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## **Work on the Victorian Dinosaur: Histories and Prehistories of Nineteenth-Century Palaeontology<sup>1</sup>**

*Abstract.* In recent studies of Victorian Literature and Science, valuable insights into the history and discursive constitutions of geology, palaeontology, and evolution have often shone a sidelight on the figure of the dinosaur. Few, though, have engaged head-on with the dinosaur itself as a conceptual category. In discussing why, this article aims to provide the reader with a reading list by which they may themselves begin to explore the Victorian dinosaur – as well as a possible justification for so doing.

In November 2015, major repair work began on the Crystal Palace Dinosaurs in Sydenham, South London. Cracks had been noticed in some of the statues; there had also been problems with “tails, toes and teeth falling off”. Alongside photographs of the conservators at work, an online press release from the Friends of the Crystal Palace Dinosaurs declared that “[t]he initial work will take about six weeks and will bring the standing iguanodon [*sic*] back into robust shape” (Cain). By ‘robust shape’ was meant, of course, a return to the Victorian glory of the original statue, sculpted by Benjamin Waterhouse Hawkins (1807-1894) and unveiled to the public in 1854. As the present article goes to press, and given successful fundraising efforts, the plan is to repeat the process for all thirty-one of the concrete statues on site, restoring them to the iconic, pachydermal reptilians which greeted crowds before a century and a half of erosion and vandalism.

It goes without saying that the repairs are not intended to update the dinosaurs to current scientific standards. Such a change would be unthinkable, blasphemous.

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<sup>1</sup> I am grateful to Richard Butler, of the University of Birmingham’s School of Geography, Earth and Environmental Sciences, for fact-checking some of the modern scientific information I present in this article. Any remaining mistakes, of course, are my own.

The word 'dinosaur' is the coinage of Richard Owen (1804-1892), distinguished palaeontologist, founding father of London's Natural History Museum, and Hunterian professor of comparative anatomy and physiology at the Royal College of Surgeons (Gruber, 2004). It was in 1842 – and not 1841, as Hugh Torrens (2012) has decisively shown – that Owen first wrote of “a distinct tribe or sub-order of Saurian Reptiles, for which I would propose the name of *Dinosauria*” (Owen, 1842, p. 103). The classification hinges on an observation of skeletal similarities between three fossilised creatures which are still considered dinosaurs today: *Iguanodon*, *Megalosaurus*, and the perhaps less well-known *Hylaeosaurus*. The matter seems, perhaps, a little dry – it is largely a question of the fused sacral vertebrae – but it is now recognised that Owen's classificatory gesture was motivated by political as well as scientific considerations.<sup>2</sup> The *Iguanodon* in particular was a beast closely associated with its discoverer, Owen's rival Gideon Mantell (1790-1852), and the creation of the new order brought the conceptual identity of these ancient creatures firmly under Owen's control, just as Mantell's recent bankruptcy had brought their physical remains from the Sussex doctor's home into Owen's professional orbit at the British Museum.<sup>3</sup>

Whatever Owen's motivations, it is likely that the considerable afterlife of his coinage would have surprised him. Although it remained pretty much exclusively a technical term until the early twentieth century, 'dinosaur' is a word which now evokes science fiction video games and children's colouring books every bit as much as it evokes the fauna of the Earth's Mesozoic past. Amazon sells dinosaur-headed poncho towels for humans not yet capable of speech; a recent YouTube craze for people publically performing stunts in a particular *Tyrannosaurus rex* costume (trampolining, ice skating, riding dirt bikes) has found millions of viewers ('Lvge Cotton Animal ...', n.d.; 'T-Rex Costume', 2016). If Owen's act of naming was not purely or singly scientific and dispassionate, then perhaps we may say that popular culture has robustly kept faith with him.

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<sup>2</sup> For scholarly discussion of Owen's political motivations, see Rupke, 1994, pp. 133–34.

<sup>3</sup> See Dean, 2015. Owen finally became superintendent of the BM's natural history collections, including Mantell's material, in 1856.

How did we get here? It seems a long way from Owen's spat with Mantell to the ABC sitcom *Dinosaurs* (1991-1994), although the distance between Owen's work and Charles Dickens's famous *Megalosaurus* "waddling like an elephantine lizard up Holborn-hill" (Dickens, 1996, p. 11) is considerably shorter.<sup>4</sup> My suspicion, which I will attempt here to justify through a discussion of some recently-published work in the field, is that the value of the dinosaur for literary studies lies in its conceptual ability (perhaps even imperative) to collapse apparently large distances: between Mesozoic and Holocene, between Victorian and Postmodern, between frontier and metropole, between Literature and Science.

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We should be clear what it is that we are talking about. Dinosaurs were a diverse group of animals thriving on Earth during the Mesozoic Era (Mantell called it 'The Age of Reptiles' in 1831), which ran from around 250 to around 65 million years ago. The name, which comes from the Greek words *deinos* (*δεινός*) and *sauros* (*σαῦρος*), is usually mistranslated as 'terrible lizard', but in the superlative sense Owen was drawing upon carries a meaning closer to 'fearfully great lizard' (Brett-Surman et al., 2012, p. ix). Although popularly thought extinct, dinosaurs survive today in the form of birds: a recent scientific reference work defines Dinosauria as "the common ancestor of *Corvus* (the crow) and *Triceratops* (a ceratopsian dinosaur) and all of its descendants" (Brett-Surman et al., 2012, p. 1076). This ancestor-and-descendants definition, which taxonomists call a *clade*, represents a rather different way of delineating the dinosaurs to Owen's, largely because it follows a phylogenetic understanding of classification rather than the traditional (Linnaean) approach which Owen used. Like Owen's, though, the modern scientific definition rules out the water-dwelling plesiosaurs or the flying pterosaurs which also inhabited the Mesozoic age. The monster in Loch Ness is not a dinosaur – but the sparrowhawk which circles above is.

Dinosaurs are subdivided into two major clades, designated by Harry Seeley (1839-1909) in 1888. The ornithischian (or 'bird-hipped') dinosaurs are a largely herbivorous group including both

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<sup>4</sup> See, for instance, Dawson, 2016i; Dawson, 2016ii, pp. 116–18; Rupke, 1994, p. 6.

*Iguanodon* and *Hylaeosaurus*; paradoxically, modern birds evolved not from these but from the saurischian (or 'lizard-hipped') dinosaurs, the group which includes carnivorous theropods like *Megalosaurus* (the group most closely related to birds) as well as giant sauropods like *Diplodocus*. In summary, the 'terrible lizards' are not terrible, not lizards, not extinct, and are both far more (birds) and far less (pterosaurs) diverse than their representations in popular culture have tended to imply.

For a student of literature, who must face up to these contradictions as a scientist need not, a somewhat more catholic understanding of the dinosaur is therefore necessary. Writers, including even some scientific writers, generally use the term a little more flexibly, and this is truer the closer in time one moves to the term's origins. Despite its 1842 coinage, 'dinosaur' remained largely in specialist language until at least the *fin de siècle*. During the interim, most people would have used words like 'saurian', 'monster', or even 'dragon' to describe a group which included all ancient vertebrates, including marine animals (Dawson, 2016ii, p. 5; O'Connor, 2007, p. 9). Despite the name, the Crystal Palace Dinosaurs are not all dinosaurs – included among the statues are pterosaurs, ichthyosaurs, a *Megatherium* (giant sloth) and a *Megaloceros* (Irish Elk) – and whilst the 1854 exhibition did much to advance the creatures themselves into public knowledge, it did little to foreground 'dinosaur' as a conceptual category (O'Connor, 2012, p. 494).<sup>5</sup>

Critical work on nineteenth-century dinosaurs therefore tends away from using the word at all; when it does appear, it is often used in both a more inclusive (all Mesozoic vertebrates) and more exclusive (none of their descendants) sense. A decision to use the word in this way, or not at all (each scholar has a slightly different outlook) helps to preserve a sense of the historical contingency of the term, and may reasonably be seen as a way of avoiding anachronism. It is justifiable for the additional reason that Victorian palaeontology's big names all had considerable interests beyond the creatures we now call dinosaurs: Mary Anning (1799-1847) worked largely on marine reptiles; Mantell was a surgeon professionally and a geologist first by reputation; and Owen, who achieved much of his lifetime fame through his identification of a fossil moa bird from New

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<sup>5</sup> For more on the Crystal Palace Dinosaurs, see Marshall, 2007; Secord, 2004.

Zealand (semi-fraudulently, as Gowan Dawson (2016ii, pp.95-132) has recently taught us), worked on virtually all branches of natural history, extinct and extant. Even the chief belligerents of the American 'bone wars' of the late-century, Othniel Charles Marsh (1831-1899) and Edward Drinker Cope (1840-1897), were as actively engaged in the pursuit of ancient mammals and marine reptiles as they were with anything in the dinosaur clade, and the biography of their contest (Jaffe, 2000) does little to mark dinosaurs out as being, to either of them, special or distinct.<sup>6</sup>

To most scholars, then, the word 'dinosaur' understandably seems restrictive – early practitioners and audiences of palaeontology had wider horizons than the specific taxonomic grouping which Owen had designated 'Dinosauria', not least because the sheer quantity of fossil evidence for dinosaur species was at the time comparatively meagre. A side effect of the richer, wider understanding of nineteenth-century science generated by this scholarly perspective, though, has been that there are very few cultural studies of the dinosaur *qua* dinosaur. The most recent is probably W. J. T. Mitchell's *The Last Dinosaur Book* (1998), the numerous and diverse chapters of which do much to suggest that if the dinosaur is restrictive in some senses, it is expansive in others. Mitchell's story encompasses science fiction, economics, TV advertising, museum studies, mafia activity, newspaper cartoons, and US constitutional history, to name just a few. As befits any responsible study of the cultural dinosaur, it implicitly reveals many of the linkages between apparently-disparate facets of intellectual and popular culture. Mitchell is not, though, primarily a scholar of literature, being more concerned with the dinosaur as image. He does not refer to, but is usefully read in concert with, Bruno Latour's essay 'The Three Little Dinosaurs' (Latour, 1980), which is also focussed, albeit from a different theoretical standpoint, upon the discursive creation of the category 'dinosaur', and upon the exploration of its meaning today. Those interested in the subject from this angle should also read the highly useful article on 'Dinosaur as Metaphor' by the psychologist Helen Haste (1993).

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<sup>6</sup> For more on this point, see O'Connor, 2012, p. 494; Taylor, 1997, p. xxxix.

In their different ways, these slightly older studies focus on the development of the dinosaur as a concept. More recent work, especially in literature, has preferred to treat them as a facet of a wider historical picture of geology, evolution, or palaeontology. Ralph O'Connor's *The Earth on Show* (O'Connor, 2007) is a paradigmatic example, dexterously showing the ways in which science and popular culture interacted to create modern geology in the early-to-mid nineteenth century. O'Connor is an historian extremely sensitive to literary culture, writing intriguingly about (for example) the poetic quotations used by geologists (pp.345-55), their indebtedness to the language of theatre, dreaming, and visions (pp.366-75), and the panorama entertainments used to bring a glimpse of the ancient world before Romantic and early-Victorian crowds (pp.265-75). His emphasis is on fossils of all kinds, prominently discussing the Mammoth in the book's early pages, but *The Earth on Show* is full of unmissable illuminations of the relationships between dinosaur and popular culture, perhaps most crucially the suggestion (pp.373-74) that it was the imaginative salesman's rhetoric put on by early popularisers of geology which paved the way for dinosaurs to become the subject of twentieth-century science fiction. On the establishment of 'dinosaur' in particular, O'Connor's more recent (2012) article in the *Journal of Victorian Culture* is a must-read.

O'Connor's work on the reciprocal influences between geology and popular culture demonstrates Gillian Beer's celebrated 'two-way traffic' in action (Beer, 2009), and other scholars have noticed the potential prehistoric life has in the wider argument against the notion of a two-culture divide. John McGowan-Hartmann's article 'Shadow of the Dragon' explores the relationships between dinosaur imagery and that of the dragon, articulating them as "an area in which myth and science coalesce" (McGowan-Hartmann, 2013, p. 48). Lukas Rieppel's 'Bringing Dinosaurs Back to Life' (2012) examines the practice of mounting dinosaur skeletons (gradually adopted by natural history museums from the very close of the nineteenth century onwards) as an exercise in mixed-media sculpture "deliberately fashioned to occupy an interstitial space between theory and reality, artifice and authenticity, epistemology and ontology" (p.490).<sup>7</sup> For Stephen Prickett (2005, pp. 72–

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<sup>7</sup> My thanks to the anonymous *Literature Compass* reader who drew my attention to this article.

80), dinosaur fossils were part of a suite of discoveries which were conspiring to bring Victorian fantasy and reality closer together: “monsters, more vast and variegated than the most fantastic imagination could dream of, were now suddenly being found under people’s very feet” (p.75). A particularly invigorating intervention into this area is Adelene Buckland’s *Novel Science* (2013), which sees the two-way traffic model itself as reifying an unjust separation between the practices of writing and geology. Buckland pursues the notion that both literature and science in this period were engaged, hand in hand, in interrogating the use-value of narrative. Her book might be considered the ‘next step’, then, in the argument advanced in Stephen Norwick’s introductory chapter on geology in *The Routledge Companion to Literature and Science* (2011), which discusses not only the relationship between metaphor and (particularly Romantic) geological practice, but also the metaphors (“surface topography”; “geologic study”) which have found their way from the science into literary criticism. Buckland’s argument is a crucial one for anybody who wishes to consider Victorian dinosaurs, but again, dinosaurs themselves (“See primeval lizards” says her index, p.367) remain only a small component of her larger story.

It will be noted that Mitchell, O’Connor, and Buckland’s different books are all published by the University of Chicago Press, whose History and Philosophy of Science list also includes the influential earlier work of Martin J. S. Rudwick (see, for instance, Rudwick, 1976). Their latest pertinent release is Gowan Dawson’s *Show Me The Bone* (2016ii), a remarkably comprehensive intellectual history of Georges Cuvier’s law of correlation. Cuvier (1769-1832) was the great French anatomist whose mantle Owen was popularly supposed to have assumed, a proponent of extinction theory and putative founding father of palaeontology. Dawson’s rigorous account of the cultural lifespan and implications of correlation – Cuvier’s notion that an entire animal could be inductively inferred from a small fragment such as a single bone – takes him through the print, political, and personal contexts of swathes of nineteenth-century science. Dinosaurs themselves are often, once again, bystanders, but the book is crucial for the insight it brings into the discursive frameworks from which dinosaurs emerged:



From stage-managed news reports and fashionable serial novels to the life-size brick-and-mortar models of enormous prehistoric monsters that lurked in the gardens at Sydenham, Owen's deployment of correlation was a highly conspicuous part of the emergent consumer culture of Victorian Britain. (p.8)

It is, perhaps, the emphasis on *consumption*, and not just the University of Chicago Press, which unites Mitchell, O'Connor, Buckland, and Dawson's various studies. In their different ways, each testifies to the fact that ever since the Crystal Palace display, crowds have eagerly consumed increasingly commercialised images and stories from Earth's Mesozoic past. The traffic here may not be one-way either: "There is more than a hint", muses Mitchell, "that the Victorian monsters would, if brought back to life, consume the avid consumers who come to view them" (p.99).

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Anybody writing about the history of palaeontology today is drawing upon the influential work, in the mid-1970s and onwards, not only of Rudwick but of Adrian Desmond (eg. 1975), Peter Bowler (eg. 1976), and Susan Shatto (1976 – this latter a particularly important and readable early study of the relationship between palaeontology and literature). The decade is, I think, not a coincidence: following the discovery by John Ostrom (1938-2005) of the *Deinonychus* (Ostrom, 1969), dinosaurs, which had by the interwar years begun to be seen as ponderous and uninteresting swamp creatures, were suddenly vibrant, warm-blooded, and full of interest.<sup>8</sup> This 'dinosaur renaissance', as it is often known, was in some senses a vindication of the Victorian understanding, according to which Cope's *Laelaps* had been an agile, leaping hunter. Ostrom's work did much firmly to establish a relationship between dinosaurs and birds which had been agitated for by T. H. Huxley (1825-1895), but which had receded from scientific orthodoxy by the end of the nineteenth century. There is some question as to how far dinosaurs truly vanished from the popular imagination between Huxley and Ostrom – they remain quite discernible, for instance, in the science fiction of

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<sup>8</sup> I am far from claiming, of course, that Shatto, Rudwick, Desmond, and Bowler are straightforwardly or slavishly responsive to the 'dinosaur renaissance' – one-way traffic – but it is certainly not a surprise to learn that these studies and Ostrom's come out of the same broader intellectual moment.

this period – but consensus prevails that Ostrom’s work inaugurated a paradigm shift in how both scientists and writers imagined Mesozoic life.<sup>9</sup> Courtesy of Ostrom’s student Robert T. Bakker (b.1945), and with the direct involvement of Jack Horner (b.1946) this paradigm shift reached its public-facing apotheosis in Steven Spielberg’s blockbuster *Jurassic Park* (1993), a movie whose indebtedness to earlier forms of adventure fiction certainly does not end at the title of its sequel *The Lost World* (1997; c.f. Conan Doyle, 1995). As Horner’s willingness to collaborate in the production of this Hollywood caper testifies, the story of palaeontology is often told in part by the scientists themselves, and their histories take the form not only of personal memoir (Horner & Dobb, 1997) but of jovial reflection about the earliest roots of their discipline (Halstead & Sarjeant, 1995). One of the better bibliographies of dinosaurs in fiction (Sarjeant, 2001) is printed in the back of Darren H. Tanke and Kenneth Carpenter’s serious palaeontological collection *Mesozoic Vertebrate Life*, whilst the major reference work *The Complete Dinosaur* opens with no fewer than six essays (including region-specific histories) describing the early days of the discipline. Palaeontology is, after all, an historical science.<sup>10</sup>

As if this fact constituted an invitation – and perhaps it does – many historians more recently than the 1970s have been intrigued by the development of the nascent geology. None that I have found goes further back than does Adrienne Mayor, whose book *The First Fossil Hunters* examines palaeontological discoveries made in classical Greece and Rome: “The ancients collected, measured, displayed, and pondered the bones of extinct beasts”, she writes, “and they recorded their discoveries and imaginative interpretations of the fossil remains in numerous writings that survive today” (Mayor, 2000, p. 3). The work serves as a slice of humble pie for anybody investigating nineteenth-century fossils on the assumption that Cuvier was the first palaeontologist, although the establishment of the practice as a branch of the modern sciences *is* usually dated to what literary critics call the Romantic period, if not to Cuvier himself; the OED’s earliest use of ‘palaeontology’

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<sup>9</sup> The ‘dinosaur renaissance’ also matches exactly the dates given by David Sepkoski (2012) for the period during which palaeontology more widely was being consciously remodelled as an evolutionary discipline (palaeobiology) – a cutting-edge and exciting scientific practice rather than the act of collecting dusty bones.

<sup>10</sup> For considerably more on which, see Nitecki & Nitecki, 1992.

dates from 1833 (the year before William Whewell coined the word 'scientist'). The history of the science from this period has been told in popular accounts such as Deborah Cadbury's (Cadbury, 2000), in thematic accounts like Michael Freeman's *Victorians and the Prehistoric* (Freeman, 2004), and in biographical works like Nicholaas Rupke's *Richard Owen* (1994) or Dennis R. Dean's *Gideon Mantell and the Discovery of Dinosaurs* (1999). Mark Jaffe's *The Gilded Dinosaur* (2000) provides a welcome view of the situation in America, which, especially after the Civil War, was displacing the Old World as the site of exciting palaeontological discoveries. These works spend varying amounts of time with the literature of the period but, for perfectly understandable reasons and Dean and Jaffe's titles notwithstanding, they focus, as do most of the other historical works so far described, on vertebrate palaeontology in its wider sense. Once again, the dinosaur fails to stand apart.

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A literary-critical reader who feels sufficiently informed about the wider cultural and intellectual history of Victorian palaeontology might reasonably be asking, by this point, whether there really is anything useful about 'dinosaur' as a distinct category at all. Part of the answer may be found by taking a tour of the large and diverse quantity of fiction written about these creatures, and the scholar who wishes to do so will benefit from W. A. S. Sarjeant's well-curated bibliography (2001, already mentioned above). There is also Allen A. Debus's *Dinosaurs in Fantastic Fiction: A Thematic Survey* (Debus, 2006), a book-length review of the subject: Debus is an amateur, but a dauntingly well-read one, and his historical account is supplemented with an enormously useful descriptive appendix. A recently published sequel, *Dinosaurs Ever Evolving*, looks to continue Debus's work.

Literary analysis is yet to be done on the collective implications of the works outlined in these bibliographies. The word 'dinosaur' is as diaphanous as it is complex, and its negative associations (through the pulps of the 1920s to the children's picture books of today) are potentially not worth wrestling through – at least, on the face of it – in order to gain insight into a nineteenth-century category which had meaning only for the most elite practitioners. It only requires a modest

adjustment of perspective, however, to turn these shortcomings into virtues: precisely *because* its present-day meaning extends into pulp SF, museum design, kids' board games, nature documentaries, branded food products, and ironic T-shirts, to name but a few – precisely because of this, the origins of this particular scientific category surely merit exploration in their own right. If it is true that nobody at the time was calling them dinosaurs, it is also worth remembering that nobody was using the word 'Victorian' either – certainly not in its current sense, which has since Lytton Strachey's famous 1918 usage conspired to bring the past into focus by imposing upon it a new conceptual category (Strachey, 2003). This is also, of course, the work of the palaeontologist, part of whose job is to apply names to creatures which ceased to exist before naming began. Considered in this light, a cultural prehistory of the dinosaur seems newly justifiable.

Darwin's title *On the Origin of Species* (1859) is still easily misread as synonymous with 'On Where Life Comes From', but in fact the *Origin* is scrupulous in avoiding this question. Darwin is intent not upon explaining creation but upon explaining the natural world's subdivision from and within itself – the pigeonholes into which life is sorted, and the mechanism which regulates that process. The *Origin*, of course, is only the most prominent indication of an age which was characterised, as Harriet Ritvo (1997) has so wonderfully shown, by its category anxiety. If this anxiety extends beyond science (what separates the pig from the human?) and into the social (what separates the novel from the romance?) then, Buckland would insist, we must do our best not to privilege one over the other, or even, if possible, to separate them at all.<sup>11</sup> With that priority in mind, the dinosaur's metamorphic ability to move between Owen's study, Sydenham, and Hollywood becomes decidedly attractive. If we can follow it, passing through the various spheres in which it *means* – palaeontology, biology, taxonomy, geology, climatology, science studies, animal studies, economics, children's literature, history – then the grey areas between them may usefully be drawn into the spotlight.

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<sup>11</sup> Dawson's recent article in *Victorian Literature and Culture* (2016i) provides further ammunition for anybody wishing to discuss the analogy between literary and palaeontological practice.

Dinosaurs are frustrating. They have their own histories, but are responsive to human ones; their past changes as our future comes into being. They are scientific objects, utterly real, but they require imagination to see, and to animate, and to apprehend. They speak to us of our own age, and of theirs, and of the nineteenth and twentieth centuries, but they do so all at once. What is being conserved at Crystal Palace: anachronism? Nostalgia? The history of art? The history of science? Whose story are we telling when we reassemble those skeletons and draw ourselves, or our children, into their orbits? The greatest naivety would be to assume that there was any one answer to these questions. Dinosaurs are frustrating. But in the *ways* in which they frustrate – the ways in which they draw together and distort the boundaries between the stuff which makes up our world – lurks immense potential.

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