

Cotswold Community Lithology

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SKCC 02 722 Unstratified.

Lithology.

A fine-grained, micaceous sandstone.

Macroscopical description.

The upper weathered surface is a yellowish grey (5Y 7/2 on the Geological Society of America rock-color chart). The under surface shows post-burial, rootlet damage and pale calcareous concretions. The rock is a fine-grained (average grain size is ~ 187µm so a fine sand), well-cemented, micaceous sandstone. A single, 4mm diameter, rounded, brown, limonitic concretion/clast is present. All the surfaces and edges are smooth.

A 7mm diameter hole in one corner of the artefact is partially infilled with iron rust possibly from a nail.

Interpretation.

A post-Iron Age tile/shingle with a nail hole. Medieval/post-medieval?

Provenance.

The lithology could be a Mesozoic sandstone and so be local/regional with respect to the find spot.

SKCC 02 661 (9126) Worked stone.

Lithology.

A fine-grained, banded, acid volcanic, possibly a rhyolite.

Macroscopical description.

A banded, fine-grained, hard, siliceous rock with medium light grey (N6 on the Geological Society of America rock-color chart) bands alternating with moderate dark grey (N4) ones. Very small, pale feldspar crystals are set within an aphanitic matrix. One end shows crushing due to repeated impact damage; the other end may have been flattened. The large flat surfaces show abundant, short, very thin striae, often as double striae.

Interpretation.

Possibly a worked artefact for use as a maul/hammer and ?later as a secondary whetstone for metal sharpening.

Provenance.

Rhyolite is an uncommon igneous rock in Britain and the closest likely outcrops are in Wales especially North Wales. It is not from the Wrekin. If the rock were a glacial erratic then its provenance would be wider and would include Scotland.

Axes

SKCC 99 33 (2006) Polished stone axe

Lithology.

A medium grained, unaltered, ophitic dolerite. Group 1 (sl)

Macroscopical description.

The rock is mottled comprising 2 – 5mm long, very pale orange (10YR 8/2 on the Geological Society of America rock-color chart) plagioclase laths (some have paler

margins) intergrown with 2mm diameter, greyish black (N2), mafic minerals. The feldspar is partially enclosed within the mafics giving an ophitic texture.

Provenance.

The rock is macroscopically consistent with its belonging to Group I (*sl*) and hence from Cornubia (Southwest England).

SKCC 672 (9126) Axe Head

Lithology

A non-ophitic metadolerite with minor biotite. Group I (*sl*)

Macroscopical description.

Hand specimen

The axe has an overall greenish grey (5GY 6/1 on the Geological Society of America rock-color chart) colour where it is especially well-polished. The surface shows 1mm diameter, dark green mafic and black, opaque phases intergrown with 2 – 5mm long pale green, feldspar laths. The cut surface shows the rock to be a medium bluish grey (5B 5/1) when unweathered.

Thin section

The rock is non-ophitic and has an overall greyish yellow green (5GY 7/2) colour. It comprises 1mm x 0.1mm size, lobate, ilmenite laths and 1mm diameter equant, pale pink-grey clinopyroxene within a pale matrix.

Microscopical description.

The primary mineralogy comprised calcic plagioclase, clinopyroxene and iron-titanium oxides (probably titanomagnetite).

Coarse-grained, polysynthetically twinned, plagioclase laths have altered; subhedral clinopyroxene grains have been extensively uralitised to pale blue-green, pleochroic amphibole rims. Plagioclase showing multiple twins is highly altered but locally occurs as relict grains. More than one generation of amphibole is present. Amphibole replacing clinopyroxene forms rims but chlorite (clinocllore) infilling voids spaces has euhedral, lath-shaped or 20 - 40µm diameter, rhombic, zoned amphibole within it. Trace amounts of lath-shaped biotite are present.

Discrete, ilmenite laths up to 500µm in length enclose 2 - 4µm diameter, paler, very anisotropic ilmenite or similar sized silicates. Smaller areas of very fine-grained ilmenite forming a symplectite-like pattern are widespread throughout the rock. Ilmenite shows little sign of alteration.

Equant, ?ex-iron titanium oxide grains are more common and are up to 200µm in size.

They now comprise 5 - 10µm wide, ilmenite lamellae within a non-opaque groundmass. The ilmenite laths are crystallographically controlled suggesting that the original phase was titanomagnetite (crystallographically controlled ilmenite oxidation-exsolution lamellae in magnetite). The ilmenite looks secondary rather than relict. Sphene rims about ilmenite are rare but are up to 5µm wide.

Sulphides include a 120µm diameter chalcopyrite grain altering to a 5µm wide limonite rim, 200µm diameter patches of 2 - 5µm size chalcopyrite where some chalcopyrite is pale-coloured and 40µm diameter, euhedral pyrite. Very fine-grained marcasite-limonite intergrowths have replaced 10 - 20µm diameter, rounded pyrrhotite. Limonite up to 20µm across has replaced chalcopyrite and probably pyrite.

Provenance.

The petrography of the axe shares many features with Group I axes but there are important mineralogical differences most notably the absence of epidote but presence of biotite. The presence of secondary biotite in a few 'Group I' axes suggests that they

have suffered some degree of contact metamorphism (Mik Markham *pers. comm.*). No specific site has been suggested for these axes other than West Cornwall. Assuming that this is a Group I axe then the rock originates in Cornubia, more specifically West Cornwall.

SKCC 02 526 (8696) Stone Tool Axe

Lithology.

Microdiorite (Augite granophyre). Group VII (*sl*)

Macroscopical description.

Hand specimen

A dense, homogeneous, fine-grained, porphyritic rock that has taken a good polish. Small, up to 2mm long, subhedral, pinkish grey (5YR 9/1 on the Geological Society of America rock-color chart), feldspar phenocrysts lie in a very fine-grained groundmass. The axe is a light olive grey (5Y 7/1) and has a very good conchoidal fracture. Rare, very shiny, black sulphide/sulpharsenide, up to 2mm in diameter, is present on the surface. The cut surface shows the rock to be homogeneous and a medium bluish grey (5B 6/1).

Thin section

The rock is a light greenish grey (5G 7/1) and very fine-grained but carries 1mm diameter clinopyroxene, 0.5mm diameter, altered, feldspar micro-phenocrysts and 0.05mm diameter, dark phases in a turbid matrix.

Microscopical description.

Rare, altered feldspar phenocrysts and small glomeroporphyritic clusters of twinned clinopyroxene are present a fine-grained groundmass dominated by stubby crystals of zoned, altered plagioclase; 20 -40 μ m diameter, euhedral, altered magnetite now comprising pale-coloured sphene; 10 - 60 x 2 size ilmenite laths and quartz.

Phenocrystic feldspar has altered to fine-grained clinozoisite and epidote with high interference colours or to chlorite and epidote. Mafic microphenocrysts have altered to chlorite. Late stage quartz-?albite intergrowths are rare as is brown biotite.

A single, 50 μ m diameter, euhedral titanomagnetite now consists of 2 μ m wide ilmenite lamellae altering to pale-coloured TiO₂ minerals. Ilmenite laths have altered to sphene or to fine-grained, 2 μ m long, TiO₂ phases.

Sulphides are present. Sphalerite occurs as 2 - 5 μ m diameter grains with dark orange internal reflections, pyrrhotite as grains up to 10 μ m and chalcopyrite up to 60 μ m in diameter. Often they occur close to each other in areas of secondary chlorite-epidote and in association with the main opaque phase that is white, cubic and has quite high reflectance. This is visually identified as a CoNiFeAsS phase, perhaps cobaltite/gersdorffite. The majority of this phase is very fine-grained but grains up to 30 μ m occur.

Provenance.

Comparing the total petrography of this axe-head with recent published and unpublished descriptions of IPG Group VII axe-heads, especially Ixer et al (2004) and those from Clifton Quarry, Worcestershire (Ixer in press) show that the source material for this axe-head is an augite-bearing intermediate rock that shares many similarities with the augite granophyre from the Penmaenmawr area of North Wales. However, a number of key mineralogical elements that are characteristic of Group VII are missing and the presence of CoNiFe sulpharsenides has not been recognised within that group.

The axe is probably an atypical (or so far unrecognised) member of Group VII and if so the rock comes from North Wales.

Bracer

SKCC 02 721 (9550) Shorncliffe.

Lithology

A spotted, amphibole-rich metamorphic rock. Nephrite-jade

Macroscopical description

Hand specimen

A planar laminated, greenish grey (5GY 6/1 on the Geological Society of America rock-color chart) metamorphic rock. Dark green (dusky green 5G 4/2) spots up to 2mm in diameter have diffuse, irregular edges. The cut surface is a moderate bluish grey (5B 6/1) with a thin, 0.3mm wide, pale-coloured, weathered rim. The rock is very fine-grained and uniform with 0.1mm wide, greener discs.

Thin section

In thin section the rock is white (N9) and has a very fine foliation and feint paler and darker bands.

Microscopical identification.

It is monomineralic, comprising densely felted amphibole fibres up to 40 x 2µm in size with very rare 1 - 2µm diameter white sphene/TiO₂ minerals. The amphibole is colourless and has low interference colours suggesting that it is tremolite. Lath-shaped fibrous amphibole is coarser grained in the paler bands.

Provenance.

A typical member of the spotted, amphibole-rich bracers (Woodward et al). The bracer is exotic with regard to its find spot. Macroscopically and microscopically it has many nephrite jade-like features. If the bracer be nephrite jade then the nearest recognised source is the Alps.

References

R.A.Ixer, O.Williams-Thorpe, R.E.Bevis and A.C.Chambers. 2004.

A comparison between 'total petrography' and geochemistry using portable X-ray fluorescence as provenancing tools for some Midlands axeheads. In: *Lithics in Action*. E.A.Walker, F.Wenban-Smith and F.Healy (eds). Lithics Studies Society Occasional Paper 8. Oxbow Books. Oxford. 105-115.

See Also:

[Evolution of a Farming Community in the Upper Thames Valley Excavation of a Prehistoric, Roman and Post-Roman Landscape at Cotswold Community, Gloucestershire and Wiltshire Volume 2: The Finds and Environmental Reports](#)