Context:
Petroglyphs, geographic orientation, fractures in the sandstone

Citation:
Doe, N.A., Alignment of the petroglyphs at sites DgRw 224 and 234, *SHALE* 17, pp.33–40, September 2007.

Errors and omissions:
The larger glyph at DgRw234 is LAW-02 in the Archaeological Branch records, the smaller is LAW-01. The bearing of the -02 from the -01 is closer to 16 metres at 312º than values quoted on page 39.

Later references:
SHALE 17 was a special issue on petroglyphs. See the *SHALE* Index.

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Alignment of the petroglyphs at sites DgRw224 and -234

by Nick Doe

This article is a follow-up to a report of a study of site DgRw 229 and I will be assuming that the reader has read that report.[1] The emphasis in that study was not so much the artistic design of the petroglyphs and their possible spiritual significance, but on their orientations and their physical relationships with each other. This is not to demean the importance of the former, but is rather intended to shed additional light on these mysterious carvings by looking at them from a different and heuristic perspective. This approach was engendered by the discovery that a related site, DgRw 228, is a geometrically-complex solar calendar.

Archaeological sites DgRw 224 and -234 can be considered as "outliers" of the well-known Church site on Gabriola (DgRw 192). Like other smaller petroglyph sites in the area, particularly DgRw 228, -229, and -230, these two sites are relatively simple, comprising, so far is known, only, at most, three glyphs each. They all sit on small isolated patches of sandstone in the "southern interior" of the island, by which I mean east of Ferne and Tait Road, and more than 200 feet above sea level. Since losing their covering of moss and decayed organic matter, all are eroding rapidily probably due to either salt crystallization or the influx of sodium that weakens the adhesive properties of the clay in the matrix of the sandstone (a feldspathic wacke).

[1] Nick Doe, *Alignment and geometry of petroglyphs at site DgRw-229*, *SHALE* 17, pp.24–32, 2007.

DgRw 224

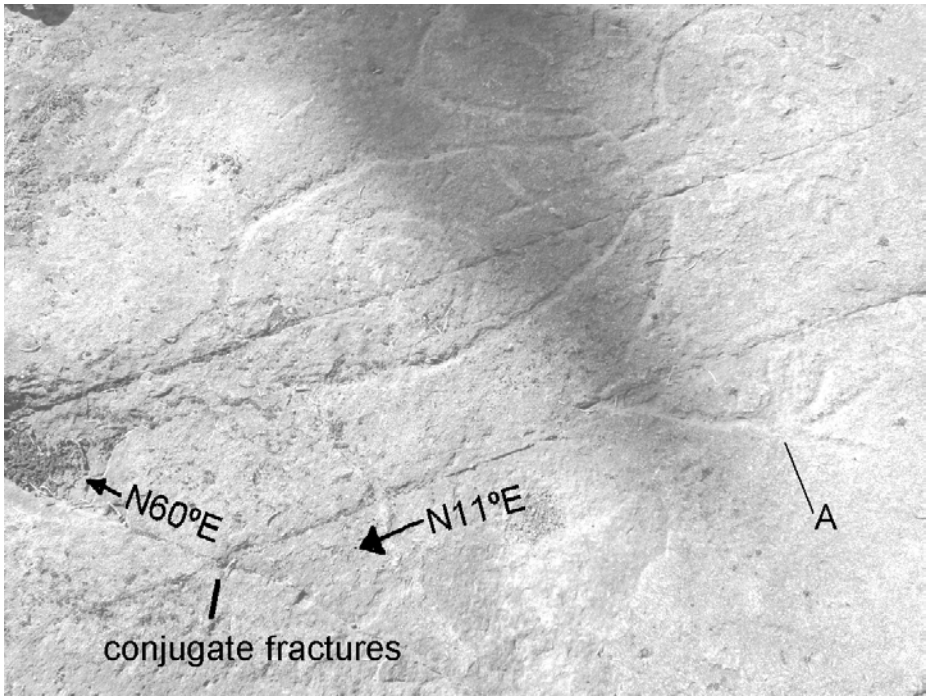
There appears to be only one glyph at DgRw 224, a large anthropomorphic figure.[2] It is difficult to photograph as the lines are faint, but you can see in the photograph that the solitary figure contains concentric "circles" in its belly, and is notable for seemingly incorporating a hemispherical hollow in its design. This hollow is situated by the glyph's right hand (observer's left) and is the result of chemical weathering of a calcareous concretion by acidic rainwater. It is a perfectly natural (and very ancient) feature of the sandstone.[3]

When I first saw the site, I made a routine measurement of the geographical orientation of the glyph.[4] Its main axis, its spine, lies almost north-south, with its head to the south, but "almost" is really not very exciting when one is looking for evidence that the alignment was deliberate and precise. I now know that I was doing the designer an injustice. It was, I believe, never his—I assume a he but without any evidence—it was not his intention to align the glyph north-south, but it *was* his intention to align it precisely.

[2] Amanda Adams, *Visions cast on stone: A stylistic analysis of the petroglyphs of Gabriola Island, BC*, Fig. A22, p.63., MA thesis, UBC, 2003. A summary is in this issue of *SHALE*.

[3] Nick Doe, *Spherical weathering*, *SHALE* 13, pp.39–44, 2006. The hollow and circles are likely related.

[4] Geoff Yendole first showed it to me, he in turn having been shown it by a logger.



At DgRw 224 there are two sets of fractures, one set running at N11ºE and a less definitive set at N60ºE with a few degrees of variation. There are also a few joints and gashes here and there running obliquely at various angles, but these are always short.

The sets are likely conjugate fractures resulting from compression in a NE-SW direction. The most recent folding of the Gulf Islands was in the Neogene, 22-million years ago, but these sets are probably Eocene fractures and as such, twice as old. The designer has incorporated both sets of fractures and true north-south in his design. The two parallel fractures in this photograph are 28 cm (11 in.) apart.

The all-important first step in the analysis of the geometry and alignment of the figure was made when I recognized that the axis of the glyph lay pretty much exactly midway between the north-south meridian and the direction of the major fractures in the sandstone. This quickly led to the realization that the glyph had been designed with numerous alignments involving the geographic coordinates, both sets of major fractures, and the natural hemispherical hollow. I've shown these in the accompanying photographs and captions.

Complicated though the construction may seem on looking at the diagrams, the basic principles are very simple. All that the designer needed to do was to be able to draw a line at right angles to another line, and determine the direction of east and west. All else follows including:

- drawing parallel lines
- bisecting an angle between two lines
- given two intersecting lines, drawing a third line that is offset from either one by the angle between the other two.

As at DgRw 229, the figure's (unerect) penis, P, is a "focal point".

The "circles"

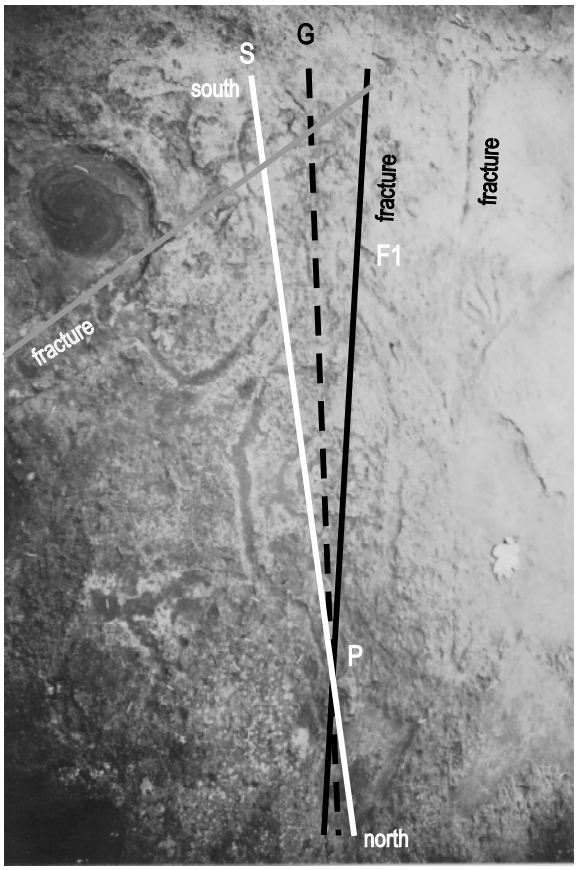
The "circles" in the figure's belly and, like those at DgRw 228, an integral part of the geometry of the design. There are actually three elements present but it is extraordinarily difficult to photograph all three at the same time as they are each seen best under differing lighting conditions and degrees of wetness. It really requires a stereoscopic camera. They appear to be incomplete in that the line of the elements has been pecked, but the rock between the holes have not always been completely abraded.

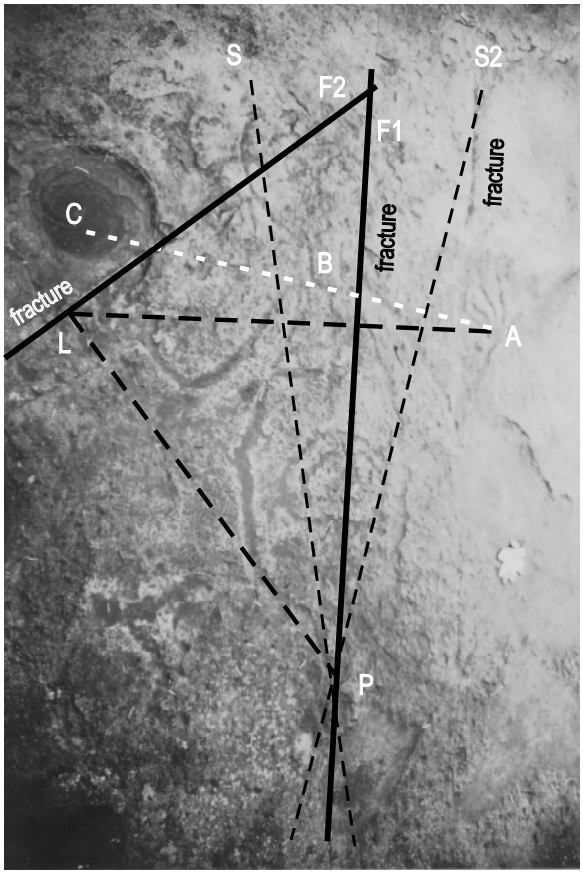
At DgRw 224, bedding-perpendicular shear fractures run at N11ºE (11º) and N60ºE (60º).

One such fracture, P-F1, cuts obliquely through the entire figure at N11ºE. Rather than align the axis of the glyph, P-G, north-south, P-S, what the designer has done is orient it exactly midway between P-F1 and P-S at N5.5ºE. The convergence of the three lines, P, is the glyph's unerect penis. The lines P-S and P-F1 were likely intended to be tangential to the smallest "circle" in the figure's belly.

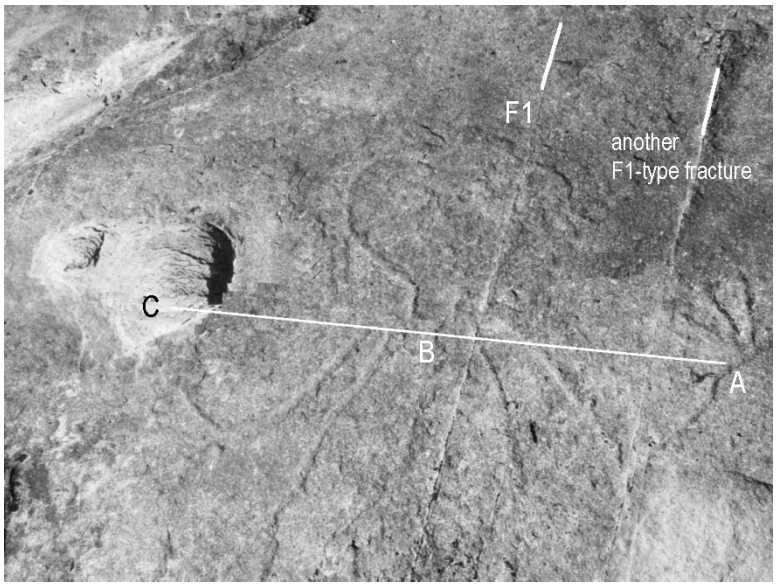
Two deep "pits", one in the palm of the glyph's left hand, A, and another at its Adam's apple, B, define a line AB passing through the centre of the natural hollow, C. The line ABC is perpendicular to a line P-S2 which like P-S is inclined at 11º to P-F1. P-S2 grazes and probably defines the outer edge of the "circles".

A line from A at right angles to the fracture line P-F1 meets a second fracture at L. The fracture L-F2 runs at N60ºE (60º). A line at right angles to this fracture, L-F2, through L returns us to P.



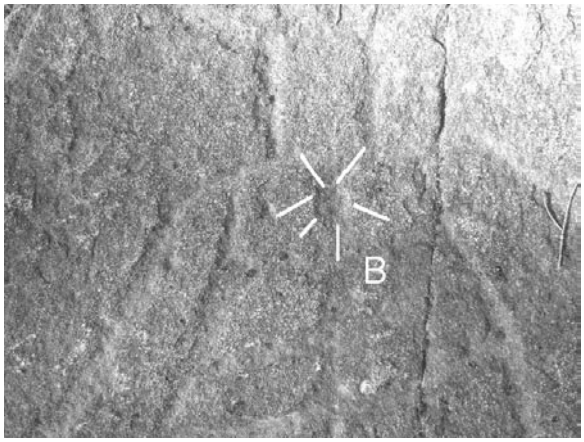


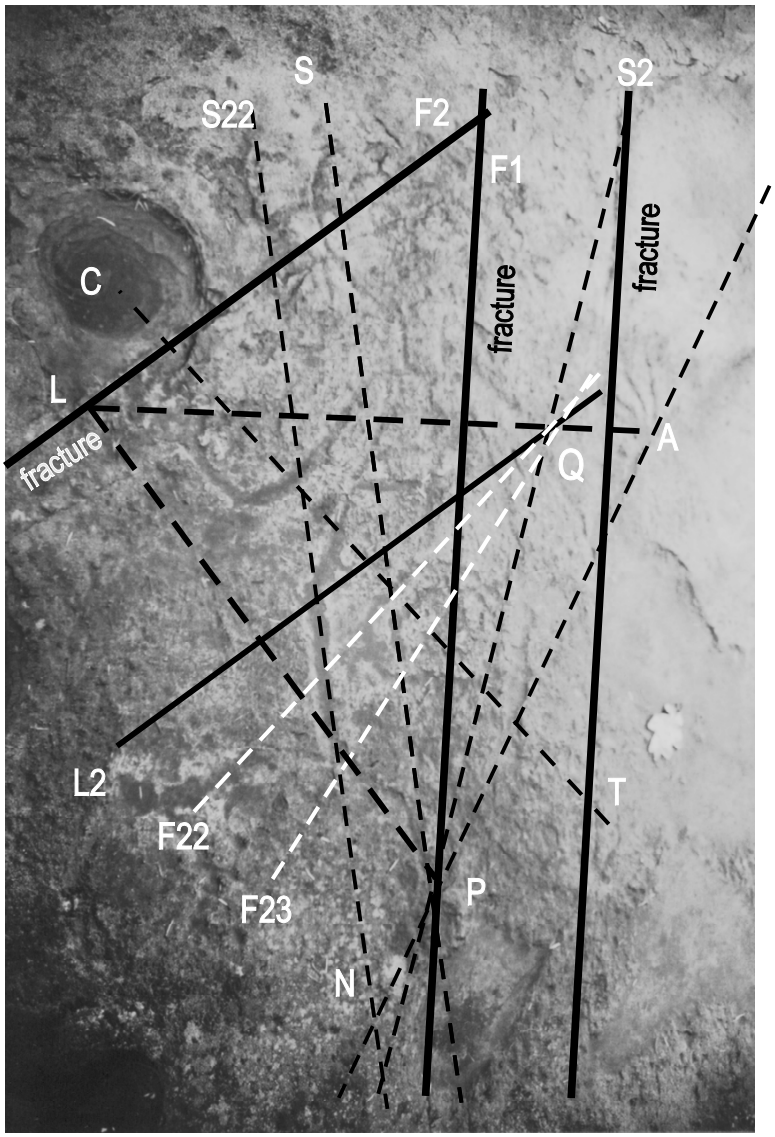
Possibly the line, or one of the lines, used by the petroglyph designer at DgRw 224 to mark the geographic coordinates. The 36-inch scale has been set exactly east-west with south at the top of the picture. Just above the scale is a slightly bowed line also running east-west. The slight bow to the south indicates it was either carved slightly before the spring equinox in March, or slightly after the fall equinox in September. The line marks the movement during the day of the shadow of a tree. It is located about 3 metres away to the northeast of the main panel. Similar lines have been found at DgRw 193, DgRw 228, and DgRw 229.



Two deeply-carved small pits at A and B define a line pointing at the centre of the natural hollow C. The glyph's left hand is beautifully carved, and appears to be a copy of the carver's right hand. B corresponds to its Adam's apple. AB is 0.44 metres.

No matter what other purposes the pits may have served, they often seem to have been used by the carver to define the geometry of his figures, as if centre-punched. Reason to suspect he was perhaps also a carpenter.

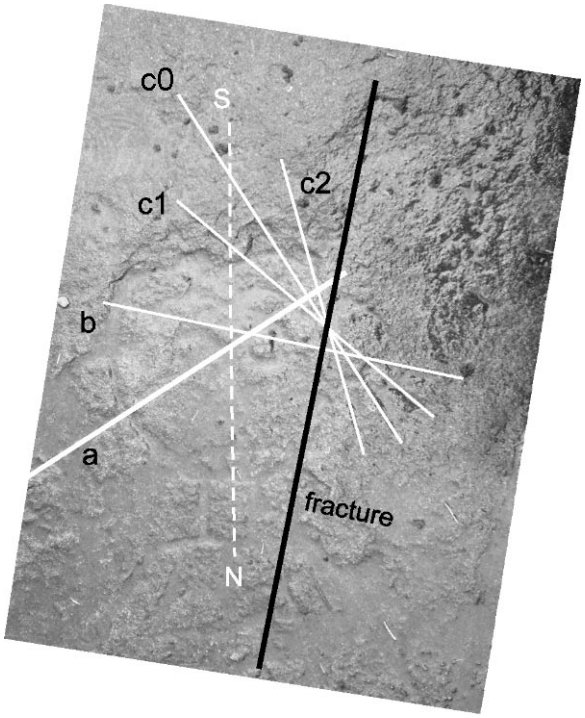




The geometry of the figure is amazingly complex, and yet very simple. The designer has used the same principles to generate new lines over and over again. The line L2-Q is parallel to the natural fracture line L-F2. The line F22-Q is L2-Q rotated 11º, just as P-F1 is P-S rotated 11º. The direction of F22-Q is clearly marked by a deeply carved line tangential to a "circle" (N49ºE). A line F23-Q, which is F22-Q rotated another 11º, passes through the centre of the "circles" on the glyph's spine. The line N-S22 runs exactly north-south (south at the top) and is marked by a deeply carved line on the figure's hip. The start and finish of this line are defined by (L2-Q and N-S22) and (F23-Q and L-P). The line P-A (A is the glyph's palm) is rotated 11º from P-Q which is in turn 11º rotated from the fracture line P-F1. P-A passes right through the glyph's elbow, which is also directly on the natural fracture T-S2, parallel to P-F1. I suspect T (a foot?) terminates a line parallel to P-L and in line with the centre of the "circles" and the pool centre, C, but the area is weathered and I couldn't see anything that had without doubt been carved. There are other lines that are also probably significant but are too short to be sure.

The head appears slightly tilted and aligned for viewing looking directly south, though this could be my subjective impression. The four short "rays" or "plumes" in the vicinity of its left earlobe have geometrical significance—they are not (or are not only) artistic symbols. Its left eye is more carefully carved than its right.

Similar traits are seen in the figures at DgRw 229 and DgRw 198 and my impression is that all were carved by the same person, in which case the 16 rays on the head of the "abstract figure" at DgRw 229 may also indicate that the figure is a geometrician—either human or perhaps a representation of the supernatural being that carved the natural fractures.



The geometry and alignment of the head—that's his right ear between the "a" and "b". The major fracture (black) runs at 11º. The line "b" is at right angles to it (measured 90º+12º). The line "a" is at 45º to the fracture and to "b", measured (45º+11º). The axis of the head alone appears to run north-south. The line "c0" is parallel to L-P. The lines "c1", (148–17º), and "c2", (148+17º), are equally and opposite inclined to "c0". The 17º is probably 1½ times 11º = 16.5º, and is the inclination of P-G to P-S2, which is related to the ratio of the diameters of two of the "circles" in the large glyph (3:1).

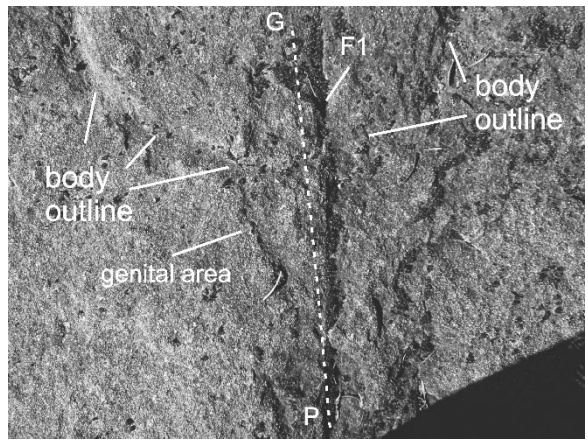
The width of the face, not including ears, is about 22 cm (8½ in.).

Although I'm calling them "circles", they are only roughly that and the outer one especially is better described as an arc.

The inner circle, measured in the field, is about 6–7 cm in diameter and subtends an angle of 5.5º (half the fracture offset from true north-south) at P.

The middle circle, measured in the field is about 18 cm in diameter and subtends an angle of about 17º (11º + 5.5º, and 3 × 5.5º) at P—it's three times the size of the inner one.

The outer circle or arc appears to be defined by a deeply carved line on its eastern side—that is, the tangent to the arc appears to have greater importance that the arc itself. It subtends an angle of about 22º (11º + 11º, and 4 × 5.5º) at Q—it's four times the size of the inner one.



The axis of the glyph (dotted, P-G) and the fracture (P-F1) clearly converge at some point P below the body of the glyph between its legs. Unfortunately, the area here is spalled and it is difficult to sort out weathering from carving. It is even possible that the glyph has been vandalized here at some point in the (presumably) distant past.

Genitalia were apparently rarely explicitly depicted in Northwest Coast art before the beginning of the Gulf of Georgia phase, *ca* 1000 AD.

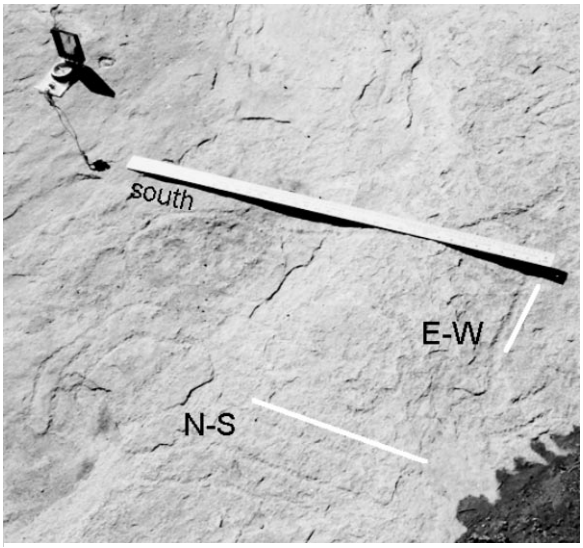
The large glyph at DgRw 234 is a slightly mischievous looking creature with teeth. It is very faint and difficult to see, yet alone photograph. Its head is on the right. The ruler is 36 inches.

DgRw 234

The DgR 234 site is the least-known site of those discussed here, and so far as know, no rubbings have ever been made of the two petroglyphs at the site. The site is unusual in that althought the main fractures in the sandstone run N17°E, as do many others in the area, a set of subsidiary fractures run exactly east-west.

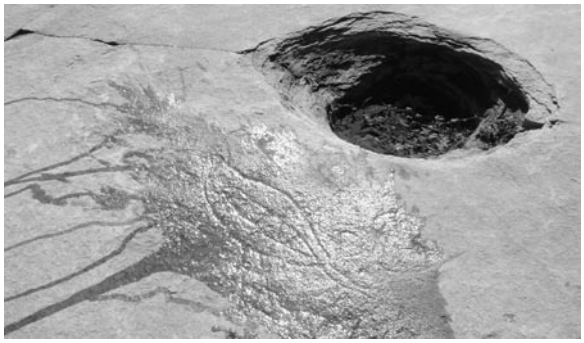
The larger glyph is a "sea wolf" similar in general style to that at DgRw 230, DgRw 193, and other sites. Like the creature at DgRw 230, it faces north. The smaller one is 17 metres away to the SE (the line of sight from smaller to bigger is 325°) and has to be described as an "abstract", but I'm sure this is only because some of the detail has completely eroded away. What remains is faint and could only be photographed by adding water.

The larger glyph incorporates both east-west and north-south lines in its design. As explained in the caption, the orientation of the smaller glyph is related to both



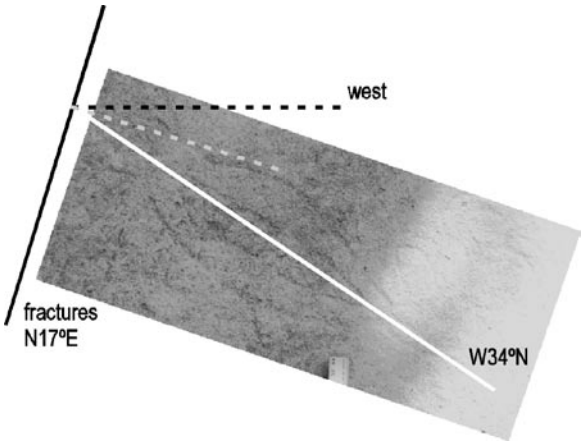
Part of the larger glyph—its tail is near the bottom of the lefthand edge of the photograph. Lines in its design run exactly east-west and north-south. The east-west line is particularly deeply carved.

Note: These orientations are wrongly described in the Archaeological Branch records. The picture was taken at 1:00 pm PST, which is what the shadows indicate.



The smaller glyph at DgRw 234. The visible "fish-shape" is 450 mm long but there is faint detail beyond that. The hole is the remnant of a calcareous concretion. These are common and ancient features of sandstone.

Although such carvings are said to be a thousand or more years old, the weathering rate would have to be less than 3μm a^{-1} for this to be true, which is much less than the current rate. However, although none of the petroglyph surfaces show any trace of glacial wear, such traces that must be more than ten-thousand years old can be seen on near-by surfaces recently exposed by removal of several feet of protective overburden.



The glyph is oriented W34°N (304°). Exactly midway between its axis and the true east-west axis is an axis at right angles to the major fractures in this and adjacent areas, N17°E. On its own, this could be dismissed as coincidence, but examples of such relationships between fracture, glyph, and geographic axes are found at all of the sites in this area.

geographic east-west, and "east-west" as defined by the fractures at this site.

Conclusions

These analyses reveal a completely new and unsuspected aspect to the design of the petroglyphs. It is likely that there are minor mistakes in this work because the glyphs are so badly weathered and research along these lines (so to speak) is in its early stages. It is also possible that there are some fortuitous alignments that were not intentional; however, the sheer number of alignments at multiple sites completely rules out this being an explanation for all of them.

All the petroglyphs in this area have to be looked at as being potentially related, and perhaps even to those on Vancouver Island.[5] To be honest though, I would be disappointed if it could be shown that petroglyphs further afield had the same characteristics as those described here. I prefer to think of them as being the handiwork of an individual exploiting the geology of where he lived and who would have had great difficulty explaining to others what he was doing and why.

My suspicions are then that most, if not all, were carved by, or under the direction of one person; that this person was an experienced carver, probably a carpenter, interested in the movements of the sun and in the natural fractures in the rocks; and that, judging by the weathering, the carvings date from late pre-contact times and, as such, are likely a few hundred, but less than a thousand years old. ◊

[5] The Monsell site in Cedar, for example. The glyphs at Nanaimo's Petroglyph Park however were, to my eye, clearly not carved by whoever carved those on Gabriola, and although one or two (only) there may be significantly oriented east-west, I see no evidence of the subtleties in alignment you see here.