

Context:

Petroglyphs, geographic orientation, fractures in the sandstone

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# Alignment and geometry of petroglyphs at site DgRw 229

by Nick Doe

Archaeological site DgRw 229 is one of five petroglyph sites on Gabriola Island that have only recently been recorded with the Province's Archaeological Branch, although some have been known to various interested parties and a few residents for years. These five sites are arrayed across the southern interior of the island at locations that, although apparently random, may have had geographical significance to whoever chose them.<sup>1</sup> Because they have now been cleared of their protective covering of moss, these petroglyphs, like many others on the island, are eroding rapidly.<sup>2</sup>

Sites DgRw 224 and -234 can be considered as "outliers" of the well-known Church site (DgRw 192);<sup>3</sup> while sites DgRw 228, -229, -230 are "outliers" of the well-known Boulton site (DgRw 193).<sup>4</sup> These associations however should not be taken as having any significance other than being convenient for reference purposes.

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<sup>1</sup> In compliance with Gabriola Historical & Museum Society policy, I am not including a map. Detailed locations are available to *bona fide* researchers and other interested persons upon application from the BC Heritage Branch in Victoria, or from the Snuneymuxw First Nation (Dr. Loraine Littlefield). Several of the petroglyphs have been replicated by the museum and stand in the museum grounds. These are much clearer than the originals.

<sup>2</sup> *SHALE* 13, pp.2–6, 2006; *SHALE* 8, pp.2–6, 2004.

<sup>3</sup> Mary & Ted Bentley, *Gabriola: Petroglyph Island*, pp.16–71 (1998 ed.), pp.16–28 (1981 ed.), Sono Nis Press. Formerly the Weldwood site.

<sup>4</sup> So-called because it was discovered by Molly Boulton, Nelder's daughter. See Mary & Ted Bentley (*ibid*), pp.72–82 (1998 ed.).

Amanda Adams included three of the five sites—DgRw 224, -229 (her UR1), and -230 (her UR3)—in a stylistic analysis of Gabriola's petroglyphs,<sup>5</sup> but a study of the geographical alignment and geometry has only been made of one of them, DgRw 228. This highly-geometric petroglyph appears to be a solar calendar.<sup>6</sup>

All previous published work on the petroglyphs at the Church and Boulton sites has either completely ignored, or left unrecognized, the alignment aspect—particularly the geographical alignment aspect—of their design. Unfortunately, this means that studying them with this perspective in mind is not possible using existing archival records or replicas.

## Geographical alignments

In an earlier article, I described how it is possible to accurately determine geographic direction in a "rainforest" by observing the movement of the shadows of tall trees, and that there is evidence that this technique was used by the petroglyph designers at some sites, including DgRw 229.<sup>7</sup>

In another article, yet to be published, I report a study of the origin and alignment of

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<sup>5</sup> Amanda Adams, *Visions cast on stone: A stylistic analysis of the petroglyphs of Gabriola Island, BC*, MA thesis, UBC, 2003. A summary is in this issue of *SHALE*.

<sup>6</sup> Nick Doe, *A most unusual petroglyph*, *SHALE* 10, pp.25–36, 2005. There are actually two glyphs.

<sup>7</sup> Nick Doe, *Petroglyphs and equinoxes*, *SHALE* 14, pp.10–14, 2006.

the long linear fractures that occur in the sandstone bedrock all over the island. These fractures are not randomly oriented, and, again, as I hope to show, some petroglyph designers were very aware of this. In principle (I've never tried it), a good scout-guide, without a compass on a foggy day, could find his/her way home from the interior of the island by looking at fractures.<sup>8</sup>

## Glyphs at -229

There are five petroglyphs at DgRw 229 (counting side-by-side “twins” as one). All lie flat on ground rising gently to the west.

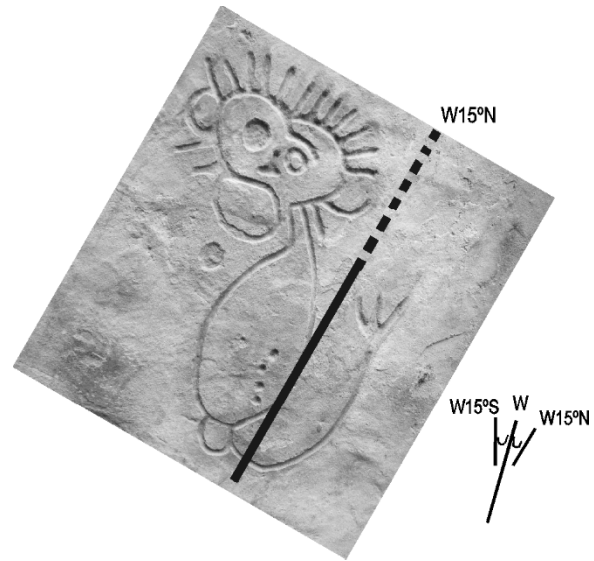
The largest is a striking anthropomorphic figure, familiar to most Gabriolans because its replica stands at the entrance to the driveway to the museum. It is shown on the front cover of this issue of *SHALE*. The original is, by my reckoning, about 1.27 metres tall.<sup>9</sup> The line passing through the creature's right hand and eyebrow is a representation of a natural fracture.

The second glyph is a curious “abstract” figure.<sup>10</sup> It is replicated on the back of the first at the museum entrance and the replica is shown in the picture above.

<sup>8</sup> For the benefit of non-residents, I should add that terms like “interior”, “south”, and “north” are frequently used by Gabriolans to reflect historical settlement patterns rather than being literal descriptors. The “north end” is anything west of Ferne and Tait, excepting areas between Brickyard Hill and Hoggan Lake. The “interior” is the forested land more than about 200 feet above sea level, and the term usually excludes low-lying farmland at the south (that is, east) end of the island. The “east end” is part of the “south end”, and roughly east of Peterson, but the “north shore” runs all the way from Orlebar (Berry) Point to Law Point, and so on. It all makes sense if you live here.

<sup>9</sup> Amanda Adams (*ibid*), Fig. A20, p.63. It is not shown in either edition of the Bentleys' book.

<sup>10</sup> Amanda Adams (*ibid*), Fig. A21, p.63.



Museum replica of an “abstract” figure at DgRw 229 from a rubbing by Mary Bentley (GHMS Archives DGRW-229/1). The black line shows part of an unrepresented fracture (W15°N, S left), exactly parallel to the one across the large glyph, but less conspicuous. It is however shown accurately in Mary's field sketch. The middle “finger” of the tail points exactly west and those either side of it  $\pm 15^\circ$ .

The third and fourth figures are considerably smaller and fainter anthropomorphs

The third has a heart-shaped face, triangular nose, and lies midway between the first and second.

The fourth is a set of “twins” with one face, either never completed or so weathered that only half can still



GHMS Archives  
DgRw 229 3 & 4

be discerned, and then only with difficulty.

The fifth lies between 7.3 and 8.3 metres (24–27 ft.) from, and roughly to the west (280–330°) of, the main group on the other side of the trail. I have never seen this glyph as the area where it lies is thickly covered with moss and accumulated organic matter. I was told that it is simple in style and may be the faces of another set of twins.<sup>11</sup>

In addition to the five petroglyphs, there is a simple line that could be ignored were it not for the fact that it runs pretty-well *exactly* east-west. A picture of it is shown in *SHALE* 14, page 14. It lies close to the largest glyph, about 0.7 metres north.

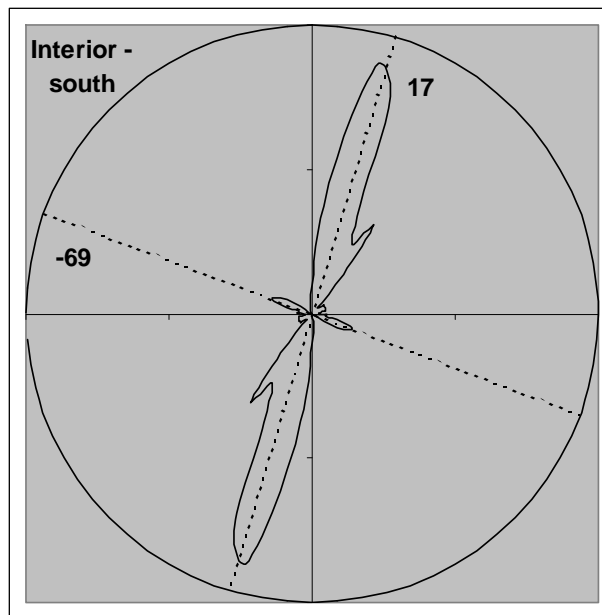
### ***Orientations***

As far as one can tell, the first three glyphs are intended to be viewed from the same direction, namely looking W15°S (255°). The twins though are turned around and you have to view them looking about E15°S (105°) along the line of the fractures.

### **Natural fractures**

Although it would appear to the casual observer that the many parallel fractures in the sandstone bedrock of Gabriola have orientations that are unrelated from one location to the next, and that they are of no particular significance, this is not true.

A few years ago, I spent a couple of months surveying the fractures easily seen everywhere on the island's beaches and, less frequently, in the patches of bare sandstone in the interior of the island. In all, I measured the orientation of over 700 fractures. At some locations, several sets of



The geographical orientation of 72 fractures at various locations scattered over the “south” half of the interior of the island. True north is at the top. Only long linear fractures are included; joints have a wider distribution of orientations and often meander or are not straight.

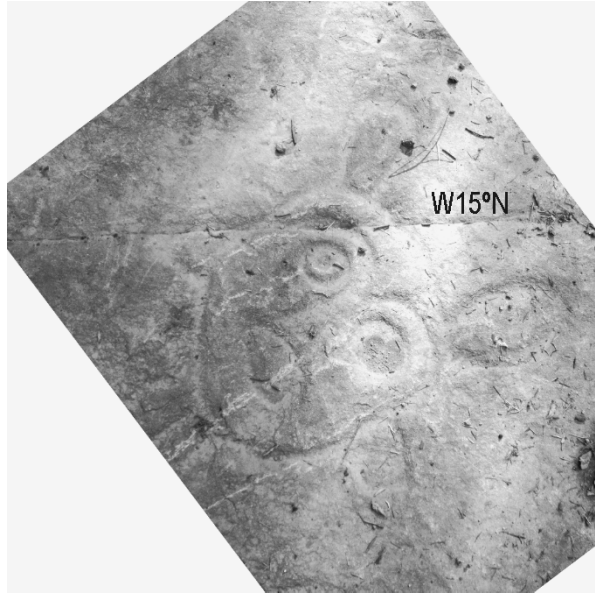
The majority of the fractures cluster around N17°E (17°), but there is a related, almost orthogonal, set at W21°N, (291° or –69°).

At the Church site, there are 17°-variants that actually run at N27°E (27°). These produce the small “spike” on the clockwise side of the main 17° axis of the polar plot above.

fractures are present with a bewildering variety of orientations, but at others, the pattern is simpler. This is especially so in the interior of the island and as the diagram above shows, in the area within a few kilometres of DgRw 229.

Many of these fractures date back to the Eocene, 42–55 million years ago, when thrusting and counter-thrusting along a SW–NE axis folded and uplifted the seafloor to create what are now the Gulf Islands. The fractures have their origin in ancient events in the floor of the Pacific Ocean thousands of kilometres away and

<sup>11</sup> It is not in any official record. The moss is frequently churned up by cross-country vehicles.



*Left:* One of many cross-bedding shear fractures that stretch across sandstone bedrock in a N17°E (17°) direction in the Gulf Islands. The fractures likely date back to the Eocene when the Nanaimo basin was gently folded by (roughly) SW-NE compression. Sandstone patches like these form glades, and where irrigated by seepage in spring, are covered with bryophytes, grasses, lichen, and wildflowers, but patches in this area have been rendered sterile by various human activities.

Axial fold fractures (SE-NW) at right angles to the compression have an orientation of W17°N (287°), which is very close to the orientation of the fracture, *top centre*, passing through the largest figure at DgRw 229, about 1.5 kilometres away from the fracture on the left.

*Bottom right:* Two sets of parallel fractures in sandstone on Gabriola. In the “southern” half of the interior of the island, the sets commonly intersect at right angles while those in the “northern” half of the interior, where there are no petroglyphs, more usually intersect obliquely at close to 60°. This small slab at DgRw 234 is not typical in that the sets cross at about 73°, but what may have attracted attention (a surmise only) is that the axial fractures (out of the bottom edge of the picture) are a rare example of natural fractures that run exactly east-west.

their orientations are not due only to very local circumstances but have island-wide and region-wide significance.

Even a casual inspection of petroglyphs on the island shows that fractures were of some significance to the designers. They (assuming more than one) did not go out of their way to avoid fractures as a modern artist might do. Patches of fracture-free sandstone (blank canvases) are not uncommon, yet are only occasionally used for petroglyphs.

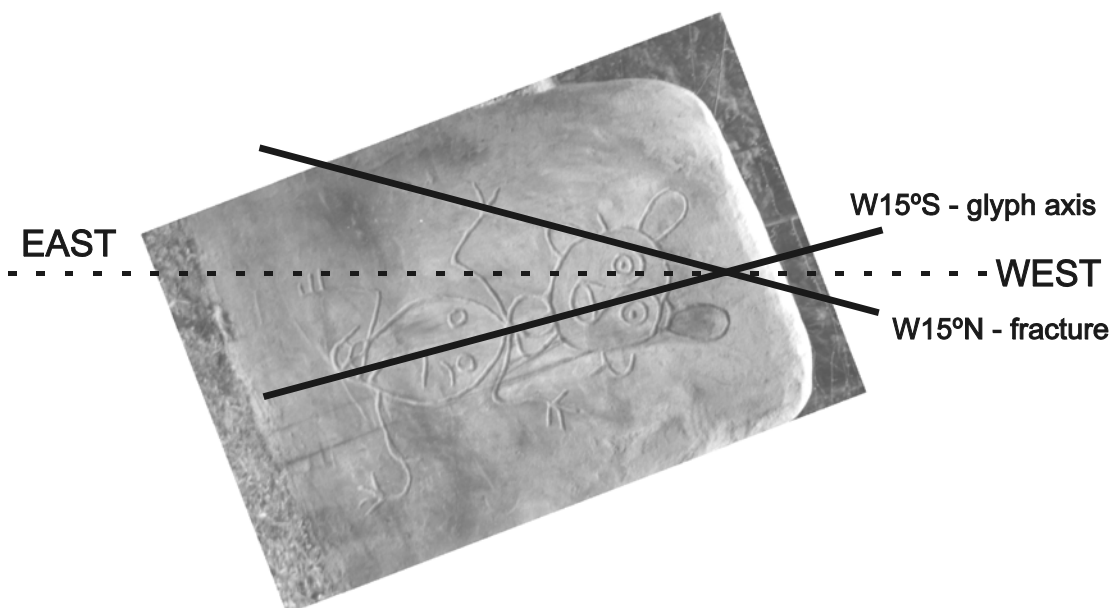
Some fractures are incorporated into the design as if they were part of it, for example, the large “serpent” figures at the Boulton site (Bentleys, *ibid*, p.73, 1998 ed.) and Stokes site (DgRw 198, Bentleys, *ibid*, p.88–9, 1998 ed.), but at DgRw 229 and other locations, they appear at first glance to be just “flaws”.

### Alignment and geometry

My motivation for looking at the geometry of the glyphs at DgRw 229 was to find further evidence in support of my

interpretation of DgRw 228 as a solar calendar. It would, I figured, be rather strange if this were to be the only petroglyph with a geometric aspect to its design. As it turns out, all the petroglyphs in the area around DgRw 228 are, to varying degrees, both geometrical and geographically aligned. The main reason this has hitherto been overlooked is that the alignments involve combinations of both geographical directions (meridians and lines of constant latitude) and directions defined by the natural linear fractures in the rock. The petroglyph designers were interested, not only in alignment relative to the heavens—the sun and stars—but also relative to the earth.

The first thing to notice is that the line of the natural fracture on the major figure, W15°N (285°), and the line of the spine W15°S (255°) exactly bracket east-west (line of constant latitude). But for the simple nearby east-west line (the sixth “petroglyph”), this could be deemed mere coincidence, but I’m quite sure that it is not.



Continuing on the geographical theme, the next thing to observe is that the two deep-pecked “dots” on what looks to me suspiciously like the pecker<sup>12</sup> of the major figure, lie almost directly north (357° by my compass) of two similar deep-pecked “dots” on the abstract figure.

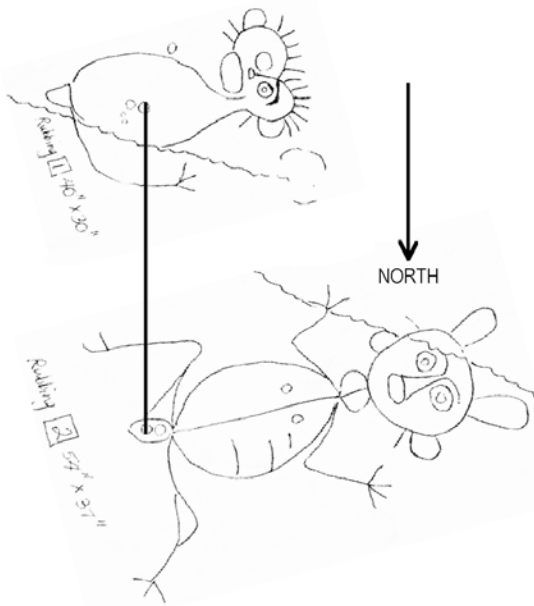


The next step was to consider the geometrical relationships between the four visible glyphs.

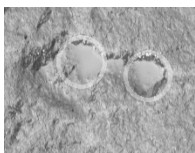
The two large glyphs have been used to define where the smaller ones “should” be. One problem here is that distances and directions from the large glyph depend on what part of the glyph you take as a base point. The one that fits best is the glyph’s right eye. It appears to have been more carefully carved than the left eye, though this may be a consequence of erosion, but we can add to this the observation that a carefully carved eye appears to have been used as base points at other sites.

Accepting for the moment that the glyph’s right eye is the reference, then we can note that the third glyph is positioned exactly half way between a line joining the eyes of the two large glyphs. Moreover, the angle of this line (N19°W, 341°) is practically at right angles to the line of the large guy’s spine (W15°S, 255°).

And if we were to take a line from the large glyph’s eye in a direction at right angles to the fracture passing by his eyebrow, where would we end up? Answer—at the fourth glyph. And where is the fourth glyph relative to the second? In the direction of the spine. The assemblage thus makes a quite remarkable integrated whole.



Adaption of Mary Bentley sketch, GHMS Archives



Four “dots”, two on each figure, directly north-south of each other.



The distinctive dots, which are common on petroglyphs on Gabriola, are 20 mm in diameter and 50 mm apart.

<sup>12</sup> John Thomas. Chances are good that the carver had a sense of humour. It is not reproduced in the museum replica. Similar features occur at DgRw 198, DgRw 201, (Bentleys, *ibid*, p.87 & 97, 1998 ed.), and DgRw 224.

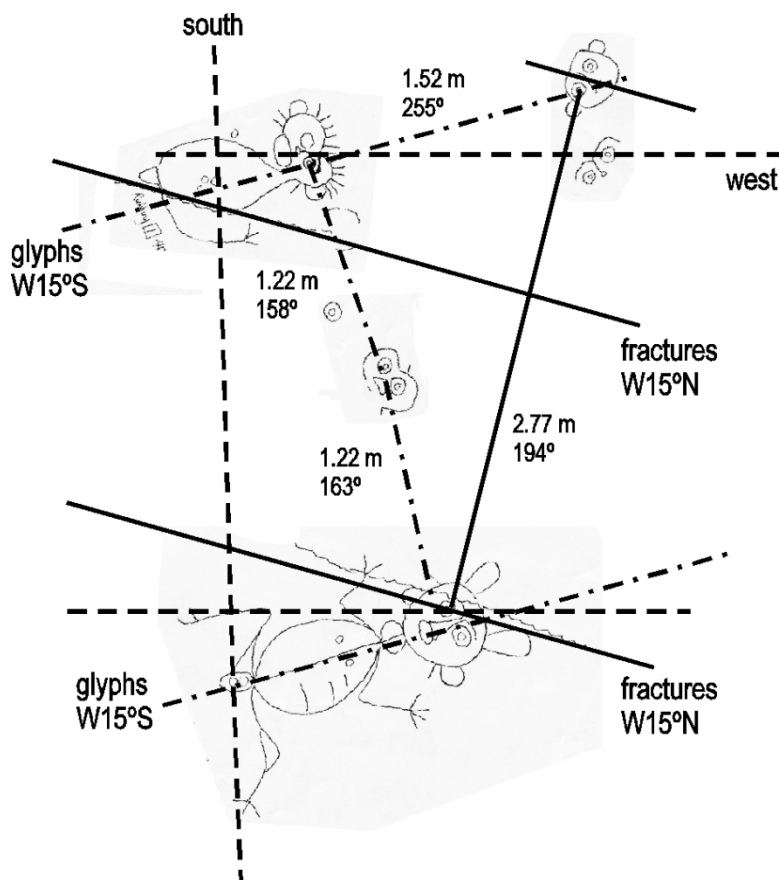
The design of the layout of the petroglyphs at DgRw 229 is based on three sets of orthogonal axes.

One set is defined by the fractures in the rock (W15°N, 285°) and (N15°E, 15°).

Another is defined by the orientation of the glyphs (W15°S, 255°) and (N15°W, 345°).

And a third, lying exactly midway between the other two is defined by geography (W, 270°) and (N, 0°).

Three worlds—the earth below, humankind, and the heavens above.



## Yes, but...

Now this all raises several questions.

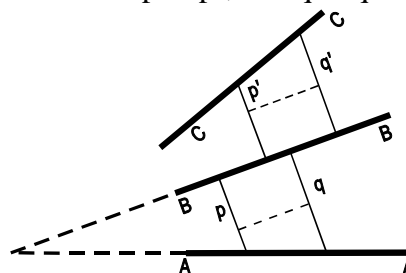
One is, does it tell us anything about what the glyphs mean and what they were for? I have some ideas, but at this point they're just speculations and no better than yours.

A second question might be, how do you know that the alignments and orientations are not a series of coincidences and how do you know that the panel was intelligently designed? The answer I believe is to find more examples at other sites. This has already been done and reported at DgRw 228, and although it doesn't strictly belong in this article, I've included a "sidebox" on research, not yet completed, on similar alignments and geometrical complexities at DgRw 192.

A third question is, how did they do it? "it" being draw a line at the same angle from a

reference as a line on the other side of the reference. Given AA and BB, find CC.

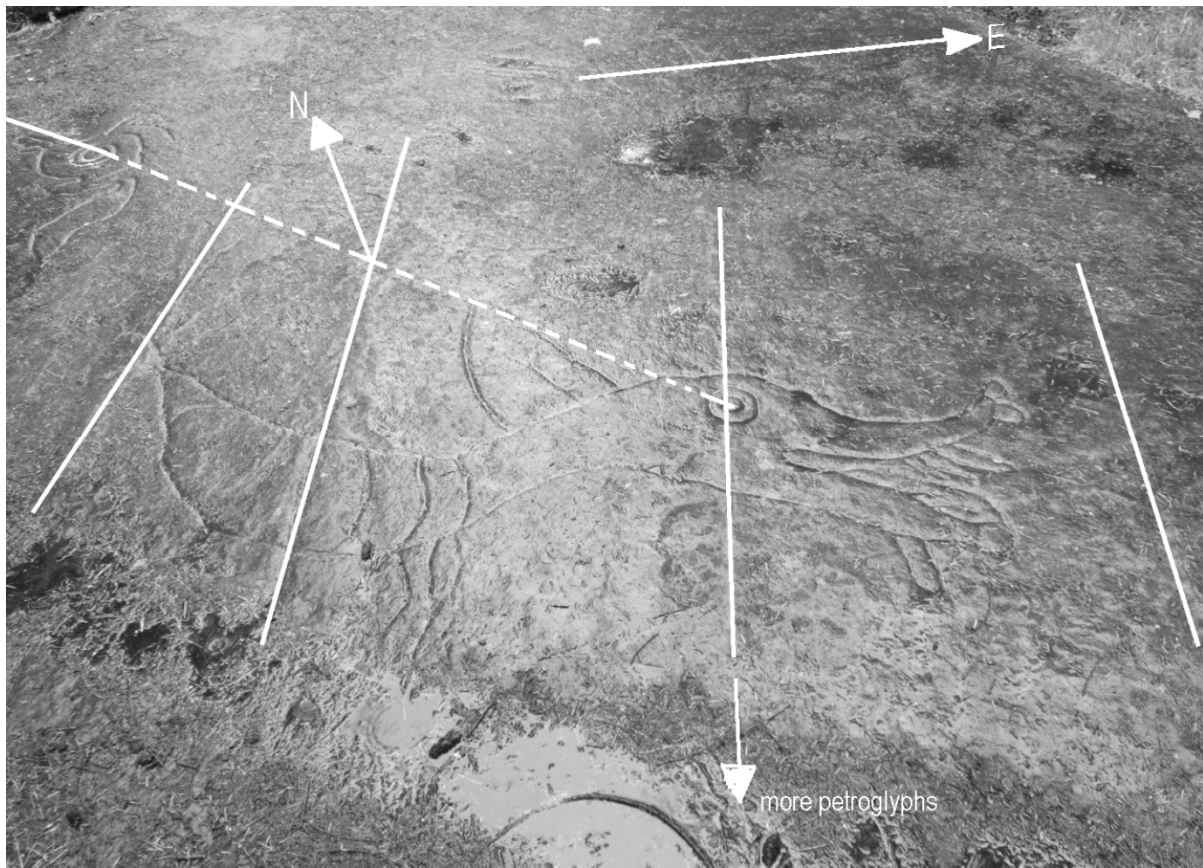
It's easy. Put sticks p and q at right angles to BB. Move p to p', and q to q'



maintaining the distance between them, and CC is defined.<sup>13</sup>

<sup>13</sup> The three lines may, but don't have to, meet at a point. Putting p and q at right angles to AA, not BB, also works, but not for angles more than 20°, a mistake the carver may have occasionally made.





Four of a large set of parallel fractures that are common at the Church site (DgRw 192) illustrate the importance of such features to the petroglyph carver(s).

One fracture passes through the creature's eye (Bentleys A7); another forms an addition to its "waistbands"; and a third passes right by the base of its tail. The set runs at N27°E and the whole figure is intended to be viewed looking in that direction. The fractures are less conspicuous than usual because they have been partially healed by "thick-lip weathering" of iron-rich minerals to *limonite*, and they have also been cleared of moss that normally grows in the cracks.

If you start at the mythical creature's well-defined eye, and look 2.67 metres along a sightline that is almost as equally west of the north-south meridian as the fractures are east of it, that is at N32°W, you find yourself looking directly at the equally well-defined eye of a second mythical creature (Bentleys A10; *ibid*, pp.18–9, 1998 ed.). And if you continue in that exact same direction for another 7.14 metres ( $2.67 \times 2.67$ ), you come to another two well-defined eyes (Bentleys A17; *ibid*, p.30, 1998 ed.). If you follow exactly the direction of the third fracture from the left into the picture, you again travel from one eye to another, this time in a curious "abstract" feature—a human fetus?—(Bentleys A1, *ibid*, p.16, 1998 ed.) reminiscent of the twinned one at DgRw 229. And if you closely follow the direction of this fracture in the opposite direction (toward the camera) through the trees, you come to another major petroglyph panel at the Church site, which contains of course, more eyes (Bentleys C13, *ibid*, pp.42–3, 1998 ed.). A few metres away is the well-known "mythical sea creature" (Bentleys ?, *ibid*, p.70, 1981 ed.), and if you carefully return from it along N27°E you arrive back where you were before (Bentleys A17). You will have noticed before you left that another "waistband" (Bentleys, C9, *ibid*, pp.46–7, 1998 ed.) is also a N27°E fracture.

These may be coincidences, but I found it hard after a while to find an alignment that did *not* appear significant, and by following the rules, I found one petroglyph I was previously unaware of. Although there is no line running east-west, the major axis of the (unfinished?) zoomorphic figure at the top of the photograph (Bentleys A2) lies within a degree of east-west. Whoever carved the glyphs knew a lot about the orientation of fractures and geographical directions.



A fetus? A possible interpretation of Bentleys' A1 at DgRw 192, which, if correct, would suggest that the "abstract" at DgRw 229 with similar features, is a woman pregnant with twins. But then again, perhaps it's a symbolic eclipse of the sun.

## Implications

The implications of these discoveries can only be listed at this stage of the research as "gut feelings", but for all that, here they are:

- these particular petroglyphs were not carved by an adolescent. They were especially not carved by an adolescent in a state of drug, hunger, or sensory-deprived confusion. They were rather carved by a mature and intelligent craftsman who was thinking very carefully about his design, and was very knowledgeable about his physical environment and artistic traditions
- it is probable that these petroglyphs along with those at DgRw 228 and others nearby were designed, if not carved, by the same person
- petrograph panels have to be looked at as a whole and not just as a collection of individual unrelated petroglyphs. It could be that the placement of individual designs usually has no particular significance, but I've not

found this to be the case in any of the eight sites I have looked at

- it is quite likely that, even at the time they were carved, the general populace were not familiar with the details of the design principles at work
- because this and other sites, when left alone by human beings, are covered in mosses, liverworts, grasses, and wildflowers (and delightfully so), we have to assume that in order to integrate them the way they were, either the site was cleared before they were carved (unlikely), or the site was cleared by natural circumstances such as drought or fire, which implies the petroglyphs were carved in the fall or early winter
- the carver may have been a carpenter (they deal with angles all the time) with greater eidetic power than most modern observers
- rays around one figure's head (plumes) are possibly geometric and symbols that the figure is a geometrician
- no archaeological study is complete without an accurate survey and an accounting of the geology of the site.

We may remain startlingly ignorant of what these works were really for and what they can tell us about the character of their designer. I am reminded very much here of Sir Isaac Newton's famous and apt quote:

"I do not know what I may appear to the world; but to myself, I seem to have been only like a boy playing on the sea-shore, and diverting myself in now and then finding a smoother pebble, or a prettier shell than ordinary, whilst the great ocean of truth lay all undiscovered before me."

This only intensifies my feeling of dismay that the carvings are disappearing fast without ever having been given the full attention they deserve. ◇