The Earth on Show

Fossils and the Poetics of Popular Science, 1802–1856

Ralph O'Connor

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William Buckland: *Antiquary and Wizard*

Historical Geology at Oxford

Cuvier's science came at an opportune time for the beleaguered University of Oxford. Since the beginning of the century Oxford and Cambridge had been under increasing attack by periodicals such as the *Edinburgh Review* for their neglect of secular learning. Reform was required: at Oxford, progressive Fellows pressed for the introduction of new secular subjects to complement a Classical, clerical education. William Buckland, who had been giving optional lectures on geology since 1814, gained his Readership in this context: the curriculum was centred on ancient texts, so Buckland presented his science initially as a historical support for Holy Writ.[1] In his inaugural lecture of 1819 he announced an

> ingrafting (if I may so call it) of the new and curious sciences of Geology and Mineralogy, on that ancient and venerable stock of classical literature

1. On this process see Edmonds 1979–80; Rupke 1983b; 1997. Rupke's work is complemented by Boylan's (1984) superb biographical study of Buckland, which includes detailed analysis of his Oxford lectures. See also *ODNB; DNBS*.

> from which the English system of education has imparted to its followers a refinement of taste peculiarly their own [. . .][2]

Geology would be both comfortingly traditional and attractively novel. Buckland then enumerated its connections with established disciplines, which it would enhance by serving "a subordinate ministry in the temple of our Academical Institutions."[3] In this clerical milieu, Buckland "ingrafted" geology directly on to the more biblically aligned "theories of the earth", as well as to Cuvier's procedures, without drawing (as Cuvier had) a polemical distinction between the two. This attitude did not impress some of Buckland's colleagues in the Geological Society, who continued to dissociate themselves from such a speculative, text-centred perversion of their empirical principles. Yet the publicity which Buckland achieved for his science in the 1820s gave "Oxford geology" a prominent place among the competing versions of geology on offer to leisured non-specialists.

As a public vindication of geology, delivered first at Oxford and then (in print) before a wider audience, Buckland's inaugural lecture indicates the appeal geology was expected to exert in an academic, clerical context. In 1819 geology was still a science under surveillance, and Buckland must have felt the eagle eye of public opinion fixed on him as he spoke. Whether what he said was original or not—and much of its content was supplied by his friend William Conybeare—it was vital that he say it in such a way as would convince his patrons that geology was worthwhile.[4]

Most of the lecture's tropes recapitulate the sentiments of Parkinson, Bakewell, and Davy. Buckland first mentions geology's practical utility, but almost at once reaches further:

> The human mind has an appetite for truth of every kind, Physical as well as Moral; and the real utility of Science is to afford gratification to [. . .] this large and rational species of curiosity [. . .]

He then claims an unmatched spectacular appeal for the "monuments of the mighty revolutions and convulsions" suffered by the globe,

> convulsions of which the most terrible catastrophes presented by the actual state of things (Earthquakes, Tempests, and Volcanos) afford only a

2. W. Buckland 1820, 2–3. On this lecture see Boylan 1984, 81–8; Edmonds 1991.

3. W. Buckland 1820, 3.

4. Conybeare quoted much of Buckland's lecture in his own popularization (Conybeare and Phillips 1822, li–lviii). On Conybeare see *ODNB; DNBS*.

> faint image [. . .] these surely will be admitted to be objects of sufficient magnitude and grandeur, to create an adequate interest to engage us in their investigation.[5]

Here Buckland was feeding on the vogue for pictorial and textual representations of the Deluge and other apocalypses.[6] He then quotes Cuvier's rapturous prophecy about the mind of man recovering the sublime narrative of geology, and adds, "It is surely gratifying to behold Science, compelling the primeval mountains of the Globe to unfold the hidden records of their origin".[7] This imagery, in which science not only produces spectacular effects but is itself a spectacle of intellectual power, would become paramount in the public rhetoric of the "gentlemen of science" in the 1830s.[8]

Buckland presents several viewpoints from which geology might satisfy the human "appetite" for knowledge, most of them by now familiar. It leads its devotee into "sublime scenery" whose grandeur they enhance by "the magnificence of the speculations which they associate with it"; it gratifies antiquarian tastes by unearthing "the Antiquities of the Globe itself [. . .] the monuments and medals of its remoter eras"; it provides the satisfaction of discovering "the order and harmony of nature" in apparent "disorder and confusion".[9] More specifically, the economically convenient arrangement of strata (exposing coal seams, for instance) reveals "the finger of an Omnipotent Architect" providing for his people's "daily wants" from the earliest eras of the earth's history: this is one of several permutations of natural theology in this lecture, and this multi-denominational discourse must be not be confused with the quite separate matter of geology's support for one particular sacred text.[10] This last argument forms Buckland's rhetorical climax in the form of the geological evidence for the Deluge. At this stage in his career, Buckland's need to unite his two professional worlds—Anglican learning and the new geology—gave him a special interest in this controversial point of encounter between human history and Cuvier's geology.[11] Here the geologist played more than a merely ancillary role in the interpretation of sacred history:

5. W. Buckland 1820, 5.

6. On this topic see Rupke 1983a; Paley 1986; F. Stafford 1994; Paley 1999; Freeman 2004, 163–89. The vogue for apocalypse is discussed in more detail in chapter 7.

7. W. Buckland 1820, 5–6.

8. Morrell and Thackray 1981, 159.

9. W. Buckland 1820, 5–6.

10. W. Buckland 1820, 12. This distinction has been blurred by some scholars (e.g. C. Cohen 2002, 126–7), resulting in an overestimation of the role of Genesis in determining Buckland's procedure.

11. Sommer 2004, 55–8.

> the grand fact of *an universal deluge* [. . .] is proved on grounds so decisive and incontrovertible, that, had we never heard of such an event from Scripture, or any other authority, Geology of itself must have called in the assistance of some such catastrophe, to explain the phenomena of diluvian action [. . . .][12]

Like Cuvier, Buckland seems to hint that, in such cases, the geologist's text of "natural monuments" has a hermeneutic authority equal to that of Genesis itself. But no such challenge is posed within his rhetorical framework. His inaugural lecture was designed to placate.

Buckland's published lecture bore the subtitle *The Connexion of Geology with Religion Explained*. Accordingly, its second half is taken up with theological matters, ending with an analysis of four current means by which the Mosaic account of Creation might be harmonized with the findings of geology.[13] The whole section is riddled with quotations from authorities whose piety and orthodoxy is, by implication, established: Chalmers, Sumner, Francis Bacon, Samuel Horsley. But the first authority quoted in this section is Cuvier, "one who deservedly ranks in the very first class of natural observers". As with Jameson, Cuvier's observations on the latest "great and sudden revolution" are made to exemplify geology's harmony with Scripture.[14] In this setting Cuvier, a determinedly secular savant, became a kind of honorary Anglican—a development with which Byron would soon make mischief. Buckland then proposed to conduct detailed research into "diluvial phenomena", understood as the physical evidence of a geologically violent and recent Deluge. This is what he subsequently did, carrying out cave explorations in Britain and the Continent and analysing the bones they contained. That project bore significant fruit in 1821–2, and will be discussed below.

Buckland's inaugural lecture was a model of dignity and restraint. As such it was uncharacteristic of him. It served its purpose, winning him the authority he needed; but thereafter, the key to his effective communication of geology lay not in how it was authorized from above, but in how it appeared to the eager crowds of genteel students who attended his lectures. When assessing the impact of early-nineteenth-century science lectures, we rely heavily on the circumstantial evidence of anecdotes, mostly recorded during a later period when historical geology was a popular and well-established science. In Buckland's case, however, there is enough evidence (some datable to the early 1820s) to shed light on his procedures. Here is not the place to repeat all the usual anecdotes,

12. W. Buckland 1820, 23.
13. W. Buckland 1820, 22–38.
14. W. Buckland 1820, 24.

which can be found elsewhere.[15] But this much is clear: Buckland was a born showman. Even the young John Henry Newman, who would later emerge as a major opponent of the vogue for scientific "wonder", informed his mother in 1821 that the geology lectures were "most entertaining, and open[ed] an amazing field to imagination and to poetry."[16]

Newman's words encapsulate a crucial aspect of the importance of Buckland's geology to the educated upper and middle classes: it broadened one's vision. The lectures had to be entertaining, or nobody would attend them: natural science was optional in the Oxford curriculum, and there were no examinations. Buckland had to work hard to persuade career-minded students to attend, and he badly needed the money from their fees to pay for his geologizing.[17] One of his triumphs (anticipated by Jameson) was his practice of lecturing outside, in a quarry or on a hill, in order to demonstrate points of stratigraphy *in situ*. Many students had come to Oxford from country seats, hunting and living the outdoor life, and were now expected to sit inside lecture-halls and become serious men of learning. This eccentric professor delighted them by lecturing in the fresh air and galloping off with an ammonite around his neck.[18]

One of the chief means by which Buckland's geology opened an "amazing field to imagination" was his visual aids, many of which still survive.[19] It is difficult to tell precisely how Buckland employed these materials, but besides the anecdotal evidence, two portraits of Buckland lecturing have come down to us. One of these (Fig. 2.1) shows him lecturing in Oxford's Ashmolean Museum.[20] Visual aids are jumbled around. Buckland is seen holding up an ammonite for the audience to scrutinize; elsewhere he is said to have passed specimens round for this purpose.[21] The visceral thrill of handling and viewing these relics gave force and immediacy to the lessons Buckland wished to convey. His own rooms in Corpus Christi College functioned as a crowded cabinet of curiosities, as celebrated by his friends in verse: "Here see the wrecks of beasts and fishes, / With broken saucers, cups, and dishes".[22] In the lecture-hall, charts presented the landscape in three aspects: in its present visible form (landscape engravings), in its structure (stratigraphic sections), and surveying the structure of the whole of England (geological maps). Engrav-

15. For example in Gordon 1894 and Cadbury 2000.
16. Gornall *et al.* 1961–77, I, 109. Newman's lecture-notes, and those of other students, are reproduced in Boylan 1984, 531–653.
17. Boylan 1984, 75.
18. Boylan 1984, 75–6. On Buckland's lecturing techniques generally see *ibid.*, 103–6.
19. Boylan 1984, 104–5; 1997, 368–9. On the use of visual aids in natural-history lectures see A. Secord 2002, 40–8.
20. Edmonds and Douglas 1975–6. The present Ashmolean occupies a different site.
21. See Daubeny 1869, 85.
22. Daubeny 1869, 81.

ings of fossils could stand in for actual specimens. On the back wall in Fig. 2.1 hangs a picture of the Peale mammoth, its tusks here upturned; about to fall off the table is an engraving of an ichthyosaur, perhaps one of Mary Anning's.

All the visual aids so far mentioned depict geological evidence of Buckland's own day: strata, rocks and fossils, the skeletal ruins of once-living landscapes. But Buckland went further, attempting to bring his audience into immediate visual contact with the former worlds themselves. He introduced into his lectures not only reconstructions of entire skeletons, but also restorations of the living creatures. In 1822 his research on fossil hyaenas allowed him to provide a ground-breaking restoration of a fossil habitat-group, which in turn gave rise to the first known pictorial restoration of a fossil animal in its environment. This breakthrough in the imagining of deep time will be discussed in more detail below. What Martin Rudwick has called "scenes from deep time" developed more seriously in the 1830s with the rise of saurian restoration, initially focusing on scenes from ancient Lyme Regis (ichthyosaurs, plesiosaurs, pterodactyles) and the Sussex Weald (Iguanodon, Megalosaurus, Hylaeosaurus).[23] The first of these, the geologist Henry De la Beche's watercolour sea-scene *Duria antiquior,* was published as a lithograph in 1830 (Fig. 2.2) and displayed by Buckland in his lectures.[24]

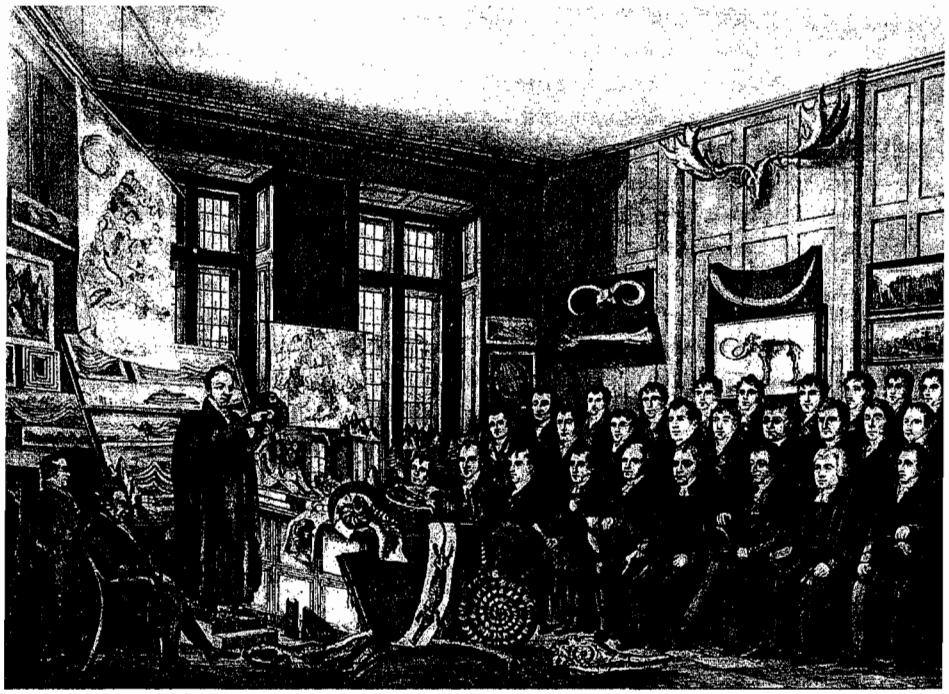

Figure 2.1. Lithograph from 1823 showing Buckland lecturing in the old Ashmolean Museum to an audience of senior members of Oxford University. Oxford University Museum of Natural History, Buckland Papers (Drawings).

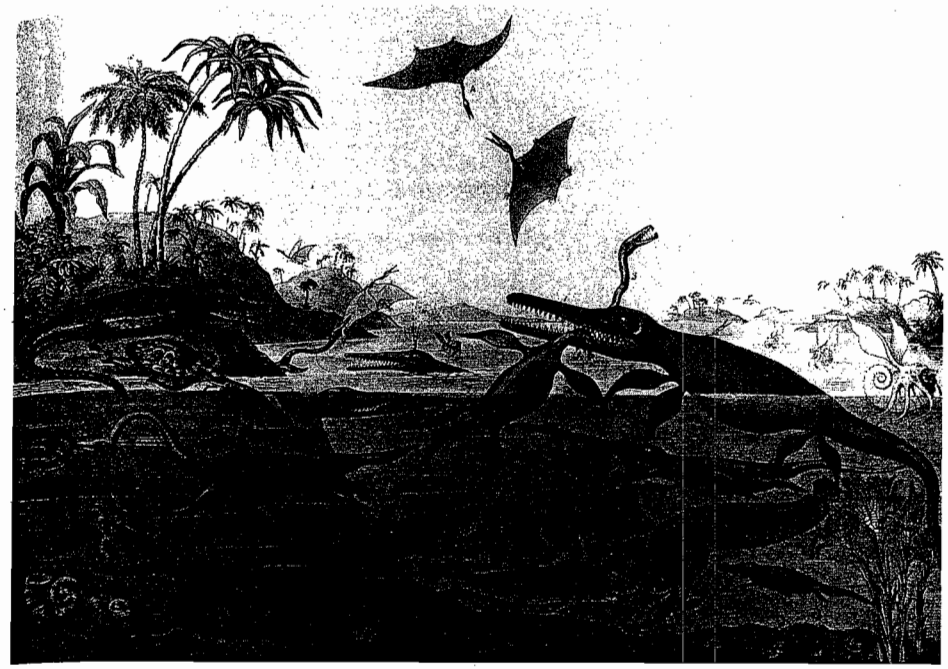

Figure 2.2. Henry De la Beche's restoration of "a more ancient Dorset", *Duria antiquior* (1830), showing ichthyosaurs, plesiosaurs, and pterodactyles pursuing prey and defecating with alacrity. This is the lithographed version, sold for the benefit of the impoverished Anning family for £2 10*s* (= *c.* £440 or $870 today). Buckland used this engraving as a "sy.labus" for his lectures, distributing copies of it to his students.

Almost all available pictorial restorations found their way into Buckland's lectures over the ensuing years.[25] Some of these are well known to historians, such as De la Beche's caricature *Awful Changes* (see Fig. 4.3), which depicts "Professor Ichthyosaurus" lecturing on fossil man with the visual aid of a human skull. Besides the published lithograph, Buckland also possessed another version whose much larger dimensions suggest that it was used in his lectures.[26] Others are less well known: the three

23. Rudwick 1992.

24. On Buckland's use of this picture see Gordon 1894, 116–17; Boylan 1984, 440; 1997, 368–9. On the picture itself see McCartney 1977, 44–7; Rudwick 1992; Norman 2000.

25. All the pictures mentioned in this paragraph are held in the Buckland Drawings file in the Oxford University Museum of Natural History.

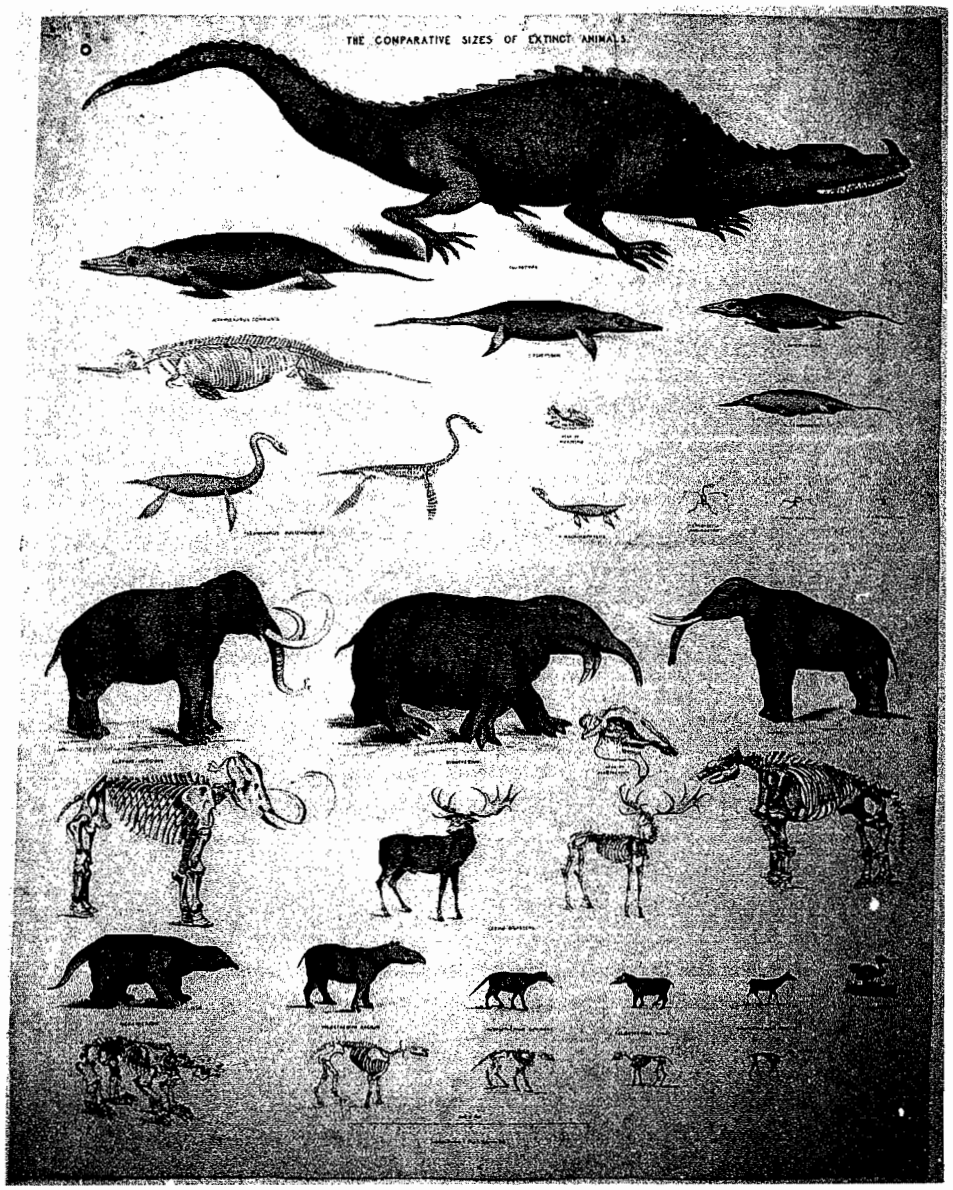

Figure 2.3. Buckland's wall-chart showing "The Comparative Sizes of Extinct Animals" (500 × 630 mm), printed not long after 1835 by the educational booksellers Darton & Clark. The Iguanodon at the top is represented as being 100 feet long. Oxford University Museum of Natural History, Buckland Papers (Drawings).

Figure 2.4. Two sepia drawings, perhaps by Buckland. The top one represents a Carboniferous landscape; the bottom one represents the Lias, the period depicted in *Duria antiquior* (Fig. 2.2). Oxford University Museum of Natural History, Buckland Papers (Drawings).

reproduced in Figs. 2.3 and 2.4 are published here for the first time. Fig. 2.3 is a large chart depicting the comparative sizes of extinct animals, apparently modelled on a similar chart of living animals dating from 1835. Fig. 2.4 shows two sepia drawings of landscapes in different geological periods. All three have small holes at the upper corners, suggesting that they were mounted as visual aids in lectures to help Buckland's audience picture the past.

Buckland enlivened his lectures with an eccentric sense of humour. He was renowned for his disconcerting swerves between the sublime and the ridiculous, a tension characteristic of Regency show-culture. This mixture of registers served two purposes for Buckland. It enabled him to set a certain distance between himself and his more daring speculations before committing himself in sober prose—as Marianne Sommer has put it, "allowing him to retreat when retreat was found necessary".[27] But it also created theatrical effect, emphasizing the extraordinary nature of the facts he was relating. Buckland brought extinct animals to life in ways that were unorthodox, and hence memorable. According to his student Charles Lyell, Buckland on occasion became a visual aid himself: he "would keep his audience in roars of laughter, as he imitated what he thought to be the movements of the Iguanodon or Megatherium, or, seizing the ends of his clerical coat-tails, would leap about to show how the Pterodactyl flew".[28] According to another former student, Henry Acland, Buckland had other means of bringing fossil specimens to life than merely pointing to posters:

> He paced like a Franciscan Preacher up and down behind a long show-case, up two steps [. . .] He had in his hand a huge hyena's skull. He suddenly dashed down the steps—rushed, skull in hand, at the first undergraduate on the front bench—and shouted, "What rules the world?" The youth, terrified, threw himself against the next back seat, and answered not a word. He rushed then on me, pointing the hyena full in my face—"What rules the world?" "Haven't an idea," I said. "The stomach, sir," he cried (again mounting his rostrum), "rules the world. The great ones eat the less, and the less the lesser still."[29]

Buckland liked to eat whatever animals he could get his hands on, and his dinner parties were voyages into unknown regions of culinary experience, impressing the rule of the stomach on his hapless guests. Some

26. Rudwick 1975, 537 n. 13.

27. Sommer 2004, 73.

28. Undated account quoted in D. Allen 1976, 63.

29. Gordon 1894, 31.

of his more earnest acquaintances found his theatrical antics "vulgar": Charles Darwin suspected that Buckland was "incited more by a craving for notoriety, which sometimes made him act like a buffoon, than by a love of science".[30] Modern historians have been hardly less forgiving, comparing Buckland's antics unfavourably with the imposing spectacle of Isambard Kingdom Brunel's engineering feats: "In Buckland's hands knowledge was buffoonery; in Brunel's it was domination."[31] For Buckland, buffoonery was a form of power in itself, helping him to build up a reputation and hence attract an audience, to establish complicity with them, and to hold their attention. A family friend recorded that Buckland "feels very nervous in addressing large assemblies till he has once made them laugh, and then he is entirely at his ease."[32]

Buckland's lectures inspired light-hearted verses by students and dons, who circulated these in manuscript or in privately printed broadsheets. These ephemeral poems are richly revealing of how genteel listeners responded to earth history as Buckland told it, and they form a major source for the rest of this chapter. For this reason some introductory remarks on the corpus are called for. Versifying in Latin or English was a common practice among Classically educated gentlemen, and was also beginning to flourish in the mixed society of Regency drawing-rooms. Occasional verses on science appeared in a variety of contexts: in private diaries, in manuscripts intended for circulation, and in albums or commonplace books. This is an extremely fugitive corpus, mostly unpublished, and confident statements on its development cannot yet be made. Some specific loci may be identified: an early and influential example was the body of parodic and celebratory verses surrounding Buckland in Oxford.[33] These poems rarely strayed outside the genteel milieu, and their frequent reliance on the comic potential of fossil turds made them unsuitable for ladies; but Buckland himself recycled some poems to add spice to his own lectures and letters.[34] A second, more public, and more polite group of verses surrounded Gideon Mantell's promotion of geology in Brighton in the 1830s: some appeared in local newspapers to advertise his museum.[35] Later still, younger members of the Geological

30. C. Darwin 1958, 102. Compare Murchison's remarks quoted in Rudwick 1985, 170.

31. Morrell and Thackray 1981, 159.

32. Gordon 1894, 27–8.

33 Some examples: [Conybeare] 1822; Daubeny 1869, 69–73, 90–1, 119–22; Magdalene College, Oxford, MS 377, I, 489–91; II, 151–3; Devon Record Office, Exeter, 138 M/F 709, 711, 722, and 725 (original manuscripts now in the collection of Roderick Gordon).

34. Oxford University Museum of Natural History, Buckland lecture notes, "Deluge" 2/3; Edmonds and Douglas 1975–6, 150.

35. Some examples: Magdalen College, Oxford, MS 377, I, 157–9; Alexander Turnbull Library, Wellington, New Zealand, MS-1956; Daubeny 1869, 123–6; G. Richardson 1838, 6–7, 222, 289–95; Curwen 1940, 134. Caricatures such as Fig. 10.5 were part of the same movement.

Survey (founded in 1835) imitated the Geological Society grandees with a cult of the field and hearty annual dinners punctuated by singing. Romantic nature-poetry and rollicking ballads were the result.[36]

These verses are central to a full appreciation of how the science was popularized. They are often quoted today as anecdotal evidence for the science's vogue or for the popularity of individuals like Buckland,[37] but only recently have they become the subjects of serious analysis. Marianne Sommer has shown, in an important article on British cave geology, how Buckland and his colleagues used humorous verses and other informal genres to develop a chivalric, romantic self-image as "knights of the hammer", heroes with prophetic or magical powers over nature.[38] More recently Sommer has shown that Buckland, when presenting his more daring theories *viva voce*, used humour both to reinforce the social cohesion of his gentlemanly audience and to test daring geohistorical scenarios without public commitment.[39] Her account of Buckland's humorous strategies can, I believe, be applied more widely to the whole genre of occasional verses: like caricatures, these were circulated privately for specific audiences rather than placed firmly in the public realm.[40] In this chapter, following on from Sommer's work, I will show how literary techniques which would become central to later public geology—geologist as necromancer, dream-vision frameworks, time travel, resurrection of extinct animals—assumed humorous form in occasional verses well before making a confident public appearance in the sober prose of science books.

These techniques were not invented by the versifying geologists. They drew on eighteenth-century models, which included works that had fallen into official disfavour, such as "theories of the earth" and Erasmus Darwin's speculative botanical verses. The old stories soon found their way into the new science. Philip Shuttleworth's "Specimen of a Geological Lecture, by Professor Buckland" (*c.* 1820–2) is a good example of this continuity and also indicates how Buckland brought the science to life in his lectures. Shuttleworth found it appropriate to parody his style with a sublime sequential narrative clearly modelled on the opening lines of Darwin's *Temple of Nature* (1803):

36. Some examples: Daubeny 1869, 99, 106–16, 158–76; Geikie 1895, 142, 175–6. See Porter 1978a, 825–9.

37. For instance, Gillispie 1951, 98; Cadbury 2000, 58; Rupke 1983b, 71–4, 222–5.

38. Sommer 2003. On magical elements in these occasional verses see also Klaver 1997, 157; R. O'Connor 2003c, 86–96. On the knightly image see Porter 1978a, 819–20.

39. Sommer 2004, 60, 72–4.

40. On caricatures and the testing-out of geological scenarios see Rudwick 1992, 56–7; on scientific caricature as a vehicle of group cohesion see Paradis 1997, 170. See also Janet Browne's study of science and undergraduate humour (1992).

'Twas silence all, and solitude; the sun,
If sun there were, yet rose and set to none,
Till fiercer grown the elemental strife,
Astonished tadpoles wriggled into life;[41] [. . .]
Now mammoths range, where yet in silence deep
Unborn Ohio's hoarded waters sleep.[42]

This distinctly unbiblical narrative, teasingly reminiscent of discredited evolutionary speculations, was a far cry in both mode and content from Buckland's cautious inaugural lecture. Such grand narratives were not yet suitable for public dissemination. Before the 1830s, Buckland indulged in speculation only when every member of his audience could be vouched for as a gentleman.[43]

These were sensitive times for a visionary science, as can be seen by the example of a slightly earlier series of Darwinian imitations. Between 1818 and 1820 a consortium led by the London bookseller Longman had published a series of mineralogical verses in the form of court scenes and knightly legends about the rocks—Baron Basalt, Lady Serpentine, and so on—in heroic couplets, a rhyming form typical of eighteenth-century narrative poetry. The first volume, John Scafe's *King Coal's Levee*, conveyed the physical characteristics and relationships of the rock types in anthropomorphic terms, rather as Darwin had done for flowers (Fig. 2.5). Later editions of *King Coal* incorporated geological notes by Buckland and Conybeare. These poems were seen by geologists as diverse as J. W. von Goethe and Benjamin Silliman as didactically valuable.[44] In 1819, however, *King Coal* was appropriated by Yorkshire and Lancashire radicals as a satire on the Prince Regent: it contained a Peterloo-like passage where the tyrannical king incurs Giant Gravel's wrath by violently suppressing a plebeian intrusion by the Pebbles. The author and his learned assistants were accused of fomenting revolt, and, though that case came to nothing, the lesson was clear.[45] For now, Buckland and his circle kept their poetry to themselves.

As Buckland's friend Philip Duncan indicated in his "Picture of a Professor's Rooms in C.C.C., Oxford" (1821), only the select few could be admitted to the mysteries of geology, symbolized by Buckland's messy room:

41. Compare E. Darwin 1803, 3 (canto I, lines 3–4). On Darwin's poem see Heringman 2004, 214–15.

42. Daubeny 1869, 84–7. Compare the parody of Sedgwick's lecture discussed in Browne 1992, 181–7.

43. On the social composition of his Oxford audiences see Boylan 1984, 267–304.

44. Rupke 1983b, 223. On Scafe see *ODNB*.

45. On this controversy see [Scafe] 1820b, 60–7; Rupke 1983b, 223–5.

84
85

42

JASPER had many a hole in his gay vest;
He relish'd fun, — but this he found *no jest*,
Though he was one could struggle with the best.
LIAS, now sober, went but badly on;
He needed *help*, — his crocodile was gone!
FLINT grated grievously his parent CHALK;
For no compunction could that urchin balk.
The baron bustled, looking mighty grave;
Boldly he strove young Master WHIN to save;
And wish'd himself again in *Fingal's Cave*.
HORNBLENDE look'd *pale*, for he was sorely *bruis'd*;
Stout Lady GREENSTONE too was *much confus'd*.
The fair Miss GYPSUM sank, quite *crack'd* with fright;
Nor was her lover in much better plight;
And sadly damag'd was sweet SELENITE.
SPAR scrambled through, but as the torrent rush'd,
The youth was almost to a *rhomboid* crush'd:
The more surprising, — since great fame was his
For thrusting closely into crevices.
In spite of TUFA's *petrifying* frown,
He was by Tommy TOADSTONE trampled down.
TALC was *much cut*; and CLINKSTONE *roar'd* amain;
And SHALE oppos'd his *hardier* friends in vain.
Sad quarrels rose, too, in the struggling throng,
As through the anti-room they drove along.
ASBESTUS *burnt* to make FELSPAR atone
For some *reflections* which that wight had thrown:

Figure 2.5. Geological riot, featuring personified minerals, bringing John Scafe's poem *King Coal's Levee* to a rousing conclusion. [Scafe] 1820a, 42.

Away, ye ignorant and vain!
Away, ye faithless and profane!
Jesters and dainty dandies fly hence,
But enter thou, dear son of science!

Buckland himself appears as a "contemplative" antiquarian "sage", "his

whilst he doth utter
Strange sentences that seem to say
I see it all as clear as day;
I see the mighty waters rush,
And down the solid barriers push!
I see the pebbles pebbles chasing,
And scooping out of many a basin;
I see the dreadful dislocation,
And gradual stratification.

Like a poet or prophet, Duncan's Buckland appears as a visionary genius inhabiting two worlds at once, witnessing the Deluge and thus resolving "the strata's strange confusion" in his mind's eye, while simultaneously "strolling" with his "bread and butter" around his room.[46]

In the year following the composition of Duncan's poem, such private expressions of confidence in the new science took on a more authoritative air. Geology came to be presented as having the power to control the deep past, while the geologist was portrayed as able not merely to "see", but to go voyaging into, those landscapes. The catalyst was Buckland's cave research. In terms of the imaginative perception of former worlds, Buckland's analysis of the fossils in a recently-discovered Yorkshire cave was nothing less than a milestone.

Entering the Hyaenas' Den

In December 1821 Buckland visited Kirkdale Cave, near Kirby Moorside, to study its assemblage of fossil bones (Fig. 2.6). This was on the prompting of Cuvier's assistant Joseph Pentland, who wanted him to find some more material for Cuvier to work his magic on. As it happened, it was Buckland who stole the show.[47]

The assemblage was not in itself unusual: a jumble of fossil hyaena bones, mingled with those of other species (elephant, mouse, duck, hippopotamus, and so on), partially encased in stalagmite and coated in mud. Received wisdom would have it that the more exotic animals had drifted northwards from tropical climes during the Deluge; but Buckland suspected that these animals had lived in Britain until the Deluge brought extinction upon them.[48] His gastronomic approach to fossil detective-work enabled him to sustain his startling deductions: going where no geologist had thought to go before, he established that the stony balls lit-

46. Daubeny 1869, 81–3. On the geologist as visionary see Klaver 1997, 157–60; for a more detailed consideration see Sommer 2003, 185–97.
47. For fuller analysis see Boylan 1984; Rudwick 2005b, 622–38. See also Knell 2000, 171–6.
48. Page 1963, 108–9; Rupke 1983b, 31–3.

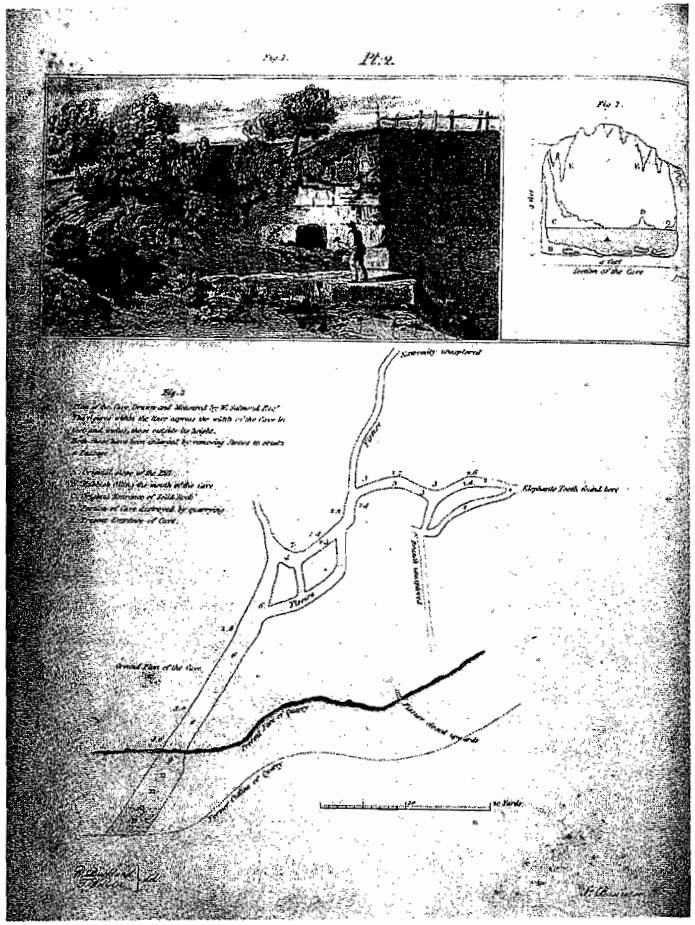

Figure 2.6. Kirkdale Cave: a plate in Buckland's *Reliquiae Diluvianae* showing a sketch of the cave opening, a cross-section, and a ground plan. W. Buckland 1823, plate 2.

tering the cave were fossilized hyaena droppings. The bones themselves showed marks of scratching, rubbing, and biting. For Buckland, the Kirkdale assemblage provided "one of the most complete and satisfactory chains of consistent circumstantial evidence I have ever met with".[49] He had already said that he hoped to find there "the wreck of the hyaenas' larder" rather than just more evidence for the action of the Deluge.[50] In February 1822 the Royal Society was regaled with the gory details of

49. W. Buckland 1822, 171.

50. Letter to Jane Talbot, 26 November 1821, quoted in Rupke 1983b, 33.

what the hyaenas ate (which included each other), how they ate it, and how they disported themselves in the antediluvian Kirkdale Cave.

Buckland's paper was published and quoted in periodicals across Europe, to widespread acclaim.[51] This revelation seemed to outdo the wizard Cuvier at his own game. Cuvier now had a string of resurrected fossils to his credit, and in one volume (1822) of the new edition of his *Ossemens fossiles* he had daringly indulged in speculations concerning the animals' feeding habits and behaviour, even providing outlines of four animals' appearances when living.[52] But Cuvier's restorations existed in an environmental limbo. For the first time in the history of the science, Buckland had restored an antediluvian habitat, establishing that the hyaenas had lived and died, over a long period of time, in the country where their remains were found. Kirkdale Cave was a time-capsule in which "a faithful record [. . .] of a past age of the world" was "sealed up".[53]

The imaginative importance of Buckland's hyaena den theory needs to be stressed, first and foremost because scenes from deep time are now too commonplace to be surprising. Buckland himself is still too often dismissed as a blustering parson engaged in the hopeless task of "reconciling" science and religion (even sacrificing his scientific integrity to do so), rather than as a pioneer of new and distinctly unbiblical ways of thinking about earth history.[54] Retrospectively, however, 1822 appears as a defining moment in the history of geology's imaginative impact, and we need to recover something of the mingled shock and pleasure the Kirkdale hyaenas occasioned. Most commentators found something uncanny about Buckland's achievement: it was greeted with rapturous applause, bafflement, or sarcasm, but rarely indifference. Geologists had prided themselves on the physical exertion and capacity for travel which their science required; now Buckland himself had ventured not only into Kirkdale Cave, but into the deep past, where he had stumbled on one of Davy's prehuman "past ages" in all its living detail. In innumerable scientific odes and rhapsodies from the previous century, the personified imagination had followed the astronomers by penetrating the vast tracts of outer space[55]—tracts whose ever-widening extent was indicated by that evocative phrase "the plurality of worlds", which John Sumner

51. Rupke 1983b, 35–6.

52. Cuvier 1821–4, III, plate 66, reproduced and discussed in Rudwick 1992, 32–7.

53. Davy 1827, 49. On the imaginative significance of this restoration see Rudwick 1992, 38–40; 2005b, 637–8. On Buckland's visionary palaeontology more generally see Boylan 1984, 431–43.

54. Cadbury 2000; Freeman 2004, 181–4. For the "sacrifice of integrity" argument see P. Martin 1982, 170 (a tendentious distortion of Page 1969, 263).

55. Nicolson 1963; W. Jones 1966.

had invoked as a possible defence for the existence of geological "former worlds".[56] Buckland's voyage into deep time now realized Sumner's astronomical analogy, bringing one of many distant "former worlds" closely into view—rather too closely for delicacy.

88
89

To recapture the novelty of this discovery, some specific responses to Buckland's discovery will now be examined. Because this research was so widely publicized and excited so much comment, it gives us a unique snapshot of how different groups represented and responded to the new science's historical claims. It opens up a vivid picture of popularization in practice at one of the most politically sensitive periods in the history of geology. In the remainder of this chapter we shall examine various oral, textual, and pictorial responses: a speech before the Royal Society, an anonymous letter to the *Gentleman's Magazine*, Buckland's published monograph on cave fossils, and various privately-circulated pictorial and poetical accounts. We begin with a speech made by Humphry Davy, president of the Royal Society.

In November 1822 Buckland was awarded the Royal Society's Copley Medal, the first geologist to be honoured so highly. Davy's speech began by rejoicing that Buckland had helped geology catch up with astronomy, and went on to identify this new achievement in terms of his own vision of the progress of civilization. His language was that of conquest and pursuit, qualities which marked a science in its maturity:

> by these inquiries, a distinct epoch has, as it were, been established in the history of the revolutions of our globe: a point fixed, from which our researches may be pursued through the immensity of ages, and the records of animated nature, as it were, carried back to the time of the creation.[57]

Davy next mentioned how "gratifying" it was that "the progress of science" proved the biblical Deluge "beyond all doubt". Such exegetical reflections were not typical of Davy, but these were sensitive times. Having thus covered himself, and adding a jibe at Lamarckian transmutationism for good measure, he asserted that God had intended "the laws of nature" to be discovered by man's own "labour and industry". Authorized from above, the man of science was "left to exert these god-like faculties, by which reason ultimately approaches, in its results, to inspiration."[58] Davy was of course speaking of "inspiration" as a manifestation of "genius"; but, because he had just been advocating the freedom of scientific inquiry and contrasting it with the moral authority of the "sacred history", his use of the term "inspiration" hinted at the problem of the Bible's literal inerrancy.

56. Sumner 1816, I, 285.

57. Davy 1827, 51. On the language of conquest in geology see J. Secord 1982 and (for its application to cave geology) Shortland 1994, 39–42, and Sommer 2003, 193–4.

58. Davy 1827, 51–3.

Perhaps unwittingly, Davy here pointed up the challenge which Buckland's findings posed to biblical literalists holding to a young-earth cosmology. First, Buckland's work showed (far more vividly than a stratigrapher could have done) that the Deluge could not have formed the bulk of the strata in the earth's crust. But there was a subtler challenge implicit in Buckland's description. His identification of "a distinct epoch" of antediluvian history, in which wild hyaenas and other animals roamed England, laid claim to a narrative domain traditionally governed by Genesis and *Paradise Lost*. It was not the monstrosity of the hyaenas that proved problematic: after all, in 1824 Buckland's literalist opponent William Eastmead published an account of the Kirkdale fauna in which the hyaenas appeared even more "savage and [. . .] frightful" than in Buckland's description.[59] The difference was that Eastmead's hyaenas were postdiluvian. Even if Buckland's hyaenas were made out to be contemporary with the antediluvian human population in the Fertile Crescent, the very existence of this alternative, unscriptural, literally bestial narrative (revealed, in Davy's terms, by the "god-like [. . .] inspiration" of "philosophy") threatened the imaginative hegemony of Genesis.[60] In retrospect, Buckland's description emerges as a crucial step on the way to the full-scale assault on biblical literalism which he and his colleagues would later conduct. These scenes from deep time may have aligned themselves with biblical, anthropomorphic narrative patterns, for instance presenting the cannibalistic hyaenas in typological terms as "fratricidal" Cain-figures, deservedly destroyed by the Deluge;[61] yet they expanded the popular view of the world before the flood well beyond its human actors and biblical scenery. Cuvier's historical geology may have been welcomed into establishment culture to support Moses against his radical detractors, but it was quick to strain at the leash.

On the evocative word "inspiration", Davy paused in order to hand the medal to Buckland. Davy then elaborated on the specific uses of geology, as in his introductory lecture of 1805. This time he placed particular

59. Eastmead 1824, 25, discussed in Sommer 2003, 186.

60. On the literalist reaction to the hyaena-den theory see Rupke 1983b, 42–7; Sommer 2004, 59. Sommer (2004, 59–60) has suggested that Buckland was unwilling to date the arrival of humans in Britain to the antediluvian period because of the argument from design, according to which humans were not created until the earth was ready for them: "placing humankind within [. . .] [a] Britain populated by gigantic mammals and cannibalistic carnivores would have been [. . .] heretical". However, this in turn raises the question of how human coexistence with Asian tigers or Egyptian crocodiles was to be explained, and I have not found any evidence that this was a problem even for literalists.

61. Daubeny 1869, 72–3, 119–20.

emphasis on the new vistas opened up by Cuvier's historical geology. In so doing he aligned the science clearly with the antiquarian spectacle to be seen in museums at the time:

> in the history of the past changes of the globe, what a sublime subject is there for the exercise of the imagination!
>
> If we look with wonder upon the great remains of human works, such as the columns of Palmyra, broken in the midst of the desert, the temples of Pæstum, beautiful in the decay of twenty centuries, or the mutilated fragments of Greek sculpture, in the Acropolis of Athens, or in our own Museum, as proofs of the genius of artists, and power and riches of nations now past away; with how much deeper a feeling of admiration must we consider those grand monuments of nature, which mark the revolutions of the globe [. . .][62]

This passage is effectively a descant on Cuvier's theme. Eloquently expressive of both human progress and the humbling grandeur of earth history, and emanating from an author of impeccable philosophical credentials, it soon became one of the most quoted passages in the literature, doing public service in the epigraphs and chapter conclusions of geological books and museum guidebooks.[63]

On a more private level, Buckland's friends composed and circulated occasional verses to celebrate his discovery. The twofold response in 1822 of his friend Conybeare is particularly interesting. First, Conybeare composed a poem entitled "The Hyaena's Den at Kirkdale near Kirby Moorside in Yorkshire, discovered A.D. 1821". This translated Buckland's already colourful account of his findings into grotesque doggerel, presenting him as one who can "spy" on "what was done ere the birth-day of time".[64] The hyaenas themselves are portrayed as unnaturally powerful, their monstrosity enhanced by their alignment with the novelties of modern technology (in this case an early form of pressure cooker):

> Their teeth had the temper of steel,
> Skulls & dry bones they swallowed with zest, or
> Mammoth tusks they dispatch'd at a meal,
> And their guts were like Pappin's digester.

62. Davy 1827, 54–5.

63. Mantell 1834b, 2; 1836b, verso of title-page; 1844, x; 1847, x.

64. These quotations are taken from the published broadsheet, [Conybeare] 1822; I am grateful to Martin Rudwick for lending me his copy. The poem is also printed, with slight variations, by Daubeny (1869, 92–4) and Rudwick (1992, 40–3).

Conybeare mocks his friend's ambition to eat his way through the animal kingdom: the poem's Buckland-persona exclaims that "potted venison" is a delicacy far inferior to "Hyaenas' bones potted in mud". Even without Buckland's own oddities, the poem's portrait of these swarming "monsters" crunching up bones and rats, defecating, "scratching their hide", and even "slic[ing] up each other" fits awkwardly with the concluding reflections on the "Mystic Cavern" with its "chasms sublime". This disjunction extends the mixed modality of Buckland's own rhetorical style, as well as the "rude harmony" Sommer identifies as characteristic of the "romantic cave".[65] When Buckland told his colleagues at the Geological Society a story about how the "half starved" hyaenas used to leave their cave and "help themselves" to water-rats by the nearby lake, his former pupil Lyell was baffled, commenting that "Buckland in his usual style enlarged on the marvel with such a strange mixture of the humorous and the serious, that we cd. none of us discern how far he believed himself what he said".[66] Buckland's antediluvian anecdote was founded on a comparison of the Kirkdale fossils with the known habits of modern hyaenas, but his "usual style" was to play up the drama of the story, ensuring that it became a "marvel" in his fellow geologists' eyes.

Conybeare's poem was printed as a broadsheet, and copies were distributed among selected gentlemen both in Britain and on the Continent. Buckland certainly relished the joke: in 1822 he sent a copy to the Yorkshire clergyman Francis Wrangham, apologizing that his paper would not be printed for some months and offering Conybeare's doggerel as "a poetical Version" of the paper.[67] What made this broadsheet special, however, was that the poem accompanied a skilful lithograph of "Mr. BUCKLAND peeping into the Hyænas' den, to see what they are about, &c." (Fig. 2.7), as another commentator put it.[68] This was one of the very earliest geological restorations of a true scene from deep time, in that the animals were drawn as they would appear when living, and in their own habitat, rather than merely being outlines with a minimal background. Restoration was an art as well as a science, and the imagina-

65. Sommer 2003, 199–200.

66. Lyell to Mantell, 8 February 1822; printed in J. Thackray 2003, 2. On this passage as a typical example of Buckland's blend of fact and jest see Rupke 1983b, 71–2; Sommer 2004, 60.

67. Buckland to Wrangham, 14 March 1822, written onto a copy of Conybeare's broadsheet, itself bound into Wrangham's copy of W. Buckland 1822 (separate offprint), now held in the British Library (1254.k.1.(1.)). The letter reveals that by this time the poem had been leaked to the *Yorkshire Gazette*, though with injunctions to maintain its anonymity. Wrangham was the dedicatee of Eastmead's *Historia Rievallensis* (1824).

68. Gibson 1822 (this article from the *Yorkshire Gazette* was enclosed in Buckland's letter to Wrangham mentioned in n. 67). Rudwick (1992, 38–41) has provided the fullest analysis of Conybeare's drawing.

Figure 2.7. Drawing of Buckland entering the antediluvian Kirkdale Cave like a time-traveller, engraved alongside William Conybeare's poem *The Hyaenas' Den* on a printed broadsheet.

tive daring of Conybeare's drawing carried a risk that its content might be deemed overly speculative.[69] For this reason it was circumscribed, like the occasional verses discussed above, by its humorous presentation and its limited circulation among gentlemen. Such images were not displayed to a wider public as serious scientific representations until the 1830s.

Rudwick has stated that Conybeare's cartoon-like drawing was not "translated into a more soberly scientific scene from deep time".[70] However, a closer look at the pictorial evidence to hand suggests that Buckland's Oxford students were in fact shown a soberer version of the drawing, without the comic element added by Buckland's caricatured figure. In 1970 two copies of a previously unpublished portrait of Buckland were analysed by Patrick Boylan (Fig. 2.8). The portrait, dated 1823, shows the

69. The drawing was probably not executed by Conybeare himself (Rudwick 1992, 257 n. 14), but for convenience it is here called "Conybeare's".

70. Rudwick 1992, 40.

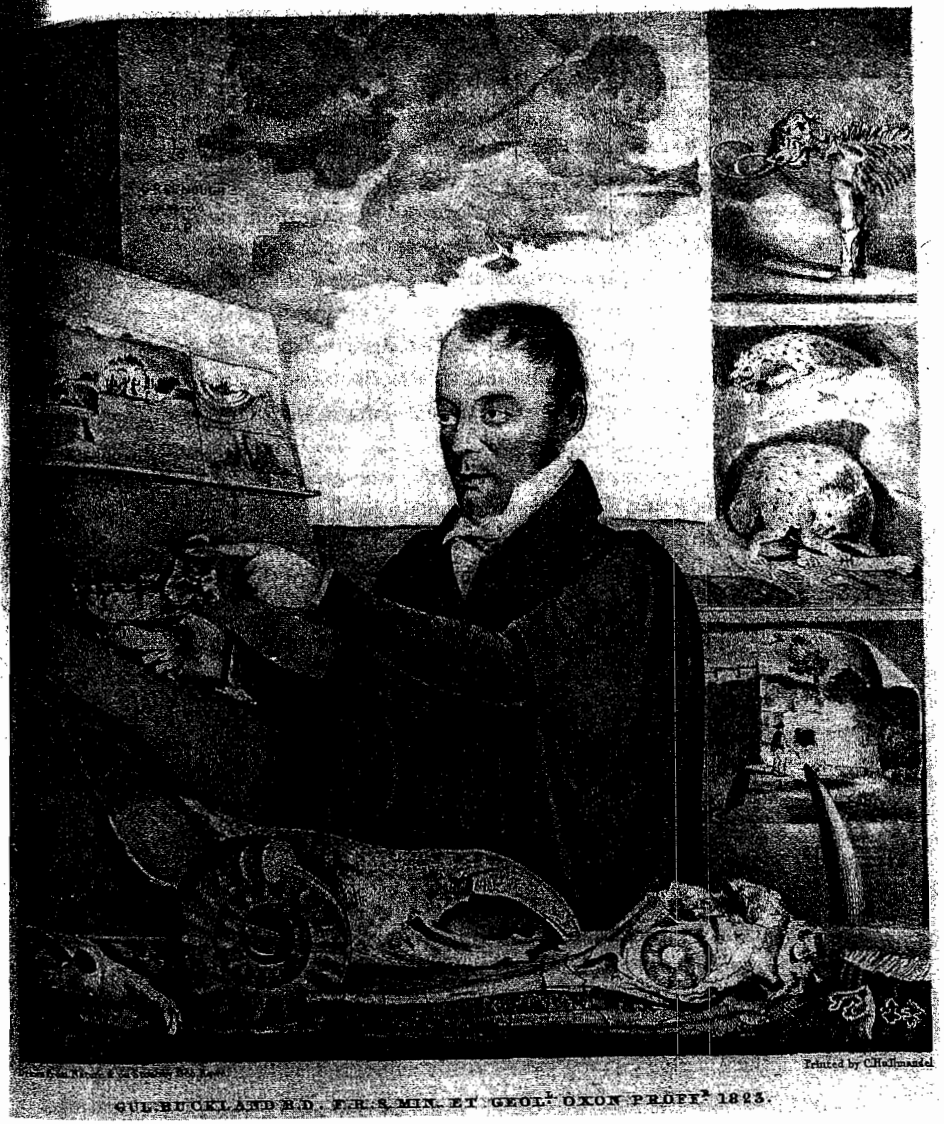

Figure 2.8. Lithographed portrait of Buckland by George Rowe (1823). Note the hyaena restoration behind his left shoulder and, below this, a reversed version of the sketch in Fig. 2.6.

Professor standing behind a table littered with fossils, holding a hyaena jaw with one hand while pointing at it with the other. Behind him are geological maps and posters, many of which represent his own discoveries. One poster clearly shows two hyaenas in all their furry, reconstructed glory, gnawing bones in a cave. As Boylan has noted, the poster has clear affinities with Conybeare's drawing.[71]

This portrait of Buckland raises two important points. First, all the other animals depicted in the portrait are in a fossil state. The hyaenas are the only ones restored in the flesh, even though it would not have been hard to restore the mammoth's outlines because an entire mammoth had been found frozen into the permafrost in Siberia two decades earlier. This distinction confirms that Buckland's discovery of an ancient habitat was of crucial importance for the depiction of the ancient earth. Second, this seems to me to be a portrait of a man engaged in demonstrating something to an audience, rather than (as Boylan has suggested) an "ikon-like" image showing the man of science "surrounded by symbolic representations of his triumphs". The latter interpretation would indeed make this portrait "uncharacteristic of the period";[72] but it has clear affinities with the contemporary engraving shown in Fig. 2.1. In both pictures Buckland's pose is identical (though holding different fossils); the table is at the same height; some of the same fossils and pictures can be seen in the room; and, if we allow for the accidental reversal of images,[73] the arrangement of the posters on wooden boards leaning against the wall beneath a suspended map is exactly the same. Buckland's mouth is slightly open: he is in full flow, giving one of his lectures.[74] According to Rudwick, the first "soberly scientific" scene from deep time was the lithograph of De la Beche's *Duria antiquior* (1830), which Buckland used as a visual aid.[75] Figure 2.8, however, suggests that this was predated in the 1820s by a serious large-scale restoration of the Kirkdale hyaenas.

In fact, this now-lost restoration reinforces rather than alters the underlying historical model proposed by Rudwick for the development of these scenes among gentlemanly geologists, with their wider popularizations coming after a process of internal dissemination and testing.[76] Buckland's Oxford lectures played their part in this earlier phase, functioning in part as an extension of the private-circulation network around

71. Boylan 1970, 351.

72. Boylan 1970, 353.

73. Lithographs had to be drawn in mirror image, so this kind of mistake was common.

74. This interpretation seems implicit in the observations made in Edmonds and Douglas 1975–6, 142.

75. Rudwick 1992, 44.

76. Rudwick 1992, 233–5.

which occasional verses and jokes moved. Members of this audience, like those in the Royal or Geological Societies, were all vouched for as respectable gentlemen.[77] Even if this portrait of Buckland was originally intended for the frontispiece of a projected geological treatise,[78] Rudwick's "caution hypothesis" would be upheld by the fact that the hyaena poster, if reproduced in this context, would be too small and marginal to attract much attention.[79] But whatever its purpose and transmission may have been, one thing is clear: Buckland is, yet again, depicted showing off, and a Kirkdale hyaena provides the focal point of his display. With this in mind we return to Conybeare's drawing, which dramatizes the moment of discovery required for this display to take place.

If Conybeare's poem can be seen as a translation of Buckland's academic hyaena paper into jog-trot verse, his drawing depicts the discovery, complete with the time-travelling figure of Buckland, crawling into the cave bearing the candle of Enlightenment science.[80] In Rudwick's words, Buckland is seen "penetrating the epistemic barrier between the human world and the pre-human, and looking perhaps as surprised to see the hyaenas as they are to see him." This is rather an understatement. Buckland's hair is standing on end, and so is that of the hyaena in the foreground, which arches its back menacingly. Mouths are gaping all round: the hyaenas closest to Buckland are snarling, while Buckland's jaw has dropped (whether in delight or fear is impossible to tell). Notwithstanding the picture's humorous mode, it conveys a strong sense of hostility between man and beast, in keeping with the traditional image of the cave as a site for primal conflict.

In its deliberate use of fantasy—the fantasy of time travel—Conybeare's broadsheet flags up the uncanny nature of Buckland's achievement, restoring what no human eye could have beheld. At this stage in the science's development, the idea of viewing such a scene was so new and counter-intuitive that Buckland and others seem to have felt that the best way of representing this leap of imagination among themselves was to translate it into a literal journey in time, jamming together prehuman

77. Several of those in the Oxford audience in Fig. 2.1 were members of the Geological Society anyway (Edmonds and Douglas 1975–6, 154–65).

78. As suggested by Boylan (1970, 353).

79. Compare Buckland's miniature and marginal restoration of the pterodactyle in his Bridgewater Treatise (1836, II, plate 22, fig. P), taken from another equally marginal German restoration of 1831 and reproduced as Fig. 9.1 below. On this marginality see Rudwick 1992, 57, 68–9. Compare also Mantell's miniature restoration of ventriculites in his first book (1822, 175).

80. This interpretation of the candle is based on Rudwick's (1992, 39). Shortland (1994, 31) sees the candle rather as "the torch that harks back to our primitive ancestors [. . .] conjur[ing] up [. . .] the era of Neanderthal man, a habitual troglodyte who [. . .] used the scourge of fire to clear his abode of potential foes." Neanderthal man, however, was not described until 1857. Sommer (2003, 195) has suggested that the candle also represents "the flag of the conqueror".

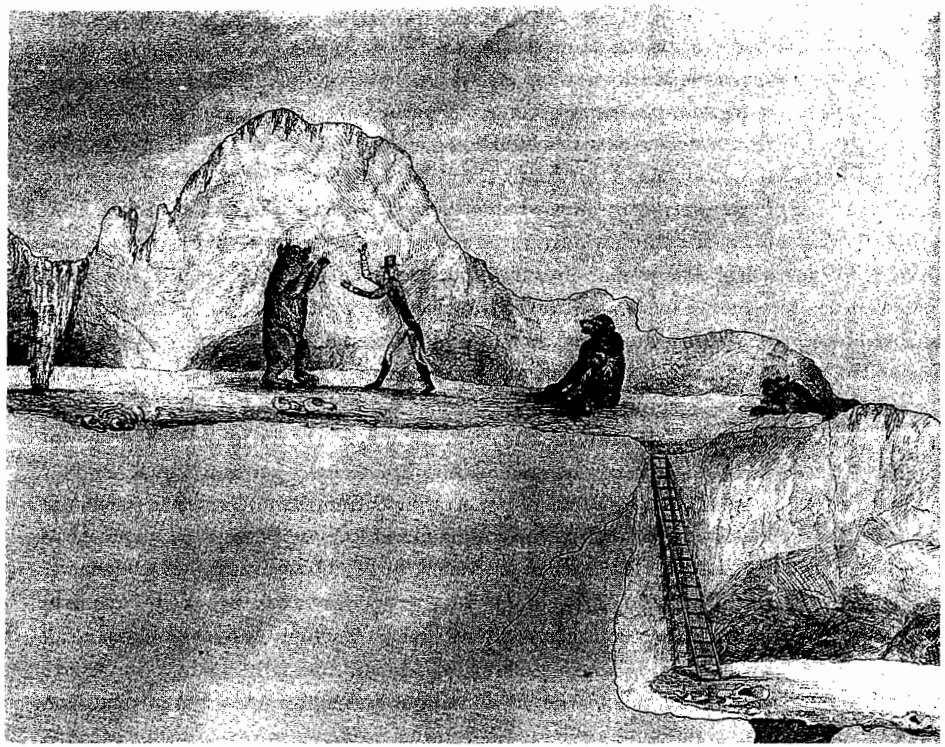

Figure 2.9. Resurrecting extinct bears in Gailenreuth Cave (and making them perform). Detail from a sketch in Oxford University Museum of Natural History, Buckland Papers.

past and human present with comical incongruity. This is confirmed by the fact that the earliest known pictorial restorations of extinct cave-bears and pterodactyles as living animals—both, again, associated with Buckland's work—used similar devices. Figure 2.9 was drawn, probably by Buckland, sometime after his trip to a bone-cave at Gailenreuth in Bavaria in 1816: it represents an encounter between a top-hatted man and the extinct cave-bears whose presence Buckland had deduced from the bones littering the cave. The man's gesture appears to combine the menagerie showman with the conjuror: it is as if he has resurrected the bears from the bones seen on the cave floor and now shows his power over them by making them dance for him or sit down quietly.[81] (This recalls the pet bear named Tiglath-pileser which Buckland acquired later in his career and dressed in a cap and gown.) Another version of the time-travel fantasy is seen in Fig. 2.10, a painting by the Lyme Regis

81. This picture has been reproduced and discussed in Rudwick 2005b, 607–8.

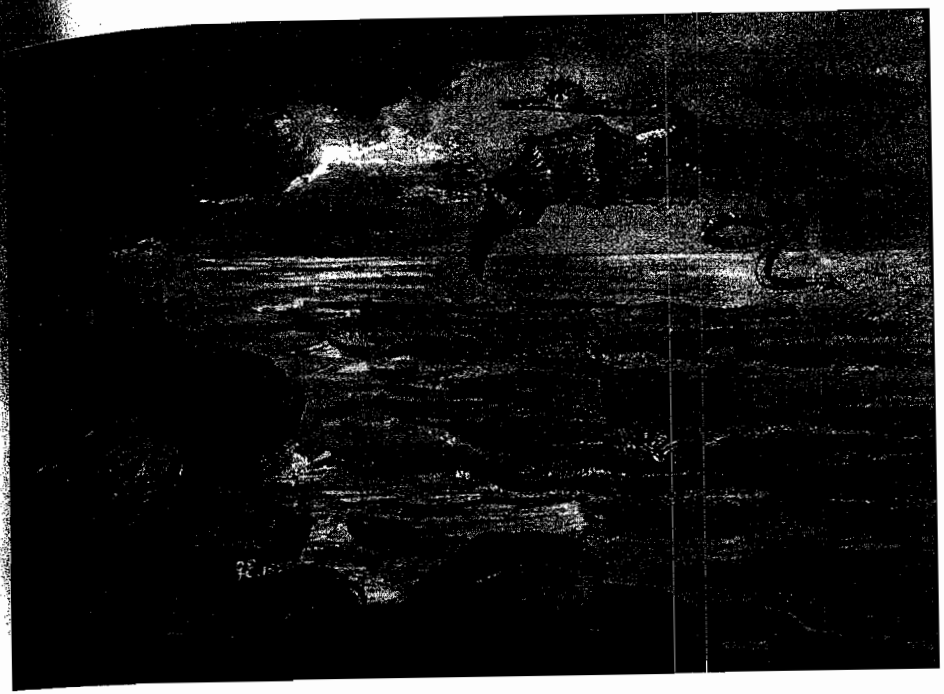

Figure 2.10. Painting by George Howman (1829, now in Lyme Regis Museum) showing a dragon flying by night over a romantic seascape. An inscription on the back states, "By the Revd George E Howman from Dr Buckland's account of a flying Dragon found at Lyme Regis, supposed to be noctivagous". This last word means "wandering by night", as Buckland described the pterodactyle in his 1829 paper (W. Buckland 1835, 218).

clergyman George Howman, inspired by Buckland's 1829 Geological Society paper on a pterodactyle found at Lyme.[82] No human figures are seen, but the ruined castle and storm-tossed boat indicate that this pterodactyle—if we may call it such[83]—has somehow flown into the present day. Its portrayal as a dragon, complete with pointy tail, enhances the scene's fantastic nature, reminiscent of the *Arabian Nights*; but it also indicates how difficult it was for people in the early nineteenth century to imagine these new monsters without drawing on old iconographies. The pterodactyle is not represented *like* a dragon, but *as* a dragon.

Both pictures present extinct animals travelling forward in time into the present day. Conybeare's drawing, by contrast, presents the geolo-

82. W. Buckland 1835. On Howman's painting see Fowles 1984, 27; Torrens 1995, 266.

83. If so, this appears to be the first British pictorial restoration of a pterodactyle. The earliest known restorations outside Britain were a pair of distinctly mammal-like sketches made by Jean Hermann of Strasbourg in 1800 (Taquet and Padian 2005).

gist travelling *back* in time, and in the poem Buckland gazes upon the distant past like a visionary. As Sommer has shown, Conybeare's lines on the "Mystic Cavern" form part of a strategy by which Buckland and other geologists asserted their own authority over the earth's secrets by drawing on contemporary mythic and literary associations of caves.[84] As for the Bible, the significance of Buckland's glimpse into a lost world is double-edged. Rudwick, taking his cue from Conybeare's twelfth and thirteenth stanzas, has commented that "Buckland's reconstruction fills in what the bare textual records of the world before the Deluge hardly begin to suggest".[85] Indeed, in his subsequent volume, *Reliquiæ Diluvianæ* ("Diluvial Relics", 1823), Buckland marketed his cave researches as historical evidence for the biblical Deluge. But his world of hyaenas does not so much fill in the biblical account as provide a starting-point (Davy's "distinct epoch") for an alternative Creation-narrative which would soon be shrugging off the historicity of the biblical Deluge as being of limited geological significance.[86] Geology was beginning to flex its muscles.

Many biblical literalists resented the triumphalism with which earth history was being wrested from their grasp. A pseudonymous letter to the popular and relatively conservative London periodical *The Gentleman's Magazine* by a native of Kirby Moorside ("Kirkdaliensis") may also reflect annoyance at this metropolitan bigwig plundering the provinces for his own glory.[87] Before we examine this letter, however, it is worth glancing at two previous mentions of the cave in the *Gentleman's Magazine*, since this will show us the overall context in which its readers first viewed the discovery.

The editors first heard of the cave in 1822. In February, while Buckland was presenting his discoveries to the learned of London, readers of the *Gentleman's Magazine* were learning of an "Antient Cave" discovered in Yorkshire, in which animal bones had been found. The likely explanations were that the bones were "Antediluvian" and had been washed there by the flood, or that the animals had lived in the cave after the flood "if they ever existed in this island".[88] This notice appeared in the "Antiquarian Researches" section, and anyone reading the magazine sequentially would have just finished a longer notice about a barrow in Nettleton, with speculations about "early British Antiquity". After reading about Kirkdale Cave, he or she would then have read about an "Egyptian Mummy" and some Roman ruins discovered in North Africa.

84. [Conybeare] 1822, final verse; Sommer 2003, especially 196–7.

85. Rudwick 1992, 39.

86. Nevertheless, at this point Buckland still maintained that the "geological deluge" (indicated by the physical evidence) was the same event as the biblical Deluge. See Rudwick 2005b, 609–38.

87. "Kirkdaliensis" 1822.

88. Anon. 1822c.

In April, part of Buckland's paper on the Kirkdale hyaenas (as printed in the *Annals of Philosophy*) was extracted and printed in the *Gentleman's Magazine*, again under "Antiquarian Researches". Again, a sequential reading reveals the way in which many readers first met the new geology. Having perused a notice of "Egyptian Antiquities in the British Museum", our reader would come to an article entitled "Antediluvian Cave" (note the change from the vaguer "Antient"), which promised to give a "minute and interesting detail" from Buckland's paper: "It gives a curious account of an antediluvian den of hyænas".[89] The word "curious" implies that Buckland's account is intriguing and worth reading, rather than intending any veiled sarcasm: this was an article designed to keep the polite reader abreast of the latest philosophy, rather than a reaction or opinion. This reader now learns how, in Buckland's view, the evidence of the hyaena den showed that "no important or general physical changes" had affected it since. The quotation from Buckland's paper ends without editorial comment, and the reader moves on to read about another "Ancient Barrow" and an "Ancient Seal" (of the heraldic variety).

These two accounts, then, present the Kirkdale hyaena as an "extinct species", a more furry and less cultured analogue of the ancient Britons, Romans, and Egyptians. In both issues, information on the cave is surrounded by accounts of man-made underground chambers whose historical secrets, like Kirkdale's, were being plundered and interpreted by intrepid antiquaries. Although these accounts are dryly narrated, we can see how the popular resonances of human antiquity (Ossianic and Oriental respectively) came to be associated with "antiquated beasts".[90] The hyaenas' position within these accounts reflects the placing of fossils in museums like William Bullock's: his 1812 guidebook contains a section entitled "Miscellaneous Articles" in which mammoth bones and Egyptian mummies constitute the chief attractions.[91] These associations were natural enough, given geology's antiquarian roots, and were already proving useful to its popularizers.

"Kirkdaliensis" was moved to write his sarcastic letter on 15 May 1822, and it was printed in the *Gentleman's Magazine* in June, taking up nearly four pages. His main objection was to the imaginative liberties taken by this upstart southerner. His letter begins by recalling the "*luminous* account of [. . .] the *dark* 'Antediluvian Cave'": insisting that "it is very far

89. Anon. 1822d.

90. The phrase is Conybeare's, taken from a poem printed in Daubeny 1869, 79.

91. Bullock 1812, 129–34.

from my intention to set up my little spark of knowledge against the blazing splendour of his", he ironically invokes the Enlightenment trope of scientific knowledge as illumination. He reasserts the scriptural basis of true historical knowledge against Buckland's "antiquarian" speculations, invoking the then-standard dating of the Deluge to 2349 BC. Against this established authority he presents the "extremely curious" evidence of "DILUVIAN MUD" with which Buckland had argued that the hyaenas were antediluvian. "Kirkdaliensis" uses the term "MUD" three times in a single sentence, each time in full capitals, presumably to discredit Buckland's grand conclusions by drawing attention to the unglamorous material on which they are founded. A page later he descends even lower, commenting that the fossil faeces are not "a whit less curious, and must doubtless afford a high treat, and perhaps *relish*, to the real lover of antiquity".[92] This innuendo plays on the same level as Conybeare's suggestion that Buckland enjoyed eating "hyaenas' bones potted in mud",[93] though the two writers used low humour with very different intentions.

"Kirkdaliensis" further attacks Buckland by ridiculing his visionary powers:[94]

> Incredulous persons might here be tempted to inquire, how this profound Antiquary knows what changes took place in these bones *before the Flood*, that is, "while the den was inhabited," [. . .] Perhaps Mr. Buckland, like many of our brethren of the isles of North Britain, may have possessed the gift of *second sight*, in a remarkably acute manner; and possibly, ere long, the world may be favoured with some more of his speculations; or as we may say, "visions, having his eyes open," [. . .][95]

The power claimed by the geologist is invoked with ironic intent, just as the Geological Society elite had defined themselves against "theories of the earth" by ironically praising their poetic qualities. The conclusion of the letter suggests that "Kirkdaliensis" had heard the discovery applauded in terms similar to Davy's, even if he had not heard Davy's own words:[96] Buckland was seen by many as an inspired genius, and "Kirkdaliensis" aimed to undercut such vague intimations of supernatural powers. Here

92. "Kirkdaliensis" 1822, 491–2.

93. [Conybeare] 1822.

94. As noted by Sommer (2003, 189–90).

95. "Kirkdaliensis" 1822, 492.

96. The letter ends by parodying the language of progress and genius: "we have had a secret laid open to our view in this discovery, which for above 4000 years past has been concealed from 'mortal ken;' [. . .] In the mean time hope [. . .] will doubtless keep alive in the minds of *Philosophers* the expectation of having wonders hereafter revealed, which may make air-balloons, steam-boats, gas-lights, and other wonders of this enlightened age in which we live, appear like mole-hills compared with the Grampian-hills" ("Kirkdaliensis" 1822, 493–4).

he invokes the familiar "primitive" figure of the supposedly clairvoyant Hebridean peasant, signalling connotations of credulity, obscurantism, and fraudulence which could be made to apply as much to the Enlightenment image of the "sage of science" as to the priestly or magical authorities this image was designed to displace. Strikingly, he then invites Buckland to indulge in further "visions" and "present us with a correct picture of this curious spotted animal, as the same presented itself to his 'mind's eye,' when he wrote this elegant illustration"—a wish that turned out to be amply granted by Conybeare's drawing and the related poster.[97]

"Kirkdaliensis" then attempts to tar Buckland's discovery with the brush of commercial sensationalism. He proposes that a *"Bazaar"* be opened for selling such "curiosities" as *"Antediluvian Album Græcum"*[98] and *"Diluvian mud"*:

> And as Mr. Belzoni's curiosities are advertised to be very soon sold, your Correspondent is of opinion, that the owner of the Egyptian Hall [. . .] [should] open such a Bazaar there, and your Correspondent, who lives very near the Kirkdale Cave, will readily become his country Agent.[99]

This reference needs some explanation. In 1815 the itinerant showman and circus strongman Giovanni Battista Belzoni had become involved in excavations of ancient Egyptian sites such as the Valley of the Kings and the Lost City of Berenice. Some of the resulting plunder had been displayed in Bullock's Egyptian Hall (see Fig. 1.2) in May 1821, once the fashionable London publisher John Murray had successfully promoted Belzoni's memoir on the excavations.[100] The sensation caused by these exhibits lasted well beyond the obligatory season, drawing crowds for over a year. In June 1822, as "Kirkdaliensis" mentions, the relics were to be auctioned off, many going to the British Museum. But one aspect of Belzoni's display had created a particular stir: he had installed replicas of part of the tomb of Seti I, into which the visitor could walk as if it were a more comfortable version of the real thing. This display was designed to re-create Belzoni's first impressions as he entered the tomb. It offers tempting parallels with Conybeare's caricature, the first scene from deep time, which also depicts the immediate reaction of an antiquary-*cum*-showman on crawling into a newly-discovered tomb (albeit a tomb

97. "Kirkdaliensis" 1822, 492. On the relation between the concept of second sight and the "mind's eye" see Larrissy 1999; on the Celtic connotations see Sims-Williams 1986. On the "sage of science" generally see Knight 1967. Sommer (2003, 182–4 and 189–90) has commented on the relations between magic and "enlightenment" in Regency cave science.

98. Dung.

99. "Kirkdaliensis" 1822, 493.

100. Altick 1978, 243–6; Leask 2002, 128–56.

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of antediluvian hyaenas). Whether intentionally or not, both Conybeare and "Kirkdaliensis" associated Buckland's discovery with the same exhibition of antiquarian time travel. Both men drew out the spectacle's vulgarity, which allowed Conybeare to explore the science's imaginative possibilities but which, for "Kirkdaliensis", only confirmed the disreputable nature of these trespassers upon biblical (and Yorkshire) territory.

In a final irony Murray, having succeeded with Belzoni's Egyptian memoir, published Buckland's new book on cave fossils in 1823, *Reliquiæ Diluvianæ*. Like Belzoni's book, this handsome treatise united learned antiquarianism with the pleasures of sublime topography. It sold well. Its yoking of Genesis and fossils discomfited some geologists, but even Buckland's most outspoken opponent admitted that it had "greatly contributed to render the science of geology popular" and supported "the authority of revelation".[101] Indeed, the challenge to a literal six-day Creation implied by its contents was distinctly underplayed by the surrounding matter (such as the impressively orthodox-sounding title). Geology's cultural status was still precarious. Before we dismiss the letter of "Kirkdaliensis" with retrospective wisdom, we should remember that it was printed in a widely circulating magazine and read by thousands, whereas Conybeare's statement was privately printed and circulated among a chosen circle of savants. Davy's speech was delivered before a similarly select audience and not published until 1827. The implications of Buckland's research for cherished views of Scripture were more likely to damage him than the literalists if aired publicly—and would in all likelihood be used against him by radicals.

Here Byron's verse-drama *Cain* served as an object lesson.[102] Published by a reluctant Murray in December 1821, *Cain* was a sophisticated biblical "problem play"—subtitled *A Mystery*—about how Adam's elder son came to kill his brother Abel. In it Byron remorselessly anatomized the concept of rebellion against established order. At the drama's heart is a pair of scenes in which Lucifer, using the language of Enlightenment rationalism, tempts Cain to rebel. Lucifer teaches Cain that the earth is immeasurably ancient, cosmically irrelevant, and involved in a cycle of divine destruction, extinction, and replenishment. He takes him on a cosmic voyage into "the Abyss of Space", where Cain watches the earth dwindle to nothingness. By this interstellar route Lucifer conducts him into deep time or "Hades" (Fig. 2.11), where phantoms of former worlds with their extinct pre-Adamites, mammoths, and leviathans overwhelm Cain with wonder,

101. Fleming 1825–6, 208.

102. On Byron see Franklin 2000; *ODNB*. The most reliable editions of Byron's poems are Peter Cochran's online texts at http://www.internationalbyronsociety.org, but for bibliographic convenience I cite McGann and Weller's printed editions (Byron 1980–93 and the much more accessible Byron 1986).

LUCIFER.

Enter!

CAIN.

Can I return?

LUCIFER.

Return! be sure: how else should death be peopled?
Its present realm is thin to what it will be,
Through thee and thine.

CAIN.

The clouds still open wide
And wider, and make widening circles round us.

LUCIFER.

Advance!

CAIN.

And thou!

LUCIFER.

Fear not—without me thou
Couldst not have gone beyond thy world. On! on!

[*They disappear through the clouds.*

SCENE II.

Hades.

Enter LUCIFER *and* CAIN.

CAIN.

How silent and how vast are these dim worlds!
For they seem more than one, and yet more peopled
Than the huge brilliant luminous orbs which swung

Figure 2.11. Lucifer leads Cain into Hades, the realm of the geological past: the beginning of Act II, Scene ii of Byron's verse-drama *Cain*. Byron 1821, 384.

then sadness, then anger at God's cruelty.[103] These didactic visions were explicitly based on Cuvier's geology, as Byron noted in a mischievously pious preface. Several commentators accordingly saw *Cain* as an unwelcome form of geological popularization. Byron's friend Tom Moore, the Irish poet, regretted that Byron had promoted the potentially "desolating" (but as yet little-known) catastrophe-theories of Cuvier "in poetry which every one reads".[104]

By demonizing the new science as a gift from Lucifer, Byron confronted the imaginative challenge it posed to biblical literalism. If you base your faith on the literal truth of Genesis, he seemed to suggest, modern science will wreck it for you. But the play created such a furore that its subtleties were ignored or flattened out by many readers. Outraged clerics and delighted radicals saw Lucifer as a cipher for Byron's opinions, preaching the liberating power of reason in opposition to "priestcraft".[105] This reading completely ignored Lucifer's evident bad faith, not to mention the dénouement in which Cain, reduced to a state of abject depression by Lucifer's cosmic showmanship, gets into a fight with Abel and accidentally kills him. Nevertheless, the radical journalist Richard Carlile remarketed Byron's drama as cosmology for the people, reprinting it in a cheap pirate edition and marshalling it alongside explicitly didactic works by Percy Shelley, Elihu Palmer, and George Toulmin. Moore's fears were confirmed. *Cain* spurred radicals in Carlile's circle to start wielding Cuvier's historical geology as a weapon against the Church (for instance in Carlile's newspaper *The Republican*), rather than relying solely on the increasingly outdated eternalist cosmologies of Hutton, Toulmin, and Palmer.[106]

Meanwhile, Buckland was engaged in the delicate operation of trying to persuade the English establishment that this new science was not harmful to the Christian faith, but could positively support it.[107] His Kirkdale research invited a still bolder self-image for the science. But *Cain* set the cat among the theological pigeons, and one suspects that, in the resulting flurry, Buckland was particularly feathered. His response was characteristically offbeat. In order to refine and reinforce geology's self-presentation as a safe "dark art", he added his own satirical verse "antidote" to the growing number of hostile reviews of *Cain*. In its close engagement with well-known poems of the day, Buckland's response stands out from the writings so far examined. Here, too, Kirkdale Cave served as a focal point for the new self-confidence with which geologists presented their science to each other, if not (yet) to the wider public.

103. *Cain* II.i and II.ii (Byron 1986, 901–21).

104. Marchand 1973–94, IX, 103–4; Dowden 1964, II, 620.

105. The same interpretation is common today. See Goldstein 1975; for a subtler reading see Schock 1995.

106. Carlile 1822a; 1822b; 1823, 407. On Carlile's other scientific interests see Goldstein 1975; Cooter 1984, 201–23. I have so far found no evidence for other radical writers using Cuvier's geology to this end before 1821.

107. Rupke 1983b; Sommer 2004.

Wizards and Radicals

Buckland's cave research rejuvenated the image of geologist as wizard.[108] One aspect lent itself especially well to characterization as a dark art. The study of fossil turds or coprolites, pioneered by Buckland, yielded valuable information about the diets of extinct animals. William Wollaston, writing to Buckland to confirm that the gritty nodules in the hyaena caves were indeed droppings, added that "though such matters may be instructive and therefore to a certain degree interesting, it may [be] as well for you and me not to have the reputation of too frequently and too minutely examining faecal products".[109] Philip Duncan took the opportunity to recast his earlier poem about the "dear son of science" quoted above. This time the novice is shown that geology's exalted status rests on very unglamorous material.

> Approach approach ingenuous youth
> And learn this fundamental truth
> The noble science of Geology
> Is bottomed firmly on Coprology
> For ever be Hyaena's blest
> Who left us the convincing test [. . .][110]

In the same letter Duncan also suggested that "Coprologia" should be set as the subject for the university's Latin Verse Prize ("Ars Geologica" was in fact chosen as the subject for 1823).[111] Tellingly, Duncan scribbled on the back that Buckland was not to reveal these secrets to "Mrs B." Lavatory humour notwithstanding, the image of the geologist as the uncanny possessor of mysterious, potentially rather grim secrets reinforced the

108. Contrasting assessments of this image are offered by Shortland 1994 on the one hand and Sommer 2003 and 2004 on the other. On the image's seventeenth- and eighteenth-century ancestry see F. Stafford 1994, 34–41.

109. Wollaston to Buckland, 24 June 1822; quoted in Rupke 1983b, 33.

110. Oxford University Museum of Natural History, Buckland Papers, Miscellaneous MSS./1. This poem was not printed by Daubeny.

111. Rupke 1983b, 223.

notion that geology was an elite science, not to be tampered with by the "profane"—nor, in these delicate matters, by women either.[112]

This earthy dimension of cave geology chimed in with the mythic resonances of caving in this period. As Michael Shortland has put it, "the deeper one goes into the bowels of the earth, the closer one gets to something forbidden and threatening, alluring yet repulsive."[113] Oddly, however, Shortland has tried to set up a disjunction between the "poetic" aspect of caves celebrated by "the Romantics", and the "coarse" mining-related practice of cave geology exemplified by Buckland. Shortland's claim that geology should be "disengage[d] [. . .] from Romanticism as a source and context" is founded on a popular misunderstanding of who and what the English "Romantics" were.[114] This so-called movement (invented at the end of the nineteenth century)[115] is often represented in literary encyclopaedias by six very different canonical poets of the period 1780–1830: William Blake, William Wordsworth, Samuel Taylor Coleridge, Lord Byron, John Keats, and Percy Shelley. Shortland's definition of Romanticism excludes political engagement, scientific thought, the sexualization of nature, masculinity, physical exertion, and individual experience. All of the six poets just mentioned, in their different ways, strongly embraced these concerns and rejected the watered-down pantheism Shortland attributes to them. There was no such thing as a homogeneous, anti-scientific "Romantic attitude to nature":[116] all these men engaged enthusiastically with the sciences of their time, including geology (which Shortland claims had no appeal for Wordsworth, Shelley, or Coleridge).[117] Turning then to the "earthy" science of geology, Shortland uses the example of Buckland to suggest that geologists' experience of caves had nothing in common with "the manipulated delights offered to the Romantics" or "Romantic effusions to sublimity and sensation".[118]

However, the following passage from Buckland's treatise *Reliquiæ Diluvianæ* tells against this view:

> This cave is one of the most remarkable I have ever seen, for the beauty of its roof, and perfection of its stalagmite [. . .] presenting the varied features and irregular undulations of large and beautiful cascades, suddenly congealed into a mass of transparent alabaster [. . .] The roof also of the main chamber, as well as of its side aisles, is in all parts broken into, and clustered over with irregularly grotesque forms of exquisite beauty, rivalling the richest combinations of the most complicated gothic fretwork, and far surpassing them in the wild and irregular varieties in which its masses descend, like inverted pinnacles, to meet the icy lake of stalagmite that covers the floor.[119]

112. "Mrs B." (née Mary Morland) was an accomplished geologist in her own right (Kölbl-Ebert 1997; Burek 2001; *ODNB; DNBS*).

113. Shortland 1994, 13–14.

114. Shortland 1994, 5.

115. St Clair 2004, 212–13 n. 10.

116. Shortland 1994, 39.

117. Shortland 1994, 19. On these figures' interest in geology see Levere 1981, 167–71; Wyatt 1995; Leask 1998b; R. O'Connor 1999; Heringman 2004. On other interlockings of science and Romanticism see Cunningham and Jardine 1990.

118. Shortland 1994, 36. Shortland's conclusion has been disputed along similar lines by Sommer (2003) and more briefly by Heringman (2004, 26 n. 58).

Buckland's indulgence in this kind of language for the benefit of genteel readers belies the notion that his geology was the opposite of "romantic" and points up the danger of using popular dichotomies and literary-critical labels as a cultural-historical shorthand. Even if we retain the label, "Romanticism" was clearly no distillation of pure idealism. There is, of course, a discrepancy between the conventional sublimity of an enchanted cavern and the image of Buckland eagerly gathering dung with his bare hands; but the British public had an appetite for the curious and the sensational. In this age of sensibility, caves appealed to early-nineteenth-century tourists because they united the "grotesque" and the "exquisite", the material and the spiritual.[120] Geology's appeal cannot be put down to one side or the other: geological fieldwork was, in Rudwick's words, "loaded with sentiments that united elements of romanticism [. . .] with those of robust, manly Christianity and the gentleman's love of the countryside",[121] to which one might add (here following Shortland) a delight in transgressing the boundaries of genteel respectability. Several anecdotes suggest that Buckland and his friends, secure in their social status, relished the doubt which their grubby pursuits cast over their gentility in the eyes of humbler onlookers.[122]

The geologists' enthusiasm for this heterogeneous "cult of sensibility" certainly contributed to their developing self-image as necromancers. As Shortland has rightly noted, they drew on a long-established image of the cave as a site of "spiritual confrontation" charged with "classical monstrous associations" and "able, through the category of the sublime, to unfetter the overcivilized mind and thrust it forth on wild imaginings".[123] This complex chain of associations was not confined to the traditional "Romantic period":[124] it can be traced, in substantially similar forms,

119. W. Buckland 1823, 127–8, describing Forster's Höhle.

120. Sommer 2003, 199–200.

121. Rudwick 1985, 40–1.

122. See Gordon 1894 and Shortland 1994.

123. Shortland 1994, 13–14; Sommer 2003, 178–82.

124. In present-day literary-historical accounts, the limits of this period vary from 1789–1824 at its narrowest to 1770–1850 at its widest.

back to the early eighteenth century (and arguably beyond). The cult of sensibility which developed in the 1750s drew strength from antiquarian writings on the Old North and the Celtic West (including Macpherson's Ossian). Caves became a standard trope for "spiritual conflict" and "wild imaginings" such as were later recast by Shelley and Keats.[125]

Thomas Gray's ode *The Descent of Odin*, first published in 1768, was an early example. The Norse god Odin, mediated through Paul-Henri Mallet's *Introduction à l'histoire de Danemarc* (1755) and various later works, was the necromancer *par excellence*. Here he makes a voyage down to Hel, the underworld, where he summons a dead prophetess from her grave to question her about the future. Gray's ode is a free adaptation of an English translation of the seventeenth-century Danish scholar Bartholin's Latin translation of *Vegtamskviða* ("The Wayfarer's Song"), a medieval Icelandic poem based ultimately on Norse mythology.[126] By the beginning of the nineteenth century, *The Descent of Odin* was extremely well known and had been reprinted many times.[127] In view of the material discussed above, it is easy to see how a geologist might make the link between Gray's depiction of the Norse necromancer and Buckland's summoning of hyaenas from beyond the grave. One piece of occasional verse made just this link.

The Professor's Descent was written in 1822. The only surviving manuscript is in Buckland's own spidery hand, and internal evidence suggests that he composed it himself rather than just copying it down.[128] Formally speaking, it is a close parody of *The Descent of Odin*, taking the "high" theme of the Norse gods and applying Gray's form and metre (and many lines verbatim) to the "low" subject of geological investigation, specifically Buckland's visit to Kirkdale Cave:

> Uprose the King of Rocks with speed
> And saddled strait his War-bro' steed:

125. Romantic cave-poems are discussed more fully in Sommer 2003. On the cult of northern antiquity see Wawn 2000, from which the term "the Old North" is here lifted (see especially pp. 30–3). Wawn's usage covers Scandinavia and various perceptions of an ancient "Scandinavian Britain". Before the 1830s, however, the poetic perception of Scandinavian and Celtic antiquities in Britain often overlapped, as seen in Gray's "Odes" (which adapted Norse, Welsh, and Orcadian traditions). For wide-ranging reflections on northern otherworlds as sites of spiritual conflict see Davidson 2005.

126. Gray's poem is edited in Lonsdale 1969, 220–8. *Vegtamskviða* is translated in Larrington 1996, 243–5. On Gray and the Old North see Wawn 2000, 27–30.

127. On the reception of Gray's Norse odes see Gray 1973, unpaginated introduction; Clunies Ross 1998, 105–66.

128. The most compelling evidence for Buckland's authorship is the presence of crossings-out and corrections in his handwriting. The manuscript (of which the Devon Record Office, Exeter, holds a microfilm, 138 M/F711), is in the collection of Roderick Gordon, to whom I am grateful for allowing me to print extracts here. The full poem is printed in R. O'Connor 2006a.

> To the Yorkshire steep he rode
> The Old Hyæna's drear abode.
> Him the Dogs of Darkness spied
> Their shaggy throats they opened wide [. . . .]

Buckland takes the place of Odin as the hero of an otherworld voyage, battling monsters and demons.[129] But, although the poem is a parody of Gray's ode, the object of its satire (quite a different matter) was Byron's *Cain*, which for Buckland represented a direct encroachment of "mad" radicalism upon his hard-won scientific and theological territory. Buckland was not alone in responding poetically to *Cain*. Many hostile responses were written in verse: it was widely felt that the poetic power of *Cain* spread a moral poison which required a poetic "antidote".[130]

In Buckland's poem the Professor enters the cave and, on speaking the magic words ("the verse that vocalizes stone"), has a vision of the antediluvian world or "Lord Byron's Hell & Chaos". Lucifer appears and, thinking his visitor an ally, reveals that he is brewing a poisoned drink to drive radical science writers into further acts of madness:

> A drink to madden Byron's brain,
> To nonsense madder still than Cain;
> To fire mad Shelly's impious pride
> To final crisis, suicide.
> This quaff'd in vulgar Carlisle's alehouse
> Shall quickly urge him to the gallows.

To which the Professor retorts, "D—— their souls with all my heart!" before asking Lucifer to unveil further secrets of the strata. Realizing that this questioner is a geologist and therefore a "Foe of hell", Lucifer goes back to bed, grumbling that he will not be outwitted again.

In his study of Buckland, Nicolaas Rupke has briefly mentioned *The Professor's Descent* as a piece intended for "amusement", citing it as evidence that geologists "were proudly aware of the literary use of their work".[131] This interpretation seems to dampen the poem's fire somewhat. The aggressive jocularity of the Professor's retort suggests that the poem also had a tactical dimension. In writing this poem, Buckland was fiercely discrediting a set of writings which threatened the status he and his colleagues had begun to claim for geology—a position they had

129. On cave geology and the quest-romance see Sommer 2003.

130. Anon. 1822a; 1822b; 1822e; Battine 1822; Adams 1823; Wilkinson 1824. On these reviews see Chew 1924; Steffan 1968.

131. Rupke 1983b, 76; 1983a, 38.

not yet consolidated, and which was therefore vulnerable. In the light of Buckland's stealthy campaign to win geology greater independence from the clerically oriented disciplines which had acted as its academic patrons, the radically anticlerical science of Byron's Lucifer (and Carlile's Byron) needed to be shown up as "nonsense". This poem apparently circulated only in Buckland's circle: it seems to have been aimed at bolstering the self-image of geology, rather than effecting any direct change in its public projection.

But why use Gray's ode in this context—why, in particular, model this satire formally on Gray rather than on its chief target, Byron? It may be that Byron's later styles—exemplified by *Don Juan* on the one hand and *Cain* on the other—were too difficult to parody without implying admiration. Buckland's use of an older form was not unique: other hostile reviewers of *Cain* who responded in verse tended to employ older satiric forms such as (mock-)heroic couplets. Perhaps Buckland felt that his purpose was best served by the insistent rhythms of Gray's iambic tetrameters, which often slid into pounding, incantatory trochees.[132] Perhaps, too, the landscape of the Old North was felt to be more familiar geological territory than the unspecified cosmic spaces of Byron's drama. Bakewell, Playfair, and several eighteenth-century geological writers had manipulated the subjective connotations of the Old North to render their books more appealing. Moreover, during the late eighteenth and early nineteenth centuries, British pioneers of Icelandic geology (John Thomas Stanley, George Mackenzie, Henry Holland) also spearheaded a new wave of enthusiasm for Norse literature in Britain.[133] Imaginatively speaking, the worlds of Scandinavian antiquity and geology were never far apart: as the layout of the *Gentleman's Magazine* demonstrates, geology was just another branch of "antiquities". It is not in itself surprising that Buckland should employ these associations in his poem.

But none of these factors explains why Buckland chose *The Descent of Odin*. In view of his satiric design—to show that geology was not "demonic" or anticlerical—it would surely seem inappropriate to cast himself as hero in the role of Odin, that fearsome death-god of a heathen people usually known for performing hideous atrocities on monks, nuns, and each other at the drop of a helmet. Only a few months before, Walter Scott's historical novel *The Pirate* (1821) had been published, selling in large numbers and profoundly affecting the way people viewed

132. A tetrameter is a line constructed from four pairs of syllables. Iambic tetrameters place the stress on the second syllable of each pair ("Their shaggy throats they opened wide"); trochees place the stress on the first syllable of each pair ("Foe of Hell I know thee now").

133. Playfair 1802, 485; Bakewell 1813, 21–2. On British geologists in Iceland see Wawn 2000, 41–59.

the Old North before the canonical saga-translations of the 1840s and 1850s. *The Pirate* conveyed Scott's vivid enthusiasm for Scandinavian antiquities, but the swashbuckling, bloodthirsty "Viking ethos" came in for sustained moral condemnation (much more so than the "Highland ethos" in Scott's first historical novel, *Waverley*). Indeed, Scott's representation of a modern-day Viking, the corsair Clement Mertoun, owes not a little to Byron's very own verse-romance *The Corsair* (1814), whose harsh individualism had been mocked a few years earlier in two verse-satires by Buckland's Oxford colleague and friend Charles Daubeny.[134]

Buckland's choice of Odin seems less strange when we examine the English poetic tradition which had grown up around this figure. He had arrived in early eighteenth-century England in the hybrid uniform of neoclassical Gothic. At first, readers were shocked, and some regretted Gray's abandonment of sense for sensibility, of country churchyards for heathen rituals.[135] However, the new aesthetic soon became familiar, and Odin's image began to mellow. As a hero of Regency odes he was still uncanny, yet distinctly decorous. Unlikely as it may seem, in Regency England Odin could even be viewed as a primitive Protestant culture-hero, thanks in part to a scholarly euhemeristic tradition according to which the "real" Odin, far from being a god, had been a powerful military leader at war with a tyrannical Rome.[136] Two Odin poems written in 1827 by the poet laureate, Robert Southey ("The Race of Odin" and "The Death of Odin"), are typical in representing Odin as a vigorous and noble warrior. His magical powers were merely another aspect of his might, and his love of battle was more Homeric than demonic. This Odin was more suitable for Buckland's purposes.

These observations are supported by the iconography of Odin in eighteenth-century English book-illustration. One image merits particular attention, for it was used to illustrate Gray's *Descent of Odin* in editions of his verse from 1776 onwards (Fig. 2.12). It illustrates the moment in the poem when Odin summons the dead prophetess from underground by tracing the "Runic rhyme" on a rock in front of him. Odin is shown in neoclassical splendour, his Gothic wildness discreetly signalled by the shock of curly hair protruding from beneath his clean helmet, neatly tied in a knot. His gesture is confident, his physique virile. The surrounding scenery is wild and barren, with beetling cliff and dark mountains. It has been an arduous journey: he has come on horseback, and his "coal-black

134. On *The Pirate* and its reception see Wawn 2000, 60–88. On Scott's career see *ODNB*. See Daubeny's commonplace book: Magdalen College, Oxford, MS 377, I, 146–8.

135. Clunies Ross 1998, 110.

136. Wawn 2000, 188.

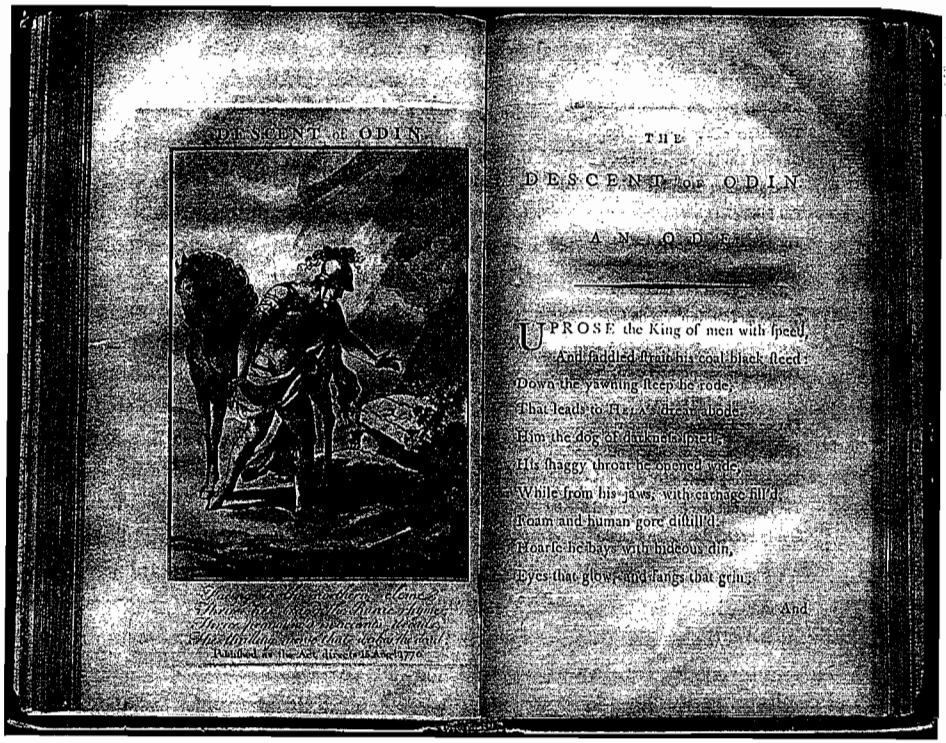

Figure 2.12. Odin tracing the "Runic Rhyme" in a John Murray reprint of Gray's *Descent of Odin*, on which Buckland modelled *The Professor's Descent*. Gray 1786, 119 and facing plate.

steed" stands nearby.[137] What more fitting image for the gentlemanly geologist as heroic "knight of the hammer"?[138]

Now look again at the picture, this time with Buckland in mind. A hero stands at the mouth of a cave, gesturing confidently towards a well-lit rock face on which strange runic symbols are seen. This rock face is particularly striking, because it is clearly stratified. Seen from this viewpoint, the runes take on a new meaning—in fact, an old meaning which dates back well into the eighteenth century, but which Buckland and others were developing into the idea of strata as pages of earth history.[139] The lines beneath the picture describe Odin having just "trac'd" the runes on the rock, but both the word "trac'd" and the figure's gesture can be given another meaning outside the context of the poem itself: the figure can be seen as interpreting rather than writing the runes, "tracing" them as an antiquary traces the history of an ancient people. The lines also describe the "Runic rhyme" as having the power to "wake the dead"; similarly, Buckland's decipherment of the book of nature allows him to "resurrect" the bones of extinct creatures. Accordingly, the weathered bones of the long-dead prophetess lie on the floor at the mouth of the cave, soon to be awakened by our "knight" (like the bears' bones in Fig. 2.9). These geological resonances are solely in the mind of the viewer; but had Buckland been one such viewer, it seems unlikely that he would have missed them. Gray was one of his favourite poets; he may have encountered this picture during his reading, prompting him to employ *The Descent of Odin* as a basis for his own poem.

Whether Buckland knew this picture or not, his need for a heroic model was well answered by Gray's Odin, with his propensity for travel, his vigorous physicality, his supernatural authority, and his mastery of a secret language. These characteristics all pass to the Professor. His dialogue with Byron's Lucifer fits the common poetic trope of spiritual warfare in caves, a site in which (as Sommer has shown) geologists staged their contests with poets—and Moses himself—for cultural authority.[140] Buckland was only just beginning to embark on a long struggle against widespread biblical literalism. At stake was the authority to tell (part of) the story of Creation, and *Reliquiæ Diluvianæ* represented Buckland's public consolidation of the territory claimed at Kirkdale. In *The Professor's Descent*, the struggle between Byron's Lucifer and the Odinic Professor enacts a contest over the same patch of imaginative ground, but Buckland is fighting on the opposite frontier—that of the radical materialists, to whom the poem's savage and cannibalistic hyaenas are compared.

Buckland had to fight the cause of historical geology against both extremes: while retaining its respectability, geology had to provide a sublime frisson of adventure and magic. He therefore presented a hybrid character for his hero, a geological "parson" modelled on the heathen knight/god Odin and exemplifying the tension between rational neoclassicism and irrational sublimity.[141] The Professor's uncanny supernat-

137. Odin's horse Sleipnir was traditionally held to have eight legs, as Gray noted in his commonplace book (Lonsdale 1969, 223 n.); the picture sacrifices accuracy to decorum.

138. Thor would fit this epithet more closely, but in the early 1800s he was not a particularly prestigious member of the Norse pantheon. During the 1840s his reputation grew, however, as witness the pseudo-mediaeval title-page of the (recently lost) 1850 manuscript volume containing the songs and ballads sung at Geological Survey dinners, "Ye Recorde Boke off ye Royale Hammereres, off whyche Anciente Ordere Tooballcane and Thorr were erlie Knyghtes" (Geikie 1895, 142).

139. On fossils and minerals as "lithic writing" or "natural runes" see B. Stafford 1984, 293–314.

140. Sommer 2003, 196–7.

141. Compare Wawn's judgement (2000, 29): "The neo-classical and the sublime co-exist in a creative tension."

ural powers are repeatedly pitted against forces of chaos and darkness (the "Radical" hyaenas, the vision of "Lord Byron's Hell", and Lucifer himself), and the villains are outwitted. Lucifer comes across as a particularly feeble character, partly because most of the advantages he is given in Byron's *Cain* are denied him here and given to the Professor instead. It is the Professor who takes the initiative, compelling Lucifer to reveal secrets; the Professor, rather than Lucifer, is a "Traveller" who can pierce the bounds of space and time, summoning up Byron's former worlds; and the Professor is the one portrayed as "fearless" and Promethean in his transgressive boldness. In short, the Professor possesses all the supernatural powers one would usually associate with "Satanic" figures, but (and this is the point) he is a "Foe of hell", because he is a true geologist. To make this point clear, Buckland adds a footnote: "(i.e. not dealing with the Devil tho' some have their doubts)". There is a world of difference, Buckland seems to insist, between the imaginative "Hell & Chaos" of Byron's "mad" and self-destructive vision, and the sensational but ultimately rational wonders of geology as taught by those qualified to pronounce on it.

Cain, and the upsurge of radical geology-writing in 1822, may well have prompted some geologists to abandon all ideas of making their science appeal to the public, and once again to avoid taking imaginative risks. Buckland did not react in this way, and *The Professor's Descent* may have been meant to show his fellow-geologists that their science could remain inviolate without sacrificing its attention-grabbing potential. It also demonstrates just how closely antiquarianism and geology were entwined in the early 1820s. Finally, it leaves no room for doubt over the importance of literary culture and poetic sensibility to the rise of geology. We have seen Buckland engaged in a complex literary and metaphorical debate in order to define the territorial claims of historical geology over the picturing of life before man. Far from being a mere *jeu d'esprit*, this poem reveals Buckland wielding his sense of humour as an instrument of aggressive exclusion, ensuring that the cohesion of his chosen group (the genteel geologists) is not threatened by radicals' deployment of Cuvier.[142]

The local effect of Buckland's poem is unknown, but geology's cultural self-confidence continued to increase, apparently undeterred by the *Cain* controversy. In his inaugural lecture, Buckland had promised that geology would serve "a subordinate ministry" in the temple of the humanities; but by the mid-1820s he was lecturing on the evidential superiority of fossils over texts in reconstructing the past.[143] More and more occasional verses were written in which geologists were presented with a supernatural authority rivalling that of Old Testament prophets.[144] Conybeare penned an "Ode to a Professor's Hammer" in the late 1820s which celebrated recent fossil restorations in apocalyptic vein:

> Hail to the hammer of science profound! [. . .]
>
> Beneath the storm of its thundering blows
> Bending, and opening, and staggering, and reeling,
> Mountains reluctant their story disclose,
> The secret of millions of ages revealing.
>
> The fossil dead that so long have slept,
> And seen world after world into ruin swept
> Start at the sound
> Of its fearful rebound.[145]

Geology here presides over a secular Apocalypse, replacing the Last Trump with hammer-blows. The aggressive instrument of "science" forces nature to give up her most precious treasure, a "story" which contains "the secret of millions of ages". This is an image of supreme confidence in the power of science, echoing Cuvier's exhortation to "burst the limits of time" and dramatizing the boldest claim in Buckland's inaugural lecture: "it is surely gratifying to behold Science, compelling the primeval mountains of the Globe to unfold the hidden records of their origin".[146]

Such unashamed subversion of biblical language underlines the challenge posed by the new science to the old Creation-narrative. We have moved a long way from Sumner's cautious approval of Cuvier. Only a few years after Sumner's book came out, clerics like Buckland and Conybeare were revelling in the rhetoric of Enlightenment science, embodying Cuvier's "antiquary of a new order".[147] The hidden records were beginning to be deciphered, and the monuments restored. Of course, the image of the geologist as antiquary was far from being Cuvier's inven-

142. On Buckland's humour as an instrument of exclusion in another context see Sommer 2004, 66.

143. Here Buckland was reviving an older rhetoric: see Rappaport 1982, 27–31.

144. Sommer 2003, 197, 201.

145. Daubeny 1869, 78–9.

146. Cuvier 1813, 4; W. Buckland 1820, 5. Compare Cuvier's explicit allusion to the Last Trump and Ezekiel's valley of dry bones (Cuvier 1812, III, 3–4). On the persistence of this imagery in British geology see Shortland 1994, 39–40; Sommer 2003, 193–201.

147. Cuvier 1813, 1.

tion. Fossils had long been associated with antiquaries, and this label was bound to attach itself to anyone collecting old bones and inspecting ancient caves. This association is borne out in early-nineteenth-century journals and museums, where fossils jostled against Egyptian mummies for the public's attention. Images of "bringing to light" or "penetrating the darkness" of "a hoar antiquity" had been associated with the discovery of ancient monuments long before geologists began to use such language.

Consequently, when some of the geologists' bolder claims began to reach a wider public, they chimed in with pre-existing expectations that geologists should have stories to tell about the distant past. This narrative dimension was not the primary concern of most Geological Society members, but it dominated the science's constitution in the genteel and clerical setting of Oxford University, thanks partly to the peculiar institutional role geology was brought in to play there, and partly to Buckland's talent for showmanship. With the help of colleagues like Conybeare, Buckland became the pre-eminent British advocate of Cuvier's vision of geology. In this capacity he transformed the science's public profile and helped establish it as "a branch of the science of Archæology".[148] His eccentric sense of humour and vivid lecturing style played an important part in this strategy: the personality cult surrounding him spilled over into enthusiasm for the science, resulting in a melting-pot of self-confident rhetorics of display and authority. A decade later, the same techniques would be flourished before a wider public: under Buckland's guidance, Oxford would launch the BAAS's deliberate cultivation of spectacle.[149]

Buckland's identification of an antediluvian hyaena's den at Kirkdale was crucial to this process. Here Cuvier's hints at time travel ("bursting the limits of time") actually took pictorial form, resulting in the first-ever graphic restoration of a former geological era. When Humphry Davy celebrated Buckland's hyaena research in 1822 as the conquest of "a distinct epoch" in the "immensity of ages",[150] he was not merely indulging in hyperbole, but expressing a real sense of scientific breakthrough. The rest of antediluvian history remained a vast, chaotic *terra incognita* as well as a *terra incognitorum*, a savage land awaiting intellectual colonization. The old cartographic motto "Here be dragons" was to prove only too appropriate for the fossil researches Buckland's work now helped stimulate.

148. Francis 1839, 16. See also Torrens 1998.
149. Morrell and Thackray 1981, 158–9.
150. Davy 1827, 51.

3

Lizards and Literalists

The 1820s saw a marked rise not only in the number of geological investigations taking place, but also in the number of large English fossil vertebrates identified. Besides the ancient mammals of North America, Siberia, and the Paris Basin, an older, more alien world than that of the hyaenas was coming into focus. In the updated edition of his *Ossemens fossiles*, Georges Cuvier took his readers back "to another age of the world [. . .] when the only creatures which walked the earth were cold-blooded reptiles".[1] The evidence for what Gideon Mantell would soon christen the "Age of Reptiles" was drawn from the impressive array of recently collected English saurian fossils:[2] ichthyosaurs, plesiosaurs, and other marine reptiles from the West Country and Yorkshire; Iguanodon bones from Sussex; a Megalosaurus from Oxfordshire. With this fossil repertoire, the pictorial possibilities of deep time expanded. Fragments

1. Cuvier 1821–4, V part ii, 10: "à un autre âge du monde [. . .] où la terre n'étoit encore parcourue que par des reptiles à sang froid".
2. Mantell 1831.