William Martin, 1767-1810, pioneer palaeontologist

Trevor D. Ford

Abstract. A biographical study of the early Derbyshire palaeontologist, William Martin, with a re-assessment of his published works.

One of the founders of British palaeontology, William Martin is best known for his illustrated book on the Carboniferous fossils of Derbyshire *Petrificata Derbiensia*, published in 1809. Brief biographies of William Martin have been written by Edwards (1931), Challinor (1947; 1948; 1970) and Stanley (1973) and there is an anonymous review of his life in the Monthly Magazine of 1811. A short note was included in the Dictionary of National Biography and a more substantial account has been compiled by H.S.Torrens for the forthcoming new edition. Otherwise Martin's contribution to geology has not received the prominence it should have attracted, and some of the general historians of geology, such as Geikie and Adams, totally ignored him.

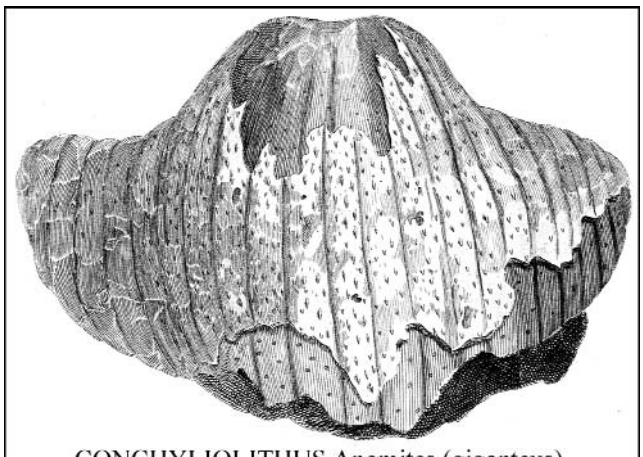
His personal history

William Martin was born in Mansfield, Nottinghamshire in 1767. He was the only son of Joseph Martin (died 1797) and Ann née Mallatratt (c.1746-1819). Joseph Martin was a hosier, but abandoned his wife and two-year old son and went to Ireland, where he adopted the name Booth and followed a career embracing actor, portrait painter and inventor. Later he moved to London and exhibited polygraphic paintings. He never saw his wife and son again and failed to support them in any way. He died in Vauxhall, London in 1797.

After being abandoned by her husband, William Martin's mother took up a career in acting and joined a group in Kibworth, Leicestershire, before going on tour. She supplemented her meagre income by putting young William on the stage from the age of five. He sang and even gave lectures in Buxton at the age of nine. While on tour he took up drawing and engraving as a pastime, and developed these talents to supplement their income further. Their tour encompassed Lancashire, Cheshire, Staffordshire, Derbyshire and Yorkshire. It was in the latter, at Halifax, that young Martin, then aged 12, was introduced to James Bolton who had a school at Stannary near Halifax. Bolton took Martin under his wing and taught him the arts of penmanship and drawing, particularly of birds. Bolton was an ardent naturalist and influenced young Martin's tastes in that direction. He lent Martin Da Costa's *Natural History of Fossils* (1757) (actually largely on mineralogy) so there must have been an element of geological education too. Bolton also taught him Latin.

At the age of 15, Martin joined Stanton's Company of actors in the Peak District of Derbyshire in 1782. He was an indifferent actor except in comedy roles (Anon, 1811). Much later his death notice in the *Gentleman's Magazine* described him as a comedian. Among his roles he played Trip in the School for Scandal. During his stage career, Martin visited local schools and taught drawing in his spare time. About 1785, Martin met the marble worker and naturalist White Watson (1760-1835) in Bakewell. Later Martin moved from full-time acting to teaching drawing and writing, firstly in Burton-upon-Trent from 1798, then in Chapel-en-le-Frith and Buxton from 1800, and from 1805 at the Kings School in Macclesfield. Martin bought a fourth share in the Buxton theatre and continued acting there in the summer season until 1809. During these moves he was accompanied by his wife, Mrs Mary Adams "an unfortunate but interesting young widow… and actress" whom he married in 1797 in Stoke-on-Trent. Mary Adams was widowed at the age of 19 and was taken into Mrs Martin senior's care as she could sing well, and presumably earned her keep on the stage. William and Mary Martin had six children, of whom the eldest, William Charles Linnaeus Martin (1798-1864), became a well-known writer on natural history and superintendent of the Zoological Society's museum 1830-8, with a long list of publications in the *Proceedings of the Zoological Society*.

William Martin died after a long illness with consumption in Macclesfield on 31st May 1810 at

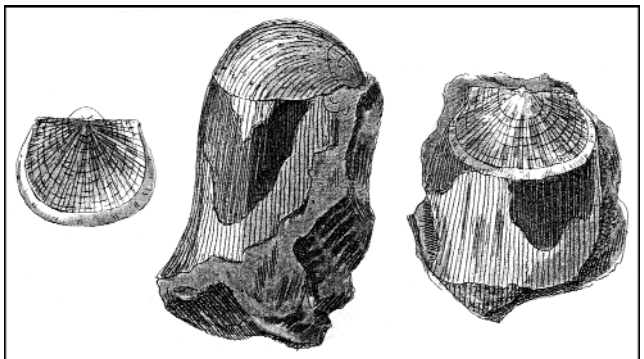


CONCHYLIOLITHUS Anomites (giganteus)
Gigantoproductus giganteus

the early age of 43. During his last year he lost his voice and could not sing or act. His illness may explain the large number of errata in the *Petrificata*. His wife helped in colouring some of the plates. He left his widow, six children and aged mother with very little financial means. Subscriptions were raised to help them but the outcome is not known. His widow tried to sell his uncompleted works and other papers, but neither the buyer nor the present whereabouts are known, if any survive. Martin's two posthumous papers were published two years later with editor's notes suggesting that they were among these unfinished works but what happened to the rest is unknown.

William Martin developed his liking for natural history and is said to have published his first scientific paper, on ants, in 1788 (Torrens, *pers comm*). Within a year or so, inspired by the geologist Abraham Mills (c.1750-1828), Martin started to study the fossils and minerals of the Peak District. He met A.B.Lambert (Vice President of the Linnean Society) while on tour, and the latter was so impressed with his drawings of birds and fossils that Martin was elected a member of that Society in 1796. On the title page of his book *Petrificata Derbiensia*, Martin described himself as being a Corresponding Member of the Manchester Literary & Philosophical Society and an Honorary Member of the Geological Society of London, to which he was elected in June 1809.

Martin's claim to fame lies chiefly in his *Petrificata Derbiensia*, subtitled "Figures and Descriptions of Petrifactions collected in Derbyshire". This project apparently arose out of a proposal by White Watson in 1790 whose Prospectus dated 6 May 1790 was for a three-volume Catalogue and Description of the Derbyshire Fossils then said to be "nearly prepared for the press". It is doubtful if Watson ever prepared anything, as no such matters are mentioned in the catalogue of his works compiled by E.R.Meeke (1996). Within a year an almost identical prospectus (undated but probably also 1790) was for an illustrated catalogue said to be under joint preparation by White Watson and William Martin. There is some doubt as to what fossils (the term then encompassed minerals as well) were actually supplied by Watson for Martin to draw and describe. There is no mention of this matter in Meeke's compilation, and his transcription of Watson's cash book (which only started in 1796) has only brief entries regarding a "List of Specimens sent by Watson to Martin on 17th Dec. 1800", and "rec'd from Martin two half notes May 14/23 1809". Apart from these Watson specimens, Martin evidently did some collecting on his own. Several of his *Petrificata* descriptions gave localities around Ashford-in-the-Water, which was very much home territory to White Watson. Whether the latter supplied the fossils or simply directed Martin to the localities is not known. From about 1800 Martin supplied fossils to James Sowerby (1757-1822) who noted them in his *Mineral Conchology* before they were passed to the British Museum (Natural History) collection (Muir-Wood, 1951; Stubblefield, 1951).


CONCHYLIOLITHUS Anomites (productus)
Productus productus

Figures with this paper are reduced versions of Martin's drawings from Petrificata Derbiensia, together with their later "official" names.

No portrait of Martin is known. He was described as "below the middle size, slender and of delicate appearance even in the best of health" (Anon, 1811).

Figures and Descriptions

In 1793 Martin alone issued another prospectus "Just Published in quarto – Number 1" of "*Figures and Descriptions of Petrifactions collected in Derbyshire .. to which are added a Systemtical List of the Minerals, which have been found constituting the Substance of Extraneous Fossils in that County and a brief Introduction to the Knowledge of Petrifactions in General*", printed for the author by Lyon & Atkinson in Wigan and sold by Benjamin and John White of Horace's Head, Fleet Street, London, W. Creech of Edinburgh, W. Lyon, bookseller of Wigan, and the author in Buxton. Although dated 1793, it did not appear until the following year.

Martin's 1793 prospectus noted that the "Figures and Descriptions … would be completed in fourteen numbers … with all convenient expedition". However only four subsequent numbers are known to have been issued from 1794 to 1796. No mention of Watson was made in these but the latter noted in the preface to his *Delineations of the Strata of Derbyshire* (1811) that many of the specimens were his (Watson's) but that the drawings were by "one who has departed and shall not be named", i.e. Martin, as stated in the 1790 prospectus. No written agreement between the two has been found. Challinor (1970) recorded that the five parts contained the first 29 of the 52 Plates in *Petrificata Derbiensia*, but with subtle differences.

As no correspondence between Watson and Martin survives, it is impossible to resolve what the working relationships were, but it seems likely that Martin "borrowed" at least some of Watson's specimens without giving him much credit.

Martin's Anomites

A paper on fossil Anomitae (a term roughly equivalent to brachiopods today) found in Derbyshire was read to the Linnean Society in 1796 and published in 1798. In it, Martin was largely concerned with the unusual Spiriferid now known as *Syringothyris cuspidata*. He had found a single specimen at Castleton – now lost (Muir-Wood, 1951). He gave a detailed description with comments on its mode of life. Comparisons were drawn with other Anomites though they were not named. From his sketches these can be identified as *Dielasma*, *Productus*, *Spirifer*, *Pugnax* and *Riphidomella*. Surprisingly, Martin included *Gryphea* in his comparative discussion and sketches: indeed he made little distinction between brachiopods and bivalve molluscs.

Outlines of an Attempt to Establish a Knowledge of Extraneous Fossils on Scientific Principles

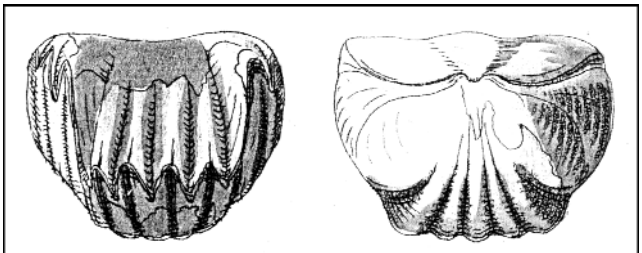
This book was published in April 1809 and was dedicated to A. B. Lambert, Vice President of the Linnean Society and Fellow of the Royal and Antiquarian Societies. It was printed by J. Wilson of Buxton and sold by the author in Buxton, and by J. White, Fleet Street, and Longman's & Co, London. The *Outlines* appeared three months before Martin's *Petrificata Derbiensia*. Though not well known it was reprinted by P.P.B.Minet and the Geological Society in 1972. According to Challinor (1970) and Stanley (1973) it was regarded as the first palaeontological textbook to appear in English.

Martin's preface (18 pages) opened with the statement that " The Study of Extraneous Fossils is …. useful to the Geologist – it enables him to distinguish the relative ages of the various strata". This is the basic William Smith principle which was being promulgated then, chiefly by Smith's disciple, John Farey (1811), though Smith's own work was not published until several years later (1816-7). Whether Martin arrived at the same conclusion independently is not known. Martin then stated the principles on which he distinguished Extraneous Fossils or Reliquia from minerals by their organic and organized form, the material (rock or soil) in which they are preserved being of lesser significance. He remarked on the lack of any previous treatise on extraneous fossils. He proposed to remove from nomenclature those names that gave no reference to their biological origin, though, of course, fossil names based on localities or persons became commonplace much later. Four pages of Addenda and Emendanda followed the preface.

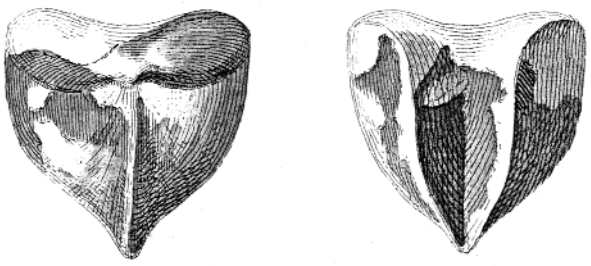
Martin was evidently well read, as footnotes refer briefly to the opinions of such writers as Werner, Hutton & Playfair, Gmelin, Hauy, Kirwan, Bergman, Cuvier and Jameson. His *Outlines* book was contemporary with James Parkinson's *Organic Remains* though it differed in approach. In Martin's view none of the above writers made a clear enough distinction between the substance (i.e. mineral composition) of a fossil and its organic form. Fossils were either "organized" (i.e. animal or vegetable - with organic structures) or "unorganized" (i.e. mineral). At that time "Native Fossils" meant minerals as they were "native" parts of the enclosing rock, and true fossils were "Extraneous". It is unknown how or where Martin had access to the continental works or whether he was proficient in foreign languages, though Bolton had taught him Latin, but he acknowledged assistance from Professor Hull in Manchester on matters of nomenclature. In his last years he also corresponded with Hull on health matters.

After Section I which is a brief definition of Animals, Vegetables and Fossils, Section II (35 pages) was concerned with general principles: Reliquia could be divided into Conservata wherein the original substance, wood, bone etc. was preserved, and Petrificata wherein the fossils took on some characteristics of the enclosing rock. He noted that Reliquia were not to be found in granites, schists, toadstones (basalts) etc and very rarely in mineral veins or in strata associated with salt or gypsum. Lengthy footnotes gave a summary of geological principles in general, former extent of the sea, deposition of sedimentary rocks, origin of mountains, etc. and including the Wernerian system of First, Second and Third periods. Various shrewd observations were included, such as "towards the middle of the (second) period mammalia and other land animals were created or greatly increased". This was a fore-runner of the sequence of life through time, with a hint of evolution thrown in.

Section III (142 pages) was by far the longest in the book. It covers matters of preservation (broadly covering what would be called taphonomy today), including impregnation, substitution and transmutation (replacement), and whether the fossils were intrinsic (with internal structures preserved) or extrinsic (with outward form only preserved). The Section then defined the various biological groups from mammals to insects and "worms" (this last term covered most invertebrates; molluscs, corals and other such groups were not separately defined) and the many groups of plants.



CONCHYLIOLITHUS Anomites (Pugnus)
Pugnax pugnus



CONCHYLIOLITHUS Anomites (acuminatus)
Pugnax acuminatus

He moved on to substances, relative ages, structure (of "soils"), materials (calcareous, argillaceous and arenaceous). There are long footnotes of miscellaneous observations relating to fossils, and glossaries of anatomical and other biological terms.

Section IV was very short with only one page that emphasized the importance of recording localities in detail, though Martin's own record of localities did not often follow this principle.

Sections V, VI and VII (40 pages) were on the closely related themes of Arrangement, Nomenclature and Delineation. Martin used a modified Linnean System of classification, Class, Order, Genus, Family, Species, adapted to treat fossils as separate from living species. Thus Class meant Reliquia, i.e. simply fossils; there were only two Orders - Animalia and Vegetalia. Genus was the main division, broadly equivalent to family today, whilst Family to Martin was a subdivision of Genus. Fossil names were distinguished by the addition of -lithus, thus Mammodolithus, Ornitholithus, Amphibiolithus, Ichthyolithus, Entomolithus (insects, trilobites), Helmintholithus (non-fabricated worms), Conchyliolithus (shells), Erismatolithus (fabricated worms, i.e. corals and bryozoans). Reptiles were included in Amphibolithus. Shells included brachiopods and molluscs, the latter embracing bivalves, univalves and cephalopods. Thus Martin's name in *Petrificata* "Conchyliolithus Anomites striatus", the well-known spiriferid brachiopod, signified genus, family and species. "Phytolithus" included all fossil plants. With reference to vertebrates, Martin debated the use of Permanent and Temporary names: whole skulls could be permanently named but separate teeth or bones were only temporary, until the whole fossil was found. Cumbersome and invalid as it may be to modern eyes, the *Outlines* appears to have been the first attempt at systematic nomenclature and classification of fossil organisms.

Part II of the Outlines was a list of "Genera" with very brief definitions in Latin. Many of the "genera" are recognizable today as families of molluscs and other organisms, e.g. Mytilitiae (mussels). Some of the terms used in the *Outlines* were criticized in the Antijacobin Review, presumably in the summer of 1809 (Anon, 1811).

Petrificata Derbiensia

William Martin's best known book, with its pseudo-latin title, was a collection of hand-coloured engravings of Carboniferous fossils from Derbyshire, dedicated to Sir Joseph Banks, and published in August 1809. It was printed by D. Lyon in Wigan and, while several sales outlets were noted, no publisher is cited; so effectively it was privately published by Martin in Macclesfield. However, bibliographies usually list Wigan as the place of publication.

Petrificata Derbiensia has 52 plates with no particular arrangement, either by stratigraphy or by biological group, though a key was included after the title pages. Two pages of errata were also bound in at the front, and Martin offered the excuse that these were due to difficulties in keeping in contact with the printers. Among the fossils illustrated are 18 plants, 13 brachiopods, 6 corals (including one bryozoan), a miscellany of molluscs, two trilobites, several crinoid stems and one of tufa encrusting a feline skull. Short diagnoses in Latin, usually only one or two lines, were followed by English descriptions amounting to one or two pages for each fossil. Somewhat more than half the fossils are from the Carboniferous Limestone and the rest from Millstone Grit or Coal Measures. The title page noted that it was Volume 1. An announcement for Volume 2 in 1809 declared "A considerable portion of the plates … will be appropriated to the illustration of specimens of such species of Reliquia as have not hitherto been figured or described by English authors". Regrettably, volume 2 was never published.

Localities were only given to the nearest town or village, e.g. Castleton or Chesterfield, though anyone who knows Derbyshire fossils well could probably place many of them more accurately.

Martin added a separately paginated (28 pages) Systematical Arrangement list wherein his fossils were cross-indexed to Plate numbers and listed by biological groups. However, his list reveals some confusion: both plano-spiral gastropods and goniatitic cephalopods appear on one plate. Crinoid stems were assigned to a group Helmintholithus without discussion of their echinoderm affinities, in spite of Whitehurst (1786) having compared modern and fossil crinoids in detail nearly 30 years before. Trilobites were considered to be some kind of insect and referred to the genus Entomolithus. Brachiopods were placed in a "family" *Anomites*. All plants were referred to a group Phytolithus. Corals were listed uner the name Erismatolithus (misprinted several times as Erismolithus), and further subdivided into Madrepores and a Millepore (the latter being a bryozoan).

It is Martin's system of nomenclature which has caused difficulties to later palaeontologists. It was a trinomial system in contrast to the Linnean binomials. He was aware of Linnaeus' method, as

Martin's "species"	Modern genus and species	New author
Conchyliolithus		
Anomites giganteus	*Gigantoproductus giganteus*	J Sowerby
" crassus	*Gigantoproductus crassus*	J Fleming
" aculeatus	*Krotovia? aculeatus*	J Sowerby
" punctatus	*Echinoconchus punctatus*	J Sowerby
" scabriculus	*Buxtonia scabricula*	J Sowerby
" acuminatus	*Pugnax acuminatus*	J Sowerby
" lineatus	*Phricodothyris lineatus*	J Sowerby
" triangularis	*Fusella triangularis*	J de C Sowerby
" acutus	*"Spirifer" acutus*	T Davidson
" rotundus	*? Brachythyris routndus*	?
" glaber	*Martinia glabra*	J Sowerby
" cuspidatus	*Syringothyris cuspidatus*	J Sowerby
" sacculus	*?Girtyella sacculus*	J de C Sowerby
Nautilites sphaericus	*Goniatites sphaericus*	J Sowerby
" listeri	*Gastricoeras listeri*	J Sowerby
" woodwardii	*Leveillia woodwardii*	J de C Sowerby
gastropod		
Erismatolithus (Madreporites) duplicatus	*Lonsdaleia duplicata*	M'Coy
" floriformis	*Lonsdaleia floriformis*	M'Coy

his eldest son had the middle name Linnaeus, but he seemingly thought that the Linnean system had to be modified to deal with fossils. Of the three names, the first is usually Conchyliolithus, which simply means "shell-stone". In the *Outlines*, as noted above, this first name is the genus, but this categorization was not discussed in the *Petrificata*. Martin's second name is what we would regard as the genus today but he regarded it as a family name. His third name (usually given in parentheses and sometimes with a capital initial) was the species name. If one ignores the first name, the second and third could have been made to fit the Linnean system but Muir-Wood and Stubblefield thought otherwise.

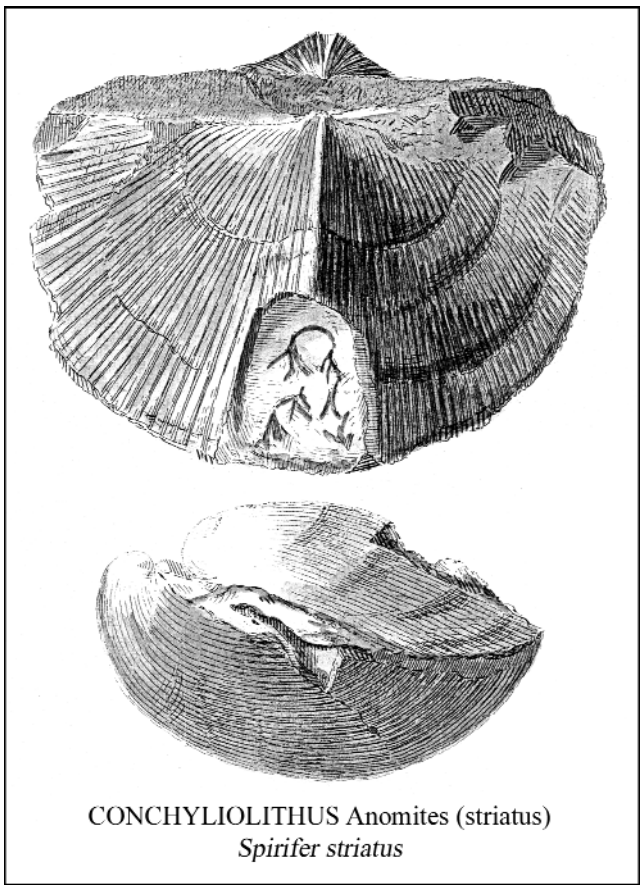
Validation of Martin's specific names

Martin's trinomial system of nomenclature soon came to be regarded as unnecessary and it was superceded by the Linnean binomial system from the Sowerbys onwards. However, both the Sowerbys and many subsequent writers used Martin's specific (=trivial) names which became common features of Carboniferous palaeontological literature, with Martin cited as the author of the species. In 1948, the International Commission on Zoological Nomenclature ruled that all Martin's names were invalid as they were trinomials. The Commission also ruled that the attachment of Martin as the species author was thereby invalid and the next subsequent author to describe the species should thenceforth be regarded as the true species author, in many cases Sowerby, but in a few Davidson and M'Coy (see also Anon, 1950). Muir-Wood (1951) and Stubblefield (1951) discussed the nomenclature, type specimens, synonymy and definition of the following common Carboniferous fossils, and made formal applications to the Commission for validation of the redesignated Martin specific names. Bivalves, gastropods, corals and plants received only passing comment by Muir-Wood and Stubblefield. Martin's trilobites were not mentioned. Martin's carbonicolid bivalves were noted by Wheelton Hind (1894-6) and his plants by Kidston (1923-5). The correlations tabulated above are mostly taken from Muir-Wood (1951) and Stubblefield (1951) to whom reference should be made for details of nomenclatorial changes. Among others, *Dictyoclostus* (*Productus*) *semireticulatus*, *Schizophoria resupinata* and *Pugnax pugnus* can be recognized from Martin's plates (see Davidson, 1857; Thomas, 1914; Muir-Wood, 1951).

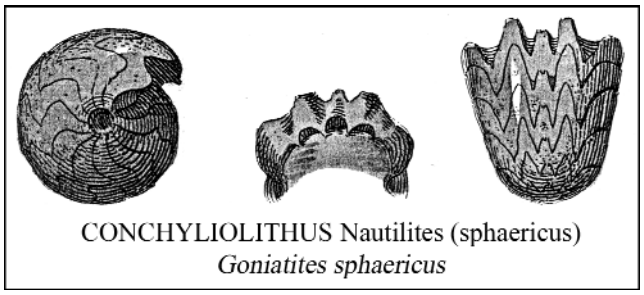
Later Martin was honoured by his name being used in other redefinitions – *Martinia* for a group of smooth-shelled spiriferid brachiopods (M'Coy, 1844) and *Lithostrotion martini* for a well-known Carboniferous coral (Milne-Edwards & Haime, 1851) (see Challinor, 1970).

Unpublished works

While no Martin manuscripts are known to survive, there are mentions of several items that could be of great interest if they could be found. The anonymous obituary of 1811 recorded that he had prepared a Zoological Table in 1789 in which he laid out a classification of the animal kingdom. Manuscript volumes were also drawn up about the same time and included Zoological Tables, and he



CONCHYLIOLITHUS Anomites (striatus)
Spirifer striatus



CONCHYLIOLITHUS Nautilites (sphaericus)
Goniatites sphaericus

intended to compile a Fauna Britannica on Linnean lines, in Latin with common English names added. Illustrated volumes on birds, fish and Derbyshire minerals were projected but never completed. His own introduction to the *Petrificata* claimed that volume 2 was in preparation but it never appeared. His obituary recorded that he kept up a regular correspondence with his teacher James Bolton, and that Bolton's daughter took the letters to America about 1809, but what happened to them thereafter is again unknown. A letter to Dr Hull in Manchester noted that he had prepared a paper "On the Origin of Pipe Veins in Derbyshire" about 1809 but no trace of this has been found.

Late in his life, Martin met John Farey and they conceived a joint project relating Martin's fossils to Farey's stratigraphic units, but this never came to fruition (Challinor, 1970). A letter to the Rev, James Cumming of Trinity College, Cambridge, (Anon, 1811) intimated Martin's intention of drawing the specimens in the Woodwardian Museum (now part of the Sedgwick Museum) but the authorities there decreed that the Woodwardian Professor was to write the text while Martin was to be paid £3 for each of the drawings. Another project was to draw and describe the fossils in the Leskean Museum in Dublin. His premature death prevented these projects being started.

Obituaries

The only full obituary traced is an account of Martin's life in the *Monthly Magazine* of 1811, anonymous but obviously by a close friend with information supplied by his widow. The *Gentleman's Magazine* (1810) contained only a brief death notice which described Martin as a botanist, painter and comedian! There was no mention of his work on fossils in the latter.

Conclusions

It is difficult to judge the influence of Martin's works on contemporaries, as none of his papers survive. Carboniferous palaeontology would have progressed whether or not Martin had compiled his *Outlines* and *Petrificata*, but his specific names have passed into palaeontological literature with suitable modifications. His drawing of attention to Derbyshire fossils doubtless spurred others on to more complete works later in the 19th century. Many of his specific names survive and other fossils have been named after him. His modification of Linnean systematic nomenclature did not survive and probably held things back. Martin is not known to have travelled widely, indeed he was so impecunious that he could not afford a horse, and his books make few references to fossils outside Derbyshire, so he is unlikely to have become a second William Smith (see Smith, 1816, 1817). Martin's early death at the age of 43 may have robbed us of more significant works to follow such as the catalogues of fossils in the Woodwardian and Leskean Museums and the joint project with Farey. Martin's collaborator in the 1790s, White Watson, lived for another 25 years after Martin's death and could possibly have continued his work but failed to do so.

Martin's Publications

1788. On ants. (whereabouts not traced).

1794 (dated 1793). *Figures and Descriptions of Petrifactions collected in Derbyshire*. Part 1. (four more parts followed – all five were revised and combined in *Petrificata Derbiensia*, 1809).

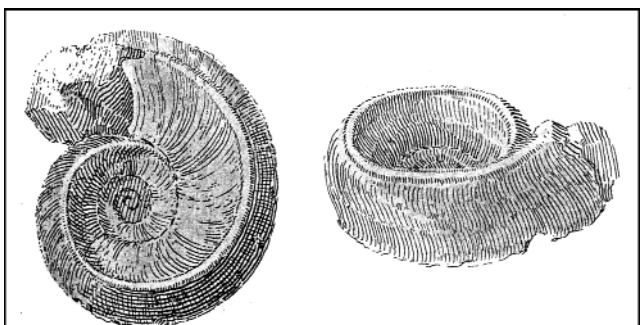
1798. An account of some species of Fossil Anomiae found in Derbyshire. *Transactions of the Linnean Society*, **4**, 44-50.

1809. *Outlines of an Attempt to Establish a Knowledge of Extraneous Fossils*. Macclesfield. 250 pp. (Reprint 1972 by the Geological Society of London & P.P.B.Minet, Chicheley, Bucks).

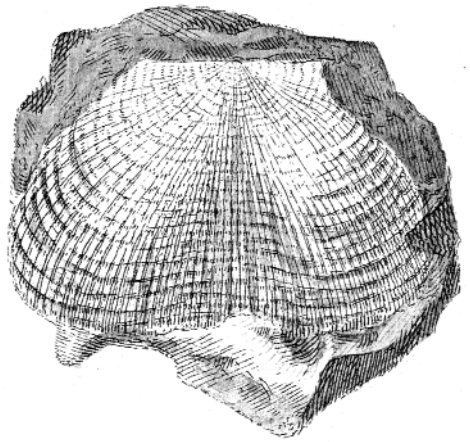
1809. *Petrificata Derbiensia*. 29pp & 52 Plates and explanations, to which is appended *A Systematical arrangement of the Petrifactions Described*. 28 pp separately numbered. Wigan.

1812. On the localities of certain Reliquia or extraneous fossils found in Derbyshire. *Philosophical Magazine* (*Tilloch's*), **39**, 81-85.

1813. Cursory remarks on the mineral substance called in Derbyshire – Rottenstone. *Memoirs of the Literary & Philosophical Society of Manchester*, Series 2, **2**, 313-327; and in *Journal of Natural Philosophy, Chemistry & the Arts*, Series 2, **36**, 46-56.



CONCHYLIOLITHUS Helicites (Catillus)
Straparollus sp



CONCHYLIOLITHUS Anomites (semireticularis)
Dictyoclostus (Productus) semireticularis

Acknowledgements

Thanks are due to Hugh Torrens for an advance copy of his revision of the Martin entry in the forthcoming new edition of the Dictionary of National Biography, and to Roy Paulson for his efforts in locating some of Martin's publications. The drawings that accompany this text are copies of Martin's originals.

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Trevor D. Ford,
Geology Department, University of Leicester, LE1 7RH