

Alick D. Walker 1925–1999: an appreciation

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With the death of Alick Walker on 4 December 1999, Britain lost one of its most respected comparative anatomists, and one whose scientific contributions lay far beyond his relatively small number of publications. Alick Walker is best known for his work on Mesozoic fossil reptiles, particularly the basal archosaurs from the Triassic rocks of Elgin in north-east Scotland, and for his later work on crocodylomorphs. His research was characterized by highly detailed anatomical documentation and comparative interpretation. Using casting techniques that he developed, exhaustive reading of old and current literature, and a belief in the importance of a knowledge of living forms, he demonstrated the quality and quantity of information that could be extracted from Mesozoic reptile fossils.

Alick Walker was born on 26 October 1925 at Skirpenbeck, just east of York. His father was an Anglican priest, and he spent his childhood at various places in Yorkshire, as his father moved parishes. This upbringing gave Alick his strong Christian faith, which was an important part of his life. He attended Pocklington School as a day boy, from 1936 to 1943. He began a degree course in engineering at Cambridge, but found it uncongenial, and dropped out in 1944 after barely passing his first year exams. After that, with the Second World War just ended, he had to do National Service, and was trained as a radio engineer in the Fleet Air Arm, and then enrolled as an Ordinary Seaman in the Royal Navy in 1945, becoming a Leading Radio Electrician's Mate, before being demobilized in January 1948. Then he took up a university degree more to his liking, Geology at the University of Bristol. After taking a First-class degree in 1951, he decided to go into research. He was offered two PhD options, in Bristol working on Old Red Sandstone fishes, supervised by Professor Walter Frederick Whittard, then Head of Department, or an alternative in Newcastle working on the fossil reptiles of the Late Triassic of Elgin, supervised by Professor Stanley Westoll. He chose the latter, and



moved to Newcastle in 1951. He was appointed Lecturer in Geology in 1954, while working on his PhD.

Westoll had a long-standing interest in the Old Red Sandstone of the north of Scotland, and particularly

its fishes. While based at Aberdeen University, Westoll had explored the geology of north-east Scotland, and he had examined the Old Red Sandstone fossil fish sites around Elgin. At the same time, he looked at the Permo-Triassic sites close by. In 1948, he led a major field trip of the International Geological Congress, then meeting in London, around Scotland, and the assembled geologists visited Elgin for a day. Either then, or about that time, Westoll came upon some new specimens of fossil reptiles, including two fine skulls of the rhynchosaur *Hyperodapedon*, released by blasting of the sandstone at Spynie Quarry. The quarry had long since ceased full-scale operations for building stone, but it was (and is still) used as a source of fine yellow sandstone for facing.

The Elgin reptiles had been studied extensively since the 1840s by a number of distinguished Victorian palaeontologists – Louis Agassiz (who identified the first to be found, *Stagonolepis*, as a large fish), Richard Owen, Thomas Henry Huxley, Edwin Tulley Newton – and then in the first decades of the twentieth century by Friedrich von Huene. However, nothing had been published since 1920, largely because quarrying had ceased and no new specimens were being found. However, his interest aroused, Westoll sought a student to begin work on the Elgin reptiles again. Alick Walker went to Newcastle knowing that he would be pretty much on his own, and he began work. Soon after, however, in 1956 Alec Panchen was appointed to a position in the Zoology Department, and so began the long and distinguished ‘Newcastle school’ of vertebrate palaeontology, now sadly ended. Walker and Panchen marked their association with a joint paper about the British Coal Measure tetrapod sites, published in 1960.

The bony remains of the Elgin reptile fossils were poor – soft mushy white fragments of bone in many cases, sometimes merely hollows in the rock. The earlier work had been done on the exposed bone, but preparators caused more damage than good when they set to work in the traditional way. The natural moulds of the bones in the quartz cemented fine sandstone were, however, superb. Newton had used plaster to make casts, and von Huene had used gutta percha. Alick Walker devised a new casting method and used it to extract much additional anatomical information from the specimens. He settled on PVC because it could be poured into the moulds as a liquid, and cured to a tough but flexible condition. Sometimes, with a particularly tricky specimen, Alick Walker spent several days or weeks making a cast. He had to clean out all traces of bone and iron oxide minerals, either mechanically or with acid. He then cemented together dozens of rock fragments to reconstruct the entire block, filled holes and gaps with plasticene, poured in the PVC, put it in an oven for several hours to cure,

and then began painstakingly pulling it out. These casts proved to be of great use to himself and other researchers, but he later became concerned when a few of his PVC casts, many now in the National Museum of Scotland (= Royal Scottish Museum) in Edinburgh and in the Natural History Museum, London, began to degrade slowly, with the surface becoming sticky.

Alick Walker’s PhD concentrated on the aetosaur *Stagonolepis*, and it was completed in August 1957. The thesis was published, almost in its entirety, in the *Philosophical Transactions of the Royal Society, Series B* in 1961. Three years later, his monograph on *Ornithosuchus* appeared in the same organ. The *Ornithosuchus* monograph also included an important account of Jurassic theropods, including *Eustreptospondylus*. Both monographs established Alick Walker’s name. These papers were a dramatic revelation of how much could be achieved, and they set new standards in the detailed anatomical analysis of apparently scrappy fossils.

By 1965, Alick Walker had re-examined virtually all the Elgin reptiles, but did not publish much more on the subject, beyond an account of the dating of the lower reptile-bearing sandstones, in 1973. However, he had compiled extensive anatomical notes on all the Elgin reptiles, and some of this work, on the small archosaur *Erpetosuchus*, is extended and presented here (Benton & Walker, 2002). Alick Walker made an annual trek to Elgin, and lived in a caravan with his wife Dorothy, and children Mark, Paul and Helen. He was able to use these visits to examine the collections in Elgin Museum (and he helped the Museum to modernize its displays). He would also potter about in the quarries, taking notes and measurements, and always hoping to find more specimens. He did uncover two or three minor specimens over the years, and located footprints in a new locality.

In the mid 1960s, Alick Walker extended his interests to the Middle Triassic reptiles of the English Midlands, and he published an account of these in 1969, focusing on the stratigraphic implications, an important topic at that time, because intense work was underway to bring sense to the complexities of the British Triassic. He contributed to those debates, and his work was useful in straightening out some stratigraphic tangles. Not least was the absence of the classic Germanic Muschelkalk in Britain. This had long been assumed to mean that there was a major hiatus in sedimentation in the British Isles through the Mid Triassic. Alick Walker demonstrated that the rhynchosaurs and basal archosaurs from the Midlands and Devon were in fact of Mid Triassic age, and that, while the marine Muschelkalk was being deposited in Germany, broadly continental sedimentation continued apace in Britain.

By the late 1960s, Alick Walker had moved his attention to a broader issue, the origin of crocodylians and of birds. He studied all the Late Triassic and Early Jurassic crocodylomorphs, as well as the anomalous *Hallopus* from the Mid/Late Jurassic of North America. This he described in the *Philosophical Transactions* in 1970. His work entered a controversial phase following the publication of a paper in *Nature* in 1972, in which he argued for a close relationship between sphenosuchian crocodylomorphs and birds. That this hypothesis might be incorrect and based on convergent evolution was accepted in a 1985 paper following the Eichstätt conference on *Archaeopteryx* in 1984, but the similarities he documented between the otic region, in particular, of crocodylomorphs and birds had so impressed him that the possibility of a close relationship between these groups continued to influence his subsequent published and unpublished work.

An important attempt to survey and interpret the evolution of the pelvis of archosaurs and birds appeared in 1977. Alick Walker took a slightly early retirement in September 1983, his decision brought about by significant changes in the undergraduate syllabuses, a minor heart attack and quintuple coronary bypass (1979), and the illness of his eldest son Mark (who died in 1984 at the age of 30). He also looked upon retirement as an opportunity to finish his work on *Sphenosuchus* and the braincase of *Archaeopteryx*. He never seemed to regret his decision, although he often became downhearted and perhaps overly sensitive about others' views of his work. He set up a fully working home laboratory and surrounded himself with an impressive osteological collection of extant reptile and bird skulls, and reprints of relevant anatomical papers. Detailed considerations of neontological data gleaned from existing literature and his own observations (including dissections) continued to inform almost all of his anatomical interpretations. He carefully mechanically prepared Elgin fossil material and the holotype of the South African crocodylomorph *Sphenosuchus acutus*, meticulously keeping notes on each step with accompanying photographs, sketches and draft descriptions on what was revealed. The work on *Sphenosuchus* was eventually written up in a 1990 monograph that again displayed his mastery of the undervalued skill of anatomical description and interpretation.

Although no more senior authored papers appeared after his 1990 monograph, Alick Walker continued to write up descriptions and interpretations that were included in long letters to colleagues or kept on file in case future manuscripts could be completed. Until his death, he had been working towards writing up a reanalysis of the otic region of *Stagonolepis* based upon his ongoing preparatory work (published in this

volume – Gower & Walker, 2002). In these retirement years, he showed his continued support for all matters Elgin by attending the one-day conference there in April 1999.

Through his homologizing of anatomical structures, Alick Walker worked within some kind of phylogenetic framework, although this was not always clearly structured and was certainly less explicit than his anatomical ideas. Alick's hypotheses of homology were 'tested' much more through intensive application of similarity criteria and less by explicit use of overall congruence – in contrast to many recent studies. Available embryological data were often considered and, when dealing with fossil material, details of possible soft-tissue relations of preserved hard parts were also incorporated in the application of similarity tests. He never came to like the numerical phylogenetic methods of cladistic analysis. However, it could be argued that his objections were grounded less in a full understanding of the methods involved and more in his open discomfort with the rapid appearance in print of cladistic studies of the groups that he knew well – studies that he believed fell short of the required detail of anatomical study.

Alick Walker's failure to appreciate (and therefore to produce) explicit phylogenetic trees detracted from the clarity of his phylogenetic arguments, especially concerning his work on bird origins. This led others to dismiss him, quite unfairly, as being someone who only proposed an incorrect hypothesis of bird origins. However, his devotion to producing accurate and cautious descriptions and to communicating his reasoning for homologizing the structures he observed means that Alick Walker's anatomical work has stood the test of time, and will continue to do so. Whatever the fate of his phylogenetic statements, his publications contain a wealth of untainted primary morphological information that can be utilized by any number of present and future approaches. He rightly believed that this contrasted with one of the little-discussed aspects of modern numerical phylogenetic publications – that many of these papers report a wealth of new morphological observations and interpretations of homology, but represented purely as coded numbers in a matrix that can be checked and assessed by other scientists only if they observe the same material.

Alick Walker's approach also avoided a common error nowadays, where the possible homology of problematic structures is swept under the carpet by giving them a name or avoiding them altogether. Such structures were often discussed in detail in his papers and, in several cases, these discussions represented important steps towards an improved anatomical understanding. A prime example of how he tackled difficult anatomical issues head-on was his dogged persistence

in attempting to document and interpret the highly complex pneumatic sinuses in the skulls of many archosaurs – work that paved the way for, and directly influenced, recent advances in this field.

Alick Walker enjoyed research, but was less fond of writing it up for publication. In addition, his meticulous approach weighed against him in terms of numbers of scientific publications, and he looked upon the modern pressure on younger colleagues with sympathy and horror. Despite this, he was much more influential than a superficial examination of his publication record might suggest. A large amount of his anatomical work was never published but instead was contained in notes that were generously shared among many colleagues, several of whom have authored papers in this volume. His work on *Sphenosuchus* exemplified his struggle to write up work for publication. In letters to colleagues, he said that he felt somewhat burdened with the responsibility of documenting and interpreting such a supremely well-preserved specimen. However, he undertook this task and carried it to the limits, and as a result it took him many years.

In both the informal and official reviewing of the manuscripts of colleagues, Alick Walker was forthright but courteous. He was happy to accept ideas contrary to his own thinking, so long as they were argued in explicit detail. He consistently shied away from controversy, especially if it appeared to involve more than the cold debating of facts. He was particularly reticent about the fuss over the origin of birds that arose from his hypothesis of a crocodylomorph affinity and from the approximately contemporaneous resurrection and extension of the theropod-dinosaur affinity hypothesis. He was always taken aback at the fervour of such controversies, even when they did not concern his own work.

Alick Walker found it difficult to point out errors in the work of others. He told of his visit to Tübingen, Germany in 1954 and the embarrassment he experienced when telling Friedrich von Huene that the great German palaeontologist might have been mistaken in his interpretation of a particular element. He was much less reticent about correcting errors in his own work, to the extent that he continued to annotate even his oldest reprints before sending them off, and would type out and informally distribute new, improved interpretations.

In 1995, Alick Walker made his last incursion into the realm of *Archaeopteryx* and the origin of birds. Following a typically meticulous examination of the feather imprints of the available specimens of the Bavarian 'bird', he wrote an open letter reporting his findings and interpretations and sent it to various colleagues and experts. The main thrust of the letter was that the isolated feather comprising the holotype of *A.*

lithographica was indeed like that of modern birds in many respects but that it differed in observable structure from those of the remaining *Archaeopteryx* specimens that included skeletal elements. He concluded that these skeletal specimens were a different and only distantly related taxon to *A. lithographica*. This allowed him to reverse his 1985 decision to resign the crocodylomorph hypothesis of bird origins in favour of the increasingly orthodox theropod hypothesis. He was greatly dismayed and dejected by the flavour of the responses he received to this open letter, and he allowed this to feed into his occasional tendency to become inward-looking and disheartened about continuing his work – to the point that he backed away from completing this and other outstanding projects. He wrote (pers. comm. to D.J.G., 8 January 1996) 'I have got tied up again with "*Archaeopteryx*", rather against my will' and later (21 March, 1996), 'In fact I don't intend to get mixed up with *Archaeopteryx* any more from now on, or the question of the origin of birds. I would much prefer to avoid it altogether.' Only after much persuasion did he once again resume work on his preparation and study of the Elgin material of *Stagonolepis* early in 1999, a project he had earlier offered to abandon and hand over. Even here there were reminders of the bird-crocilian hypothesis. In a letter (to D.J.G., 29 March 1999) he wrote dryly of a certain braincase feature, 'The situation in *Stagonolepis* is surprisingly bird-like (sorry, but there it is)'.

Alick Walker was an intensely private and shy man. He almost never went to conferences, and he worked largely alone. In many ways, he was an individualist. He did not much enjoy public speaking, and lecturing was anathema to him. He largely avoided students and did not attempt to build a research group, but was immensely helpful to anyone who came to him with research questions, especially young aspirants. He supervised two PhD students, Bobbie Paton (formally Stanley Westoll's student; now at the National Museums of Scotland) and Mike Benton (now at the University of Bristol), but was hugely generous with his time and advice to many established and junior colleagues around the world. A chance or slight enquiry would be answered with a lengthy letter, often pages long, and supported with hand-drawn anatomical sketches, private notes and other information. His letters to colleagues commonly contained a mixture of greatly detailed anatomical discourse with helpful pointers to the older literature, and minor (usually scientific) reports of his latest, often recurring, medical affliction, be it erysipelas, angina, a slipped disc or inflamed tendons. Many students made the pilgrimage to Newcastle especially to discuss their work, and Alick and Dorothy Walker were always kind and welcoming hosts. The sudden illness and death of Dorothy

in the summer of 1999 was a terrible blow from which he never recovered.

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PUBLICATIONS

A complete list of publications by Alick D. Walker, arranged chronologically.

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