

**AN IGNEOUS ERRATIC AT LIMESLADE, GOWER,
AND THE GLACIATION OF THE BRISTOL CHANNEL**

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In January 2022 a large dolerite erratic boulder was discovered on the rocky foreshore of Limeslade, near Mumbles, by local resident Phil Holden. It is located between HWM and LWM in an area of southward-dipping Carboniferous Limestone beds, at grid reference SS624870 (Fig. 1). It rests in a deep gully or crevice, flanked by water-worn outcrops and pinnacles of bedrock with abundant solution pits and sharp-edged ridges (Fig. 2). It sits in a shallow rock pool, supported by boulders of mostly local origin. There are abundant beach gravels, cobbles and boulders in the vicinity, which contribute to the abrasion of bedrock outcrops and the surface of the erratic. The environment is affected by waves during the rise and fall of every tide, and it is possible that the erratic is occasionally buried by these mobile beach materials.



Figure 1. The rocky foreshore of Limeslade Bay, near the Mumbles. The erratic boulder is in a narrow crevice, top right. Most of this area is submerged at high tide. (Photo: courtesy TheDeacon1323)

The boulder cannot have been derived from anywhere in the vicinity, since the Gower Peninsula is made up almost entirely of Carboniferous and Devonian sedimentary rocks (Fig. 3) on the southern edge of the South Wales Coalfield. Carboniferous limestones crop out extensively across southern Gower, but to

the north of the Mumbles Peninsula and Limeslade Bay there are exposures of mudstones and sandstones belonging to the Marros Group and also mudstones, coal seams and sandstones of Lower Coal Measures age, in Swansea Bay. Pennant Sandstones crop out extensively to the north of Swansea and Penclawdd in the core of the coalfield syncline. The nearest igneous rocks are found in central and northern Pembrokeshire, about 65 km away.



Figure 2. The erratic boulder resting in its crevice between the tide marks on the rocky limestone foreshore. At one end it has a more or less triangular cross section. The shape of the underside is not known.

In Limeslade Bay the newly discovered boulder is invisible from a distance, and from a few metres away it may appear to be just another detached mass of limestone bedrock; but on close examination it is seen to have a distinct greenish hue and a coarse surface texture. It measures c. 2.2m x 1.3m x 1m and has an irregular shape, with a somewhat triangular cross section. It has a twisted bulbous feature at one end and a flattened surface at the other, with a number of approximately parallel fractures from which thin slabs of rock have broken off, probably as a result of pounding during storm conditions. The ridge or top edge is smoothed, and on one flank there are signs

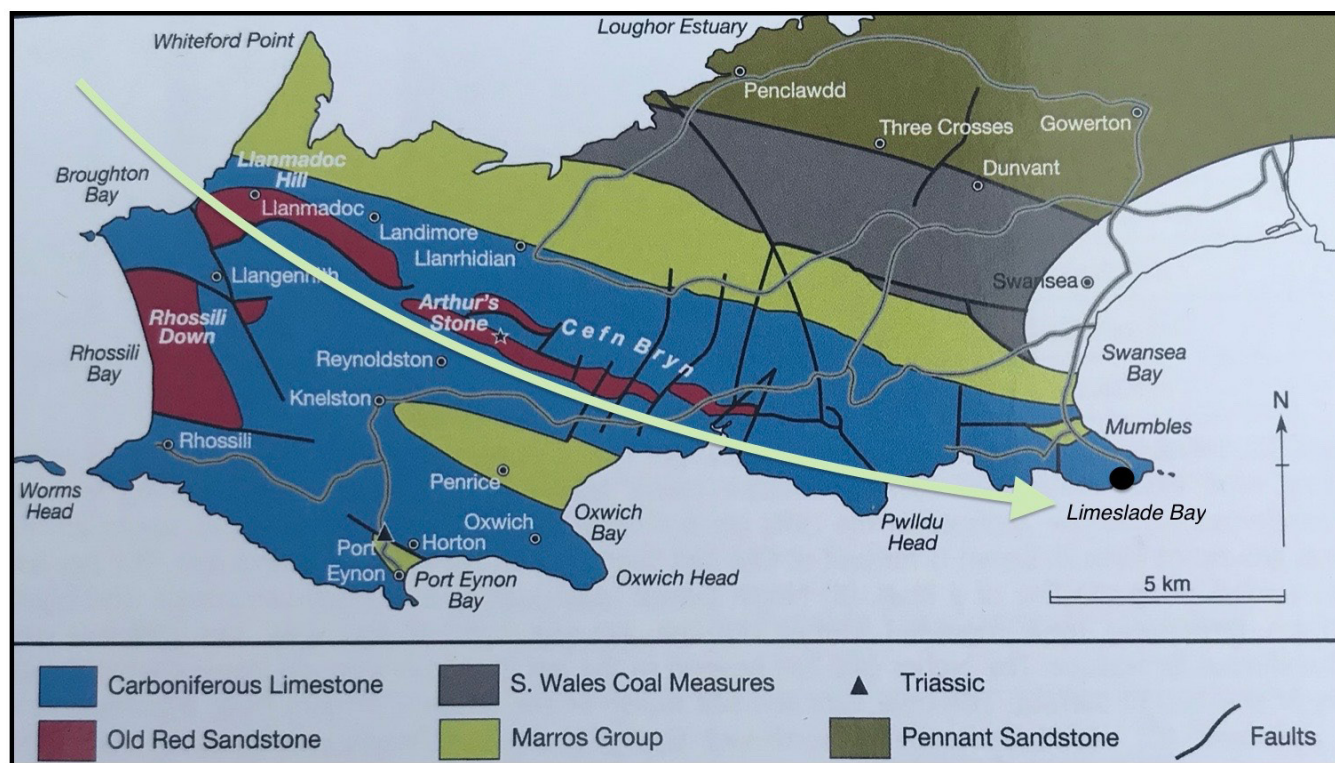


Figure 3. Simplified bedrock geology map of the Gower, showing the extent of the Carboniferous Limestone outcrop, the location of Limeslade Bay and the postulated direction of erratic transport. (Source: G.Owen and QRA, *Gower Field Guide*, 2015.)

of facets (now heavily abraded) which are suggestive of damage during transport. The weight is estimated as c 5 tonnes, but in the neighbourhood there are small boulders of the same rock type (Fig. 4), so it is possible that at one time the erratic was substantially larger.

The boulder surface is remarkably fresh; if there ever was a weathering crust, it has been removed by constant pounding and abrasion by waves. On close examination the crystal structure is quite visible. The rock's colour is very similar to that of fresh unspotted

dolerite surfaces in the western part of Mynydd Preseli in Pembrokeshire. A small flake from the bottom surface of the boulder was examined by igneous geologist Dr Katie Preece at Swansea University. She reported that the rock is made of greenish unspotted dolerite or micro-gabbro with crystals of feldspar and pyroxene, similar to another rock sample from Foel Eryr on Mynydd Preseli but with slightly larger crystals. Crystal size is linked to cooling rate - so the same intrusion can have a coarser (slower cooled) interior portion and finer (quicker cooled) exterior. When the surface texture is compared visually with that of unspotted dolerites in Cilgwyn, near Newport, there is a remarkable similarity.



Figure 4. Some of the small “matching” igneous cobbles found in the vicinity of the larger Limeslade boulder.

Professor Peter Kokelaar, who has extensive knowledge of the igneous rocks of north and west Pembrokeshire, has visited the boulder and has said this on the basis of an initial visual assessment: “It is a metamorphosed coarse dolerite (not quite gabbro), sparsely porphyritic with oscillatory- zoned euhedral and subhedral plagioclase phenocrysts mostly ~0.5 cm and up to 1 cm; dark patches could be (altered) ophitic pyroxenes. The rock shows sub-parallel feldspathic banding roughly perpendicular to the long axis (2.2m) of the boulder. The banding perpendicular to the ‘columnar’ length is fairly typical of some coarsely jointed sills I have mapped between Fishguard and St David’s Head.” One such sill occurs at Ogof Golchfa,

near Porthclais (SM740236), and the similarities in hand specimens are again striking. However, visual comparisons (especially for weathered surfaces) can cause confusion, and no further precision in provenancing has been possible until now.

Geological Analyses

Two fragments taken from the underside of the boulder have kindly been analysed by Prof Tim Darvill (TD) and by Dr Steve Parry using pXRF and thin section analysis. The results (Table 1) are instructive, but they highlight the need for more intensive analyses, preferably using non-invasive methods.

The Limeslade study was undertaken in order to test the hypothesis that the boulder might have come from one

of the dolerite outcrops at the eastern end of Mynydd Preseli. All figures represent ppm measurements, which means that direct comparisons are not possible with much of the past geochemistry work on Preseli which presented oxide percentage weights for the major elements and ppm measurements for the trace elements. However, comparisons are possible with some of the figures published by Thorpe et al (1991), Pearce et al (2022) and Bevins et al (2022) in which element concentrations are given in ppm.

The most striking feature of the 3 columns of Carn Meini figures is the disparity between the TD readings (average 99.1 ppm for Ni) and those of Pearce et al (2022) where the average across 165 readings is 42.5 ppm. Not one of the 165 readings was over 90 ppm, raising the possibility of calibration or instrumental

Table 1: Average compositions (ppm) for elements, from pXRF analyses

Element	Limeslade erratic	Carn Meini	Carn Meini	Carn Meini	Carn Goedog	Carn Goedog	Cerrig Marchogion	Cerrig Lladron	Carn Ddu Fach	Carn Ddafad-las
Mo				5.4		5.1	5.4	4.9	4.85	4.7
Zr	111	68	70.6	64.5	69	59.2	65.1	73.9	61.4	78.5
Sr	223	276	231	241	228	217	245	216	319	278
Rb	8.8	19	5.7	9.7	9	5.9	6.9	7.4	5.4	6.3
Pb			15.8	48.8		46.4	56.9	40.3	49.7	54.0
As	5.6		12.6	46.9		26.6	71.2	22.3	63.0	33.8
Zn	88	68	79.6	29.6	75	42.3	45.5	58.4	54.2	50.4
Cu	64	60	78	26.6	41	29.6	26.6	26.0	26.3	25.9
Ni	96.2	29	99	42.5	43	49.6	62.4	83.5	94.2	83.0
Co				206		202	250	236	227	206
Fe	58478		62746	30165		44374	47127	56986	50784	53586
Mn	1007		1725.0	504		731	772	932	891	946
Cr	141	213	221	101	523	148	136	141	116	116
V	172	190	157	107	205	123	155	168	156	170
Ti	5342		2720	2310		3315	3166	3923	3664	5288
Ca	58871		39755	37175		43957	44731	41457	43185	41895
K	3240		2253.4	4131		3420	4377	4576	4582	4005
S			783.4	2081		1973	2058	2124	2214	1558
Ba	544	326	452	313	113	493	458	298	566	529
Nb		3		3.6	4	3.8	3.9	4.5	4.2	4.3
Al	17139		12533.0	21248		25520	22988	32329	32771	31940
P			1040.0	549		565	506	806	567	489
Si	103691		73379	81237		96108	91556	114913	114247	128119
Cl				757		343	658	673	646	430
Mg	2410		1502.4	9616		10366	11803	14457	12968	13549
All in ppm	TD	RT et al	TD	NP et al	RT net al	NP et al	NP et al	NP et al	NP et al	NP et al

Table 1. The geochemical compositions of three “control samples” of spotted dolerite from Carn Meini and the average of three analyses of the same sample from the Limeslade boulder, with other columns providing data from the unspotted dolerites in other Preseli tors. Yellow highlights: noteworthy “high” readings. Blue highlights: noteworthy “low” readings. *Data courtesy Prof Tim Darvill. Sources are acknowledged on the bottom line: TD = Tim Darvill, RT = Richard Thorpe, NP = Nick Pearce.*

error. On the other hand the Rb readings reported by Pearce et al for Carn Meini averaged at 9.7 ppm, with a very wide scatter, whereas the TD readings were lower, averaging at 5.7 ppm. For Ba, the TD figure is 452 ppm and the Pearce et al figure is 313 ppm. The discrepancies are even wider for Fe: 62,746 ppm for the TD readings and 30,165 ppm for Pearce et al. There are similar wide discrepancies for the elements Pb, As, Zn, Cu, Mn, Cr, V, K, S, Al, P, and Mg. Again it is possible that these anomalies are related to instrumental, environmental, procedural and human errors. But perhaps the greatest reason for these discrepancies (and the wide scatter of plotted points on bivariate graphs) is that Carn Meini is not a single tor but an association of tors, with at least ten prominent craggy outcrops across 250,000 sq m of terrain. Samples have been taken by researchers from many different locations in this assemblage of tors, revealing great heterogeneity within the parent igneous mass. This contradicts the claim made by Pearce et al (2022) that there is homogeneity in the Carn Meini intrusion, based on the fact that there are near constant concentrations of Ni, Zr and Ba over 12m of stratigraphic height (see their Figure 6). That takes no account of substantial lateral variations across the intrusion which are visible to the naked eye.

When the readings for the Limeslade boulder are compared with those for Carn Meini and selected unspotted dolerite outcrops on Preseli, a number of differences are apparent. Zr exists in the Limeslade sample at 111 ppm, far in excess of any of the readings for the dolerite tors and outside the “scatter field” as drawn by Thorpe et al (1991). Zn (88 ppm) is also

substantially higher, as are Ti (5342 ppm) and Ca (58871 ppm). On the other hand the following have very low comparative readings: As (5.6 ppm), Al (17139 ppm) and Mg (2410 ppm).

There is inadequate data for the creation of scatter diagrams or bivariate graphs involving the Limeslade boulder ppm readings. So it is not possible at present to say that the pXRF readings occupy a different visualised “compositional space” for trace elements than the readings for the Preseli tors.

However, following an investigation of thin sections taken from a boulder sample (Fig 5), Dr Steve Parry characterises the rock as an ophitic microgabbro. He states that in terms of its state of alteration, the constituent feldspar is argillized and some of the pyroxene appears to be uralitized, but he concludes that this is by no means a pervasively altered rock.

He reports as follows: *In detail, it can be stated that medium- to coarse-crystalline (clino-)pyroxene (the relatively strongly coloured, high relief mineral seen in PPL or plane-polarised light) is intergrown with, and commonly ophitically encloses, variably elongate, chiefly medium-crystalline, prisms of plagioclase. The pyroxene shows evidence of incipient uralitization (giving rise to a fibrous appearance and lower order interference colours seen in cross-polarized light images), while the feldspar is argillized to a greater or lesser extent (reflected in its variably turbid appearance in PPL). Localized remobilisation and overprinting by opaque material (presumably oxides of Fe and/or Ti) provides further evidence of alteration. Inferably late, interstitial, developments of*

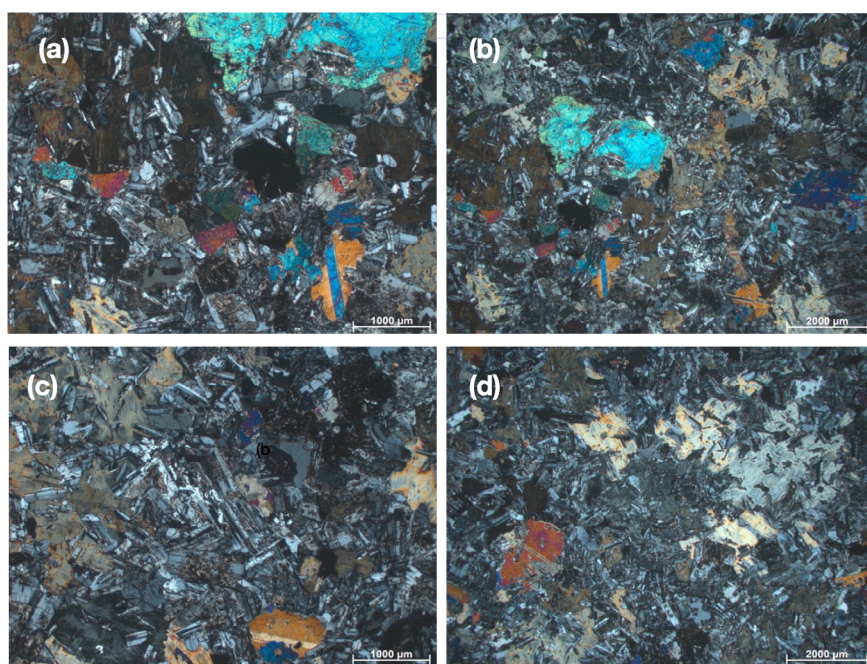


Figure 5. Thin sections (photomicrographs) from the Limeslade samples, showing general textural characteristics, courtesy Dr Steve Parry. Note the different scales. Image (a) is an enlargement of part of image (b).

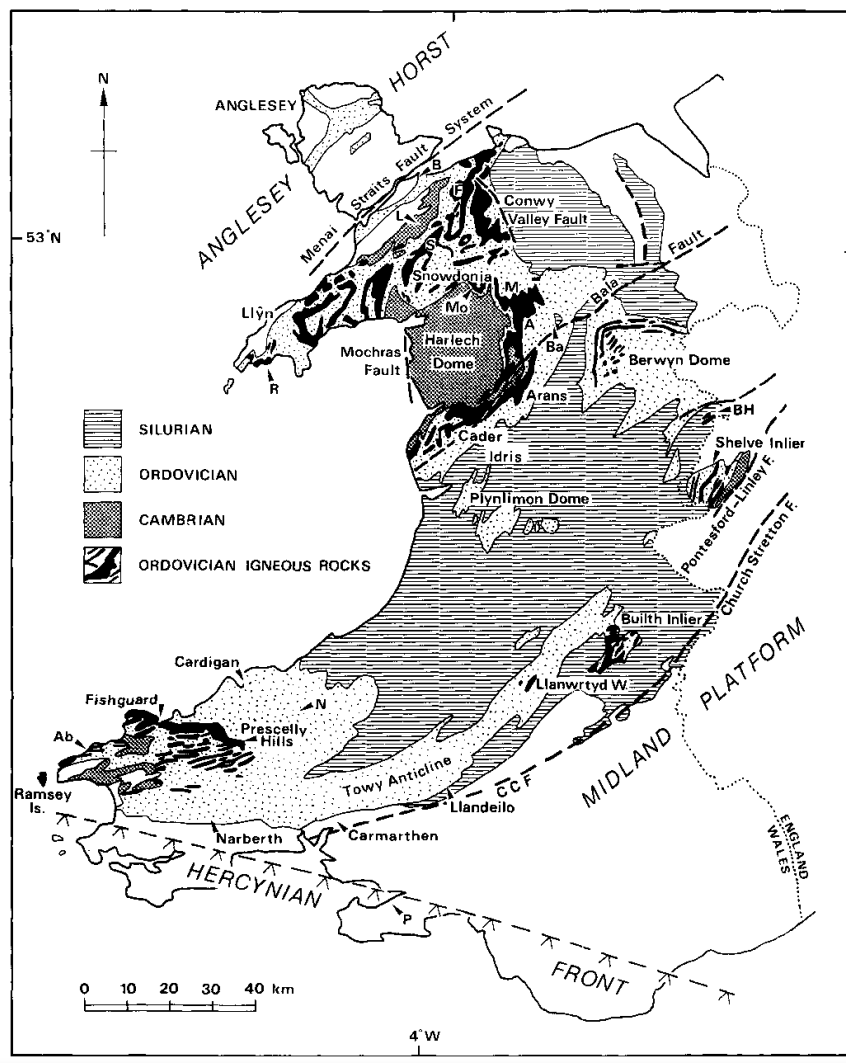


Figure 6. Ordovician igneous rocks: outcrops in Wales shown in black. (Source: Kokelaar et al, 1984)

quartz occur sporadically, and their occurrence is typically marked by more intense alteration of the neighbouring pyroxene and feldspar.

In summary, Dr Parry suggests that there is nothing about the petrology or geochemistry which is exceptional or particularly noteworthy. Micro-gabbro intrusions of this general type are not unusual in the Lower Palaeozoic successions of Wales (Fig. 6), but at present it would be unwise to suggest a specific age or provenance. Material of this general type does occur at Stonehenge, but further studies are needed to determine whether the erratic is a possible match for any of the bluestones or debitage.

It is already well established through detailed petrological and geochemical research that almost all of the known spotted and unspotted dolerites in the Stonehenge bluestone assemblage have come from Preseli, although there is still doubt about the precise provenances of analysed samples (Thomas, 1923; Ixer & Bevins, 2017; Bevins et al, 2014; Bevins, Pearce & Ixer, 2021). There is also an important association with rhyolite standing stones and debitage

at Stonehenge, apparently having come from the northern flanks of Mynydd Preseli. Preseli unspotted dolerite is also found in hand axes, and the Implement Petrology Group has classified it as “group XIIIb”, assuming that at least some of the axes were made in Neolithic or Bronze Age times from destroyed bluestones or “knock-offs” at Stonehenge. “The group comprises altered sub-ophitic dolerite, originally with clinopyroxene-plagioclase-titanomagnetite-ilmenite-apatite intergrowths. Alteration is widespread and secondary minerals include albite, muscovite, chlorite, epidote, clinozoisite, actinolite, quartz, pyrite, titanite, pumpellyite and prehnite” (Ixer and Bevins, 2018). However, there are substantial differences between samples, probably precluding a common source. Again, more detailed petrological and geochemical analyses are needed.

On the basis of this research it can be tentatively suggested that the Limeslade boulder has not come from a Mynydd Preseli outcrop. It remains to be seen whether there is a closer compositional match with either Precambrian or Ordovician dolerite outcrops in other parts of NW Pembrokeshire. There are scores

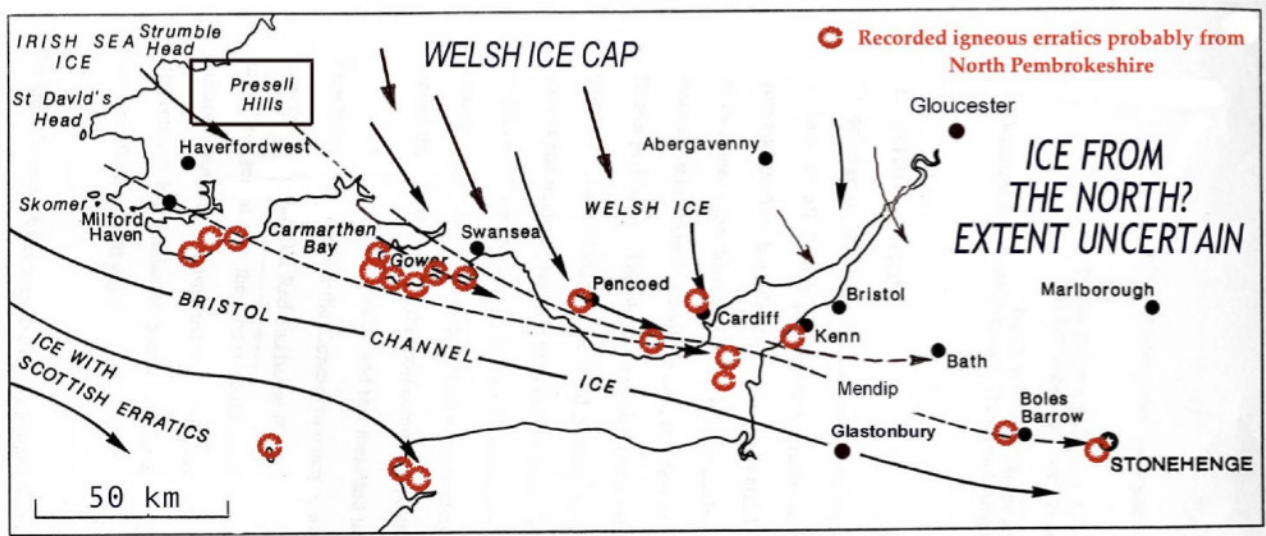


Figure 7. Ice movement directions for the Anglian Glacial episode, c 450,000 years ago. Igneous erratic distributions suggest a concentration along the contact zone between Welsh ice and Bristol Channel ice (as part of the Irish Sea Ice Stream). (Base map adapted from Kellaway 1971 with data from Mitchell 1960, Gilbertson and Hawkins 1978, Thorpe and Williams-Thorpe 1991, Williams-Thorpe et al 1991, Boulton and Hagdorn 2006, and Patton et al 2012.)

of outcrops in NW Pembrokeshire (including the St Davids Peninsula, Pen Caer and the Eastern Cleddau catchment) where narrow strips of microgabbro or coarse dolerite with a greenish tinge are exposed at the surface; as noted above, one such occurs at Ogof Golchfa, near Porth Clais (Downes, 2011), and there is another “candidate outcrop” on the prominent summit of Garn Fawr, near Pwllderi. There are other possible sources in mid Wales and in the Welsh borders (Fig. 6). The more distant sources of dolerite, for example in the Cader Idris region, in Llyn, and in Snowdonia, have in the past been considered as possible sources for the Stonehenge unspotted dolerite assemblage, but dismissed on the grounds that they are physically not well matched (Kokelaar et al, 1984; Williams-Thorpe et al, 2006; Bevins et al, 2014).

The History of the Boulder

As for the mode of transport and deposition of the Limeslade boulder, it might be claimed that it is a bluestone monolith transported by human beings and then dropped accidentally or as a result of a shipwreck in this exposed and dangerous coastal location. Atkinson (1979), Green (1997) and many others have suggested that stone-bearing seafarers passed this way, *en route* for Stonehenge. However, the boulder is an irregularly shaped lump of rock rather than an elegant pillar, and it is considerably larger and heavier than most of the Stonehenge bluestones. No evidence has ever been produced to show that in the Neolithic tribesmen from West Wales had either the technical

ability or the vessels capable of transporting rocks of this size and in this environment (John, 2018).

Could the erratic be a “drop stone” transported by floating ice and then dumped on the shore at a time of relatively high sea-level? This mechanism has been discussed at great length with respect to the giant erratics on the coasts of Devon and Cornwall (Lewis (ed), 1970). The biggest problem with this “IRD” (ice rafted debris) hypothesis is that when conditions are cold enough for the presence of floating dirty icebergs in the Bristol Channel, sea level must inevitably be more than 100m lower than its present position, with a coastline far out on the Celtic Shelf. The only mechanism, at such a time, for the establishment of an active coastline in more or less its present position is isostatic depression of an equivalent value, associated with an ice cover at least 300m thick. Nothing on this scale has yet been discovered or modelled in studies of isostatic adjustments in the Bristol Channel region (Massey et al, 2008; Shennan et al, 2018). Bradley et al (2023), in a study of Devensian palaeo-shoreline positions around the British and Irish coasts, using BRITICE-CHRONO data, demonstrated that the Bristol Channel coasts were far offshore at times of possible ice rafting of debris. This is supported by the study of debris inputs and ice rafting episodes by Fabian et al (2023). However, Scourse (2024) has suggested that there was a substantial glaciation in Early or Middle Devensian time, possibly around 50,000 years ago, with ice from the Irish Sea Ice Stream crossing Pembrokeshire, extending into the

Bristol Channel, and sufficiently thick to depress the crust by around 80 m. This is not supported by the field evidence, since on the southern coast of Cardigan Bay the Quaternary sediment sequence shows only one glacial episode following the Ipswichian Interglacial — namely the Late Devensian LGM (26,000 years ago). The deposits beneath the LGM Irish Sea till are probably periglacial but do not incorporate any other glacial sediments (John, 1970; McCarroll & Rijdsdijk, 2003; Scourse et al, 2021).

The IRD hypothesis is also incapable of explaining the presence of “high level erratics” in Devon and Cornwall (Madgett & Inglis, 1987). Paul Berry (2021) has described igneous erratic boulders near Baggy Point at 46 m, 60 m and 80 m altitude, and the famous Shebbear erratic lies at 150 m altitude. Prof Nick Stephens (1998) recorded erratic material in the Ilfracombe - Berrynarbour area, up to an altitude of 150 m - 175 m. High-level erratics were also plotted in the Ilfracombe area by Harmer in his famous “erratic map” published in 1928. The “apparent concentration” of big erratics between the present-day high and low tide marks arises simply because that is where large stones are washed clean by wave action and are exposed to view. Large erratics on the coasts of Devon and Cornwall are not restricted to the intertidal zone, and it is a mystery why glacial transport should be questioned, given that glacial deposits are known on the Isles of Scilly, on Lundy Island (at an altitude of c 105 m) and south of Barnstaple up to an altitude of 60m.

Could the Limeslade erratic boulder have come from the north? This is unlikely (Fig. 7), since the glacial deposits carried by southward-flowing Welsh Ice appear to have contained sandstones, grits, shales, conglomerates, limestones, quartzites and other sedimentary rocks associated with the Carboniferous sequence of the South Wales Coalfield and the Silurian and Ordovician sediments of mid-Wales. There are very few igneous rocks cropping out in a vast area affected by the south-flowing ice of the Welsh Ice Cap — and the only igneous erratics found in the “Welsh” glacial deposits of the Gower are assumed to have been picked up from pre-existing deposits carried in from the west and then laid down by the Irish Sea Glacier (Shakesby and Hiemstra, 2015; Kokelaar, 2021). The directions of ice movement in the Builth Wells and Llanwrtyd Wells area were broadly eastwards and south-eastwards, but there is a chance that igneous erratics from the Llanwrtyd Wells area might have travelled south-westwards along the

Tywi trough during some glacial episodes. There is also a slight possibility that the Limeslade erratic has come from Ireland, since it is widely recognised that ice from the Irish Ice Cap fed into the Irish Sea Ice Stream as it flowed towards the Celtic Sea shelf edge. This option cannot be completely dismissed until further studies are complete.

On balance, the Limeslade boulder is most likely a glacially transported erratic, carried south-eastwards by the ice of the Irish Sea Glacier during one of the Quaternary glacial episodes. It is already known from abundant studies of glacial erratic transport that igneous rocks from North Pembrokeshire were transported southeastwards and then up the Bristol Channel during at least one glacial episode, generally referred to as the Anglian or MIS-12 glaciation. Transport and emplacement might also have occurred during the Late Devensian glacial episode (John, 2023). Dolerites are prominent in the erratic assemblages (Griffiths, 1940; Kellaway, 1971; Thorpe et al, 1991: Lewis (ed), 1970; Lewis and Richards (eds), 2005; John, 2018). This may be because dolerites are more “massive” and are less liable to comminution during transport than other rock types.

Implications

The discovery of this erratic in the SE corner of the Gower Peninsula has a profound bearing on the debate concerning the entrainment and transport of Preseli “bluestones” from West Wales towards Stonehenge. Following the assertion, a century ago, that glacial entrainment and transport would have been impossible (Thomas, 1923), it has been widely accepted by archaeologists that bluestone monoliths were either collected or quarried by tribal groups in Neolithic times and then transported eastwards to Salisbury Plain either by sea or overland. This idea has been supported by some geologists and geomorphologists (Scourse, 1997; Green, 1997; Ixer & Bevins, 2017), although many other earth scientists have been quite prepared to accept that glacial entrainment, transport and emplacement would have been perfectly possible (Judd, 1902; Kellaway, 1970; Thorpe and Williams-Thorpe, 1991; Patton et al, 2012; Elis-Gruffydd, 2017; John, 2018, 2023). In recent years Bevins and Ixer have been part of a research team led by Prof Mike Parker Pearson which has developed a narrative of Neolithic bluestone quarrying at Rhosyfelin and Carn Goedog, the establishment of a “lost circle” of bluestones at Waun Mawn, the transport of bluestones to Stonehenge as part of a ritual featuring

ancestor worship and political unification, and finally the creation of specifically bluestone settings at Stonehenge.

This new narrative has been disputed (for example, by Elis-Gruffydd, 2017 and John et al, 2015) on the grounds that “bluestones” of rhyolite or dolerite were not preferentially used — and were therefore not greatly revered — in West Wales Neolithic stone settings; that the presence of bluestone quarries has not been adequately demonstrated; that the Waun Mawn stone circle (deemed to be a place where bluestone monoliths were “parked up” for several centuries) never actually existed; that no evidence has ever been found to support long-distance bluestone transport across sea or overland; and that the bulk of Stonehenge bluestones are not elegant pillars but heavily weathered and abraded boulders that would not be out of place at any present-day glacier snout (Fig. 8). Nonetheless, the narrative has been repeated multiple times by Parker Pearson and his team (e.g. Parker Pearson et al, 2021), and has been made more complex in spite of a paucity of hard field evidence.

Following Phil Holden’s discovery in January 2022, the assertion that “glacial transport of the bluestones was impossible” (Parker Pearson, 2012) is now unsustainable. The narrative developed by archaeologists over the last decade is based upon questionable assertions. Indeed, there is already a substantial retreat from key components in the story in recent publications (Parker Pearson et al, 2022; Bevins et al, 2022; Pearce et al, 2022; Parker Pearson, 2023).

We still do not know when this erratic might have been entrained by glacier ice, or what route it might have followed. It may have been moved several times, over several glacial episodes, following a zig-zag course. It may have been much larger to start with. And it will be interesting to see whether the provenancing work on fresh samples from the boulder will produce clear results.

A further point of some significance is that the erratic now found on the Gower south coast demonstrates that at some stage the ice of the Irish Sea Glacier or Ice Stream was powerful enough to affect the Gower, resisting the force of Welsh ice coming off the western Coalfield and the Black Mountains (Shakesby & Hiemstra, 1995; Kokelaar, 2021). We do not know precisely where the junction between these two ice streams might have been at the time; but this

new evidence confirms that the ice coming from the W and the NW must have been powerful enough to reach Somerset and quite possibly Wiltshire. (This is already established from the evidence summarised in Figure 7.)

Further work is required. Cosmogenic dating of the boulder surface will be distorted by the fact that it is subject to constant surface abrasion in this high energy wave-lashed environment. However, there are exposures of a cemented raised beach in Limeslade Bay, now widely assumed to be of Ipswichian age (Kokelaar, 2021; Shakesby & Hiemstra, 2015). If it can be established that the raised beach contains boulders and cobbles of the same dolerite rock type as the Limeslade erratic boulder, that would indicate entrainment, transport and emplacement during a pre-Ipswichian glacial episode.

Finally, what are the implications for the interpretation of Stonehenge as a national icon and as one of the wonders of the world? It is indeed a spectacular monument to the aspirations of the Neolithic and Bronze Age tribes who inhabited Salisbury Plain. But once the glacial transport hypothesis is taken seriously, Stonehenge loses much of its aura and marketing potential! It is still enigmatic, but it is now appears that it was built of a wide variety of stones, large and small, from many different provenances, and used more or less where they were found. As noted above, many of the stones have the characteristics of long-abandoned glacial erratics (Fig. 8). Further, since there are only about half as many stones as there should have been in an “immaculate” or completed monument, a reasonable assumption is that it was never completed, having been abandoned by the builders when they simply ran out of stones (John, 2018). There appears to be no convincing evidence to counter that interpretation of the romantic old ruin.

Acknowledgements

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Figure 8. Bluestone SH45, made of spotted dolerite. This was sampled by the OU research team in 1987. (Photo: courtesy Simon Banton) Like most of the other Stonehenge bluestones, this has many of the characteristics of a glacially transported erratic boulder.

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