Progressionism in the 1850s: Lyell, Owen, Mantell and the Elgin fossil reptile *Leptopleuron (Telerpeton)*

By MICHAEL J. BENTON

University Museum,
Parks Road,
Oxford OX1 3PW.

SUMMARY

The advanced fossil reptile *Leptopleuron (Telerpeton)*, collected in 1851 from supposedly Old Red Sandstone rocks near Elgin, northern Scotland, was regarded by Charles Lyell as good evidence for his anti-progressionist views. The specimen was sent to London to be described by Richard Owen, who published a brief account of it. Gideon Mantell then published a longer description of the same specimen, apparently at the request of its discoverer. The general opinion, then and now, has been that Owen acted badly, as he apparently did in other cases, because of his personal enmity towards both Lyell and Mantell. However, new evidence from previously unpublished archive materials shows that Lyell urged the ailing Mantell to produce a description at speed, in full knowledge that Owen was also doing so. *Leptopleuron* was almost the last piece of evidence that Lyell proposed as evidence against progressionism, and he was happy to accept its true Triassic age by 1860, by which time he was a progressionist and grudging evolutionist.

INTRODUCTION

The Elgin fossil reptile *Leptopleuron (Telerpeton)* has been recognised in recent works by M. Bartholomew (1976) and P. J. Bowler (1976) as important in the early 1850s to Sir Charles Lyell’s anti-progressionist stance. Long before the publication of Darwin’s *Origin*, many palaeontologists viewed the history of life as progressive, and recognised a general trend towards more and more complex forms through time — arising by a series of creations. Lyell opposed progressionism until the mid-1850s, and eagerly took *Leptopleuron*, an advanced reptile in apparently ancient rocks that had previously yielded only fish, as confirmation of his views. He sponsored Gideon Algernon Mantell (1790–1852) to describe the reptile, but Sir Richard Owen (1804–1892) published a brief description first and established his priority.

Owen is well known for his bitter disagreements with other scientists such as Darwin, Lyell, and Grant (Himmelfarb, 1962; Desmond, 1979) and, in his role as bogeyman of nineteenth century British palaeontology, he is assumed to have acted unscrupulously in this matter (Spokes, 1927). However, I suggest here that it was Lyell who moved fast to have Mantell describe the specimen to bolster his anti-progressionist position, and that Owen was, in fact, the victim. New evidence shows that the reptile was destined to be described by Owen, and that he examined it well before Mantell saw it.

In the present paper, I describe briefly the feud between Owen and Mantell, and analyse in more detail the sequence of events surrounding the description of the Elgin reptile from largely unpublished archive material. I attempt to assess the motives of the participants in terms of their personal interactions and in terms of their views of the history of life.

The archives of letters used in the following were obtained from the Alexander Turnbull Library, Wellington, New Zealand (Mantell archives, ATL), the British Museum (Natural
History), Palaeontology Library (Brickenden letters, BMNH), Imperial College, London (Huxley archives, IC), Yale University Library, New Haven, Conn. (Silliman archive, YU), Elgin Museum (Duff, Brickenden papers, EM), and Elgin Library (Elgin newspapers, EL).

**MANTELL AND OWEN: CONTROVERSIES 1845–1851**

Mantell spent his early years as a surgeon in Lewes, Sussex, collecting fossils from the South Downs, including some of the first found dinosaurs (*Iguanodon, Hylaeosaurus*). He moved to Brighton, and eventually to London in 1840 after his wife left him because of his morose nature and excessive attention to his museum. He continued his palaeontological researches, but suffered a spinal injury that gave him constant torment until his death in 1852 (Spokes, 1927; Morris, 1927). He recorded details of his unhappy life in a *Journal*.

Owen was also apprenticed as a Surgeon and acquired a taste for natural history as assistant to the conservator of the collections of the Royal College of Surgeons. He published a series of important papers on comparative anatomy and vertebrate palaeontology from 1830 onwards, and died in 1892 full of honours. Owen, unlike Mantell, was a friend of Royalty, active in scientific affairs of government, and brilliant. He was also described by his contemporaries as arrogant, and jealous of rivals, devious and "jesuitical" in scientific controversy. Mantell, honest and ambitious, yet unimaginative, could not deal with this treatment as effectively as the brash and confident T. H. Huxley did later.

The early disagreements between Owen and Mantell were of a minor nature and devoid of real acrimony. Mantell had identified some bones from Tilgate Forest as those of birds, while Owen ascribed them to a pterosaur—a flying reptile. Mantell commented that he "would gladly give up any point of science than hurt the feelings of any man". However, after Owen "made a most virulent attack" on Mantell for his views on belemnites, fossil cuttlefish, Mantell wrote, "after this I can never put confidence in the apparent civility of Prof. Owen, and I must, to my great regret, keep aloof from him". Mantell repeated this opinion after Owen criticised his views on a new jaw of the dinosaur *Iguanodon* found in early 1848.

Mantell recorded that Owen then tried to prevent his receiving the Royal Medal of the Geological Society of London in 1849. They clashed again in 1850 over specimens that each had received of the feet of moas, large extinct flightless birds from New Zealand. Each claimed the best specimen. Owen committed his first apparently unethical act towards Mantell in late 1850. He requested permission to reproduce some plates of fossil reptiles that had been published in the *Philosophical Transactions of the Royal Society*, to which the Council readily agreed. Mantell then complained that the plates were all his, and Owen then retracted his request in some embarrassment. Next year, Mantell tried to oppose a government grant to Owen for publication, but failed. Finally, Owen criticised some of Mantell's work in a monograph on Cretaceous reptiles, and Mantell again failed to obtain redress from the publishers for what he considered offensive remarks. Thus, it is clear that Mantell and Owen were at loggerheads well before the *Telerpeton* affair arose, and this must have affected their actions—in particular, their complete lack of contact or cooperation over this single specimen.

**LEPTOLEURON (TELERPETON): LYELL'S "CONFOUNDED FROG"**

The last in the series of confrontations between Mantell and Owen is the most intriguing. In early 1852 Mantell published an illustrated paper on a small fossil reptile that he called
Figure 1. "Telerpeton elginense". Copy of Mantell's original (1852) figure of the type specimen (Royal Scottish Museum, 1891.92.528, 528a), described a few months earlier by Owen as *Leptopleuron lacertinum*. Figs 1, 1a, 2, 3 show teeth and jaws and Fig. 4 shows the remains of a cranium. Fig. 5 is a restoration of the skeleton preserved in two counterpart blocks (Figs 8, 9). Fig. 6 shows a dorsal vertebra, with a comparable view of a salamander vertebra, in support of Mantell's interpretation of *Telerpeton* as a fossil salamander.
Telerpeton elginense (Figure 1) from supposedly Old Red Sandstone (Devonian) rocks of Elgin, north-east Scotland. As the oldest known tetrapod it was regarded as a very important discovery. However, Owen had independently published a description of the same animal, calling it Leptopleuron lacertinum, only a few weeks earlier. The story of this whole remarkable episode is well documented in largely unpublished archive material, and deserves to be told in some detail because the new evidence suggests that the generally accepted view of Owen as villain, and Mantell as victim, is not really the case.

In July 1850 Captain Lambart Brickenden, who had collected dinosaur bones for Mantell in the South of England, wrote to Mantell that he had obtained a slab containing footprints from supposed Old Red Sandstone beds of the Elgin area. He realised that this was either indirect evidence of the oldest tetrapod, or that the rocks were not Old Red in age.

While Brickenden was preparing a paper on his footprints, even more convincing evidence of an early Elgin tetrapod was obtained in October 1851 in the form of a small reptile skeleton from Spynie quarry (Figure 2) by Mr. Patrick Duff, Elgin Town Clerk and brother-in-law of Brickenden. Brickenden endeavoured to obtain it for Mantell to describe. Sir Charles Lyell was informed of the discovery early by Mantell, and took great interest in it. He asked Mantell to describe it and provide him with information for a footnote to a new edition of his Manual of elementary geology, for which he delayed publication. At his instigation, Mantell sought to determine the true age of the Elgin sandstones. Brickenden was certain now that the sandstones were truly Old Red, and stated that the specimen had now been sent to London by Patrick Duff to his brother, Dr George Duff. Lyell was first to examine the reptile on 1 December 1851, and renewed his request to Brickenden to confirm that the reptile was really Old Red in age. Two days later, Lyell had drawings made for his book, and reported that Owen had seen the specimen and corresponded with Patrick Duff. Lyell also settled on the name Mantell was to use for the beast — Telerpeton elginense — “very euphonious indeed”. By 5 December Lyell was having engravings made, and confirmed that Mantell was shortly to lay a description of Telerpeton before the Geological Society. He discovered that Dr Duff was going to send the reptile to Owen for further study, and urged Mantell to examine it.

Mantell finally obtained the specimen, and planned a joint paper with Brickenden on the footprints and Telerpeton. Mantell stressed the importance of the animal, and his interpretation of it as a “batrachian” (i.e. amphibian), largely because he ascribed to it certain so-called “frogs eggs” from the Old Red of Forfarshire. He prepared a description of Telerpeton and had drawings made.

Mantell’s and Brickenden’s papers were scheduled to be read on Wednesday, 17 December, and Mantell took them and the specimen along to the meeting of the Geological Society. However, their papers were postponed because of lengthy discussion on an earlier contribution. In the Literary Gazette of Saturday, 20 December, Owen published a brief unillustrated account of the reptile (dated 15 December, naming it Leptopleuron lacertinum, and interpreting it as a lizard (Owen, 1851). He stated that “it would seem, however, that Mr. Duff’s lacertian is not the only evidence of reptilian remains in the ‘old red’, for I see in your notice for the Geological on Wednesday, a description of a ‘Batrachian Reptile’ by Capt. Brickenden and Dr. Mantell”. Owen must have known that Lyell and Mantell had examined Duff’s specimen, and this comment seems rather facetious. Mantell complained bitterly, and unfairly, that Owen had merely described the specimen from his recollection of Mantell’s drawings that he had seen three days before at the Geological Society. Mantell immediately contacted Patrick Duff to find if Owen had, in fact, been
asked to describe the specimen, as he claimed, and Duff replied in some embarrassment that Owen had been sent the Elgin Courant notice and some drawings before Brickenden saw the specimen in mid-November, and long before Mantell knew of the find.28
Brickenden’s and Mantell’s papers were read to the Geological Society on Wednesday, 7 January 1852, and Mantell sent lengthy abstracts and Lyell’s woodcuts of the Elgin fossils to his friend Benjamin Silliman, editor of the *American Journal of Science* and prepared his paper and plates for publication in April.

THE ATTITUDES OF MANTELL AND OWEN

In this controversy, both Mantell and Owen considered that they had been wronged. Spokes (1927:206) contrasts well the reactions of Mantell and Owen to their disagreements: after Owen’s violent attack on Mantell’s belemnite paper, Mantell went home “to my desolate hearth, suffering in mind and body, and felt how vain are all earthly pursuits, even that of truth and knowledge”. On the other hand, Owen immediately forgot the episode and “stayed up very late” enjoying the latest number of Dickens’s *Domby and Son*.

Owen was heartily disliked by many people for his equivocal approach to controversy. With regard to his behavior after publication of Darwin’s *Origin*, Gertrude Himmelfarb (1962:278) characterised Owen’s attitude as follows: “either history would prove his enemies wrong, or, if right, Owen could claim priority”. Huxley, Owen’s most consistent, and at times equally devious, opponent, wrote in 1851: “It is astonishing with what an intense feeling of hatred Owen is regarded by the majority of his contemporaries, with Mantell as arch-hater” and on Owen’s death, Huxley wrote in 1892 that he had “many excellent and great qualities and one fatal defect — utter untrustworthiness”.

However, in assessing the events of this period, it is important to realise that much of the documentation comes from Mantell’s *Journal* and correspondence, while Owen’s side of the story is hardly recorded. Mantell wrote daily of his frustrations and poor treatment by other scientists, and often in a rather distorted and paranoiac fashion. After Owen had published his *Literary Gazette* paper, Mantell wrote to Silliman that “Owen, who had been *shown* the specimen, but had never had it in his possession and came to the meeting on the 17th, and saw my drawings &c . . . describing it (in of course a very vague manner) . . .”, while Mantell had been clearly informed several times that Owen had seen the specimen and given his interpretation of it before Mantell saw it. Likewise, Mantell complained later to Silliman regarding Lyell’s comments on *Telerpeton* in his *Manual*: “You will see that he has acknowledged my services in the most infinitesimal manner possible: you would little suppose . . . that all the trouble (sic) and expense of the investigation was by me . . . I cannot understand these things”. In the space of two octavo pages, Lyell had mentioned Mantell’s name six times in reference to his forthcoming descriptions, and quoted his views extensively.

Mantell considered Owen’s publication a deliberate, unethical attempt to forestall him. However, Owen had been asked initially by Duff to notice the specimen, and in early December Lyell was still not clear about who was to describe the specimen: “I must learn positively from Dr. Duff that you are to describe the beast before I publish *Telerpeton elginense* Mantell”. The speed with which the ailing Mantell prepared the description, and the hectic correspondence between Lyell, Mantell, and Brickenden, indicate that they were consciously racing to publish, partly because of the importance Lyell placed on the find, and partly because they must have known that Owen was also likely to describe it. Mantell considered that he had priority since his paper had been “published at the previous meeting Decr. 17th, the title having then been declared by the Chairman, to ensure its precedence over any other description of the fossil. This announcement was warmly
applauded and so all ended well".\textsuperscript{37} He later noted, in one of his textbooks (Mantell, 1858–798), apparently without rancour, that \textit{Telerpeton} was described “by Prof. Owen, in the “Literary Gazette”, contemporaneously with Dr. Mantell’s communication on the subject to the Geological Society”. Lyell wrote, in 1853, that “every one calls the reptile of Elgin the \textit{Telerpeton}”.\textsuperscript{38}

However, Owen was not so magnanimous. He probably resented the general condemnation of his action, and never wrote the full description in his \textit{History of British fossil reptiles} that he promised.\textsuperscript{39} The fact that Owen published in a rapid publication literary journal suggests a deliberate attempt to forestall Mantell. Connected with this was a curious incident in January 1852. The \textit{Literary Gazette} published an abstract of a lecture given by Lyell on 17 December 1851, stating that “Professor Owen had pronounced [the reptile] to be a lacertian”. Lyell complained that he had not stated this, and Mantell suggested that “the Literary Gazette . . . is under [Owen’s] control, & he suppresses or puts in what he chooses”,\textsuperscript{40} which seems a remarkable assumption.

After reproducing the 1851 paper in his textbook \textit{Palaeontology} (Owen, 1860), Owen stressed the difference in dates of publication – giving his own paper as “Dec. 15th, 1851” (the date it was written), two days before Mantell’s paper was announced at the Geological Society. He did not refer to the published version of Mantell’s paper, but merely to an advance announcement of its reading. He translated \textit{Telerpeton} as “last of reptiles”, whereas Mantell’s intention was that it meant “far-off reptile” or “ancient reptile”, and criticised Mantell’s interpretation of its nature as batrachian, and his interpretation of its age as Old Red. “The term \textit{Leptopleuron} has, however, the priority of publication: being also the result of a truer exposition of the nature and affinities of the fossil, and free from the signification of its appearance in time, it will be, probably, preferred” (Owen, 1860: 255–257). Time has, in fact, favoured Owen’s name, and his interpretations.

\textbf{THE AGE QUESTION OF THE ELGIN SANDSTONES AND PROGRESSIONISM IN THE 1850s}

The yellow sandstones north of Elgin were quarried for building stone during the late 18th and the 19th centuries. Nobody doubted that they were Devonian in age because they rested apparently conformably on definite Old Red Sandstones with fishes. When a series of large scales was discovered in 1844 at Lossiemouth, 10 km north of Elgin, they were named \textit{Stagonolepis} by Agassiz and classified as a ganoid fish typical of the Old Red.

Brickenden’s find of footprints raised doubts at first as to the true age of the beds,\textsuperscript{41} but re-examination did not produce any evidence for a separation from the Old Red. The great field geologist, Roderick Murchison, who had studied the geology of the Elgin area, declared the beds to be definitively Old Red,\textsuperscript{42} although in discussion of Mantell’s paper at the Geological Society, he suggested that they might belong to the later Oolite that occurred on the opposite coast.\textsuperscript{43}

Lyell was very cautious in accepting the Devonian age for the Elgin reptile beds. He questioned Brickenden and Mantell continuously in order to avoid any doubt,\textsuperscript{45} and stated in a footnote to his account of \textit{Telerpeton} in early 1852: “The generally received determination of the age of this rock is probably correct; but as there are no overlying coal-measures and no well-known Devonian fossils in the whitish stone of Elgin, and as I have not personally explored the geology of that district, I cannot speak as confidently as in regard to the age of the Montreal chelonian”.\textsuperscript{46} However, it is clear that Lyell wanted the reptile to be Devonian: “I feel sure it is a genuine product of the Old Red”.\textsuperscript{47}
Lyell was an anti-progressionist, opposing the schemes of Lamarck and Agassiz for fear, as Bartholomew has suggested, that they ultimately lead to transmutation. In place of the generally accepted progressionism, he offered a theory that stemmed from his uniformitarian views in the broad sense, as defined by Michael Ruse (1979: 40–42, 80–81), (specifically his ‘steady state’ view of the Universe by which he believed that species were created and became extinct regularly, and his ‘actualist’ view that no cause not acting today acted in the past). Thus, species could not progress, but merely be replaced by new creations, and any apparent progression through geological time was merely the result of inadequacies of the fossil record. Thus, advanced forms of life were absent from the oldest rocks because they had been metamorphosed and the fossils lost.

In his address to the Geological Society in 1851, Lyell defended anti-progressionism in detail, citing apparently advanced early plants, Jurassic mammals, and supposed evidence of a Cretaceous whale. Owen (1851a) strenuously attacked Lyell’s paper, pointing out absurdities in his statements, and attempted to discount the so-call anomalies in a progressive fossil record. This attack greatly surprised Lyell, and ranged him against Owen as a personal enemy.48

The 1852 edition of Lyell’s Manual contained a long series of added notes detailing examples of advanced forms found early in the record. He was delighted with Logan’s so-called tortoise footprints from the Lower Silurian of Canada, with the new Triassic mammal teeth from Germany, and with the Devonian Elgin reptile. In the frantic series of letters he wrote to Mantell in late November and early December 1851, Lyell gleefully enumerated these new discoveries, “which would make 10 Paleozoic (sic) or infra-permian reptiles in about 4 years!”;49 “I am also going to announce a mammifer in the trias of Germany”;50 “I am writing about a bone Logan is said to have found in the lowest Silurian with the Canadian tortoise”;51 “If therefore the Telerpeton be an undoubted batrachian we have the first of that order in a primary fossiliferous rock and no secondary one is yet known”.52

Lyell’s deep involvement with the Elgin reptile is also revealed in his letters to Mantell. He pointed out the significance of the age, supplied the name, had the first drawings made, and constantly questioned Mantell on questions of its anatomy, and possible connection with the Old Red “eggs” from Forfarshire. Mantell wrote: “Lyell is more interested in this discovery than even I am”.53 Lyell’s keen interest was also noted by Murchison, who wrote in late 1851: “I have just been seeing the confounded frog that leaped in the primeval Devonian days . . . And he is to wag his tail next meeting, to the infinite delight of Lyell, who is inebriate with joy, and who will have him out in a new edition before we can launch him in our own Journal . . .”.54

Lyell, however, did not abandon all caution, and questioned Mantell about Stagonolepis, pointing out the close resemblance between its scales and those of Mystriosaurus, a Triassic crocodile from Germany: “It would be so serious a blunder to confuse lias and Old Red”.55 After some initial doubt, Mantell was clear that Stagonolepis resembled the Old Red fish Glyptopomus most closely.56

Mantell was readily convinced of the Old Red age, probably because of his support of Lyell’s uniformitarianism and non-progressionist views, and because of the greater importance of a Devonian, rather than Triassic, reptile: “to me the evidence of the Devonian age of the reptile appears most conclusive”.57
Owen apparently changed his views with respect to progressionism from 1840 to 1860. In the early 1840s, he disliked the views of Lamarck and Robert Grant who proposed a steady advance through time to the perfection of man. He pointed out that Triassic amphibians are more advanced than living frogs and salamanders, and that his dinosaurs, “designed” in 1841 (Desmond, 1979), were mammal-like in many features, and much more advanced than today’s degenerate lizards and limbless snakes. However, Owen was not an anti-progressionist in the sense that Lyell was. P. J. Bowler (1976: 99–102) and M. J. S. Rudwick (1976: 207–214) have distinguished two facets in Owen’s view of natural history, developed during the 1840s. Firstly, he accepted Cuvier’s concept of adaptation and design manifest in the structure of an organism. All parts of an animal were intimately connected and had to remain in the same relation to each other or the organism became non-functional. This “comparative anatomy” approach supposedly allowed Cuvier and Owen to reconstruct whole animals from single bones — typified by Owen’s brilliant concept of large extinct flightless birds in New Zealand based on a single scrap of femur shown to him in 1839. Secondly, Owen developed the concept of “special homologies” within major groups of animals, based around central “archetypes”. Thus, he considered all vertebrates as variations on a theme because they share many features that are clearly equivalent, such as a five-fingered hand, or skull structure. But, as Bowler has shown, Owen’s “progressionism” of the early 1850s was not unidirectional as was that of Lamarck, Grant, or Agassiz. He believed that organisms diverged from their archetypal forms under the control of a “continuously operative secondary creative power”. Thus, he accepted development from the primitive to the specialised, but along diverse lines.

Thus, by 1850, Owen was ranged against Lyell in preferring a progressive fossil record. Although initially accepting the Old Red age of Leptopleuron because there seemed to be no evidence against it, he was quite clear in 1860 that “it is, most probably, of triassic age”. Likewise, in 1852, Owen strongly condemned the interpretation of Logan (accepted by Lyell) of his Lower Silurian “tortoise tracks”, and ascribed them to arthropods, thus effectively removing the other anomalous Lower Palaeozoic reptile.

T. H. Huxley received new remains of bones and scales of Stagonolepis in 1858 and 1859 which convinced him that it was an advanced crocodile or thecodontian. This, together with remains of a third Elgin reptile, Hyperodapedon, discovered in 1859, confirmed in his mind the Triassic age of the sandstones.

Lyell was quick to follow Huxley, despite his earlier views. After a visit to the Elgin area in 1859, and in view of the further finds of reptiles, Lyell wrote to Huxley: “When one reflects on the very numerous faults, the occasional change of dip at the faults, . . . the entire want of admixture of reptilian remains or footprints with a single Devonian fish-scale one wonders that the probability of the triassic origin of the reptile-bearing white sandstone was ever questioned”. He then pointed out mineralogical differences and differences in sedimentary features between the Old Red and Triassic sandstones, and concluded: “When I reflect on the shock given to my faith in Telerpeton being devonian in 1854 when I saw Wagner’s plates of Mystriosaurus & sent them to Hugh Miller I regret that I did not so far follow my instincts as to avoid committing myself in the Manual”.

This about-turn in Lyell’s views had been coming on gradually owing to his grudging reception of Darwinism and the inevitability that progressionism would become accepted. In a letter to Principal Dawson in Montreal, Lyell wrote in 1860: “I abandon the Old Red reptile, which will gratify the progressionists, some of whom still feel inclined to adhere to it. The Telerpeton I mean. If Darwin’s theory is ever established, it will be by the facts and
arguments of the progressionists such as Agassiz, whose development doctrines go three parts of the way, though they don’t seem to see it”.

Throughout the events of the 1850s and 1860s, Roderick Murchison’s views on the age of the Elgin beds are interesting. He was a strong supporter of progressionism (Bowler, 1976:75), but accepted an Old Red age in 1851 because of his earlier field work and the fish interpretation of Stagonolepis. It will be recalled that Murchison complained of Lyell’s jubilation over this “confounded frog”. In the second edition of his Siluria (1854), he argued tentuiously, that Leptopleuron was more primitive than definitely Carboniferous tetrapods (Bowler, 1976:97–98). Huxley’s evidence that Stagonolepis was a reptile did not sway Murchison in the face of what he considered overwhelming field evidence for an Old Red age, although he admitted that the discovery of Hyperodapedon “has... somewhat shaken the belief” (Murchison, 1859). However, when Huxley reported specimens of “Hyperodapedon” from Triassic strata of Warwickshire and India in 1867, Murchison wrote to him that he would accept a Triassic age for the Elgin beds. He recast parts of the new edition of Siluria (1867: 267) to incorporate this change, and discussed progressionism in more detail and more confidently: “to such fossil evidence as this the field geologist must bow”, and Lyell reported this change with some satisfaction.

It is interesting to note that the local naturalists in Elgin were still arguing for an Old Red age for the reptiles, even as late as the 1890s — no doubt they were loth to give up the world’s oldest advanced tetrapod fauna (Phillips, 1886; Gordon 1892).

Finally, Hugh Miller, the Scottish Free Church mason and geologist, was also an anomalous figure on the sidelines of the Leptopleuron controversy. Miller opposed the progressionist views of Lamarck and Chambers: his 1847 book, Footprints of the Creator; or, the Asterolepis of Stromness, was an extended critique of Chambers’s anonymous Vestiges of Creation (1844). Miller argued that the Old Red fish of the north of Scotland, that he knew so well, were very advanced in their armament, and the absence of armour in living fish indicates degeneration. (The progressionist Murchison regarded the armoured fish as intermediate between crustaceans and modern fish.) Nevertheless, Miller accepted a steady advancement of major forms through time, even if evolution within groups did not occur. He was quoted as authority on the Old Red nature of Stagonolepis in 1851, but stated in 1852 that the Old Red Sandstone “has furnished the remains of but one reptile (if, indeed, the lacertian of Spynie in reality belong to it)”. Later, in 1854, he compared Stagonolepis and Mystriosaurus, on receiving illustrations of the latter from Lyell; and since outliers of Lias and Oolite rest conformably on Old Red in the area, he suggested that “it seems at least as probable that it belongs to that secondary period of the world’s history during which reptiles were abundant, as to that middle Palaeozoic period during which ... reptiles were exceedingly rare”. However, in supplementary notes to his posthumous works, published in 1859, his wife, Lydia Miller, placed her husband strongly back in the Old Red camp, and quoted Murchison’s views triumphantly.

CONCLUSION
Owen actually took little part in the Elgin reptile affair. He described the specimen briefly as requested by its discoverer, but was unable to publish a full description as promised because of the outraged protests of his enemies. Mantell and others considered that Owen had acted badly, and Mantell took the role of the wounded party in this encounter. The Elgin reptile Leptopleuron (Telerpeton) was a perfect case of their rival interests centring
on a single object of research, since Duff had led both to believe that they were to describe the specimen. Owen proceeded, impelled by his ambition; Mantell proceeded, ambitious too, but also impelled to a large extent by Lyell, who viewed *Telerpeton* as an addition to the anti-progressionist edifice, and perhaps as a refutation to his enemy Owen’s recently expressed views on progressionism.

At this time, Lyell must have felt his isolated anti-progressionist position keenly, and the establishment of the advanced nature and great geological age of *Leptopleuron* was important to him as virtually the only form of argument he could level against Murchison, Agassiz, Grant, Chambers, and others. However, their views of the regular succession of Palaeozoic fish, Mesozoic reptiles, Tertiary mammals were extremely flexible, and Lyell’s points were readily answered by a partial new member of the progressionist camp, Owen.

Neither Owen nor Hugh Miller was particularly concerned about the age, because of their mixed views of undirectional development of forms, with the progressive creation of major groups through time. In other words, to Owen *Leptopleuron* was an interesting find from an anatomical point of view, but it was in no way basic to his philosophies of biology and palaeontology as it was to Lyell, and his disciple Mantell. Murchison, long a well-known progressionist, relied heavily on field geology and could not find evidence there for the decision he so much wanted — that the Elgin reptiles were Triassic.

ACKNOWLEDGEMENTS
I thank the staff of the various archive libraries for their assistance in supplying copies of letters in their care, and I thank Adrian J. Desmond for helpful comments and advice on early drafts of this paper.

NOTES AND REFERENCES


5 Spokes (1927: 205–206) quotes a letter from Mantell to Silliman describing Owen’s unfair attack.


9 *Ibid.*, pp. 260–2 (Oct.–Nov. 1850). MS and printed copies of Mantell’s and Owen’s applications to the Council of the Royal Society are contained in ATL MS 83, file 85. Owen claimed to have described a specimen of an *Iguanodon* jaw in his 1841 Report on British Fossil Reptiles, and Mantell determined from its discoverer, Capt. Lambart Brickenden, that it had been collected in 1848 (Spokes, 1927: 226–227; BMNH letters 26, 30, 31; ATL MS 83, file 16; Nov., Dec. 1850).


12 Letter, Brickenden to Mantell, 4 July, 1850 (ATL MS 83, file 16).


Letters, Brickenden to Mantell, 22, 27 Nov., 1851 (ATL MS 83, file 16); Mantell to Brickenden, 25 Nov., 1851 (BMNH letter 42).

Mantell Journal, 26 Nov., 1851. Mantell showed Lyell drawings of the footprints and of the reptile that he had received from Brickenden.

Letters, Lyell to Mantell, 27, 28, 29 Nov., 1851 (ATL MS 83, file 66).

Letters, Mantell to Brickenden, 29 Nov., 1 Dec., 1851 (BMNH letter 41, 38).

Letters, Brickenden to Mantell, 1, 6 Dec., 1851 (ATL MS 83, file 16).

Letter, Lyell to Brickenden, 1 Dec., 1851 (BMNH letter 10); see also letter, G. Duff to Mantell, 2 Dec., 1851 (ATL MS 83, file 36).

Letters Lyell to Mantell, 3 Dec., 1851 (ATL MS 83, file 66); Brickenden to Mantell, 10 Dec., 1851 (ATL MS 83, file 16).

Letters, Lyell to Mantell, 4 Dec., 1851 (2 letters) (ATL MS 83, file 66).

Letters, Lyell to Mantell, 5, 9 Dec., 1851 (ATL MS 83, file 66).

Letter, Lyell to Mantell, 5 Dec., 1851 (ATL MS 83, file 66) (dated "5th Mondy" – probably Friday the 5th and not Monday the 8th, as Mantell wrote on the 7th that he had seen the specimen).

Letters, Mantell to Brickenden, 7, 8 Dec., 1851 (BMNH letters 35, 28); Brickenden to Mantell, 10 Dec., 1851 (ATL MS 83, file 16).

Copies of pen and wash drawings by J. Lee for engraving (ATL MS 83, file 57); Letter, Mantell to Brickenden, 12 Dec., 1851 (BMNH letter 37); Mantell, Journal, 8, 11–12 Dec., 1851.


Letters, Mantell to Duff (copy), 21 Dec., 1851; Duff to Mantell, 24 Dec., 1851 (ATL MS 83, file 100, 36): “Dr. D. wrote me on the 2d instant that you, Sir C. Lyell, and Prof. Owen, were seeking to have possession of it and that I must decide who was to have the priority. I immediately wrote him that if he had not promised it to Professor Owen that you should have the first turn of it, in order that you might describe it in Capt. Brickenden’s paper and I understand that you got possession of it accordingly. Please excuse me from entering further in the subject of your difference with Professor Owen . . .” Duff was apparently on good terms with Owen, and sent him some further specimens of bone from Elgin in 1852 (letters of 29 Dec., 1851; 17, 27 Jan. 1852 (BMNH letters 208–211 in vol. 10 of R. Owen correspondence); Brickenden to Mantell, 18 Jan., 1852 (ATL MS 83, file 16).

Letter, Mantell to Brickenden, 8 Jan., 1852 (BMNH letter 39).

Letter, Mantell to Silliman, 13 Jan., 1852 (YU); Anon. (1852): letter, Mantell to Brickenden, c. 28 Jan., 1852 (BMNH letter 40); Mantell (1852). Mantell dated his paper “November, 1851” and stated in his Journal (27 Jan., 1852) that it was sent to the Geological Society on 3 Dec. However, Mantell first saw the specimen on 7 or 8 Dec. and wrote the first version of the paper only after that. It was Brickenden’s paper on footprints that Mantell submitted on 3 Dec. (Mantell, Journal, 3 Dec., 1851).


Letter, Mantell to Silliman, 13 Jan., 1852 (YU).

Letters, Lyell to Mantell, 3, 5 Jan., 1852 (ATL MS 83, file 66); Brickenden to Mantell, 10, c. 25 Dec., 1851 (ATL MS. 83, file 16).

Letter, Mantell to Silliman, 21 Jan., 1852 (YU).

Letter, Lyell to Mantell, 6 Dec., 1851 (dated 'Dec. 5, 1851, Saturday morning', thus must be the 6th) (ATL MS 83, file 66).

Mantell, Journal, 7 Jan., 1852. Mantell also wrote, in a letter to Lyell (27 Dec., 1851, ATL MS 83, file 101): “The German naturalists term all new generic and specific descriptions without figures, still-born: the offspring of the illicit intercourse of the Professor with the Devonian reptile, is therefore nil, – and cannot disturb the claims of my legitimate offspring!”.

Letter, Lyell to Brickenden, 20 Apr., 1853 (BMNH letter 13).

Owen evidently had drawings of Leptopleuron made (Mantell to Brickenden, 8 April, 1852 (BMNH letter 36): “twice natural size, to put ours in the shade!”); 4 coloured drawings of Leptopleuron by J. Dinkel in R. Owen collection, folio 168 (BMNH).
PROGRESSIONISM IN THE 1850s

40 Literary Gazette, 27 Dec., 1851; 10, 24 Jan., (1852); Letters, Lyell to Mantell, 5 Jan., 1852 (ATL MS. 83 file 65), Mantell to Brickenden, 8 Jan., 1852 (BMNH letter 39); Mantell to Silliman, 13 Jan., 1852 (YU); Spokes (1927, pp. 237–239).


42 Letters, Mantell to Lyell, 25 Dec., 1851 (ATL MS 83, file 101);
43 Murchison to Sedgwick, late Dec., 1851, quoted in Geikie (1875, 2: 120).
44 Letter, Mantell to Brickenden, 8 Jan., 1852 (BMNH letter 39).
45 Letters, Lyell to Mantell, 27, 29 Nov., 1851 (ATL MS 83, file 66); Lyell to Brickenden, 1, 24 Dec., 1851 (BMNH letters 10, 12).
47 Letter, Lyell to Mantell, 29 Nov., 1851 (ATL MS 83, file 66).
48 Mantell wrote (Journal, p. 275, 19 Oct., 1851): [Lyell] “will now understand the real character of Owen!”, and (Journal, p. 276, 26 Oct., 1851): “Lyell is not accustomed as I am to unjust attacks and misrepresentations!”.
49 Letter, Lyell to Mantell, 27 Nov., 1851 (ATL MS 83, file 66).
50 Letter, Lyell to Brickenden, 1 Dec., 1851 (BMNH letter 10).
51 Letter, Lyell to Mantell, 4 Dec., 1851 (ATL MS 83, file 66).
52 Letter, Lyell to Mantell, 9 Dec., 1851 (ATL MS 83, file 66).
53 Letter, Mantell to Brickenden, 7 Dec., 1851 (BMNH letter 35).
54 Letter, Murchison to Sedgwick (date?: between 17 Dec., 1851 and 7 Jan., 1852), quoted in Geikie (1875, 2: 120).
56 Letters, Mantell to Lyell, 25 Dec., 1851, 5, 9 Jan, 3 Jun., 1852 (ATL MS 83, file 101); Mantell, Journal, 5 Jan., 1852; W. C. Williamson of Manchester, confirmed Mantell’s view (Letters, Williamson to Mantell, 8 Jan, 9 Jun., 1852 ATL MS, file 97).
57 Letter, Mantell to Lyell, 29 Dec., 1851 (ATL MS 83, file 101).
58 Owen (1858: 130; 1860a: 257; 1860b: 162, 163), Osipovat (1976).
59 Huxley (1859); Letter, Huxley to Lyell, 10 Oct., 1859 (IC Huxley Papers, 30: 33).
60 Letter, Lyell to Huxley, 1 Oct., 1859 (IC Huxley Papers, 6: 27–30).
64 Miller, H., 1857 Geological evidences in favour of revealed religion (read 7 Jan., 1852 to Royal Physical Society of Edinburgh), published as appendix to The Old Red Sandstone (Constable Edinburgh, 7th ed.).

REFERENCES


DEAN, D. R., 1979 The Gideon Mantell Collection, New Zealand. *Journal of the Society for the

DESMOND, A. J., 1979 Designing the dinosaur: Richard Owen’s response to Robert Edmond Grant. *Isis*
70: 224–234.


GORDON, G., 1892 The reptiliferous sandstones of Elgin. *Transactions of the geological Society of


HUXLEY, T. H., 1859. On the *Stagonolepis robertsoni*; and on the recently discovered footmarks in the

LYELL, C., 1851 Anniversary address of the president. *Quarterly Journal of the geological Society of
London* 7: xxv-lxxvi.


MANTELL, G. A., 1852 Description of the *Telerpeton elginense*, a fossil reptile recently discovered in the
Old Red Sandstone of Moray; with observations on supposed fossil ova of batrachians in the Lower


MORRIS, A. D. 1972 Gideon Algernon Mantell LLD FRCS FRS (1790–1852) Surgeon and geologist:


MURCHISON, R. I., 1859 On the sandstones of Morayshire (Elgin &c.) containing reptilian remains; and
on their relations to the Old Red Sandstone of that country. *Quarterly Journal of the geological
Society of London* 15: 419–439.


OSPOVAT, D., 1976 The influence of Karl Ernst von Baer’s Embryology, 1828–1859: a reappraisal in
light of Richard Owen’s and William B. Carpenter’s “Palaeontological application of von Baer’s Law”.


OWEN, R., 1851b Vertebrate air-breathing life in the Old Red Sandstone. *Literary Gazette* 1851: 900
(20 Dec., 1851).


British Association for the Advancement of Science* 1859: 153–166.

PHILLIPS, J. G., 1886 The Elgin sandstones. *Report of the British Association for the Advancement of


Pp. 263.