

## **Tiree's Pink Marble and the Geologists who made it Famous**

***An An Iodhlann* research paper<sup>1</sup>**

**William Welstead**

**15 November 2025**

Tiree is famous among mineralogists for a distinctive pink marble that seems to be found nowhere else. This paper reviews how this attractive rock became famous through the close investigations of five distinguished geologists between 1764 and the mid-twentieth century. Each of these men made important contributions to mineralogy, from the first beginnings of its study as an academic subject. Over the next two centuries the narratives around Tiree pink marble shifted as science advanced and the practices of museums and private collectors responded to external pressures. But this paper is not just about great men. Tiree pink marble has played a role in the development of scientific thinking since the birth of geology during the Scottish Enlightenment. Over that time, this distinctive rock has been assigned different meanings, as the science of mineralogy developed and as the potential economic value of the rock changed. While Alberti applied the concept of object biography to individual museum exhibits, this paper follows the biography of Tiree pink marble as a species.

After the paradigm shift in geology in the 1960s, with the formulation of the theory of plate tectonics, the pinkness of Tiree marble was overshadowed by other characters that could be measured to illuminate how and when regional metamorphism formed the Hebridean marbles. The aesthetic beauty of the rock, however, and the dramatic nature of its exposure on the cliffs at Balephetrish beach, justify its continuing cultural importance as part of Tiree's geoheritage. The aim of this paper is to inform the interpretation of the marble collection, mainly in the form of beach pebbles, in *An Iodhlann*/Tiree's Historical Centre and as a way to celebrate the island's geoheritage for both residents and visitors.

### **Rev. Dr. John Walker**

The Rev. John Walker is credited with the discovery of this marble in around 1764. Walker who was to make his name as a botanist and mineralogist, was also heavily involved in the improvement of agriculture during the Scottish Enlightenment. In 1764 he was despatched on a tour of the Scottish Highlands and Islands at the behest of Lord Kames, acting in his role of

---

<sup>1</sup> Images may be subject to copyright.

Commissioner to the Forfeited Annexed Estates (confiscated from rebels after 1715). Walker was to make six trips chronicling the state of agriculture and suggesting ways in which it could be



improved (Withers 1985:134). Along the way he amassed a huge collection of botanical and mineral specimens. He visited Tiree on his first trip. In his written report to the 4th Duke of Argyll, the proprietor of Tiree at the time, he made many suggestions for how agriculture could be improved. The significance of the inefficiencies that he identified and the impact of the resulting improvements urged onto the islanders by the estate, has been covered elsewhere (for example see Hunter 2018). He also searched for opportunities for employment away from agriculture. It is in that context that he came across the pink marble that is the focus of this paper.

Walker found white marble which had been quarried to burn for lime for use in mortar (Walker around 1764: 22). He advised the Duke that this would not serve for cutting as it was pitted by many small holes. He was more interested in another exposure of rock that seemed both distinctive and more valuable, but at this stage his identification of the rock was as porphyry rather than marble, but with the disclaimer that ‘there is a great Confusion among mineralists concerning Porphyry, nor has it been sufficiently distinguished from the Marbles, Granites, and Jaspers, which are the stones that approach nearest to it’ (22). In his discussion, he references Pliny the Elder<sup>2</sup> and gives a Linnaean Latin binomial name for the rock that he assumes to be nearest to it. In the eighteenth century it was still common practice to refer to classical scholars to identify a species (Healey 1981: 177). In his study of Walker’s contribution to mineralogy, Eddy stresses that ‘the immense influence of [Pliny’s] mineralogical vocabulary in this text [his thesis] on Walker and his contemporaries should not be underestimated. Indeed, Walker used Plinian names for many of his genera’ (Eddy 2003a: 95).

A principle of the Linnaean system is that species were to be identified according to visible characters. Walker’s development of the Linnaean system for minerals is described in detail by Eddy (93). The very distinctive appearance of Tiree’s pink marble ensured its significance in the

---

<sup>2</sup> Pliny the Elder (23-79) author of *Historia Naturalis*.

classification of minerals in the late eighteenth century and as desirable addition to any gentleman's cabinet of curiosities. In modern usage porphyry does not refer to any of the examples that Walker cites. It is a term used for extrusive igneous rocks, where slow cooling in the mountain has enabled large crystals of some minerals to form, but when the partly solidified rock is extruded as lava flows, the remaining liquid cools very rapidly to form very small crystals as the background. On Tiree, from its proximity to the Mull lava field, porphyritic basalt beach pebbles are a common find. Despite the uncertainty between Pliny's classification and Linnaean naming systems, Walker describes what he sees:

The Ground of the Stone is very hard, compact, opaque (sic) Quartz, of a fine Carnation colour, interspersed with Spangles of a bright Green Talc. It is susceptible to a fine looking Glass Polish, as I have found by Trial, and is a stone of a very great and uncommon beauty. In some Rocks, the talc is of a much darker Colour, and in some it is entirely black, which is generally the Case in the antique Egyptian Porphyry. Walker around 1764: 23

Walker's geological and botanical observations on the tours enhanced his growing reputation as a serious scholar in both mineralogy and botany. In 1765, soon after he wrote this letter, he was awarded the higher Doctorate of Divinity from Edinburgh. He was subsequently appointed in 1779 to the Chair of Natural History in the University of Edinburgh, which he held until his death in 1803. He taught botany and mineralogy within the School of Medicine, necessary disciplines for medical practitioners who had to source and prepare their own medicines. (Duffin 2013). His papers and writing were gathered together by his executors and published posthumously in two volumes in 1808 and 1812. In the second volume there is a summary of the marbles he found in his surveys of the Highlands and Islands, including those in Iona and Tiree (Walker 1808: 378-83). Recalling his first exposure in Tiree to this 'very uncommon marble ... of a carnation colour, and the concretions are of a green chrystalised schorl' in 1764, he records that a block brought to Edinburgh for the Duke of Argyll was fashioned into a table and placed in the palace of Holyroodhouse (379-80). Other pieces brought to Edinburgh were much admired. 'it is not only beautiful, but its composition and colours are quite singular, and not known to exist anywhere else.' 380 It is this aesthetic beauty and uniqueness in mineralogy that account for its fame. Others had been attracted to this distinctive rock long before Walker first came across it.

Although Walker claims to have discovered the pink marble, he was not the first person to be attracted to its distinctive beauty. Goudie did a cursory investigation of a prehistoric hut at

Kilkenneth in Tiree, where he found several pieces of smoothed pink marble, that he identified as being from Balephetrish (Goudie 1917: 104). Marble, this time green, was also found in a prehistoric hut between the sea and Loch Bhasapoll, Tiree: '[a] smooth pebble of marble mottled over its entire surface with blotches of light brown and light green'. This author also records a find of 'brownish-grey metamorphic sandstone ... [that] bears many small pittings, and also three large pittings (apparently produced by a boring mollusc), which give the stone if viewed from one side, a marked likeness to the frontal part of a human skull'. He suggests that it was the curious features of these stones that caused them to be picked up (Mann 1906: 375-6). It seems that even our prehistoric ancestors were fond of a cabinet of curiosities. From excavations in the Qesem Cave, Israel, Assaf suggests that collecting pebbles for their aesthetic value may be instinctive: 'For over two million years, early humans were noticing, collecting and bringing "home" various non-utilitarian objects with aesthetic visible characteristics, in what seems to be a human trait.' (Assaf 2018: 1). It is also possible that such stones may have had utilitarian or ritual significance. Mann's identification of this piece as metamorphic sandstone is however erroneous.

Stone bored by marine molluscs and polychaete worms are frequently found on Tiree's beaches and in the exposures of marble on the beach at Balephetrish. We have yet to find a live example of this creature, but it seems that both the molluscs and the polychaete worms burrow into limestone and marble by secreting acid. All those we have found are limestone, marble or calcareous mudstone that all fizz when a drop of 10% hydrochloric acid is applied. It would be impossible for these creatures to burrow into sandstone. The holes remaining in marble were to be a cause of difficulty when the stone was quarried. Which creatures made these holes is still an open line of enquiry.<sup>3</sup>

Tiree marble continued to be of interest to mineral collectors for the next century. However the next geologist to give it attention was more interested in exploiting its commercial potential as a decorative stone. There had been sporadic attempts to mine the stone in the late eighteenth century, but without the necessary skills these came to nothing. Included in a 1785 report by Dr James Anderson to James Ferrier on the fisheries at Tiree and Iona, are comments about the

---

<sup>3</sup> A possible identity for the boring mollusc is *Rocellaria dubia*, the flask shell, which gets its English name from the calcium carbonate lining that it secretes to line the burrowed hole. These linings are evident in many of the pieces found on Tiree. It is common around the Mediterranean and there are contemporary records from Dorset and western Ireland, but no live record in Scotland. One claim to fame is the damage done to submerged marble statuary and other submerged antiquities around the Mediterranean. Owen 2022.

marble quarry on Tiree: 'I examined the marble quarry, and found it never has been worked in a proper manner - And has been so little opened that no just judgement can be formed of it. The rock however seems to be solid and of considerable size, and it is now known to be of great value' (Anderson 1785). He goes on to suggest that 'some gentlemen might find a copartner to take a lease of the quarry if the Duke were so inclined to let it'. It seems that some blocks were subsequently mined and sent to Edinburgh. Donald Campbell writing in March 1787 to James Ferrier, reported on the dimensions of three blocks of marble he had shipped to Leith via Easdale, as follows:

No. 1 Length 4 ft, Boar [sic, breadth?] 1 ft 4 in, Thickness 1 ft 2 in.

No. 2 Length 3 ft 8 in, Boar 1 ft 4 in, Thickness 1 ft 4 in.

No. 3 Length 2 ft 9 in, Boar 1 ft 4 in, Thickness 1 ft 4 in. Campbell 1787

It was in this context that the 5th Duke engaged the services of the German mining geologist, mentioned in Walker's posthumous account.

#### **Rudolph Eric Raspe (1736-94)**



The German mining geologist, Rudolph Eric Raspe had wide interests apart from his practical skills in surveying mines, these included Ossian's *Poems* and Percy's *Reliques* which he translated (Niven 1898: 152). He also found fame as the author of the fictional account *Baron Munchhausen's Narrative of His Marvellous Travels and Campaigns*. It is his mineralogical discoveries that are of concern here. After spending some time as overseer of mines in Cornwall, he came to Scotland in 1788, spending time with Sir John Sinclair of Ulbster and in Edinburgh. In a letter to the 5th Duke he set out the terms for surveying the mineral wealth

of the Argyll estates, this was to be one of a number of such surveys across Scotland and the north of England to be covered by subscription by the proprietors. Each subscriber who paid £25 was entitled to two weeks of Raspe's survey, in the expectation that his report on any minerals worth exploiting would attract investors (Raspe 1789a).

A satirical account of his mineral discoveries from the *Scots Magazine* is cited by Niven:

It must give the greatest satisfaction to every friend of the prosperity of the Highlands, to understand that the marble of Tirie, belonging to the Duke of Argyll, the lead in the property of Lord Breadalbine, and the iron on the estate of Glengarry, are likely turn out of great value and importance. Niven 1898: 153

It seems Raspe had a reputation for exaggeration to justify the fee he charged his aristocratic clients to survey their estates. 'Thus, as we shall afterwards see, where Sir John Sinclair's miners found a vein of ore three inches thick, Raspe had found one of three feet.' (Niven1898: 154)

The Duke had specifically tasked Raspe to look at the marble quarries on Tiree (Raspe 1789a). His survey was reported to the Duke in a written letter (Raspe 1789b). In his report on the marble quarries in Tiree we can see his charm at work:

I saw, examined and surveyed them [the quarries] on the 23, and 24, of July and that I may the better understood and the concise in my account I submitt (sic) to your Grace a slight Sketch of the same, together with my humble congratulations, that your Grace is possessed of an immense Stock and great Variety of Marble of exquisite Beauty in Situations which are exceedingly favourable. Raspe 1789b

He explained at length the lack of overburden, in the sense of rock that must be removed to get at the marble, and estimated that there was a 'no less a Mass of 900,000 Cubic Feet' of marble that he valued at £900,000. 'A sum very attractive to "adventurers" [investors]'. In the quarry below Balephetrish Hill he found the same white, pink and green, and the darker red and black-spotted marble that the Duke was already familiar with. Although it is the pink marble that first attracted Walker, Raspe seems to have included all the colour varieties in his estimate of volume and in the valuation of the mine.

In turning his attention to the exposure at the beach, he found more varieties which he describes in writing that starts out business-like, but rapidly turns towards his creative style of prose:

They are between 24, and 30, Feet above the sandy Beach and Low Water. And having been exposed during the undeterminable Series of Ages to Wind and Weather and the washing and battering of the Atlantic Ocean at High Water, they have been wonderfully corroded and washed away into Caves, meandring in the rock. Or shaped into very romantic forms according to their respective Hardness, Softness or Texture. The richest and most eccentric Fancy of a Painter would see these Cliffs with admiration and

improvement, nor can anything in nature serve as a finer Prototype of the magnificent Haunts and Habitations of Neptune and his retinue. Raspe 1789b

It is not clear whether Raspe was aware of Sir Joseph Banks's 1772 account of Staffa, with its caves and magnificent columnar basalt, that was to play an important part in the romantic movement. Perhaps because these cliffs are only accessible at low spring tides, their tourist potential is still underexploited. He went on to list nine colour varieties at these cliffs which would be a great interest to 'a Mineralogist and practical Observer'. He removed a 'Horse load of Specimens' to cut and polish to attract investors. Despite his flight of fancy he recommended that the cliffs should be mined. A later written report on Iona, for the Argyll Marble Company sent to the Duke in 1790, included detailed instructions for extracting the green marble from that island. It included estimates of the tradesmen and other personnel required, and the arrangements for transferring the mined blocks to ships for transport to Glasgow (Raspe 1790).

It seems that despite Raspe's reputation for exaggeration, the Duke decided to go ahead with developing the quarry in Tiree. On Raspe's recommendation a road was constructed from Balephetrish to the only safe harbour in Scarinish; this was to be paid for on the basis of a third each from the Duke, the Argyll Marble Company and the Tiree tenants. Some blocks were exported including those for the chimney piece at the Duke's London residence, the table made for Holyrood Palace (Niven 1898: 154), and a further chimney piece in the billiard room at Inveraray. The latter was removed in the nineteenth century (Lindsay and Cosh 1973: 21).

The correspondence between the Duke and his chamberlain on Tiree gives some ideas of the difficulties the Argyll Marble Company faced in the commercial exploitation of this distinctive stone. Moreover, it seemed as if the Duke was forced to intervene just to get blocks moved to the harbour for forwarding to Leith. In his instructions to the chamberlain of Tiree in October 1785, he ordered that 'the blocks of marble to be forwarded to Leith by an Easdale vessel immediately. Direct them to Mr John Beanie there and write to Mr Ferrier by post' (Cregeen ed. 1964: 5). To which the chamberlain replied in October 1785 'that by the unwieldiness of the marble blocks they cannot be conveyed to Scarinish harbour until they are made lighter, being ten in number & at least one half of them not solid & full of large green spots' (6). A year later the Duke had to try to get some action, in his October 1786 instructions to cut as much off as was needed and then to forward them as instructed (7). This seemed to have some effect, but then only for half the blocks. The chamberlain reported in October 1787 that three blocks had been sent to Leith and a list of

the colour and dimensions of those remaining had been sent to the factor. The quarry seemed far from realising the potential claimed by Raspe, even allowing for some overstatement on his part. It is not clear if the Marble Company employed a professional manager or if they relied on the chamberlain to manage the quarry on their behalf. In 1801, there were no skilled quarry workers on Tiree (Cregeen 1964: 56-7).

An important part of Raspe's recommendation was that a road was to be constructed to take the heavy marble blocks to Scarinish harbour, for onward shipping to Leith. Even here the Duke was forced to intervene. In 1791 the Duke stressed that he had paid his share of the cost of the road between the quarry and Scarinish, and it was now down to the Marble Company and the tenants to 'do their parts' (20). The chamberlain replied in the same month, that the road was now increased to twelve feet in width, adding that it was also useful for tenants to transport kelp to the harbour, and that the tenants and the Marble Company had paid their share (22). By 1801 the Duke was led to understand that the road had been entirely neglected and was now impassable. He instructed that the tenants should be called out to repair it. He also suggested that the minister had ideas both about the quarry and the harbour and should be consulted.

For John MacCulloch, even though Tiree marble is hard to work 'it is still be cheaper than many continental marbles of far inferior beauty' (McCulloch 1819: 50).

The quarry has been ill wrought, and indeed nearly ruined by gunpowder, having been managed apparently by workmen ignorant of the use of the feather-wedge or other means of raising unstratified rocks. About half of it seems to remain untouched, but much even of that is split by mines used in detaching the blocks which have been quarried. 50

The initial promise of the quarry was never realised. Raspe with his charm, wit and imaginative prose has contributed to the fame of Tiree marble, but not to its commercial success. Perhaps some blame can be placed on those charged with marketing the marble. MacCulloch attributes the lack of marketing success to 'the public caprice with regard to our native production that scarcely an ornament exists in Britain of the beautiful serpentine of Portsoy, although in the reigns of James V and Mary it was wrought and exported to Paris, where specimens of it may now be seen among interior architecture of many houses' (50 f.n.). As the French Revolution in 1792 and the Napoleonic Wars from 1803-15 gave Tiree a bonanza in the kelp market, so these events would have cut off the French market for Tiree's distinctive marble. The reliable source of income

from kelp made it easier for crofters to meet their rent obligations and eased the financial pressure on the Duke.

One place where Tiree marble can be seen in practical use, is the font in St Kilda's Episcopal



Church at Lochbuie on the Isle of Mull. That

church was built in 1879, so some years after the Tiree quarry was active in the 1790s.

MacLaine of Lochbuie, who built this tiny church, seems to have been eclectic in his furnishing of the church. A framed stone on the wall was part of the stone that covered the remains of the Bishop of Metz who died in 1851. That church was fired by French troops during the Franco Prussian war. MacLaine acquired it when covering the war as a correspondent for the *Times*. It is not clear whether he commissioned the font from a stone carver who had a block of Tiree marble in his yard,

or if he bought it readymade. The piece is

significant as the only easily accessible, albeit at the end of a single track road, piece of worked marble. However, Tiree's marble continued to play a part in the history of mineralogy.

### **John MacCulloch (1773-1835)**



John MacCulloch was a pioneer in geological survey and mapping, who produced the first geological map of Scotland. Born in Guernsey of Scottish ancestry, he attended Edinburgh University graduating with an M.D. in 1793. Although he was at Edinburgh while John Walker was Professor of Natural History, he does not appear on Walker's class lists (Eddy 2003b: 107-17). However, the ideas of John Walker and James Hutton were much discussed in academic circles while he was at Edinburgh and MacCulloch made personal studies of geology while he was

there. (Cumming 1980: 179, note 6). Over his career he had wide interests in chemistry, geology, medicine and natural history. He was a pioneer in the study of malaria and is credited with introducing the term to the English language. However, it is now as a geologist that he is remembered.

MacCulloch practiced at first as a physician, enlisting as a surgeon's mate in the Royal Artillery. His chemical expertise led to him being appointed as assistant chemist to the Board of Ordnance. (156). It was in that role that he was sent to conduct geological surveys to find a non-siliceous crystalline limestone suitable for use as grindstones in the manufacture of gunpowder, it was his search for this rock in Perthshire that laid the foundations for his wider survey of Scotland (156).

Tasked with preparing a report on the Scottish mountains, he began his observations on the geology and mineralogy of Scotland. MacCulloch was the first geologist employed in government service in Britain. Geological mapping was then within the Board of Ordnance, under the management of the Army. He did not always enjoy the support of the government bureaucracy or of other geologists, but he carried out a prodigious volume of work to complete the map and to describe the geology of the western islands of Britain. His survey of these islands, including the Isle of Man, is a classical work in geology, and its publication in 1819 raised his prestige (157). A copy of his geological map hangs in the stairwell of the Geological Society in Burlington House in London.

He was criticised by Walker's successor, Robert Jameson, who was jealous of his success and felt that he could have conducted the survey better (158). Also MacCulloch was unfortunate that the publication of his *System of Geology* in 1831, coincided with that for Sir Charles Lyell's *Principles of Geology*, in three volumes from 1830-33. Archibald Geikie also criticised his *System of Geology*, for paying too much attention to crystalline rocks as 'the sullen protest of the last high-priest of a supplanted religion [in which] fossil remains are ignored [and] the rocks are described by their mineral characters, precisely as if William Smith had never lived' (cited by Cumming 1980:172). There was never any likelihood of fossils in Tiree's marble, but it seems that its fame was very dependent on the regard held by the academy for mineralogy. It is MacCulloch's description of the rocks on Tiree that concern us here.

The first volume of his *Description* includes a comprehensive review of the agriculture and geology of Tiree, of which nine pages are given to a detailed description of the marble

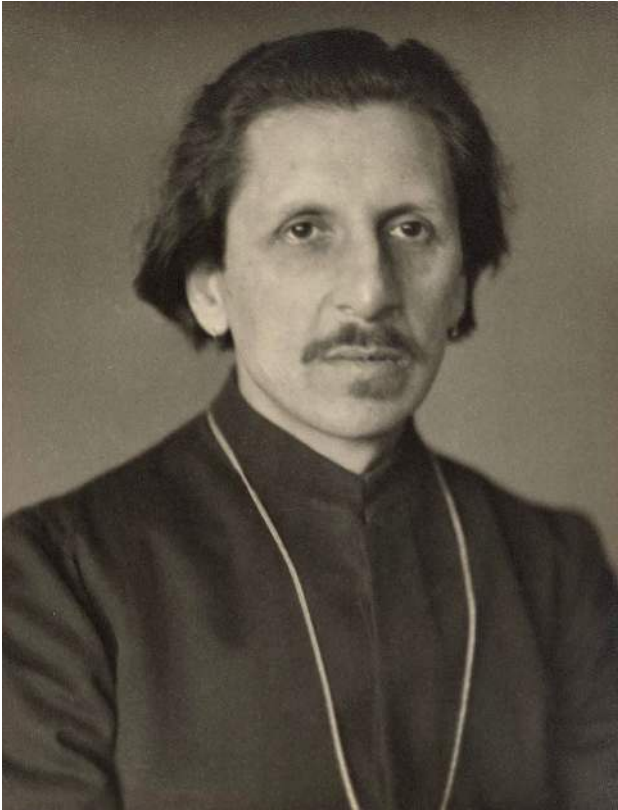
(MacCulloch 1819: 48-56). These add considerably to the accounts of the marble given by Walker and Raspe. He regarded the marble as a large nodule that showed no sign of sedimentation. 'There is considerable obscurity attending these detached masses of limestone. Of all the rocks which occur in extended masses, granite, trap, and porphyry, only are unstratified; while others possess characters of stratification almost always very unequivocal, although in many cases attended with marks of posterior derangement.' (48-9) He noted that this limestone is in contact with the gneiss that surrounds it on all sides, but it does also in some places contain imbedded lumps (49). 'The limestone is of a reddish hue, varying from a high flesh-colour through pink to nearly white, and from a muddy crimson to a dull purple; often also with a greyish aspect bordering on blue.' (49) Despite dismissing MacCulloch's work for its focus on minerals, this description is quoted by Geikie verbatim in the catalogue for the Museum of Practical Geology discussed below. Although MacCulloch admired the pink marble, he found other colours equally handsome.

In the quarry to the south of what is now the B8068 road, he found marble not unlike that in Iona. He noted that when pure it is white, but mostly it is impure: 'breaking with large irregular fractures, and showing greenish yellow stains in the natural rifts. This seems to arise from an admixture with serpentine or steatite. The same substance is found dispersed through it, either in small lumps or minute grains of a dark green or yellowish hue' (50-1). He felt that this variety is highly ornamental, but its only use seemed to have been in building dykes. It had also been burnt to lime for use in mortar.

The last marble he found was in Gott Bay, here both the marble and the gneiss were traversed by granite veins apparently running without a break between the rocks. This was of interest because the theory then current was that granite was formed contemporaneously with the gneiss. 'It appears to be so obvious a consequence of the posterior disturbance of the beds in a softened state, that it is unnecessary to accumulate arguments on the subject.'<sup>52</sup> These granitic veins and masses within gneiss, are now thought to be from the partial melting of gneiss where the minerals with the lowest melting points, quartz and feldspar, form a liquid that can run into fractures and voids. The large-grained rock is known as pegmatite which is associated with the concentration of some valuable ores. It is a feature of the Lewisian Gneiss Complex that is much in evidence in Tiree. While extending what was known about the Tiree marble, he cautioned that some variations in the gneiss may have escaped his attention because they were under a 'grey crust of lichen'

(46). Anyone who has stared at the cnoc outcrops on Tiree will be familiar with this problem. Exposures on the beach between the algae covered lower shore and the lichen cover in the splash zone show the colour and texture of these rocks to their best advantage. It is these accessible exposures that are valuable in the enjoyment of Tiree's geoheritage.

**Ananda Kentish Muthu Coomaraswamy (1877-1947)**



Ananda Coomaraswamy was born in Ceylon (now Sri Lanka) to a Ceylonese father and an English mother. His father died when he was two and the family returned to England where he was educated, graduating in geology and botany from University College London in 1900. Coomaraswamy had an influential career across many fields, that included introducing Indian art to modernist British artists, including Jacob Epstein and Eric Gill, and contributing to the philosophy of art, literature and religion. In his introduction to a collection of Coomaraswamy's papers on geology and mineralogy, Rao lists the reasons why he is important in the history of the

twentieth century. First he was a brilliant science writer, and second, he broke new ground in metaphysical subject matter which opened minds to the depths of meaning in the Indian classics including the Vedas, Brahmanas and Upanishads (Ranganathan and Rao eds. 2000: xiii). His friendship with Rabindranath Tagore helped forge the intellectual foundations for the advancement of Indian independence.

It is his early career in geology that concerns us here, but like the other geologists discussed in this paper he had much broader interests, and made original contributions across a wide range of fields. Soon after graduating he came to Tiree to study its Marble. The resulting paper was read to the Geological Society in London on 17 December 1902 and published in the Quarterly Journal of the Geological Society, London 59 (1903), pp. 91-104. This paper is included in the collection edited by Ranganathan and Rao (2000) and it is this version that is discussed here.

Although Tiree's pink marble was well known and represented in many mineralogical collections, Coomaraswamy felt that it had never been described in detail. He was aware of discussion by Professors Cole<sup>4</sup> and Sollas<sup>5</sup>, that compared Tiree pink marble with a pink wind-blown coral reef in the Torres Straits in which the mineral inclusions came from detrital fragments of rock (133). He visited Tiree in the summer of 1902 to survey the marble outcrops and collect samples for laboratory examination. At the Balephetrish marble quarry, he noted how the marble occurred with the gneiss:

[T]he gneiss has a general south-westerly and north-easterly trend and that the masses of limestone occur as lenticles of various size in the gneiss, exhibiting a similar foliation. The latter in the gneiss is more or less interrupted by the large limestone-augen round which it sweeps, and the result is a great local irregularity in its direction; the foliation of the gneiss and limestone is, however, always parallel. Coomaraswamy 2000: 133

On the shore to the west of Balephetrish Hill, he found that the marble and gneiss 'were most intimately associated, some quite small inclusions and with narrow streaks of marble, besides larger masses, occurring in the gneiss' (133). He was to use these observations to formulate his theory that the marble was formed by contact metamorphism with the hot gneiss (139). In particular he asserts that 'The presence of accessory minerals in the limestone is in itself to be regarded as evidence of contact-metamorphism' (138). He also found examples of 'crush brecciation' where fragments of gneiss occur within the marble.

It seems that, from exposure to Tiree marble in museums, he had expected it all to be pink. In fact he found that the marble was not uniform in character. Whereas Raspe had listed nine colour varieties, Coomaraswamy found four. These are:

The pink marble of Balephetrish Quarry, for Coomaraswamy: 'This is the well-known Tiree Marble, so common in collections' 135;

Pink marble from the cliffs on Balephetrish beach which was very similar to that from the quarry;

A grey marble from the quarry in the field south-east of Balephetrish hill (to the south of the modern road), and

---

<sup>4</sup> Grenville Arthur James Cole (1859-1924) was demonstrator in geology at the Royal School of Mines 1878-90 and latterly director of the geological survey of Ireland.

<sup>5</sup> William Johnson Sollas (1849-1936) was professor of geology at Trinity College, Dublin from 1883 and from 1907 at Oxford.

A white marble from the same quarry.

One innovation that he brought to this study was to prepare thin sections of rock to view under the microscope. It was the Sheffield geologist Henry Clifton Sorby (1826-1908) who had developed the technique of using a petrological microscope to examine thin sections of rock. Coomaraswamy viewed his sections through 'crossed nicols' [prisms of Iceland spar]. One prism produced polarised light that was scattered by the crystals of the specimen which was then viewed through the polarising filter of the other prism. The 'fine series of microscope-sections exhibited by the author' when the paper was read to the fellows of the Geological Society were particularly well-received (147). The photographs in this paper were taken by his wife Ethel, née Partridge, who was a rock collector in her own right. The collection she made with her brother James is now held in the Barnstable Museum. Sadly it does not include a specimen of Tiree pink marble. The minerals that he was able to identify included: light to dark green, nearly black pyroxene; dark-green amphibole which are a characteristic of the pink marble; forsterite showing partial or complete serpentinisation; scapolite; watery-brown blunt-angled crystals of sphene and others (141-2).

The printed version of the paper included a record of the subsequent discussion by the fellows in attendance. The President advanced several possible explanations for how the marble had formed. He found Coomaraswamy's argument that the Tiree marble was first a limestone that had been 'intruded upon, enveloped, metamorphosed by igneous rock ... was simple and seemed to agree with most of the phenomena cited'. He did, however, suggest that 'the entire complex itself might not have been squeezed and yielded more than once afterwards' (147). Professor Sollas, who had made the comparison with the coral reef deposits in the Torres Straits, offered a suggestion that the Tiree marble might have a close connection with the Ledbeg marble. In response Coomaraswamy stressed that the Tiree marble was pre-Torridonian (around one billion years ago), whereas those of Ledbeg were post-Torridonian. As with all good papers his paved the way for further lines of enquiry.

The first section of their collection of his writing by Ranganathan and Rao brings together the papers that were included in support of Coomaraswamy's thesis for the higher Doctorate of Science from University College, London, awarded in 1906. The Tiree paper is among these, and it is gratifying to find that the geologists who made Tiree pink marble famous were themselves in the process of achieving fame and recognition as academic geologists.

### **Arthur Francis Hallimond (1890-1968)**

Arthur Hallimond was born in Yorkshire, and showed early promise in science, he graduated from Cambridge in Natural Science, with chemistry, physics, geology, and mineralogy,. His first appointment was as assistant curator at the Museum of Practical Geology, where he carried out his first important mineralogical studies of the specimens. During the First World War he was seconded to the iron and steel industry, studying slag, refractory materials and the metallurgy of carbon steels. He is best known for innovations to the polarising microscope for examination of thin sections of minerals. After the Second World War he visited Germany to study advances in the petrological microscope within its optical industry. He subsequently worked with the York firm, Cooke, Troughton, and Simms, to advance the design of their petrological microscopes, that were the first to use polaroid in place of the traditional Nicol prism of Iceland spar (Smith 1969). It seems likely that my own introduction, as a metallurgy student at Sheffield in 1958-61, to using a Cooke, Troughton, and Simms polarising microscope to examine mineral thin sections, was with a microscope to Hallimond's design. Of interest here is Hallimond's petrological examination of two thin sections of pink Tiree marble from hand samples in museum collections.

Hallimond's research was conducted in 1938, but due to the outbreak of war was not published until 1947. His particular interest was the dark green silicate minerals that form distinct areas of the marble up 'to half an inch across and often much smaller' (Hallimond 1947: 230). Coomaraswamy had considered these as modified gneiss inclusions. He examined two hand specimens collected by Victor Eyles<sup>6</sup>, one the 'typical groundmass marble, with small scattered grains and groups of pyroxene; and the other, a gneiss-like assemblage of pyroxene, amphibole, mica, and scapolite with coarse crystalline calcite (231).

In the first hand specimen that he called a 'pyroxene marble', he found 'dark pistachio-green pyroxene in a groundmass of pink porcellanous calcite'. Under the microscope 'the pyroxene forms isolated grains inter grown with calcite' (231). After crushing and dissolving the calcite in dilute acetic acid, the grains were dried and separated by a magnet. From this he was able to determine the optical properties of the pyroxene (232).

---

<sup>6</sup> Vincent Ambrose Eyles 1895-1978 graduated in geology from Bristol University. After a course at the Cambourne School of Mines he was appointed to the Geological Survey and posted to Edinburgh.

The second hand specimen, which he called 'gneiss-like aggregates in calcite', was a much less pure limestone, or calc-gneiss. 'Dark silicate grains up to 1/3 of an inch across are scattered through fine-grained pink calcite, amphibole is present along with pyroxene. In thin-section he identified 'pyroxene, amphibole, biotite, altered scapolite, and calcite, with some apatite' (232). In places the pyroxene and amphibole form complex aggregates, with 'polyhedral boundaries with a tendency to hexagonal outlines, a typical metamorphic texture which probably corresponds with prolonged heating under conditions of physical and chemical equilibrium' (222-3). In comparing the Tiree marble with others he notes the extensive distribution of foreign rock-fragments as a distinguishing feature (242).

While Hallimond has used more advanced microscopy and chemical analysis than the techniques available to the earlier geologists discussed in this paper, he was limited by having examined only two hand specimens. He was not exposed to the remarkable variation seen by the geologists who had studied the rock on Tiree. If pink marble made its reputation, the wide range of other colour forms sometimes showing across a single hand specimen means that mineralogical research may still have other stories to tell. Later in the twentieth century geologists returned to Tiree with new experimental techniques and new hypotheses to test. If these departed from the pinkness of the marble, they still illustrate what a fascinating story Tiree marble has to tell.

### **Tiree marble after the plate tectonics paradigm shift**

As structural geologists formulated the theory of plate tectonics, attention shifted to how colliding plates led to mountain building, subduction and subsequent uplift of submerged formations. Where, Coomaraswamy saw marble formation through contact with hot gneiss, this new theory allowed for gneiss and the limestone protolith<sup>7</sup> of marble to be buried together under great pressure and temperature. Contemporary geologists have new tools to investigate these rocks. Coomaraswamy placed the Tiree marble as pre-Torridonian because of its place in the sequence. To estimate a more accurate date for the metamorphism of the marble, Parnell, Boyce and Naeraa were able to measure the decay of radiative isotopes of lead and titanium in the mineral titanite (previously in this paper referred to as sphene) (Parnell et al 2022: 1638). This places the Tiree

---

<sup>7</sup> Contemporary geological mapping has adopted the convention of naming metamorphic rock by their their form before metamorphism. Thus in the BGS Geology Viewer app (free to download) gneiss on Tiree is shown as either meta-granite or meta-granodiorite and marble is shown as meta-carbonate.

marble as being formed around 1.6 billion years ago. These authors suggest that the limestone was deposited in a shallow sea that evaporated before being buried, where high pressures and temperatures metamorphosed it into marble. Coomaraswamy was correct to reject any similarity between the marble and coral reefs formed from the skeletons of deceased organisms. What life existed that long ago was very simple. Primitive seaweeds may have been among the first multi-cellular organisms and some single-celled organisms might have lived in colonies that may have been precursors to multi celled organisms (New Scientist 14 July 2009). Parnell and colleagues had passing interest in the pinkness of 'the' Tiree marble which they attributed to pink colouration in the talc groundmass (1641).

### **Pink Tiree Marble in Museums and Collections**

Walker saw his discovery Tiree's pink marble as significant because it seemed to be unique and might have a practical use. Successive generations of geologists have met examples of this marble in the museums where they studied mineralogy. Each brought their own interpretation to the rock. Alberti suggests a reading that follows the 'biographies' of objects in museums, as new meanings are associated with them and old meanings are discarded.

In museum scholarship, meanwhile, the object biography approach has most commonly been applied to ethnology and archaeology. The method I advocate here lies at the intersection of these fields. We can trace the careers of museum things from acquisition to arrangement to viewing, through the different contexts and the many changes of value incurred by these shifts. In doing so we study a series of relationships surrounding objects on the way to the museum and then as part of the collection. Alberti 2005: 560-1

Given its central position in museum collections, Tiree marble makes a good case study to test Alberti's concept of object biography.

Walker amassed a comprehensive mineral and botanical collection over his lifetime, that came to be the largest in the country (Eddy 2003a: 3). However he failed to vest ownership in the university. On his death, his executors took possession of these collections to be sold at auction (Edinburgh Archives Online). Museum exhibits were valuable commodities, with a ready market among private collectors, that universities found difficult to compete with. The gentry often made displays of minerals among their cabinets of curiosities. Specimens of the Tiree pink marble that were on prominent display in the hall at Inveraray, were much admired by the 5th Duke (Lindsay and Cosh 1973: 213). In his account of Dr. Johnson's 1773 visit to Inveraray, James Boswell

relates how after dinner, the Duke asked a gentleman to fetch a piece of 'curious marble'. Boswell does not show any further interest in the piece, being entertained by the gentleman at first bringing the wrong piece and also dwelling on his impression that the Duchess had taken a dislike to him (Boswell 1852: n.p.).

On succeeding Walker as Professor of Natural History at Edinburgh, Robert Jameson (1774-1854) therefore had to set about making his own comprehensive mineral collection. He had toured the Highlands and Islands to study their mineralogy, publishing his findings in two volumes in 1800. There is a brief description of the Tiree marble in volume 1 (Jameson 1800: 29-33). At first he struggled to get his collection recognised as an essential teaching resource. Jameson played an important role in the development of the museum as being open to all (Swinney 2010). Citing Macdonald, Swinney discusses 'the role of the museum in constituting and civilising a public and fostering concepts of nationhood' (235). In particular he shows how the concept of public access changed over the nineteenth century, as efforts to open up the museum conflicted with its role as a 'scholarly institution' (236). Jameson took his students to the museum three times a week to inspect and write descriptions of the objects. 'The collection was the embodiment of Jameson's knowledge, his intellectual capital and he protected it vigorously. His efforts to restrict access were in part to protect this asset from physical damage and from erosion and depreciation through its use by others.' 236 There was however a need to finance the museum that was beyond the resources available to Jameson.

At first, entry was to be by subscription which, under pressure from social reformers to increase access, was reduced to one shilling. Jameson was in favour of free access on condition that he retained control of who could visit the museum. On 28 June 1838, to celebrate the coronation of Queen Victoria, the museum was thrown open gratis to 'the Street' and vast crowds attended. Social reformers saw museums as counter attractions to the gin palaces (238). After such problems with crowd control, Jameson agreed to admit 'Bodies of the Lower Orders recommended by responsible associations' (239). It was in 1851 that the museum was opened to the working classes on a ticket basis. Jameson's struggle to secure funding to enable the museum to be accessible to the general public is one that we are very familiar with on Tiree.

The School of Mines in London, now part of Imperial College, also needed a collection to support its teaching. Established in 1835 as the Museum of Economic Geology and opened to the public in 1837, the museum was supported by the fellows of the Geological Society. The third

edition of the catalogue for the museum published in 1862, now renamed the Museum of Practical Geology, includes a description of Tiree marble composed by the distinguished Scottish geologist Archibald Geikie (1835-1924). Despite Geikie's criticism of MacCulloch's *System of Geology*, he included verbatim the description of the colours of Tiree marble in that author's *Description of the Western islands of Scotland* (1819: 49), cited above. Tiree marble rock is well-suited for ornamental purposes and Geikie reports that a polished block is used to support the bust of Sir H. T. De la Beche.<sup>8</sup> 'A polished cube of this marble is also placed in Table-Case III, in the Lower Hall.' Geikie in Ramsay et al 1862: 5. Although the commercial exploitation of Tiree marble did not fulfil its promise, its presence in museum and private collections ensured that it was well-known to generations of geologists, schooled in the practice of writing descriptions of minerals and hand specimens of rock. The Geological Survey under De La Beche set new standards for data capture that placed the amateur geologists at a disadvantage. Knell dates the decline of museums set up by the philosophical societies, to the 1850s as hard science displaced amateur enthusiasm (Knell (1996: n.p.)). Geologists today conduct their discourse behind journal paywalls in language that the interested amateur struggles to understand. They may just be realising that they have taken this isolation too far. At least a rudimentary knowledge of geology is essential if geoheritage is to be supported. Geologists have to concern themselves with the public understanding of their science. As university teaching makes use of new media, some professors have published their field visits to a wider audience, Luisa Hendry, who styles herself the Scottish Geologist, and Professor Rob Butler have made accessible videos. The UK Virtual Microscope now allows anyone to look at hand specimens and microscope slides. Its entry for Tiree marble has a photograph of a pink hand specimen from the collection at the Hunterian Museum of Glasgow and a thin-section from David Anderson, a collector based in Girvan. Although such free access extends the audience for this rock, there is much to be said to make pieces freely available to be handled.

## **Conclusions**

For over two hundred years, Tiree's pink marble has been prized for its beauty. Although quarrying has not been a commercial success, it has played a key role in the development of the eminent

---

<sup>8</sup> Sir Henry De La Beche was a prominent geologist, but he was also a slave owner. Imperial College as part of its 2020 review into its connections to slavery, removed the bust from public display. It also renamed societies and scholarships associated with De La Beche.

geologists discussed in this paper. Samples were sought for private collections and, from the nineteenth century, by the academic museums. These were the forerunners of the great museums we have today, including the National Museum of Scotland, the Hunterian Museum of Glasgow and the London Natural History Museum. *An Iodhlann*, the historical centre on the Isle of Tiree, has a role to play to enable both residents of, and visitors to, Tiree to handle specimens of marble and to experience directly this important aspect of our geoheritage.

### **Acknowledgements**

This paper has drawn on the archives and collections in *An Iodhlann/Tiree's* Historical Centre. I am grateful for the help and support from David Beaman, its archivist, and Dr John Holliday, its chair. Papers being made available from the Argyll Archives were particularly useful, as was the helpful collaboration by Alison Diamond, its archivist. These papers have been transcribed and digitised under the *Written in the Landscape* project which makes them much more accessible to the researcher. I am grateful for the effort by the volunteers who are transcribing papers from the longhand originals. I also thank Nicole Hicks and Anita Nathwani of the Museum of Barnstable and North Devon for searching the Partridge rock and mineral collection. Lastly I would like to thank my wife Moira for reading versions of the paper in draft.

### **References**

- Alberti, Samuel J. M. M. (2005) 'Objects and the Museum', *Isis* 96, pp. 559-71.
- Anderson, Dr James (1785) *Report on Fisheries at Icolmkill & Tirie* to Mr Ferrier. 20 January 1785. Argyll Archives GD9/1.
- Assaf, Ella (2018) 'Palaeolithic aesthetics:collecting colourful flint pebbles at Middle Pleistocene Qesem Cave, Israel', *Journal of Lithic Studies* 5(1), pp. 1-22.
- Boswell, James (1852) *A Journal of a Tour to the Hebrides with Samuel Johnson, LL.D.*
- Campbell, Donald (1787) *Letter* to James Ferrier 30March 1787. Argyll Archives DD9/1.
- Coomaraswamy, Ananada K. (2001[1903]) 'Observations on the Tiree Marble, with notes on others from Iona', Coomaraswamy, Ananda K. (2001) *Writings on Geology and Mineralogy: scientific papers and comments*. Edited by Ranganathan, A. and Rao, K. Srinivasa. New Delhi: Indira Gandhi Centre for the Arts, pp. 132-48.
- Cregeen, Eric R. (Ed.) (1964) *Argyll Estate Instructions: Mull, Morvern and Tiree*. Edinburgh: T. and A. Constable for the Scottish History Society.

- Cumming, David A. (1980) 'John MacCulloch, F.R.S., at Addiscombe: the lectureships in Chemistry and Geology', *Notes and Records of the Royal Society of London* 34(2), pp. 153-83.
- Duffin, Christopher J. (2013) 'Geology as medicine and medics as geologists', in Duffin, C. J.; Moody, R. T. J. & Gardner-Thorpe, C. (eds.) (2013) *A History of Geology and Medicine*, London: Geological Society, Special Publications 375, pp. 1-6.
- Eddy, Matthew Daniel (2003a) 'The "ingenious" Rev. Dr. John Walker: Chemistry, Mineralogy and Biology in Enlightenment Edinburgh (1740-1800)', unpublished PhD *Thesis*, University of Edinburgh.
- Eddy, M. D. (2003b) 'The University of Edinburgh natural history class lists 1782-1800', *Archives of natural history* 30(1), pp. 97-117.
- Edinburgh Archives Online. 'Jameson, Robert, 1774-1854 (geologist and professor of natural history, University of Edinburgh)', University of Edinburgh Archive and manuscript collection.
- Goodie, Gilbert (1917) 'An underground gallery recently discovered in the Island of Tiree, with a note of another in the same island, from a plan by Sir Henry Dryden', *Proceedings of the Society of Antiquaries Scotland* February 12, 1917, pp. 100-8.
- Hallimond, A. F. (1947) 'Pyroxenes, amphibole, and mica from Tiree marble', *Mineralogical magazine and Journal of the Mineralogical Society* 28(199), pp. 230-43.
- Healy, John F. (1981) 'Pliny the Elder and Ancient Mineralogy"', *interdisciplinary Science Reviews* 6(2) pp. 166-80.
- Hunter, James (2018) *The Making of the Crofting Community*. Edinburgh: Birlinn.
- Jameson, Lawrence (1854) *A Biographical Memoir of Professor Jameson*. Edinburgh: Neill and Company.
- Jameson, Robert (1800) *Mineralogy of the Scottish Isles: with mineralogical observations made in a tour through different parts of the mainland of Scotland*, Volume 1. Edinburgh: E. White and Son.
- Jameson, Robert (1820) *A System of Mineralogy in which Minerals are Arranged According to the Natural History Method*. Volume 1. Edinburgh: Archibald Constable. Available in Google Books.
- Knell, Simon (1996) 'The roller-coaster of museum geology', in Pearce, S. M. (1996) *Exploring Science in Museums*, New Research in Museum Studies, Athlone.

- Lindsay, Ian G. and Cosh, Mary (1973) *Inveraray and the Dukes of Argyll*. Edinburgh: Edinburgh University Press.
- MacCulloch, John (1819) *Description of the Western islands of Scotland including the Isle of Man comprising an Account of their Geological Structure, with Remarks on their Agriculture, Scenery, and Antiquities*. London: Archibald Constable.
- Mann, Ludovic McLellan (1906) 'On the exploration of the floor of a prehistoric hut in Tiree', *Proceedings of the Society of Antiquaries Scotland* May 14 1906 pp. 372-8.
- Owen, Nick (2022) 'Notes on the identity and ecology of *Rocellaria dubia* (Bivalvia: Gastrochaenidae)', *Journal of Conchology* 44(3), pp. 257-65.
- Parnell, J.; Boyce, A. J. and Naeraa, T. (2022) 'Seawater signatures in the supracrustal Lewisian complex, Scotland', *Geological Magazine* 159, pp. 1638-46.
- Ramsay, Andrew C.; Bristow, Henry W.; Geikie, Archibald and Bauerman, Hilary (1862) *A Descriptive Catalogue of the Rock Specimens in the Museum of Practical Geology*. London: George E. Eyre and William Spottiswoode.
- Ranganathan, A. 'Ananda Coomaraswamy's contribution to Geology and Mineralogy: Introduction', Coomaraswamy, Ananda K. (2001) *Writings on Geology and Mineralogy: scientific papers and comments*. Edited by Ranganathan, A. and Rao, K. Srinivasa. New Delhi: Indira Gandhi Centre for the Arts, pp. xiii-xxvi.
- Raspe, Rudolph Eric (1789a) *Letter to the Duke of Argyll*, May 1789, transcribed by Dr Sheila Dickson, Friends of the Argyll papers 2023.
- Raspe, Rudolph Eric (1789b) *Reports to the Duke of Argyll*, 6 August 1789, transcribed by Dr Sheila Dickson, Friends of the Argyll papers 2023.
- Raspe, Rudolph Eric (1790) *Report on Iona Marble*, transcribed by John C. Maclean, Friends of the Argyll papers June 2019.
- Smith, W. Campbell (1969) 'Arthur Francis Hallimond (1890-1968)', *Mineralogical Magazine* 37(287), pp. 313-6).
- Swinney, Geoffrey N. (2010) 'Robert Jameson (1774-1854) and the concept of a public museum'. *Archives of Natural History* 37(2), pp. 235-45.

Withers Charles W. J. (1985) 'A neglected Scottish Agriculturalist: the 'Georgical lectures' of Rev Dr. John Walker (1731-1803)', *The Agricultural History Review* 33, pp. 132-46.

Walker, John (around 1764) 'Observations on Tiry [Tiree] by Dr. John Walker', *Argyll Papers* Reference ARG/4/3/65/33. Transcribed by John C. Maclean, Friends of the Argyll papers January 2019.

Walker, John (1812) *An Economical History of the Hebrides and Highlands of Scotland*, Vol 1. Edinburgh: Guthrie and Anderson.

Walker, John (1808) *An Economical History of the Hebrides and Highlands of Scotland*, Vol 2. Edinburgh: Edinburgh University Press.