinosaurs. These included Diplodocus, ‘an enormous creature’ with ‘a brain that was not much bigger than a walnut’; Brontosaurus, or ‘Thunder Lizard’; the armour-plated Stegosaurus, who ‘looked far worse than his name sounds’; the ‘astonishing’ horned Triceratops; and, of course, Tyrannosaurus, ‘the Tyrant Lizard’. All of these genera and many more had been excavated from the bounteous strata of the United States across the previous half-century.

These stately scientific names are still familiar to us and there exists a substantial scholarship on the dinosaurs’ rise to a cultural fame that persists today. The history of the excavation of dinosaur bones in Gilded-Age
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Introduction: Dinosaurs in Transition

America, and the subsequent transformation of these bones into twentieth-century museum exhibits, is well known. The prior discovery of British dinosaurs in the early nineteenth century, too, has received thorough scholarly attention, accompanied by astute research into how imaginative authors and artists first shaped the malleable materials of palaeontology for diverse audiences. A significant and tantalising disconnection can be discerned, however, between these bodies of scholarship. Students of literature and science have established that, during the first two-thirds of the nineteenth century (and chiefly in Britain), geology and palaeontology were strongly linked to literary innovation; moreover, they have shown that, in some of the most innovative non-fiction about the prehistoric world published during this period, authors’ claims to scientific authority and the nature of their target audience could be distinctly hazy. This was not just writing by scientific specialists, for scientific specialists, but neither was it necessarily what has come to be called ‘popularisation’. Little has been written to link these literary findings with work by historians of science on the later museum-led (and chiefly American) excavations and exhibitions that, as Lucas noted, helped ‘dinosaur’ to become a household word before the First World War. This disconnection prompts intriguing questions about the changing relationship between science and literature in the transatlantic print culture of the late nineteenth and early twentieth centuries. For instance, how did the new pre-eminence of American vertebrate palaeontology affect British scientific pride? After all, Britain was the original home of dinosaurs. Furthermore, did the increasingly specialised and institutionalised nature of palaeontology diminish the earlier overlaps with literature and art that scholars have found so fascinating? What role did dinosaurs play in the new literary media of the long fin de siècle? And, if dinosaur had become a household word, what did this word mean?

Examining an array of writing on dinosaurs – fiction and non-fiction, scholarly and popular, archival and published – Reimagining Dinosaurs reveals that the popularisation of the new American dinosaur palaeontology was a transatlantic enterprise in which non-specialist writers played a crucial role. Such writers were typically neither university nor museum employees, nor authors of technical papers in disciplinary journals, these being the standard characteristics of contributors to elite palaeontological knowledge at the end of the nineteenth century. Instead, most of the British and American writers I will examine were opinionated journalists and novelists from a wide variety of backgrounds. This book therefore counterbalances existing accounts which emphasise the role of American palaeontologists, and palaeontologists more generally, in the
popularisation of dinosaurs. I show that British fascination with America, and the latter country’s long-standing reliance on the former for literary content, meant that many of the earliest influential writings on American dinosaurs were produced by British authors, especially by the science writer Henry Neville Hutchinson, or by authors writing in transatlantically developed literary genres like the New Journalism and the New Romance. Furthermore, I demonstrate that, from Hutchinson to New York millionaire John Jacob Astor IV and novelist Arthur Conan Doyle, alongside many now-obscure figures of the turn-of-the-century mass media, writing on dinosaurs was regularly characterised by populist and even downright heterodox attitudes towards science. These authors contradicted the authority of the leading palaeontological researchers: their depictions of dinosaurs were intertwined with critiques of modern science, including attacks on scientific jargon, over-specialised knowledge, and secularism. In the process, dinosaurs were co-opted into saleable and topical narratives of evolutionary progress, nationalism, imperialism, and romance. As such, the popularisation of this group of extinct animals was rarely as neat an affair as was implied in Lucas’s idealised hierarchy, which imagined a descent from the authoritative reconstructions of the museum palaeontologist to the humble repackaging of the populariser, pitted against unscrupulous newspaper hacks.

Recognising the integral role of non- and anti-specialist literature in constructing the modern dinosaur allows for important insights into scientific and literary culture during this period. As we shall see, the reshaping of dinosaurs from sprawling mid-Victorian lizards into iconic American titans was an interdisciplinary and international operation, encompassing new relations between ‘literature’ and ‘science’, renegotiating the borderlines of ‘popular’ science writing and criss-crossing the oceanic highways of transatlantic print.

Redesigning the Dinosaur

Although ‘dinosaur’ started to become a household word only around the 1890s, during the period covered in this book, it was by then half a century old. Translating as ‘terrible lizards’, ‘Dinosauria’ was coined by English anatomist Richard Owen in 1842. This identity grouped together Iguanodon, Megalosaurus, and Hylæosaurus, three giant extinct reptiles whose sparse fossil remains, all unearthed in the south of England, exhibited fused sacral vertebrae. At first, ‘dinosaur’ did not catch on as a conceptual category. Not only was Owen’s anatomical rationale for the
coinage disputed by his colleagues but the word itself remained largely unknown among the general public. For most people, these oversized reptiles – initially conceived as resembling huge iguanas or monitor lizards – were not intrinsically more compelling than many stranger hybrids, such as the flying pterodactyls, that aroused widespread attention following the birth of modern palaeontology in the late eighteenth century. French comparative anatomist Georges Cuvier had established the fact of species extinction to the satisfaction of most contemporary savants in the 1790s, demonstrating the clear differences between the bones of fossil animals and those of their closest living analogues through ground-breaking speculative reconstructions. From the early decades of the next century, the extinct creatures studied by Cuvier and his colleagues were visualised for general audiences in Europe and the United States via models, illustrations, and textual descriptions (of which more below). These animals were initially believed to have been sequentially wiped out by cataclysms of unprecedented magnitude. The geological catastrophes had eventually, and providentially, paved the way for the present order of life, in which humans faced no competition from terrestrial behemoths. Owen’s dinosaurs were, at least at first, far from the weirdest or most scientifically intriguing remnants of this rediscovered prehistoric world.

To say that dinosaurs were not, as they are today, uniquely popular among extinct animals, is not to say that the individual genera were obscure before the 1890s: famously, a *Megalosaurus* is mentioned in the very first paragraph of Charles Dickens’s novel *Bleak House* (1852–3). In the form of ‘restorations’, the term for speculative lifelike reconstructions, lizard-like dinosaurs duelled to the death and surfaced from the slime in paintings and prints by major artists, including John Martin and Édouard Riou. However, for most of the nineteenth century, Owen’s coinage and its anatomical subtleties were ignored in favour of the more general appellation ‘saurians’. These saurians were often additionally considered to be ‘antediluvian’, meaning that they had lived before the Flood recorded in the Book of Genesis, although the use of this term did not necessarily mean that the writer considered the Flood the actual cause of their extinction. ‘Saurians’ meant dinosaurs, but it also meant entirely unrelated reptiles like pterodactyls, or the aquatic ichthyosaurs and plesiosaurs that had been unearthed by Mary Anning at Lyme Regis during the 1810s and 1820s. In fact, the merely fragmentary remains of the British dinosaurs made for much less impressive museum displays than the complete reptile skeletons excavated by Anning. Dinosaurs were regularly outshone by the other skeletal exhibits from across the world that became familiar to mid-
Victorian museum-goers: the bones of the mammoth, the so-called Irish elk, the American mastodon, the South American giant ground sloth, and the New Zealand moa.

Whereas members of the London public could, say, view a fossil ground sloth skeleton at the British Museum in Bloomsbury, it was harder to be certain what dinosaurs had looked like in toto, even for experts, given the incompleteness of their remains. They were seemingly giant reptiles, but were they actually something more? Owen initially imagined that dinosaurs, although reptilian in nature, had resembled quadrupedal mammals in posture. Studying Iguanodon, surgeon Gideon Mantell tentatively proposed an alternative scheme that allowed for bipedalism, a highly unusual habit in a reptile.\(^9\) Scientific interest in these enigmatic creatures increased from 1858 following the excavation of what seemed to be a nearly complete dinosaur skeleton in Haddonfield, New Jersey. Philadelphian savant Joseph Leidy proposed, as Mantell had suggested of Iguanodon, that this herbivorous American Hadrosaurus sometimes stood on its hind legs. His cautious conclusions were supported by Thomas Henry Huxley, the British naturalist and enemy of Owen, who stressed the bird-like characteristics of Megalosaurus in the late 1860s and early 1870s.\(^10\) Dinosaurs were now turning into something distinctly new: reptiles that looked like birds. Thanks substantially to the pro-Darwinian campaigning of Huxley and his allies in this period, most palaeontologists would henceforth understand these bird-reptiles as products of evolution.

The theories that dinosaurs were not simply giant lizards were soon spectacularly reinforced. A thirst for space, land, and mineral resources to tap had driven fortune-seekers from across the increasingly industrial United States to western territories like Colorado and Wyoming.\(^12\) It quickly became apparent to canny prospectors not only that these regions contained huge quantities of fossil bone but also that men of science from the East Coast would pay for their excavation and transportation. Upon realising the novelty of the western fossils, Yale palaeontologist O. C. Marsh and his Philadelphian rival E. D. Cope sought to acquire as many of them as they could. The bitter feud that followed would become known as the ‘Bone Wars’.\(^13\) As Kyla Schuller points out, scientific claims for the ‘disinterested advancement’ of palaeontology during the Bone Wars were used to legitimise what were, effectively, ‘treaty-encroaching explorations’ into Native American lands, especially those of the Sioux.\(^14\) Marsh and Cope benefitted handsomely from illegal or otherwise dubious encroachments into, and expeditions on the edge of, the shrinking Sioux lands: across the 1870s and 1880s their employees and collaborators...
unearthed countless important mammal fossils and many new dinosaurs, including *Triceratops*, *Stegosaurus*, and *Ceratosaurus*. These dinosaurs were variously bipedal and quadrupedal, in addition to displaying previously unimagined characteristics like long necks, large spikes, and unusual horns. Sauropods like *Brontosaurus*, the largest land animals the earth had ever seen, were particularly astounding and unprecedented. Despite the heterogenous appearances of these animals, Marsh’s papers in the *American Journal of Science* reinforced the idea that they all belonged to a coherent group of animals, Owen’s ‘Dinosauria’. For the American public, the fossil fruits of the Bone Wars were at first little more than evocative names in newspaper columns. They would fascinate much wider audiences during the 1890s and beyond.

Both during and after the American Bone Wars, important dinosaur fossils continued to be unearthed and studied in Owen’s native land and across the empires of the world, including an extensive excavation in the German colony of East Africa in the years before the First World War. Moreover, the huge group of complete skeletons of *Iguanodon* discovered in a mine in Bernissart, Belgium, in 1878, constituted the most spectacular dinosaur treasure trove of the nineteenth century. Among many other insights provided by the Belgian hoard, these skeletons confirmed that the bipedal posture of numerous American dinosaurs also applied to genera previously known only from remains in Britain, in this case Mantell’s *Iguanodon*. Thanks to all these fossil remains of unprecedented quality and quantity, Owen’s original vision of the terrible lizards was being globalised and, in the process, drastically reimagined.

Although spectacles like the coal mine filled with *Iguanodon bernissartensis* indicate that the reimagining of dinosaurs was not a uniquely American affair, during the decades around 1900 none disputed that the United States boasted the world’s greatest abundance of different specimens. The country’s title as the new home of dinosaurs was cinched by the rise of its museums. Until now, these museums have usually been at the centre of scholarship on the popularisation of dinosaurs. After all, this was the period when dinosaur skeletons started to become prestigious, almost invaluable exhibition centrepieces. The late nineteenth and early twentieth centuries were a time of great growth for museums across Europe, the European colonies, and the United States. After decades of lobbying by Owen, the British Museum in London transported its scientific collections from cramped rooms in Bloomsbury to South Kensington, where the new Natural History Museum opened in 1881. This vast building was the fossil repository of an empire, but it would soon be cast into shade by its
American equivalents. The immense wealth amassed by tycoons and industrialists in Gilded-Age America established, filled, and expanded a number of affluent philanthropic institutions, including the American Museum of Natural History, New York (founded 1869) and the Carnegie Museum, Pittsburgh (founded 1895). The scramble to find giant sauropod dinosaurs (such as Brontosaurus) by staff from these museums during the late 1890s has been dubbed the ‘second Jurassic dinosaur rush’, the sequel to Cope and Marsh’s initial ‘rush’. The American Museum of Natural History was at the forefront of innovation with regard to displaying its spoils. From the 1900s on, in the museum’s bright and modern galleries, skeletons were mounted, posed, and juxtaposed with lifelike paintings of prehistoric scenes by the artist Charles R. Knight. These displays have received substantial critical attention, as have the casts of Diplodocus carnegii donated by Scottish-American industrialist Andrew Carnegie to museums across the globe, the first being unveiled in London in 1905. The American Museum’s displays and Carnegie’s donations are widely recognised as two of the most important factors in turning dinosaurs into world-famous icons.

This study adds a new dimension to the story of the dinosaurs’ rise to fame. The fluctuation of technical interpretations of the dinosaurs throughout the nineteenth century, and their emergence as iconic museum exhibits at the dawn of the twentieth, recounted above, are well-trodden ground. The significance of dinosaurs for general audiences during the late nineteenth century, when dinosaurs were morphing from British lizards to multiform American monsters, however, has hardly been studied. With a few exceptions, most discussions of dinosaurs in popular media typically relegate discussion of the late nineteenth-century period to prologues or epilogues. Critics have characterised these decades as a somewhat unremarkable time for the popularisation of dinosaurs, as if nineteenth-century audiences were patiently anticipating Knight’s iconic paintings, first produced in the mid-1890s but not widely known before the twentieth century, and the museum exhibits to come. Historian of visual culture W. J. T. Mitchell is representative when he comments that, lacking a ‘public image of the dinosaur for America’ during the late nineteenth century, Americans ‘had to await Knight’s ‘modern’ imagery, which ‘would break decisively with the Victorian archetype and epitomize the New World Order’. As for palaeontology in the popular culture of early twentieth-century Britain, this is largely unexplored territory beyond Carnegie and his Diplodocus.
The late nineteenth-century decades were a much more interesting period in the popularisation of the dinosaurs than previous analyses suggest; furthermore, the literature of these years and of the early twentieth century is an unjustly overlooked factor in their cultural history. Indeed, print played a prominent role in generating the dinosaurs’ fame that has yet to be acknowledged. However sensational exhibitions of dinosaur skeletons were to become in the 1900s, fiction and popular science writing had long been instrumental outlets for engaging general audiences with the planet’s prehistoric story. We shall see that, even before casts of Carnegie’s *Diplodocus* began to land on foreign shores, American dinosaurs were already objects of popular fascination thanks to works of literature shaped by transatlantic currents. As Henry Woodward, Keeper of Geology at the London Natural History Museum, remarked in 1899, Marsh’s ‘wonderful’ dinosaurs had already ‘produced a more powerful impression on the public mind than almost any of the other discoveries of modern science’. However, Neville Hutchinson, the central figure in this book, was the first popular science writer to publish illustrated books on these dinosaurs in Britain, and his influential titles, including *Extinct Monsters* (1892), were sold in the United States before American writers attempted the subject. Subsequently, novels by American authors like John Jacob Astor’s *A Journey in Other Worlds* (1894) and British ones like Frank Savile’s *Beyond the Great South Wall* (1899), were among the very first works of fiction to depict the newly reimagined dinosaurs. In these texts we can see uniquely fin de siècle conceptions of dinosaurs form alongside interpretations that would go on to have great influence in the twentieth century. Beyond the 1890s, later British works like Arthur Conan Doyle’s *The Lost World* (1912) and Emily Octavia Bray’s *Old Time and the Boy; or, Prehistoric Wonderland* (1921) provide intriguing visions of prehistory very different from those familiar to scholars of American culture. Hutchinson bridges the length of my study, being the first major populariser of Marsh’s and Cope’s dinosaurs as well as an important source in Bray’s unusual outlying contribution.

The lack of detailed attention to dinosaurs in the literary culture of the turn-of-the-century period, and especially the 1890s, is surprising, given that these were the decades in which the word ‘dinosaur’ first became meaningful to general audiences. This is not simply trivia. The ‘cultural work’ performed through dinosaurs, specialist scientific objects that are equally at home decorating a pencil case, has been the subject of a steadily increasing body of scholarship. Numerous critics have argued that the widespread popularity of dinosaurs, combined with experts’
ever-shifting understanding of these animals, makes them extremely useful instruments for shining light on ostensibly unrelated aspects of culture and society, from corporate capitalism to nuclear power. Brian Noble, for instance, has shown how dinosaurs were used to articulate and promote conservative notions of race and gender in the early twentieth century, and then again to challenge these notions in the late twentieth. In a memorable statement of the cultural omnipresence of these prehistoric animals, Mitchell calls the dinosaur ‘the totem animal of modernity’: ‘a symbolic animal that comes into existence for the first time in the modern era’, embodying ‘the cycles of innovation and obsolescence endemic to modern capitalism’. Due to the American orientation and exploratory, ludic nature of his oft-cited Last Dinosaur Book (1998), many questions remain about how exactly the symbolism or totemism Mitchell describes might have been produced, reproduced, and experienced. I will identify more concretely the process by which dinosaurs were given meaning in Britain and the United States between the 1880s and the 1910s, when they first became objects of mass media interest. Throughout Reimagining Dinosaurs, we shall see these inhabitants of the Mesozoic Era intersect in unexpected ways with key currents of turn-of-the-century culture, from imperialism to spiritualism. It was in these interchanges that an obscure group of apparently extinct bird-reptiles was made remarkably relevant.

Fatefully, just as the dinosaurs’ cultural fame was accelerating, their scientific validity received a new and damaging blow. As discussed in Chapter 1, the British savant Harry Govier Seeley argued in 1887 that Owen’s grouping misleadingly lumped together two only vaguely related groups of animals, Saurischia and Ornithischia. This view that ‘dinosaur’ was a colloquially useful but effectively non-scientific generalisation became an orthodox stance among palaeontologists in the early twentieth century, persisting until the so-called ‘Dinosaur Renaissance’, a revision of dinosaur palaeontology that took place from the late 1960s. In the 1980s, the familial connection between the Saurischia and the Ornithischia was officially reinstated and the almost paradigmatic belief that dinosaurs were slow, awkward, and unintelligent, first posited in the late nineteenth century and explored here in Chapter 2, was overturned. Indeed, even the notion that dinosaurs are an entirely extinct group has now been complicated by the recognition that birds evolved directly from certain dinosaurs, a fact spectacularly reinforced by Chinese discoveries made within the last few decades. The reimagining of dinosaurs is still going strong.
Several prominent calls to answer the question of what dinosaurs mean have turned, as this introduction will now do, to the field of literature and, more specifically, to the thriving sub-field of literature and science. Print is a particularly illuminating site in which to examine how these extinct animals were transformed into meaningful objects for large and diverse audiences. Stressing ‘the importance of public discourse in generating ways of thinking about the past’, Ralph O’Connor argues that dinosaurs offer a particularly ‘empowering role for literary and iconographic analysis’, whose proponents can demonstrate, for example, ‘how Victorians constructed these ancient reptiles’. Inert dinosaur fossils, after all, have had symbolism and values imposed upon them at various times and in the name of various causes. Will Tattersdill adds that ‘[l]iterary analysis is yet to be done on the collective implications’ of writing on dinosaurs for general audiences. Indeed, most of the texts examined in this book have received little or no literary analysis, despite their rich potential and often substantial contemporary influence. As I will show, in a climate characterised by new literary forms aimed at emerging mass readerships, many non-specialist writers on dinosaur palaeontology did not passively popularise new discoveries by experts; they also gave dinosaurs imaginative power, drew attention to the negotiation of modern distinctions between ‘literary’ and ‘scientific’ writing, and attempted to undermine the hierarchies of the scientific community.

**Literary Palaeontology**

The defined boundaries generally anticipated by twenty-first-century readers between ‘scientific’ and ‘literary’ writing were much less marked for most of the nineteenth century. This has led to a wealth of scholarship on the relationships between literature and science in which geology and palaeontology have received sustained attention, surpassed in quantity only by related research on the literature of evolution. What we now call the earth sciences were still new and in flux at the beginning of the nineteenth century. The chronological profundity of a ‘deep time’ almost beyond human conception and the former existence of bizarre animals were enticing ideas, and as such they were explored in a diverse outpouring of print, much of it highly skilled. As one reviewer of geologist-journalist Hugh Miller’s *The Old Red Sandstone* (1841) remarked, geology ‘has commanded the greatest number of eloquent expounders’ of all the sciences, even going so far as to add that ‘[l]iterature has been its patron’. Geological and palaeontological ideas were infused into many of the