SOUTHWEST BRITISH COLUMBIA

SICKER PROJECT – MOUNT RICHARDS AREA

(92B/13E)

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In 1979 the Stratford-Westholme mapping was extended over the Mount Richards Group to Crofton and Osborn Bay Road. Reports of pre-Cretaceous rocks in the Chemainus River at a place known locally as Hells Gate led to traverses up-river from the road bridge at Osborn Bay to the vicinity of Fuller Lake. A drift-covered area between the river and Mount Sicker Road was cruised west to Range 4, and the area between Mount Sicker Road and the main high-tension transmission line was mapped.

The oldest rocks of the area are sedimentary and volcanic rocks of the Sicker Group, which have been intruded by dykes and small stocks of porphyry and gabbro. These rocks are unconformably overlain by clastic sedimentary rocks of the Nanaimo Group. The Sicker rocks and porphyry are extensively and intensely sheared and pyritized along the north side of the belt, on the two northerly ridges of Mount Richards and westward across the Island Highway. The gabbro is less affected, and in one exposure was seen to truncate schistosity in the intruded rock. The intensity of shearing decreases sharply southward across strike and more gradually eastward along strike. Small local shear zones are present in the central and south parts of the belt.

The pre-gabbro rocks in the north part of the belt are sericite-quartz schists containing sporadic rounded, clear quartz eyes, and were thought by Clapp to represent a large stock of quartz porphyry. However, these rocks pass southward in the east part of the north and middle ridges to lightly sheared, banded, chert-like rocks, and in the most northerly exposure contain intercalated black argillite. It would appear that the sporadic quartz eyes may represent small porphyry dykes in a siliceous sedimentary sequence, or possibly a small amount of coarser detritus within an area of fine-grained or cherty deposition.

Across the middle ridge there is a transition to felsic rocks, which are both siliceous and feldspathic. This transition is oscillatory in that intercalated siliceous bands occur at least as far south as Breen Lake. The felsic rocks are felsic tuffs and derived volcanogenic sediments. A more mafic band is exposed on the north side and to the west of Breen Lake, and is in sharp contrast with siliceous rocks on the north. It is characterized by epidote clots, which are seen elsewhere to be altered volcanic clasts. Felsic rocks are again exposed on the south side of Breen Lake and in scattered road cuts up to the crest of a northerly spur of the main ridge of Mount Richards. Here there is an irregular transition to more mafic rocks.

The summit area and south slope of the main ridge of Mount Richards is underlain by intermediate to mafic volcanic rocks. In a few small outcrops these rocks appear featureless, but they are generally characterized by volcanic clasts, medium to large hornblende grains, or by both. The clasts range from pea to football size, and the larger ones may be broken or even whole pillows. They exhibit varying stages of alteration to epidote, and commonly weather in relief. They may be sporadic or so abundant as to render the rock a volcanic breccia. The hornblendes are euhedral plates or rounded grains which appear to float in a granular light grey matrix. In mapping it was found useful to distinguish rocks in which hornblendes were readily apparent to the unaided eye from rocks in which a lens showed minor fine-grained hornblende to be part

of the groundmass. The obviously hornblendic rock forms at least two bands, one through the centre of the main ridge and the other low on the south slope above Richards Trail. More may have been present, since much of the section on the south slope has been obliterated by gabbro intrusion. At Richards Trail three small outcrops of felsic and siliceous rocks south of the hornblendic band could indicate a repetition, with the two hornblendic bands lying on the flanks of a major fold, but they could also represent a minor intercalation in the intermediate to mafic sequence. A thin cherty band is intercalated in hornblendic fragmental volcanic rocks 350 metres south of the summit of Mount Richards.

No indications of tops were found in this sequence. From comparison with the sequence in the Cowichan Lake area the black argillite and the siliceous rocks should be at the top.

The intermediate to mafic volcanic rocks are intruded by many small dykes of quartz and quartz feldspar porphyry. They are commonly 6 metres wide, but a few are as much as 15 metres. The groundmass is generally highly siliceous, and where sheared the dykes are commonly pyritized. They are probably equally common in the felsic and siliceous rocks but are less readily recognized, particularly where the rocks have been strongly sheared.

The two northerly gabbro dykes are regular in form and persistent along strike. Both show a regular increase in grain size toward the centre, with chilling to a porphyritic and ultimately a fine-grained phase at the margins. Both lack xenoliths. The most northerly dyke is generally concordant with the schistosity, but at the Crofton high-tension transmission line and Bonsall Road the central part is roofed with schist which has been injected by apophyses. The second dyke transgresses the transition from siliceous to felsic rocks at a small angle.

The other gabbro bodies are less regular in several respects. The grain size may increase and decrease repeatedly across the body, and chilled margins may be lacking. Xenoliths may be present, and one body near Osborn Bay Road contains so many that it is in fact an intrusive breccia. Volcanic clasts are preferentially preserved as xenoliths, and this can lead to misidentification of the rock if the matrix is fine grained. One dyke passes through the north end of Eves Park and the bluff face west of Breen Lake, where it transgresses the fragmental volcanic band in both strike and dip, and appears to pinch out under drift on the north slope of the main ridge. Three smaller bodies southwest and southeast of Crofton Lake terminate abruptly and are really small elongate stocks. Another body is dyke-like where it underlies the north spur of the main ridge, but it terminates in an irregular protuberance at the summit of Mount Richards. The remaining body is one large bifurcating body which underlies a large part of the south slope of the main ridge. A narrow dyke-like arm parallels Richards Trail and crosses the highway to the east slope of Little Sicker Mountain. The larger part continues along and south of Jackson Valley Road, crosses the highway south of the railway overpass, and widens on the southeast face of Little Sicker Mountain. Around Jackson Valley Road it contains large inclusions of porphyry and volcanic rock.

At Hells Gate on the Chemainus River, 1.4 kilometres above the highway bridge, a north-dipping basal grit of the Nanaimo Group overlies sheared dark hornblendic rock. Two hundred and fifty metres downstream, this unit is abruptly succeeded by Nanaimo sandstone. Apparently a fault striking between northwest and west has dropped the Nanaimo beds down a considerable distance on the southwest or south side. The rocks are thickly drift-covered outside the river canyon and the lateral extent of this inlier is unknown.

A longitudinal fault is inferred to underlie the draw between the north and middle ridges, because the siliceous rocks to the south of it are successively truncated toward the east. Clapp's Maple Bay fault should pass to the south of Mount Richards, but no definite evidence of it was found within the Mount Richards area. Several transverse faults are suggested by topographic lineaments, but movement is difficult to demon-

strate because of the irregular forms of most of the gabbro bodies and the general lack of sharp boundaries within the Sicker Group.

Most of the larger gabbro bodies have numerous quartz-filled tension fractures toward their margins. Several adits and shafts and more open cuts have been made in these veins, but the best of them contains only a few grains of chalcopyrite. Further adits and cuts have been made in porphyry dykes, but appear to have found only pyrite. Many irregular quartz veins occur in the fragmental volcanic rocks, but they appear essentially barren. Near the summit of Mount Richards the hornblendic volcanic rock is sheared at the contact with a larger porphyry dyke and contains pyrite and some malachite. About 800 metres east-southeast of the summit a shear zone in fragmental volcanic rock contains a lens of thickly disseminated magnetite 45 centimetres wide.

REFERENCES

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