CHARLES DARWIN AND VICTORIAN VISUAL CULTURE

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CHAPTER 7

Darwin’s worms

In late April of 1881, his strength failing, Darwin again took up the autobiographical "Recollections of the development of my mind and character" he had written out for his children and grandchildren five years earlier. To that document's survey of "My Several Publications" he added brief accounts of the works he had published since 1876, including the one just completed, which would be his final book: "I have now (May 1, 1881) sent to the printers the MS. of a little book on The Formation of Vegetable Mould through the Action of Worms," he wrote. "This is a subject of but small importance; and I know not whether it will interest any readers, but it has interested me. It is the completion of a short paper read before the Geological Society more than forty years ago, and has revived old geological thoughts" (xxxii:136). When Worms appeared in October, the sales of this little book surprised both author and publisher. "3500 Worms!!!" wrote Murray's Robert Cooke on 5 November. Inundated with letters and awash in laudatory reviews, Darwin stood amazed at the chord his "subject of small importance" had struck.\footnote{1}

The subject and its treatment were vintage Darwin. As they move through the soil, earthworms ingest large quantities of earth, extracting from it the nutrients contained in vegetable matter, passing whatever is undigested as "castings." Although small and seemingly weak, worms produce prodigious results through their large numbers and incessant activity: Darwin estimated that in many parts of England worms process ten tons of earth per acre in a single year. Their actions, moreover, seemed to Darwin to exhibit some level of intelligence rather than mere instinct. They do not approach in the same way the objects of different shapes and sizes they wish to drag into their burrows, but instead appear to inspect and decide on the most efficient way to seize and drag them. And worms are of considerable human and geological significance. The rich layer of surface soil, Darwin argued, is created, turned over, and continually replenished by worms. Castings, blown by wind and washed by rain, are a major component of erosion and thus of geological denudation. Even archaeologists have reason to be grateful to worms, for artifacts and ancient ruins are gradually buried in castings, which protect and preserve them. Closing the book with yet another variation on the ending of the Origin, a "wide, turf-covered expanse," doing duty for the "entangled bank," Darwin offered a paean to the lowly worm:

When we behold a wide, turf-covered expanse, we should remember that its smoothness, on which so much of its beauty depends, is mainly due to the inequalities having been slowly levelled by worms. It is a marvellous reflection that the whole of the superficial mould over any such expanse has passed, and will again pass, every few years through the bodies of worms. The plough is one of the most ancient and most valuable of man's inventions; but long before he existed the land was in fact regularly ploughed, and still continues to be thus ploughed, by earth-worms. It may be doubted whether there are many other animals which have played so great a part in the history of the world, as have these lowly organised creatures. Some other animals, however, still more lowly organised, namely corals, have done far more conspicuous work in having constructed innumerable reefs and islands in the great oceans; but these are almost confined to the tropical zones. (xxviii:139)

The earthworm was for Darwin a global agriculturalist of greater antiquity than human beings, as industrious a worker as the even more lowly coral, its accomplishments less obvious only because it does not build reefs but rather "level[s]" topographical "inequalities." Characteristically for Darwin, this "leveling" was accomplished not through revolution but the slow, inexorable rhythms of pastoral activity and geological change. Some thirty years earlier, Alfred Tennyson, in his elegy for his beloved friend, Arthur Henry Hallam, had struggled to retain the hope that "not a worm is cloven in vain" even in the face of geological evidence suggesting that humanity's fate, like that of countless other species, was merely to be "blown about the desert dust" (In Memoriam 54:9, 56:19). For Darwin, however, the worm was an earlier and more significant plowman, its role in geological processes a cause for marvel and celebration rather than despair.\footnote{2}

Compared to most of Darwin's other books, Worms was not copiously illustrated, containing just fifteen wood engravings. Surprisingly, in light of the book's subject, only one was actually of a worm — the opening figure was a diagram of a worm's alimentary canal, copied from an article by Ray Lankester in the Quarterly Journal of the Microscopical Society (fig. 7.1). This diagram functioned more like the diagrams of facial musculature in the Expression than the archetypal crustacean and barnacle in the Cirripedia monograph or the opening figure of Orchis mascula in Orchids.
Its purpose was descriptive rather than theoretical, providing readers with a visual reference for the terminology of earthworm anatomy. But in reducing the worm to its digestive tract, Darwin also pointed to the fact that his specific subject was not the worm per se but its role in the formation of vegetable mould. It was what entered and exited that alimentary canal, and what happened to the castings, that mattered. And so of the fourteen other illustrations, three were of the castings themselves, while eleven contained stones and buildings buried by the action of worms. The former depicted piles of excrement in full naturalistic detail. Copied from photographs and reproduced in their actual size, these “tower-like” castings were themselves depicted almost as architectural monuments. Darwin had long been fascinated by nature’s oddities, yet here was, arguably, the apex of the Darwinian grotesque: worm shit, lovingly rendered as an object of wonder. This wonder is perhaps tinged with envy, as Darwin was obsessed throughout his adult life by the frustrating and often debilitating inefficiencies of his own digestive tract. The larger group of illustrations, that of stones and buildings, offered a Darwinian version of the picturesque. Darwin took one of the staples of the picturesque—monuments and ruins—and rendered them schematically as geological sections. While Darwin’s aesthetic response to natural scenery had long been intimately connected to his geological vision, to see worms as the movers behind a pleasing landscape was to take this interweaving of the aesthetic and the geological to a greater extreme. Archaeological and antiquarian illustrations often retained picturesque conventions—landscapes containing realistic renderings of ruins, with human figures to provide a sense of scale—but Darwin subtracted both the landscape and the people, adapting the visual language of geology to sites rarely depicted in such a fashion.

And so it is that with *Worms* we finally, belatedly, arrive at landscape. But only because it was with *Worms* that Darwin himself finally returned to landscape, and to geology. In saying that *Worms* “revived old geological thoughts” and brought to completion a paper delivered to the Geological Society more than forty years earlier, Darwin signaled the way this final book circled back to the beginning of his career. In those early days, both during the *Beagle* voyage and in the years immediately following his return, Darwin saw himself primarily as a geologist. While he edited the volumes on the zoology of the voyage, he authored the three volumes on its geology himself. Only when his *Journal of Researches into the Geology and Natural History of the Various Countries Visited by HMS Beagle* appeared in a second edition in 1845 was the order of “geology” and “natural history” in the title reversed, with natural history given the place of prominence. In the 1870s, however, with the books that completed the arguments of the *Origin* out of the way, geological thoughts began to revive in earnest for Darwin. New editions of *The Structure and Distribution of Coral Reefs* (1874) and *Geological Observations on South America* (1876) appeared at the same time as his interest in earthworms was increasing. Paradoxically, although the *Origin*, the *Variation*, and the *Descent* had offered a radical new vision of nature and of landscape, they were books that focused mainly on parts and pieces rather than wholes. So, too, with the botany books. Despite the all-encompassing ambitions and implications of Darwin’s theory, his books mainly offered close-ups of individual organisms and parts of organisms rather than panoramas. Passages about “the face of nature” or “the entangled bank” were the exception, necessary for keeping the wider prospect in view. *Worms*, like his return to coral reefs and South American geology, offered Darwin the chance to lift his physical as well as intellectual gaze.
That gaze was also aesthetic. Cataloguing in his autobiographical recollections his “curious and lamentable loss of the higher aesthetic tastes,” Darwin partially exempted the appreciation of landscapes. While he no longer responded with “exquisite delight” to “fine scenery,” he retained “some taste” for it (xxix:158). And indeed, while he was at work on *Worms*, Darwin twice visited the Lake District, reveling in its landscape. Every walk at his “beloved Coniston,” his children recalled of their 1879 sojourn, afforded “fresh delight” that left him “never tired of praising the beauty of the broken hilly country at the head of the lake.” During a return trip two years later, with *Worms* in proof, Emma reported him as much taken with the “beauty and views.” It is little wonder that the book closed with a landscape vision, a meditation on the beauty of a “wide, turf-covered expanse.”

And yet that meditation, as we have seen, focused not on the beauty of the landscape but on the role of worms in creating it. The imagetext that was *Worms* had almost nothing to say, at least not directly, about aesthetics and visual culture. This was not the *Descent*, with its evolutionary account of beauty, nor the *Expression*, with its discussions of art, nor the books on plant fertilization, with their explanation of the role of color and ornament in the botanical kingdom. As usual, however, Darwin’s treatment of his subject, both textually and visually, seemed calculated to comment on both traditional fine art categories and contemporary visual forms. Donald Ulin has argued suggestively that *Worms* “threaten[ed] the status quo by linking physical and intellectual activities, effacing a distinction essential to much nineteenth-century cultural criticism,” especially that of Coleridge and Matthew Arnold. In *Worms*, Ulin sees Darwin as subverting the idealized high-culture landscapes of the sublime and the picturesque with the material low-culture form of the grotesque, particularly the carnivalesque that Mikhail Bakhtin associated with Rabelais. While drawing on Ulin’s insights, I want both to read the actual illustrations for *Worms* and to treat them in relation to that other great nineteenth-century cultural critic – Ruskin – with his rather different vision of the grotesque and the picturesque. No evidence, direct or circumstantial, suggests that Ruskin read Darwin’s book when it appeared. Yet Ruskin entertained Darwin at his Lake District home during Darwin’s stay at Coniston in 1879, and it is possible he did so again in 1881. And it is not difficult to guess how Ruskin would have received the book and its illustrations. In most respects, Darwin’s work aligns itself with Ruskin’s ignoble grotesque and low picturesque, and while these are not without some shreds of virtue and merit, they are decidedly inferior to their noble counterparts, making *Worms*, like the rest of Darwin’s books, dangerous in its cultural and moral implications.

Much of Darwin’s work, and many of his illustrations, can be characterized as grotesque: the bizarre sexual arrangements of barnacles and orchids; the outre forms of fancy pigeons; the extravagant plumage, ornament, and weaponry of male birds; the hideous facial expressions of Duchenne’s galvanized old man; the elaborate traps of insectivorous plants. Indeed, Darwinism as a whole is informed by many aspects commonly associated with the grotesque. The term itself was originally applied to the designs in the frescoes discovered during the fourteenth century in the underground ruins (the grotoes) of the Baths of Titus in Rome. These designs featured fanciful depictions of plant, animal, and human forms, often playfully combined. In the centuries that followed, however, the grotesque took on different meanings, depending on which aspects of the original subjects were emphasized, with some of these meanings connected to style as much as or more than subject matter. The imaginative, fanciful elements could link the grotesque broadly to the comic. The blending of forms could be used to connect the grotesque to the deliberate combination of disparate styles and subjects, while the blended forms themselves could be viewed positively, as a celebration of life in its dynamic, fecund glory, or negatively, as monstrous and terrifying, evidence of the horrors that result from failing to respect boundaries and accept restraints. In the grotesque realism of Rabelais we are to found highly exaggerated situations and characters, frequent variation and mixing of styles, a delight in jokes and wordplay, and a naturalistic view of life focused in representations of the body as a site of earthly excess – of eating and drinking, defecation and urination, copulation, pregnancy, and birth. Although the grotesque continued to thrive in popular taste during the Enlightenment, neoclassical aestheticians regarded with disdain its violations of decorum and its vulgar humor. Darwinism, with its blurring of boundaries and blending of categories, its focus on variation, eccentricity, and irregularity, and its interest in bodies and their functions, especially sexual reproduction, digestion, defecation, and death, thus had many of the hallmarks of the grotesque. While Darwin and his allies clearly revealed in nature’s grotesqueries, and took delight in their celebration of them, those who regarded nature as complete, ordered, stable, and hierarchical looked upon Darwin’s vision with horror.

Darwin’s treatment of worms and his illustrations of worm castings fall squarely within the tradition of grotesque realism. Bakhtin argues that grotesque realism is not only relentlessly material but also relentlessly positive about that materiality. Its “essential principle” is degradation – “a transfer
to the material level, to the sphere of earth and body," of "all that is high, spiritual, ideal, abstract." "The artistic logic of the grotesque image," says Bakhtin, "ignores the closed, smooth, and impenetrable surface of the body and retains only its excrescences and orifices." The essential parts of the grotesque body are thus those in which "the confines between bodies and between the body and the world are overcome": the bowels, the phallus, the anus, and especially the mouth. In grotesque realism, "the body swallows the world and is itself swallowed by the world." Grotesque realism is concerned with death and decay, but always in the context of the bringing forth of new life. Its world is fertile, abundant, and festive.  

Darwin's opening illustration (see fig. 7.1) treats earthworms in precisely this way, presenting them as a giant digestive tract, from mouth to intestine. His fundamental concern throughout the book is with worms' "excrescences and orifices": the way worms ingest soil and organic material, process it in their alimentary canals, and expel what they do not absorb as castings. So thoroughly do worms break down the division between their bodies and the world that the world almost literally passes through their bodies, over and over again. This fact, in Darwin's view, is cause for wonder and celebration, for worms thus help to create and aerate the soil, converting the products of death and decay into a source of regeneration and life.

The burden of the book's early chapters is thus to establish that worms are indeed capable of passing large quantities of castings. This is the point that the three illustrations of castings serve, and in style as well as subject matter they conform to the conventions of grotesque realism. Each is marked by irregularity and complexity, a mass of convolutions. Each is highly naturalistic—engraved from a photograph, and presented at its actual size. And size not only matters but is stressed. The first is from a species whose castings typically "rise like towers" (xxvii:47) to a height of two and a half inches, and sometimes to three inches or more. The second is similar but even taller, and the bits of vegetation sprouting out of it testify to the fertility of the castings (see fig. 7.2). The third, produced by a species over a foot in length and "as thick as a man's little finger," is remarkable for the diameter of its convolutions and its mass (the largest member of the group from which this specimen came, notes the astonished Darwin, had convolutions "rather more than one inch in diameter" and weighed "above a quarter of a pound!" [xxvii:36]). Such massive castings, moreover, are neither isolated nor present only where decaying vegetable matter is copious. The first specimen was obtained from a location where worms subsist on soil only, yet five or six large castings could often be found in a square foot. The second came from the Botanic Gardens in Calcutta, where castings were so large and numerous that the lawns had to be rolled daily to preserve their appearance. The third was found at a high elevation in an arid climate.

Figure 7.2. "A tower-like casting, probably ejected by a species of Perichaeta, from the Botanic Garden, Calcutta." Engraving from a photograph. Figure 3 from Charles Darwin, The Formation of Vegetable Mould through the Action of Worms (London: Murray, 1881), 124.

To marvel at worms and worm castings can be regarded as a fundamentally comic act, subversive of political and cultural elites. Grotesque realism was informed by the humor of folk culture, the degradation of the high and the mighty and the elevation of the low and the powerless, a carnivalesque inversion of the social hierarchy. In Darwin's day, this aspect of the grotesque lived on for contemporaries particularly in the novels of Dickens and the caricature of Punch — where, however, it was generally advancing the aims of bourgeois more than working-class culture. As the title of the prolific antiquarian Thomas Wright's important History of Caricature and Grotesque in Literature and Art (1865) suggests, caricature and the grotesque could be used virtually as synonyms, although for Wright the grotesque was limited to depictions of the fantastic or the extremely ugly or comic, and only became caricature when used for purposes of ridicule. Whether one
embraced or lamented the social functions of the grotesque depended on ideology as well as aesthetics. In their survey of the Victorian grotesque, Colin Trodd, Paul Barlow, and David Amigoni argue that in the hands of writers like Dickens and Wright, the grotesque was associated with a liberal society and a humanist ethic, "seek[ing] in deviations and eccentricities a means to destabilize the rationalizing and systematizing functions of the bureaucratic systems of knowledge." For critics like Matthew Arnold, G. H. Lewes, and Walter Bagehot, however, the grotesque was a sign of the ruination of authentic culture by a sentimental, democratic popular realism—a realism which seeks experiential plenitude through the swarming of expressive detail. 

As usual, Darwin’s work did not enact the direct “ruination of authentic culture” but the subtle undermining of it, principally through alignment with, and celebration of, the “deviations and eccentricities” that defenders of authentic culture looked upon with disdain. Certainly aware of how easily he and his theories could be caricatured for purposes playful or cruel, Darwin was perhaps content to glorify his grotesque worms, leaving any caricature of elite culture at best implied. He gave his worm castings the same visual treatment accorded to architectural monuments and antiquarian or archaeological artifacts, while the monuments and artifacts discussed and pictured later in the book were significant textually and visually not for their own sake but for the evidence they provided of the activity of worms. And indeed, as I noted above, these monuments and artifacts would not exist, or not exist as they do, were it not for worm castings. The remains of Roman towns and fallen monoliths at Stonehenge have been buried in worm castings, yet this is not presented as degradation and ruination but as preservation. The burial is not the literal bringing down to earth of ancient cultures and their civic and religious ideals but the building-up of earth by worms, which are themselves elevated not as grave diggers but as builders. Worms have played an important part in the natural and human history of the world, in a sense making human culture possible. Yet their preservation of ancient monuments is as inadvertent as their creation and aeration of the soil. Darwin does not ridicule human high culture here—his laughter at the role of worms in human history is a backstage chuckle—but his delight in worms and their achievements is palpable. They display rudimentary intelligence, and, although omnivorous, exhibit a certain degree of discrimination and taste when confronted with a choice of food. They level by building out of their own castings “tower-like” monuments as marvelous as a Celtic monolith, a Roman villa, or a medieval abbey.

Darwin’s use of architectural and geological language to describe worms’ castings—in addition to being “tower-like” they are sometimes measured from “base” to “summit” and often treated like miniature volcanoes, the soft combination of earth and unfiltered matter being thrown up suddenly and then, lava-like, hardening—is not merely in keeping with his use of ancient structures to measure worm activity and his geological approach to the problem. It connects Worms to the picturesque, the contemporary landscape form in which architecture and geology came most intimately together. Yet if Darwin’s treatment of worm castings seemed to indulge in grotesque realism, his handling of ruins virtually amounted to a massive revision or even rejection of the picturesque.

In the late eighteenth and early nineteenth centuries, the reaction against neoclassicism brought the grotesque back into favor in elite artistic and literary circles, although with its serious rather than its carnivalesque associations emphasized. Edmund Burke, in his influential Philosophical Inquiry into the Origin of our Ideas of the Sublime and the Beautiful (1756), had associated the grotesque with the trivial and the comic in contrast to the seriousness of the sublime, with the ugly in contrast with the beautiful. Subsequent theorists, however, developed the category of the picturesque for those scenes that induced serious reflection and feelings of pleasure even though they lacked the subject matter and stylistic features of the sublime and the beautiful. Picturesque scenes contained elements of beauty, despite lacking the curved lines, gentle chiaroscuro, and smooth surfaces associated by Burke with the beautiful, and elements of the sublime, even though they depicted tranquil, rustic landscapes rather than the majesty and violence of towering peaks, resounding cataracts, and stormy skies. As Frances Barash has shown, the picturesque essentially acknowledged that grotesque elements could contribute to solemn or pleasurable responses to landscapes whose comparatively ignoble subjects—blasted trees, crumbling ruins, and ragged peasants—were characterized by irregular lines, strong contrasts of light and shade, and rough or rugged textures. Ruins in particular lent themselves to such treatment and thus were a common feature of picturesque landscapes. In fact, discussing the picturesque in the third volume of Modern Painters in 1856, Ruskin made “a delight in ruin” the characteristic feature of the picturesque (vii:9).

By Darwin’s youth, the conventions of the picturesque had been firmly established, and the “exquisite delight” he then took in “fine scenery” was often couched in the language of the period’s aesthetic terminology. Darwin
owned and annotated an 1823 edition of Burke's essay on the sublime and the beautiful. His *Journal of Researches* employs "picturesque" and "sublime" liberally, particularly for South American landscapes, and he explicitly describes the ruins of Concepcion, Chile, as "picturesque" following a massive earthquake. First Lieutenant John Wickham's sketch of the scene (fig. 7.3), reproduced in Fitzroy's official *Narrative* of the voyage, captures Concepcion in precisely this manner. Aboard the *Beagle*, Darwin was friendly with ship's artist Augustus Earle and then with his replacement, Conrad Martens. Martens, who had studied under watercolorist Copley Fielding, later the teacher and friend of Ruskin as well, produced topographical drawings as well as a variety of sublime and picturesque sketches (fig. 7.4). When Darwin saw Martens again in Australia in 1836, he purchased two watercolors, one of the Santa Cruz River expedition and one of the *Beagle* in Tierra del Fuego. In 1862, Martens sent Darwin another watercolor from the *Beagle* voyage via Wickham.

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Figure 7.3 "Remains of the Cathedral at Concepcion." Engraving from a sketch by John Wickham from Robert Fitzroy, ed., *Narrative of the Surveying Voyages of His Majesty's Ships Adventure and Beagle . . .*, 3 vols. (London: Colburn, 1839) ii facing p. 405. A picturesque rendering of the massive Chilean earthquake experienced by Darwin and his shipmates on the *Beagle*.
The depiction of ruins in a picturesque fashion remained common in a variety of contexts throughout the century. Thomas Wright's popular and copiously illustrated *The Celt, The Roman, and The Saxon: A History of the Early Inhabitants of Britain* (originally published in 1832) almost invariably depicted ruins in the picturesque tradition, as did his *Wanderings of an Antiquary* (1834). Edgar Barclay's *Stonehenge and Its Earth-Works* (1835) contained numerous picturesque illustrations of the famous stone circle; while published fourteen years after *Worms*, its survey of the history of theories about the monument included many illustrations from earlier works, and thus provided a sort of visual history as well. Wright's book on the Roman excavations at Wroxeter, to which Darwin refers in *Worms* (xviii:98), contained fewer picturesque engravings, and the most finished of these were not of the Wroxeter ruins themselves, but the presence of such illustrations in a fairly technical antiquarian/archaeological work indicates just how natural the picturesque had become for illustrating ruins even outside of fine art contexts (fig. 7.5). During the 1870s and early 80s, Darwin's friend and neighbor, John Lubbock, was active in efforts to preserve Britain's ancient monuments, purchasing land on which endangered monuments, including the large stone circle at Avebury, stood, introducing in Parliament a National Monuments Protection Bill starting in 1873 (finally passed, in watered-down form, a decade later), and penning the introduction for Charles Philip Kains-Jackson's *Our Ancient Monuments and the Land Around Them* (1880), this latter containing loosely picturesque illustrations. By 1880 a thriving photographic tourist industry was producing picturesque cartes-de-visite of the countryside, and middle-class tourists, armed with their own cameras, were capturing picturesque subjects, including the remains of Celtic monuments, Roman towns, and medieval abbeys. Darwin himself owned three cartes of the Roman ruins at Chedworth — two of an essentially documentary variety depicting mosaic tile floors, but one a picturesque view of the excavations.

Long familiar with the terminology and iconography of the picturesque and aware of the precedents for employing it in archaeological and antiquarian works, Darwin could not have failed to be aware that his readers, encountering discussions of ancient monuments and ruins, would at some level associate *Worms* with these other works. And Darwin was not discussing just any monuments and ruins, but iconic ones representative of major eras and events in Britain's past — Celtic Stonehenge, Roman Silchester (among the largest and most complete Roman remains in Britain), Beaulieu Abbey (partially destroyed during Henry VIII's dissolution of the monasteries). Given Darwin's focus on the role of worms in the burial of such sites, it made sense not to treat them pictorially. But this treatment did not simply remove Darwin's illustrations from aesthetic and cultural contexts, especially since the illustrations for *Worms* could seem almost militantly anti-picturesque, because Darwin treated these picturesque archaeological sites as geological sections.

While Darwin's book was very much a work of natural history — a bit more than half was devoted to the habits of worms and their processing of soil — it was almost equally concerned with geology and archaeology. Two of its six body chapters dealt with "the action of worms in the denudation of the land," while a third discussed "the part which worms have played in the burial of ancient buildings." This geological and archeological component to Darwin's investigations, which might appear rather odd at first sight, had its roots in his initial curiosity about worms. In the early fall of 1837, the proofs of his *Journal of Researches* just sent off, Darwin visited his Uncle Josiah Wedgwood's home in Staffordshire. During one of their walks, Uncle Jos pointed out several meadows in which a layer of small fragments of cinders and lime, strewn on the surface some years before, was now buried to a depth of several inches. The cause, Uncle Jos hypothesized, was earthworms — it was not that the layer of detritus had sunk, but that worms had covered it with their castings. Intrigued, Darwin investigated further. Within six weeks, back in London, he presented a paper entitled "On the Formation of Mould" to the Geological Society. Having spoken to the same body earlier in the year on corals, and already planning the
Darwin’s worms

Thus began Darwin’s distinctive lifelong fascination with the actions of these insignificant creatures. In 1844, he reported again on his Uncle Jos’s fields, this time to the *Gardeners’ Chronicle*, updating and correcting his earlier account. Over the years he continued to collect observations and data while he worked on other projects, as usual enlisting family members and foreign correspondents to assist him. Sons Horace, Francis, and William, nieces Sophy and Lucy Wedgwood, and cousin Francis Galton were all recruited. His friend Asa Gray, the Harvard botanist; Scottish geologist Archibald Geikie; John Scott of the Royal Botanic Garden in Calcutta; the Director of the Geological Survey, A. C. Ramsay; J. L. G. Krefft of the Australian Museum in Sydney; the civil servant and amateur botanist T. H. Farrer (whose second wife was one of Darwin’s nieces, and whose daughter married Horace Darwin in 1880) – all provided information, measurements, and observations. From examining the burial of discarded cinders it was also, of course, not a long step to examining the burial of boulders and human structures, and Darwin’s desire to write about worms resurfaced in the 1870s as he obtained more and more evidence of their actions from archaeological sites and ancient monuments. Ramsay sent Darwin a sketch of the pavement of his home’s eighteenth-century courtyard, sunk because of the action of worms, in late 1871. William was dispatched to Beaulieu Abbey in Hampshire to collect worm castings in January of 1872. In the summer of 1877, Darwin traveled on a series of worm excursions. On 19 June he was at Stonehenge with George; “I’m afraid it will 1/2 kill F[ather],” Emma wrote to their daughter, Henrietta, “but he is bent on going, chiefly for the worms.” Fortunately, the old soldier guarding the monument “was quite agreeable to any amount of digging.” Three days later Darwin was himself at Beaulieu Abbey; in August he was present at the beginning of the excavations of a Roman villa recently discovered by Farrer on his property at Abinger, Surrey. That fall, Francis and Horace were sent to Chedworth, Gloucestershire, and Silchester in Hampshire to look for signs of worm activity at Roman ruins, in the company at the latter of J. G. Joyce, the superintendent of the excavations, who also provided Darwin with extensive notes and elaborate drawings of the site. In 1880–81, as he worked on the book in earnest at home, Darwin solicited additional archaeological evidence in a final intense round of source-pumping. William scouted yet another recently unearthed Roman villa at Bradling on the Isle of Wight. Farrer answered queries about both his Abinger villa and the Silchester excavations, Joyce having died. Dr. Henry Johnson, superintendent of the Wroxeter excavations, twice visited the ruins to make observations and take measurements in response to Darwin’s questions.

Darwin’s geological view of earthworm activity was present from the point of his initial fascination. His original paper for the Geological Society in 1837 was illustrated with a woodcut depicting a columnar cross-section of the soil from Uncle Jos’s field, with grass at the top and several layers of soil beneath it (fig. 7.6a). Thinking of himself at the time primarily
as a geologist, and immersed in his work on South American geology as well as the coral reefs of the Pacific, Darwin visualized his subject in geological terms, as a comparison of the columnar section of the 1837 paper with one from his *Geological Observations on South America* makes clear (fig. 7.6b). More than forty years later, this 1837 section remained central to Darwin’s vision. Retained virtually unchanged in *Worms* itself, it was the first illustration in the book’s discussion of its specific subject, embedded in an extended account, now brought up to the present, of Uncle Jos’s Staffordshire fields (fig. 7.6c).

The idea of using columnar sections to represent the role of earthworms in the burial of buildings and monuments may well have come in a letter from the Geological Survey’s Ramsay in 1871, which contained just such a rough sketch. While Darwin did not reproduce Ramsay’s sketch in *Worms*, he discussed the example (xxviii:86), and he did reproduce other columnar drawings he received over the ensuing decade. A section of Farrer’s Roman villa at Abinger, and several from the Silchester excavations, were virtually indistinguishable from that of Uncle Jos’s field, even containing the layer of turf at the top (fig. 7.7). These Silchester sections were actually slices of much longer sections made by Joyce, who sent copies to Darwin. These marvelous
colored tracings—"of too great length to be here introduced entire," wrote Darwin (xxvii:90)—are heavily annotated with Darwin's instructions to the engraver (as are all the extant drawings and proof engravings of the illustrations for *Worms*), which indicate what parts are to be reproduced and seek consistency in the representation of various layers and the objects within them from illustration to illustration (fig. 7.8). By reproducing only "the most characteristic portions" of Joyce's drawings (xxvii:90), Darwin essentially converted traverse sections—that other staple of geology's visual language—into columnar ones. Yet traverse sections are not absent: several of Darwin's illustrations of the site depict a more extended horizontal view and directional orientation, the remnants of walls analogous to geological beds, "subsided" tile floors analogous to surface topography (fig. 7.9a). Again, a comparison with Darwin's simple (fig. 7.9b) and more elaborate (fig. 7.9c) traverse sections in *Geological Observations on South America* underscores the fundamentally geological nature of the illustrations for *Worms*.35

The fact that Darwin copied or borrowed from others' archaeological drawings indicates that he appropriated rather than invented the application of geology's visual conventions to archaeological sites. Nonetheless, his geological approach to the burial of objects by earthworms was present from the outset of his investigations in 1837. As a geological problem—a question of elevation, stratification, subsidence, and denudation—it merited a geological solution and geological illustration. Darwin was, after all, originally more interested in processes and product than in the agent, in "the formation of vegetable mould" more than in worms themselves. While he grew increasingly fascinated with worms, "observations on their habits" only rose to the level of an appendage, both in the book's full title and in its text. And yet the buried object—whether cinders spread on a field, a fallen monolith from Stonehenge, or a Roman villa—was also not the focus of Darwin's attention, but rather a convenient measuring device. It was earthworms, not archaeological curiosity, that took him to Salisbury and Abinger.

His sections, and especially the prominence of them in his text, thus cut against the visual grain. Such illustrations were at best infrequent in archaeological, anthropological, and antiquarian works and were virtually absent from the visitors' guides and books devoted to these same sites. Wright's *The Celts, The Roman, and The Saxon*, for example, contained no sectional representations among its numerous illustrations of ruins. His book on the Wroxeter excavations included three sectional-type drawings, but none was really like Darwin's. The case is similar with Barclay's *Stonehenge*. Thomas Buckman's *Notes on the Roman Villa at Chedworth*, cited by Darwin in *Worms*, contains only a plan of the excavations, maps and ground plans
A north and south section through the subsided floor of a corridor, paved with tesserae. Outside the broken-down bounding walls, the excavated ground on each side is shown for a short space. Nature of the ground beneath the tesserae unknown. Silchester. Scale 1/3.

Figure 7.9 (a) "A north and south section through the subsided floor of a corridor, paved with tesserae..." Wood engraving. Figure 14 from Charles Darwin, The Formation of Vegetable Mould through the Action of Worms (London: Murray, 1881), 214. Darwin's "north and south section" is strikingly similar to the traverse sections he had used to illustrate his work on South American geology.

No. 21.—SECTION OF THE TERTIARY FORMATION AT COQUIMBO.

Surface of plain, 252 feet above sea.

Level of sea.

E—Lower sandstone, with concretions and silicified bones, some with fossil shells, all, or nearly all, extinct.

F—Upper ferruginous sandstone, with numerous Balani, all, extinct.

G and D—Calcareous beds with recent shells. A—Stratified sand in a ravine, also with recent shells.

Figure 7.9 (b) "Section of the tertiary formation at Coquimbo." Wood engraving. Figure 21 from Charles Darwin, Geological Observations on Coral Reefs, Volcanic Islands, and on South America (London: Smith, Elder, 1851), 133:128.

being of course the most common way to represent such sites for both visitors and readers. Wright's book on Wroxeter contained a number of such plans, including two large foldout ones. Darwin had similar plans for several of the other locations he discusses in Worms — including one by Farrer of Abinger and one by Joyce of Silchester — but did not utilize them. As we've seen so often with Darwin, the types of illustration he does not use are often as revealing as those he does. In this case, the rejection of maps and ground
Figure 7.10 (a) "Section through one of the fallen Druidical stones at Stonehenge, showing how much it has sunk into the ground" and (b) "Traverse section across a large stone, which had lain on a grass field for 73 years." Wood engravings. Figures 7 and 6 from Charles Darwin, The Formation of Vegetable Mould through the Action of Worms (London: Murray, 1881), 156, 151. University of Michigan Libraries.

plans reinforces his fundamentally geological approach. A bird’s-eye view of the whole is unnecessary and even distracting when the focus is on surface topography and what exists below ground.

To convert Roman ruins into geological sections was thus to reject the picturesque vision of tourist or traveler. Such was the case as well with Darwin’s depiction of Stonehenge (fig. 7.10a): a single, fallen stone, again regarded in geological terms, its subsidence measured against the uneven building up of the turf adjacent to it, much like the pieces of marl and cinders in his Uncle Jos’s field, indistinguishable from its companion illustration (fig. 7.10b) of a stone from a Surrey lime kiln pulled down a mere forty years earlier. Here was no gesture to the typical representations of Stonehenge — no reference to the rest of its stones, no human figures, no sense of the surrounding plain. Neither of the two wood engravings of Stonehenge in Wright’s Wanderings of an Antiquary, the second of which (fig. 7.11) includes one of the fallen outer stones that Darwin pictures, focuses on a single monolith, and both include human figures, one of whom in the second illustration carries a shepherd’s crook. Another pair of engravings, this one from Barclay’s

Figure 7.11 “Stonehenge, From the North.” Wood engraving from Thomas Wright, Wanderings of an Antiquary (London: Nichols, 1854), facing pages 293–94. This picturesque illustration for Wright’s popular antiquarian book includes one of the fallen stones depicted by Darwin in figure 7.10a.

Stonehenge, demonstrates the introduction of the rustic (fig. 7.12). The first, reproduced from Inigo Jones’s 1620 work on the monument, contains a pair of seventeenth-century gentlemen and their dog in the foreground, with another pair, one of them sketching, seated on the turf in the left background; the second, taken from the same point by Barclay, replaces the gentleman with sheep and their shepherd. In Turner’s dramatic rendering of Stonehenge for his Picturesque Views in England and Wales in 1838 (fig. 7.13), the lightning strike has killed or knocked out the shepherd, who lies prostrate in the right foreground, his dog howling, his flock stunned, dead, or scattered. For Ruskin in Modern Painters, this work, which set “the standard of storm-drawing” (III:413), represented the divine judgment of the Christian God upon the religion of the Druids (VI:189–91; XV:223). Darwin’s illustration obviously carries no such meaning, but it stands in contrast even to the representations of Jones, Wright, and Barclay. Darwin’s view is not panoramic but close up, a geological cross-section in which the horizon is at ground level, and humans are absent. The magnificent monument of the Salisbury plain is put on the same visual level in Darwin’s book as the modern detritus of the industrial age. Typically for Darwin, this leveling was accomplished not so much by lowering Stonehenge as by elevating industrial detritus. Lubbock could lament the “modern barbarism” that, for the sake of paving stones and the unimpeded passage of the plow,
was "destroy[ing] such interesting, I might almost say sacred, monuments of the past," but for Darwin, stones were stones. Glacial boulders, Celtic monuments, Roman pavements, abbey floors, wrecked lime kilns — all afforded the opportunity to study and measure the activity of worms.

Worms was one of Darwin's most favorably reviewed books. Virtually every reader praised Darwin's careful, detailed experiments and his patient collection of evidence. His claims about the significance of worms were almost uniformly accepted. Few so much as mentioned his illustrations, and none saw in them, as they had in the illustrations to the Expression, a threat to the fine arts. Contributing to this was undoubtedly the fact, noted by many reviewers, that Darwin's arguments in this work did not invoke natural selection, and his explanations were not dependent on its truth. It was not necessary on this occasion, as it had been in particular with the botany books and the Expression, to separate description and theory, endorsing the one while rejecting, or at least withholding acceptance of, the other. But Darwin made clear in his Introduction that skepticism about the stupendous cumulative effects of the lowly earthworm was the same prejudice against which Lyellian geology and natural selection had struggled. Citing a critic of his earlier claims about the activity of worms, Darwin wrote that "Here we have an instance of that inability to sum up the effects of a continually recurrent cause, which has often retarded the progress of science, as formerly in the case of geology, and more recently in that of the principle of evolution" (xxviii: 3). This passage caught the eye of many reviewers, the supporters of Darwinism quoting it as evidence of the book's place in the master's campaign on behalf of natural selection, the skeptics and opponents using it to distinguish between sound, empirically grounded inference and premature speculation, and even to advance a diametrically different reading. An early, anonymous reviewer in the Spectator argued that Darwin's demonstration of the earthworm's place in the natural economy, and of its central importance to humans, further bolstered the argument from design, a position echoed in the Quarterly Review by Henry Wace, divine and ecclesiastical historian, and future Dean of Canterbury. The anonymous London Quarterly reviewer went further. He not only saw the book as providing "the clearest evidences of design," but also suggested that Darwin had written it to show "how much he has been misunderstood" by atheists and agnostics. Indeed, "Mr. Darwin deserves a share of the credit bestowed on the Duke [sic] of Bridgewater's treatise-writers, in spite of his having declined to push his inferences to their just conclusions." The cultural threat posed by Darwin's work was rarely forgotten, even when his imagetext's subversive qualities were understated or even unintended.
Ruskin may or may not have read Darwin’s *Worms*, but he had certainly had much to say about the grotesque and the picturesque. From the late 1840s through the following decade, Ruskin theorized extensively about them in his two major architectural writings, *The Seven Lamps of Architecture* (1849) and *The Stones of Venice* (1851–53), and in the third and fourth volumes of *Modern Painters* (1856). For Ruskin, as Elizabeth Helsinger has argued, the noble forms of the grotesque and the picturesque were versions of, even alternatives to, the conventional sublime of Burke. They were indices of healthy minds and healthy societies. The ignoble grotesque and low picturesque, on the other hand, were often markers of the sensuality and irreverence of both individuals and nations. Darwin’s versions of the grotesque and the picturesque in *Worms* come much closer to the latter than the former, a fact which would not have surprised Ruskin, given his view of Darwin’s mind and his assessment of Victorian society.

Ruskin’s most extensive discussion of the grotesque appeared in the final volume of *The Stones of Venice*, his main purpose to distinguish between the noble grotesque of the northern medieval Gothic and the ignoble grotesque of the late Renaissance. Charting the decline of Venice through the changes in its architecture, and especially through its architectural ornament, Ruskin made the grotesque a measure of the mental and moral health of both artist and nation:

Wherever the human mind is healthy and vigorous in all its proportions, great in imagination and emotion no less than in intellect, and not overborne by a hardened and undue pre-eminence of the mere reasoning faculties, there the grotesque will exist in full energy. And, accordingly, I believe that there is no test of greatness in periods, nations, or men, more sure than the development, among them or in them, of a noble grotesque; and no test of comparative smallness or limitation, of one kind or another, more sure than the absence of grotesque invention, or incapability of understanding it. (xi:187)

The ability to create and understand the noble grotesque— and noble architecture as a whole— was for Ruskin centrally and famously connected throughout *Stones* to a nation’s attitude towards work and labor. The workmen of modern England, Ruskin argued, like those of ancient Greece, are slavish and servile, their imaginations repressed in the repetitious production of the same object or form. The medieval stone-carver at work on the great Gothic cathedrals, on the other hand, though guided and supervised, was free to express his imagination.

Refusing to reduce the grotesque to either its comic or serious forms, Ruskin argued that the grotesque always contained “ludicrous” and “fearful” elements, with the former predominating in what he termed the “sportive” grotesque and the latter predominating in the “terrible” or sublime grotesque. The sportive grotesque he associated with play, its noble forms produced by those who play wisely, understanding that life cannot be all solemn and serious, but who also never lose a “deep love of truth, of God, and of humanity” (xi:153) even in recreation, and those who play of necessity, because their work is tiring and irksome. Those who play wisely rarely produce the grotesque in art, and when they do, it is more likely to be serious and of the terrible variety. The noble grotesque produced by those who play of necessity is the grotesquerie of the northern Gothic—the cathedral ornaments of the medieval stone-carvers, whose work was imperfect but joyful and good. When united with the noble form of the picturesque, this form, too, can rise in grandeur and approach the terrible grotesque. The ignoble form of the sportive grotesque, on the other hand, is produced by those who play inordinately. It is the grotesque of the late Renaissance, the work of aristocrats and sensualists, those who make play their life, and in so doing, increase the misery of others. Such men “delight in the contemplation of bestial vice, and the expression of low sarcasm” (xi:145). They are “more sensible to what is ludicrous and accidental, than to what is grave and essential, in any subject . . . Very generally minds of this character are active and able; and many of them are so far conscientious, that they believe their jesting forwards their work. But it is difficult to calculate the harm they do by destroying the reverence which is our best guide into all truth” (xi:155).

Ruskin’s terrible grotesque expresses the human fear of sin and death, but it does so in “peculiar temper” and without entering fully into the depth of that fear. The producer of the terrible grotesque approaches his subject in a spirit of apathy, mockery, or unhealthy, uncontrolled imaginativeness. Each of these attitudes is capable of generating noble or ignoble forms of the grotesque, with the distinction lying in the fact that the master of the noble grotesque knows the depth of what he mocks, but the master of the ignoble grotesque does not—his, says Ruskin, is “the laughter of the idiot and the cretin” (xi:167).

Like other Victorian commentators, Ruskin saw Dickens and the caricaturists of *Punch* as the most prominent contemporary exemplars of the grotesque, although modern England, like Venice of the late Renaissance, was a nation of moral, intellectual, and economic disease, and thus a place where the noble grotesque did not thrive. The Dickensian grotesque was
for Ruskin a form of the terrible grotesque, that in which fear of sin and death is approached in a spirit of mockery or satire, a special province of the lower classes:

Nothing is so refreshing to the vulgar mind as some exercise of [mockery], more especially on the failings of their superiors; and... wherever the lower orders are allowed to express themselves freely, we shall find humour, more or less caustic, becoming a principal feature in their work. The classical and Renaissance manufacturers of modern times having silenced the independent language of the operative, his humour and satire pass away in the word-wit which has of late become the especial study of the group of authors headed by Charles Dickens; all this power was formerly thrown into noble art, and became permanently expressed in the sculptures of the cathedral. (xi:172–73)

The noble terrible grotesque of the Gothic workman is spoken in his own voice, the horrors of sin and death mocked but understood. He is free to lampoon his superiors’ failings, but his superiors, themselves noble, allow and encourage this expression, for the good of the workman, and of themselves, and of their society. Modern factory owners, by contrast, have silenced the expressive voices of their workers both politically and artistically. The noble grotesque once given permanent form in cathedrals is now, Ruskin complains, ventriloquized in the “word-wit” of Dickens’s novels.

Contemporary caricature, too, even in its highest forms, could not for Ruskin approach the “great imaginative grotesque” (vi:469) of the northern Gothic. When he extended his account of the grotesque to painting and drawing in Modern Painters, Ruskin, despite his great respect for the work of such caricaturists as George Cruikshank, John Leech, John Tenniel, and George du Maurier, relegated them to an appendix on “Modern Grotesque” rather than discussing their work in his chapter on the grotesque ideal. Such men have peculiar powers in the observation of character, but they “catch at faults and strangenesses” and have no eye for beauty (vi:469). Their influence over the popular mind is great, and at their best they provide “thorough moral teaching” through their “stern understanding of the nature of evil, and tender human sympathy” (vi:471). As Linley Sambourne’s two Worms-inspired 1881 caricatures of Darwin for Punch demonstrate, however, the work of popular caricaturists was often not thoroughly and unambiguously moral. Sambourne’s caricatures added the earthworm to the evolutionary genealogy of humans—the one textually, the other visually—and both suggested Darwinism’s disruptive religious and political implications. In the first (fig. 7.14), Darwin’s cultural role as skeptic and questioner is figured through his posture (he sits thinking, hand on chin, finger to mouth), the large question mark formed by the worm that rises out of the grave at which he has been digging, and the book entitled “Diet of Worms” lying at his side (a reference to the 1521 Diet at which Luther refused to recant, defying both the Holy Roman Emperor, Charles V, and the Pope). In the second (fig. 7.15), the Biblical creation story is represented in evolutionary terms, the worm that slithers out of the word “Chaos” at the lower left spiraling through a series of life forms that leads to apes, primitive humans, and finally to a Victorian gentleman, who doffs his hat to a God-like Darwin seated on a throne. The first caricature alludes to Job 25:6 in its title, making literal the Biblical text’s metaphorical statement of human insignificance and unworthiness, while the second’s reference to Hamlet’s “politic worm” offers a reminder of another leveling power of worms—that a beggar may fish with a worm that has eaten of a dead king, and eat of a fish that has fed on that worm. But is Darwin’s status as a scientific Luther and a secular
God being hailed, denounced, or simply noted? Is Darwin like Hamlet in being the scourge of tyrant and regicide, or in being a murderer of the foolish and the innocent? Sambourne's caricatures catch at the strangeness of Darwinism, but their moral ambiguity leaves unclear the depth of their understanding of its potential for evil.

As themselves specimens of the grotesque, neither Darwin's book nor his illustrations of worm castings would have risen for Ruskin to the level of nobility. Viewed with a Ruskinian eye, Worms indeed combines the sportive and the terrible. Darwin's playfulness, while not that of the sensualist, was nonetheless that of the person who places value only in the evidence of the senses, and who thus has an eye for what is accidental rather than essential, the ludicrous rather than the grave. His eye for worms and worm castings, like his eye for orchids and sundews, for the blue noses of mandrills and the red faces of blushing girls, is inappropriate and misplaced. While Darwin's mind was clearly active and able and conscientious, Ruskin, as we have seen, had often expressed the view that its influence was pernicious, its focus on material causes destroying, like that of the producer of the ignoble grotesque, "the reverence which is our best guide into all truth." Darwin took up death but refused to fear it, or to see it as the product of sin. His laughter was not that of the idiot and the cretin, and he knew the depth of what he satirized, but he questioned his culture's view of that depth. Confronting his own death, Darwin celebrated the worms that would devour him. All of this made him both contributor to and symptom of the national disease. In studying and illustrating worm castings, Darwin did what Ruskin many years earlier had specifically pronounced against: "I thought it unnecessary to warn the reader," Ruskin wrote of architectural ornament in the first volume of *The Stones of Venice*, "that he was not to copy forms of refuse or corruption; and that, while he might legitimately take the worm or the reptile for a subject of imitation, he was not to study the worm cast" (xx:350). That some of England's modern architects had adorned the walls of their buildings with carvings of organic forms so poorly conceived and executed as to resemble worm castings was for Ruskin a visible sign of aesthetic and national degradation. That Darwin had adorned his book with carefully executed engravings of worm castings would have further confirmed that sense of degradation.

RUSKIN AND THE PICTURESQUE

Ruskin's noble picturesque, like his noble grotesque, was also linked to the sublime. In "The Lamp of Memory" for *The Seven Lamps of Architecture* (1849), Ruskin ascribed the distinctive character of the picturesque to what he called "parasitical sublimity." That is, the picturesque can achieve sublime effects, but it does so indirectly, by depicting objects or forms not in themselves sublime, but suggestive of other objects or forms that are. The parasitical sublimity of the picturesque was "a sublimity dependent on the accidents, or on the least essential characters, of the objects to which it belongs" (viii:236), as the ruggedness of a cottage roof may suggest a sublime mountain aspect even though the cottage itself is not a sublime object. This view of the picturesque's inferiority to the sublime reflected Ruskin's recently developed ambivalence towards the picturesque after a period of youthful infatuation. On the one hand, he was drawn to the picturesque's emphasis on nature and the potential in its use of ruins to imply a moral thematics of decay – the downfall of tyranny and corrupt empire in medieval castles and Roman monuments, the end of Catholic superstition in moldering abbeys.
On the other, he was troubled by the picturesque's tendency to aestheticize natural forms, ruined buildings, and human figures – to convert a grove of trees or a formation of rock, an ancient monument or a crumbling castle, a solitary peasant or a group of rustics, into a mere compositional element, without regard for the individual detail of the first, without understanding of the world of the second, and without sympathy for the impoverishment of the third. Ruskin, in other words, understood what recent scholars of the picturesque have demonstrated so vividly: that the picturesque of the late eighteenth and early nineteenth centuries aestheticized poverty and ruin, idealizing a landscape that had been rapidly disappearing as commons were enclosed and converted into farmland, and as the factories of the industrial revolution sprang up in the countryside and then migrated to new manufacturing towns, boons to landowners and industrialists but economically devastating to the rural poor.33

In the years that followed, Ruskin set out to expose the picturesque's sentimentalizing of poverty and to restore the moral meaning of ruins. The latter mission was spectacularly instantiated in The Stones of Venice, while the former was taken up in the fourth volume of Modern Painters. The problem he addressed in Modern Painters was, as usual, one largely of his own making. For Ruskin, the rise of the picturesque in the eighteenth century was part of the larger decline of art begun in the Renaissance. The "delight in ruin" that he argued was the characteristic feature of the picturesque was "perhaps the most suspicious and questionable of all the characters distinctively belonging to our temper, and art" (vi:9). Yet his beloved Turner was without question a picturesque painter. Thus Ruskin endeavored to distinguish between the "noble" or "Turnerian" picturesque and its "low" or "surface" form, seeing in Turner's work a refusal to take pleasure in the depiction of poverty and decay.

As so often in Ruskin's work, his discussion melded aesthetics, morality, science, and political economy. Ruskin's analysis of the picturesque and its "delight in ruin" opened volume iv of Modern Painters, which was devoted to "Mountain Beauty" and expanded on the first volume's demonstration of Turner's superiority over all other landscapists as a painter of geological truths. The low and noble picturesque lay for Ruskin on a continuum, the precise position depending on the level of the artist's sympathy for his subject. In the low picturesque, the artist is essentially "heartless," feeling only delight, not regret, at the sight of ruin and disorder (vi:19). He takes pleasure in the mere outward appearance, the variety of color and form, of the objects he depicts. The sublimity of the low picturesque, then, is not merely parasitical but unintended – the artist is unaware of the cottage roof's mountain aspect. The sublimity of the noble picturesque, on the other hand, lies beneath the surface features and is consciously sought there by the artist. The noble picturesque expresses not outward form but inner character, and that inner character is one "of suffering, of poverty, or decay, nobly endured by unpretending strength of heart. Not only unpretending, but unconscious. If there be visible pensiveness in the building, as in a ruined abbey, it becomes, or claims to become, beautiful; but the picturesqueness is in the unconscious suffering" (vi:14–15, original emphasis). The epitome for Ruskin of a noble picturesque building was the tower of the church at Calais – weather-beaten but strong, old but still useful, expressive of "that agedness in the midst of active life which binds the old and new into harmony" (vi:11). Turner was the modern artist who refused to aestheticize poverty and ruin and was most able to capture this inner character of unconscious suffering. In England, and in the low picturesque, by contrast, the past was treated as past and dead. Ruins were specimens of the past, objects of nostalgia, "useless and piteous, feebly or fondly garrulous of better days," part of the "entire denial of all human calamity and care" (vi:11, 15). Yet the painter or lover of the low picturesque is not a moral monster, says Ruskin. Simple-minded and of limited sympathy, he is nonetheless kind-hearted and humble, and he understands that there is often as much happiness in a peasant's cottage as a king's palace. Thus the low picturesque should be cultivated, for it can lead to "a truer sympathy with the poor, and a better understanding of the right ways of helping them," and this in turn would cause the English to stop "destroying so many ancient monuments, in order to erect 'handsome' streets and shops instead" (vi:22). It was sentiments such as these that made it possible for Lubbock to invoke Ruskin in his campaign to protect Britain's ruins from destruction by modern barbarians.

Ruskin could only have seen the illustrations of monuments and ruins in Worms as a case of the low picturesque, another example of the good-hearted Darwin's limited and misguided vision. Inviting Lubbock to Brantwood in 1887, apologizing for "all the ill-tempered things I've said about insects and evolution," Ruskin wrote that "you will see the Lake Country first from my terrace – where... Darwin has walked also" (xxxv:539). When Darwin walked that terrace eight years earlier, looking out across Coniston Water, Ruskin must have heard his guest's expressions of picturesque pleasure. From their meetings over the years, Ruskin appreciated Darwin's simplicity and humility, especially towards nature (xxxv:lv–xlvi), but he much lamented the dangerous tendencies to which these traits led in Darwin's published works, as he explained in a letter to Darwin's son-in-law, R. B. Litchfield, just after that 1879 visit:
Darwin's worms

It has indeed been a great pleasure to me to be brought into some nearer and kinder relations with Mr. Darwin; but you must not think I did not before recognize in him all that you speak of so affectionately. There is no word in any of my books of disrespect towards him, though I profoundly regret that the very simplicity and humility of his character prevents his separating what of accurately observed truth he has taught us from the wild and impious foolishness of the popular views of our day. (xxxviii:334; original emphasis)

Like the painter and lover of the low picturesque, Darwin was no moral monster. But his understanding and sympathies had not been adequately cultivated, and as a result he failed to appreciate the moral meanings in the peacock's tail, the orchid's form, the maiden's blush, or the landscape's aspect. If he did not aestheticize poverty or take delight in ruins, his conversion of picturesque scenes into geological sections did not allow for the expression of unconscious suffering. Darwin's was not a noble, Turnerian picturesque. When he looked at a beautiful turf-covered expanse, he saw the leveling action of worms. When he visited Stonehenge, he did not marvel at its vastness or interpret its lessons but to dig at the base of its monoliths for evidence of worm castings. When he stood in the trenches of the Roman villa at Abinger, he examined not the ruins but the soil. Litchfield, like Ruskin an ardent supporter of the Working Men's College, knew the right ways to help the poor, but Darwin's work contributed to the "wild and impious foolishness" - the irreverent materialism - of the present day.

GEOLGY AND LANDSCAPE: SCIENTIFIC NATURALISM AND THE SCIENTIFIC IMAGINATION

Closing his first "literary child," his Journal of Researches of the Beagle voyage, some forty years earlier, Darwin had surveyed "the advantages and disadvantages, the pains and pleasures" of such a journey. "Pleasure derived from beholding the scenery and the general aspect of the various countries," he wrote, "has decidedly been the most constant and highest source of enjoyment." But for Darwin, landscape could become monotonous without scientific understanding of its different features. Pleasure in landscape, he went on to say, "depends chiefly on an acquaintance with the individual parts of each view; I am strongly induced to believe that as in music, the person who understands every note will, if he also possesses a proper taste, more thoroughly enjoy the whole, so he who examines each part of a fine view may also thoroughly comprehend the full and combined effect." A traveler who also understands botany and geology is thus at an aesthetic advantage over one who does not. With this, the author of Modern

Painters would certainly have agreed. But when Ruskin showed Darwin his Turners, Darwin withheld out of politeness what he later confessed: "that he could make out absolutely nothing of what Mr. Ruskin saw in them."34 Ruskin would not have been surprised. He knew of Darwin's ignorance of good art and had lamented Darwin's inability to draw. In his elementary treatise on drawing and painting, The Laws of Fête (1877–78), two parts of which he sent to Darwin after Darwin's 1879 visit to Branswood, Ruskin wrote that "Anatomy is necessary in the education of surgeons; botany in that of apothecaries; and geology in that of miners. But none of the three will enable you to draw a man, a flower, or a mountain" (xv:360). That a man who could not appreciate Turner converted picturesque ruins into geological sections, and illustrated his book with engravings made from photographs of worm castings, was to be bewailed rather than wondered at.

In his youth, Ruskin, like Darwin, was drawn most strongly to geology. When in London he attended Geological Society meetings, hearing Darwin's debut paper early in 1837 on the elevation of the coast of Chile; when the two young men met in Oxford a few months later, at the home of Ruskin's mentor William Buckland, the famous geologist and Bridgewater author, they talked all evening.35 Elected a Fellow of the Geological Society in 1840, Ruskin later punningly recalls that it had then been "the summit of my earthly ambition" to become its President (xxvi:97). At the Oxford meeting of the British Association for the Advancement of Science in 1847, he served as one of the secretaries to the Geological section (viii:xxv). The first and fourth volumes of Modern Painters were as much geological as artistic treatises, devoted to the proposition that Turner was a geologist without knowing it. Writing in reference to the fourth volume's geological discussions, John James Ruskin declared of his son in 1858 that "From Boyhood he has been an artist, but he has been a geologist from Infancy."36 Nor did his interest wane with the completion of Modern Painters. In the 1860s came a number of geological talks and articles, many for the Geological Magazine. From 1875 to 1883 Ruskin issued his current geological lectures - most originally delivered at Oxford or the London Institution - under the title Deucalion: Collected Studies of the Lapse of Waves, and Life of Stones.

In matters geological, Darwin was not Ruskin's whipping boy. That honor, of course, was reserved for Darwin's friend and ally, John Tyndall. Ruskin's hostility towards Tyndall had both personal and intellectual causes. Ruskin attacked Tyndall for what he regarded as Tyndall's ill-treatment of J. D. Forbes, whom Ruskin had met in the Alps in 1844, in a controversy over glacier theory that flared intermittently from the 1850s well into the 1870s. Tyndall was also one of scientific naturalism's chief publicists, championing
its worldview as aggressively and multifariously as Huxley, and this, too, drew Ruskin’s wrath. From 1865 on, Ruskin defended Forbes and savaged Tyndall in letters to the press, in his geological lectures, and in Fors Clavigera. So intense was Ruskin’s anger that he was quoted in The Pall Mall Gazette in 1884 as saying he would continue to attack Tyndall until his own dying day (xxvi:xi).

Even allowing for Ruskinian hyperbole, such a statement merits further consideration. As with the vituperative comments directed at Darwin and Darwinism in the 1870s, idiosyncratic personal issues and a general opposition to materialism seem inadequate to account for the intensity of Ruskin’s vitriol. And once again, the overlooked or underappreciated element is aesthetics.

In his 1868 and 1870 addresses to the British Association on “Scientific Limit of the Imagination” and “Scientific Use of the Imagination,” Tyndall had both offered a spirited defense of scientific naturalism and attempted to differentiate it from materialism. Less notorious but nearly as influential as Tyndall’s 1874 BAAS address at Belfast would be, these lectures asserted a prominent role for the imagination — for creativity, genius, insight — in science. After their delivery, Ruskin had to modify his strategy for dealing with Tyndall. No longer could he simply dismiss Tyndall as a man without imagination, unable either to draw the natural world accurately or to read the moral meanings contained in it. Now Tyndall had to be attacked, in spite of his own claims, as a man of limited, faulty, diseased imagination. As the 1870s progressed, Ruskin could see that Tyndall’s lectures on the scientific imagination were an early salvo in scientific naturalism’s efforts to bring beauty and aesthetics under its explanatory aegis, and to claim a place for the imagination in its methodologies. Darwin’s Descent and Expression, and then the botany books in the decade’s latter half, made scientific naturalism’s aesthetic ambitions clearer, while the popularizing efforts of people like Tyndall, Huxley, and Grant Allen ensured that these ideas were reaching a broader audience. If Ruskin read Wace’s review of Worms, any delight in seeing the book re-cast as a Bridgewater Treatise would no doubt have been tempered by the proclamation that it exemplified Tyndall’s scientific use of the imagination. Aware of the threat Tyndall’s notion, and naturalized aesthetics generally, posed to his own view of art, nature, and society, Ruskin rarely lost an opportunity to attack them.

And so in Deucalion Ruskin did not direct his ire solely at Tyndall, but at Darwin and Huxley as well. In his Introduction to the first part in 1875, Ruskin famously defended the value of myth for learning the truths, both natural and moral, of the world. The stories of Proserpine and Deucalion, Eve and Noah, are, he wrote, “incomparably truer than the Darwinian theory,” for even the feeblest myth records “the natural impression on the imaginations of great men, and of unpretending multitudes,” whereas the strongest theory is merely “an unnatural exertion of the wits of little men, and half-wits of impertinent multitudes” (xxvi:98–99). Eight years later, elaborating on this earlier passage in a chapter that aimed to “put into clear terms the natural philosophy and natural theology to which my books refer,” Ruskin explained that every materialistic theory was the product of minds lacking its imaginative power, and was always announced as if the very defect of imagination constituted a superiority of discernment (xxvi:334, 336). “Unnatural” exertion, “defect” of imagination — Ruskin’s words implicitly acknowledge the challenge as they seek to reverse its claims. But it is the contexts of these two comments to which I wish to draw attention.

Ruskin opened the Introduction to Deucalion with a frank calculation of his own mortality. In his recent reading of biographies, he says he has been struck by how many men whose brains have been emotionally engaged in controversy and polemic have died while in their fifties. Reflecting on the fact that much of his own adult life has been spent in just such jeremiads, and that whatever remains of it cannot be spent in any other way, he wonders how much time does remain for him, at fifty-six, to complete his various projects. Concluding that he can collect together only that which may be useful for others to build on, and needing to work in the unsettled state of his health on that which brings him pleasure, Ruskin announces that “I am minded to collect first what I have done in geology and botany” (xxvi:97). Like Darwin with Worms, Ruskin entered upon these final works of natural science aware of his own mortality and conscious of returning to some of his earliest loves and concerns.

Five years later, at the Royal Institution, Ruskin delivered his own lecture on worms — more accurately, serpents — in response to one by Huxley on the same subject in the same venue a few months earlier. Huxley told of the evolutionary development of snakes from lizards, but Ruskin provides a group of additional “marvelous” connections: Huxley, Ruskin tells his audience, showed you that a serpent is “a lizard that has dropp’d his legs off,” but from him they will learn that it is also “a duck that has dropp’d her wings off,” “a fish that has dropp’d his fins off,” and “a honesuckle, with a head put on” (xxvi:306). These alternative genealogies are of course ultimately not genealogies at all, but statements of the permanence and distinctions among species. Despite being issued as part of Deucalion, this lecture’s connection to geology is tenuous — Ruskin admits as much, although he contends that the indulatory motion of snakes will help his readers to understand the
effects of undulatory geological forces — but that very tenuousness suggests the extent to which Ruskin saw the work of the scientific naturalists, their accounts of rocks and birds and fish and flowers, as interconnected, and not merely at a general level.

Three years later still, with Darwin lying dead in Westminster Abbey, Ruskin returned again to Deucalion, and in doing so, to its purpose. The installments of the work issued thus far, Ruskin admits, contain his most recent geological work rather than collecting and arranging his earlier, scattered writings. The previous installment on snakes, moreover, seems to have strayed even further from the volume’s ostensible purpose. And so it is necessary, he says, to explain his “modes of thought and reasoning” in “matters of higher science than geology” if he is to bring order to the volume. Such an explanation would not have been needed twenty years ago, but since the early 1860s — the time frame is surely significant — “the laws of decent thought and rational question have been so far transgressed (even in our universities, where the moral philosophy they once taught is now only remembered as an obscure tradition, and the natural science in which they are proud, presented only as an impious conjecture)” that it cannot now be taken for granted (xxvi:333–34). Natural science sundered from moral philosophy, confident in its ability to account even for the immaterial by reference only to the material, is for Ruskin a social and political calamity as well as an individual and moral one: “the discoverers of modern science have, almost without exception, provoked new furies of avarice, and new tyrannies of individual interest; or else have directly contributed to the means of violent and sudden destruction, already incalculably too potent in the hands of the idle and the wicked” (xxvi:339). The link between scientific naturalism and laissez-faire political economy could not be more forcefully asserted: the “discoverers of modern science” are fueling the greed and self-interest that oppress the hard-working poor and destroy the natural environment. To rest pridefully satisfied in the demonstration that a snake is a lizard with its legs dropped off, is to be without the most important wisdom — for good and ill — we may learn of serpents. From the hubris of scientific naturalism it is in Ruskin’s eyes a short and inexorable step to the destruction of the nature it studies — living and nonliving, human and nonhuman, alike.

His alternative genealogies for the snake, Ruskin admits, are virtually impossible to demonstrate empirically. And so his lecture must itself appear “superficially comic, or at least grotesque,” a “piece of badinage” rather than a serious riposte to Huxley (xxvi:343). But like the practitioner of the noble grotesque, Ruskin knows the depth of that which he mocks. He playfully figures the serpent in forms more marvelous than Huxley’s, yet his subject — sin and death — is more terrible, and his love of truth extends, as it does for all those who play wisely, to God and humanity. His lecture, Ruskin says, must be understood as an illustration “of the harmonies and intervals in the being of the existent animal creation — whether it be developed or undeveloped.” By 1883 Ruskin is willing to concede the possibility that natural selection is no occult power, no mere phantasm of Darwin’s brain. He refuses to accept, however, that such a theory, even if true, is adequate, and he denies that its application to metaphysical issues is either revealing or valid:

The lower conditions of intellect which are concerned in the pursuit of natural science . . . are . . . dependent for their perfection on the lower feelings of admiration and affection which can be attached to material things: these also — the curiosity and ingenuity of man — live by admiration and love; but they differ from the imaginative powers in that they are concerned with things seen — not with the evidences of things unseen — and it would be well for them if the understanding of this restriction prevented them in the present day as severely from speculating as it does from devotion. (xxvi:338)

The curiosity and ingenuity of men such as Darwin, Ruskin acknowledges, is rooted in admiration and love. But admiration and love for material things is a lower form of intellectual exercise, and metaphysical speculation based on material things is impious. The truths of landscape were to be found in Turner, not Tyndall. The morality of aesthetics was to be found in nature, not in natural selection.

Darwin, of course, had seen things differently.
7 DARWIN'S WORMS

1. [Robert Cooke] to Darwin, 5 Nov. 1881, DAR 171; Darwin to Francis Darwin, 9 Nov. (1881), DAR 211.


5. On the Darwinian vision of nature and its role in more abstract, psychologically interior landscape perception, see Krasner, The Ensnared Eye.


8. Cook and Wedderburn state that Darwin visited Ruskin at Brantwood in early 1881 (Works xxi:xlii), but this cannot be correct, as Darwin was not in the Lake District until that June. The "Mr. Darwin" with whom Ruskin dined was probably one of Darwin's sons.

9. On Darwin's barnacle monograph and the grotesque, see Stott, "Darwin's Barnacles."


17. Wright's The Cysts, The Roman, and The Saxon: A History of the Early Inhabitants of Britain appeared in updated second (1861) and third (1879) editions; after his death in 1877, it was issued in revised fourth (1885), fifth (1892), and sixth (1902) editions. Thomas Wright, Wanderings of an Antiquary: Chiefly Upon the Traces of the Romans in Britain (London: Nichols, 1854); Edgar Barclay, Stonehenge and its Earth-Works (London: Nutt, 1895).

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20. DAR 64.2.74–76.


22. Gardeners' Chronicle (1844): 218; Collected Papers 1:195. Darwin annotated one of the offprints of his Geological Society paper with observations from this 1844 visit. See DAR 139.7.


25. Annotated proofs of the illustrations for Worms are dar 64.2.83 and 65.94, 96–101, 105, 107. Joyce’s annotated tracings and Darwin’s engraving instructions for them are dar 65.102–8. A lengthy "Memorandum on Silchester" copied from Joyce’s journal of the excavations and containing a sketch that is the basis for Darwin’s figure 13 is dar 64.2.63; Francis and Horace Darwin’s "Notes on Mr. Joyce’s Report," dar 64.2.67 and 69, contains annotated sketches that are the bases for Darwin’s figures 14 and 15; dar 65.109–11 are the annotated sketches of figures 13, 14, and 15.

26. Section-type illustrations appear on pages 42, 96, and 137 of Wright’s Uriconium: A Historical Account of the Ancient Roman City, and of the Excavations made upon it at Wroxeter, in Shropshire (London: Longmans, Green, 1872). Thomas Buckman and Robert W. Hall, Notes on the Roman Villa, at Chedworth (Cirencester: Savoy, 1872); Darwin owned the 2nd edition (1873) of this 6d pamphlet, although the plan is missing from his copy (see dar 64.2.77). In addition to the ground plans of Abinger by Farrer and Silchester by Joyce (dar 64.2.41 and 45) are untitled pencil and pen sketches of a site that could be Chedworth (dar 64.2.38 and 62).

27. For the development of Turner’s book and the early exhibition history of his original watercolors and the engravings based on them, see both Andrew Wilson’s introduction and Eric Shanes’s discussion in Turner’s Pictorial History of England and Wales, 1835–1838 (New York: Harper and Row, 1979).


34. Life and Letters of Charles Darwin, 1103.

35. Ruskin to John James Ruskin, 10 Jan. and 22 Apr. 1837, Works xxxvii:9, 14.


38. On the cultural status of Tyndall’s “scientific use of the imagination” and Ruskin’s response to it, see my Fact and Feeling, 34–35, 168–78. For a more
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general discussion of Tyndall's notion of the scientific imagination, see Anna
Therese Cosslett, "Science and Value: The Writings of John Tyndall," in John
Tyndall's Transcendental Materialism and the Conflict Between Religion and Sci-


Bibliography

ARCHIVAL SOURCES

Darwin, Charles, Darwin Papers, Cambridge University Library
Letters, Dittrick Medical History Center, Case Western Reserve University,
Cleveland, OH
Gosse, Philip, "Aquarium MS, Brotherton Collection, Brotherton Special Collec-
tions Library, University of Leeds
"British Sea-Anemones and Corals: Original Sketches and Drawings in Colour
by Philip Henry Gosse and his Correspondents, 1839–1861," Horniman
Museum, London
Orchids and their Culture, Natural History Museum Botany Library, London
P.H. Gosse MSS, Cambridge University Library
Gould, John, Gould Correspondence, Natural History Museum Zoology Library,
London
Drawings, Ellis Collection, Kenneth Spencer Research Library, University of
Kansas

PRINT AND ONLINE SOURCES

Adams, James Eli, Dandies and Desert Saints: Styles of Victorian Masculinity (Ithaca:
Cornell University Press, 1995)
The Colour-Sense: Its Origin and Development (Boston: Houghton, 1879)
"Dissecting a Daisy," Cornhill 37 (1878): 61–75
"An English Weed," Cornhill 45 (1882): 542–54
The Evolutionist at Large (New York: Fitzgerald, 1881)
"Our Debt to Insects," Gentleman's Magazine 256 (1884): 452–69
Physiological Aesthetics (New York: Appleton, 1877)
Allen, Mea, Darwin and His Flowers (New York: Taplinger, 1977)