

Bergvesenet

Postboks 3021, 7002 Trondheim

Rapportarkivet

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Kommer fra ..arkiv Sulitjelma Bergverk A/S	Ekstern rapport nr "522121003"	Oversendt fra	Fortrolig pga	Fortrolig fra dato:
Tittel Detailed geological mapping around the Lapphelleren area. Geologi. Kartlegging.				
Forfatter BELL A.		Dato 1974	Bedrift Sulitjelma Gruber A/S	
Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Fagområde	Dokument type	Forekomster		
Råstofftype	Emneord			
Sammendrag Detaljgeologisk kartlegging i området Lapphelleren. Tre litologiske enheter er skildra petrografisk - Furulundskifrene. Sulitjelmaamfibolitten er delt inn i bündet amfibolitt, skifrig amfibolitt og amfibolittbreksje. Kort omtale av strukturer og mineraliseringer (rustsoner). Geologi. Kartlegging.				

TSH/AB/SU
3/7.74

A/S Sulitjelma Gruber,
Prospektering 1974,
Prosjekt 7. 402/A.
Feltrapport.

Detailed geological mapping around the Lapphelleren area (EH-213).

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2. Air-fotos (loc. number).

1. INTRODUCTION

- 1.1. This report describes an area of approximately 1,5 sq km on the north-east side of Langvann, to the north and east of Furulund, Sulitjelma. The area lies on map sheet EH 213, and between grid northings 1850 to 1910 and between eastings 3480 to 3650.

The ground lies on the southeren slopes of Kobbertoppen, between the 200 m and 500 m contours.

- 1.2. Earlier general work has been done on the area by M.R. Wilson (Ph. D. thesis, University of Manchester, 1968), which itself is an extension of the earlier work by Rutland and Nicholson (1965). It has provided a useful background to the lithologies present on the area, but is rather too general for detailed use. The project also forms a continuation of detailed geological mapping work started by A/S Sulitjelma Gruber in 1973.
- 1.3. During the summer of 1974, two other projects are being carried out on the area, a soil-sampling project for geochemical analysis, and a survey and relocation of the original mining rights and concessions in the area. Geophysical measurements (VLF) was carried out in may 74 and a drilling project will also take place in 74.
- 1.4. The area was mapped between 15th - 30th June 1974 by Miss C. Gallay (Switzerland) and Mr. A. Bell (England) as part of a larger geological prospecting programme taking place during the summer of 1974.

2. TOPOGRAPHY

- 2.1. The land lies on the steep slope to the north of Langvann, north and east of Furulund. In general, the rock dips are low, and individual competent units stand out as small south-facing scarps, with the less competent units forming shelves on the dip slopes. Attractive waterfalls often occur when streams, of which there are many, cross the competent layers, for example at (1838 3517) where the Furulund schist outcrops, and at (1894 3492), where the upper breccia of the Sulitjelma amphibolite outcrops.

Slopes are always steep, and occasionally precipitous, and often small screes may be seen beneath outcrops, always unstable.

- 2.2. Outcrops are almost exclusively restricted to "Small cliff" types, for example, with the exception of the dip slope of some of the competent units, where glaciated slabs for the major outcrop type. Elsewhere, there is extensive soil and vegetation cover.
- 2.3. Due to its favourable southerly aspect, the area carries quite a luxuriant vegetation. Birch trees form the major flora, with lesser members of rowan and juniper, the latter mainly in exposed areas. The ground vegetation is an attractive mat of grasses, bilberries and spring flowers. Sulphur dioxide from the company's smelter has poisoned the area, however, and many of the larger birch trees, evidence of a formerly even richer vegetation, are dead or dying.

Older people in the valley also recall the time when the area supported a fuller flora than today.

Faunal elements include, of course, mosquitos and the even more deadly klegg, and a buzzard had nested above Furulund, providing a rather beautiful hazard to progress in the area.

3. PETROGRAPHY

Three major lithological units outcrop on the area, the Furulund schists, the Sulitjelma amphibolite, and the Lapphelleren schists. The mapping project has been concerned mainly with the Sulitjelma Amphibolite, and this has been subdivided into three units, proposed as the Banded amphibolite, the schistose amphibolite and the chloritic breccia.

The Furulund Schists.

- 3.1 These form the lowermost of the stratigraphic units in the area, and outcrop below the 200 m. contour in the west, and below the 350 m contour in the east. They were not mapped during the project, but form a very recognisable unit of micaceous schists with quartz/feldspar pegmatitic "sweat-outs" that have been extensively boudinaged in the flat-lying schistosity. Porphyroblasts of hornblende are everywhere common, and in the upper part, porphyroblasts of almandine garnet are to be found. The petrography is thus consistent with that mineral assemblage normally found in aluminous sandstones which have been subjected to almandine-amphibolite facies of regional metamorphism.

3.2 The Sulitjelma Amphibolite

3.2.1 The Banded amphibolite

This forms the lowermost of the 3 sub-units of the Sulitjelma amphibolite, and makes the prominent cliff outcrop seen above the village of Charlotta at 250 m, and which can be traced eastwards out of the area at Giken, 300 m. Its petrography is both complex and varied, but a diagnostic feature is the presence of light coloured felsic bands in a somewhat more mafic ground. These may be analogous to the quartz-rich boudinaged pegmatites found in the Furulund schists. The felsic bands are themselves highly boudinaged

The mineralogy of this lowermost unit consists mainly of fine-grained amphibolite and feldspar, but chlorite and epidote are common. These latter two minerals are present throughout the amphibolites, and suggest a late hydration phase in the metamorphism, regressing the almandine-amphibolite assemblage to one more stable in greenschist facies.

The banded amphibolite contains many blocks of Coarse amphibole-feldspar rock (eg. 407) which may represent blocks of diabase included into the fine-grained matrix. Elsewhere, the matrix shows fine laminations (eg. 408) which probably represent primary laminations in, perhaps, a water-lain tuff.

It seems probable, therefore, that the banded amphibolite represents an original fine grained water-lain tuffaceous sediment, containing either lava flows, or fragments of lava, which was later subjected to almandine-amphibolite facies metamorphism, and subsequently regressed to greenschist facies.

3.2.2 The schistose amphibolite

This unit forms the central part of the Sulitjelma amphibolite outcrop, and can be traced over all the area. It is a dark green, fine grained, amphibole-feldspar rock, often showing epidote inclusions, and always displaying a prominent schistosity. It also shows fine, irregularly spaced, plan laminations, usually parallel to the schistose fabric. These layers are distinguishable only by colour changes, and probably represent varying percentages of feldspar in the groundmass. It seems to have been an extensive tuff unit prior to metamorphism. Its consistent mineralogy, and prominent schistosity are characteristic.

3.2.3 The Chlorite Breccia

The uppermost sub-unit of the Sulitjelma amphibolite is termed the chloritic breccia. Most outcrops are massive, containing brecciated rock fragments, that may be primary or tectonic. At one outcrop (no. 616) clear agglomeratic and tuffaceous layers can be seen, and it is possible that much of the brecciation is primary. The presence of large plates of chlorite, and the absence of schistosity, are diagnostic for this rock type.

3.3. The Lapphelleren Schists

Above the Sulitjelma amphibolite lies a group of well-jointed micaceous schists, the Lapphelleren schists. They form a prominent outcrop, but were not studied in detail, and formed the top boundary to the area mapped.

3.4. Stratigraphy

These three major rock units represent two types of sedimentation. Sandstone deposition gave way to the deposition of a volcanic sequence, at first containing lava flows or fragments, but later exclusively pyroclastic, and ending explosive in character. Sandstone sedimentation was resumed after this volcanic episode.

It may perhaps be significant that whilst all three major units have been metamorphosed to almandine-amphibolite facies, only the Sulitjelma amphibolite shows signs of retrogressive metamorphism. It could be that the hydrothermal alteration causing this retrogression played a part in the formation or mobilisation of metalliferous minerals in the Sulitjelma area.

4. STRUCTURE

The outcrop pattern of the three units is due to the interesting interplay of two major fold traces, an anticlinal axis, lying broadly along the length of Langvann, and a synclinal axis at right-angles to this.

The area studied lies, however, wholly on the north limb of the Langvann anticline, and wholly on the east limb of the syncline.

Almost all the rocks have a marked planar fabric, and some show a well-developed schistosity. The presence of highly boudinaged pegmatites and layers in several rock types confirms the fact that there has been considerable shortening of the rocks perpendicular to the schistosity.

The schistosity, which is sub-parallel to the primary layering when both are seen, is itself folded into brand upright folds with gentle limb dips. The "transverse" syncline is the major expression of these minor folds.

Dips are gentle throughout the area, varying from 02° to 38° , but on average lie around 20° . Strikes vary from 193° to 293° , but average at 240° .

5. MINERALISATION

At three prominent horizons mapped, and one other encounter red, extensive rusty weathering may be seen. These lie near Giken (1840 3445), above Charlotta (1869 3643) and in two bands, one in the centre of the schistose amphibolite, the other at the base of the chloritic breccia. None is continuous, but form lens-shaped outcrops not more than 3 m thick. The lower zones of mineralisation are characterised only by rusty weathering, and fresh samples of metalliferous minerals proved unobtainable. The chloritic breccia zone shows well-formed pyrite crystals, or holes once occupied by them, that may be tens of millimeters in some places. Copper content seems to be low, but characteristic green weathering indicating rather higher copper content has been noted at 15 localities (405, 414-5, 418, 420, 428, 438-9, 442, 453, 600-1, 608, 618, 622).

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Data has been recorded at each outcrop on "Geomap" forms printed in Swedish, for processing by computer. These forms are simple to use, easy to start using, and ensure that systematic observations are made at each outcrop. However, the system has several drawbacks. When observations do not fit the code exactly, a somewhat misleading figure must be entered in the appropriate box on the form, with an accompanying note on the back. With difficult or variable rock types this can quickly lead to more notes on the back than on the front. In other words, the back of the forms may be being used as a field notebook, and the efficiency of the system is impaired.

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The area around the 15 mentioned "copper" sites may repay geochemical sampling and analysis.

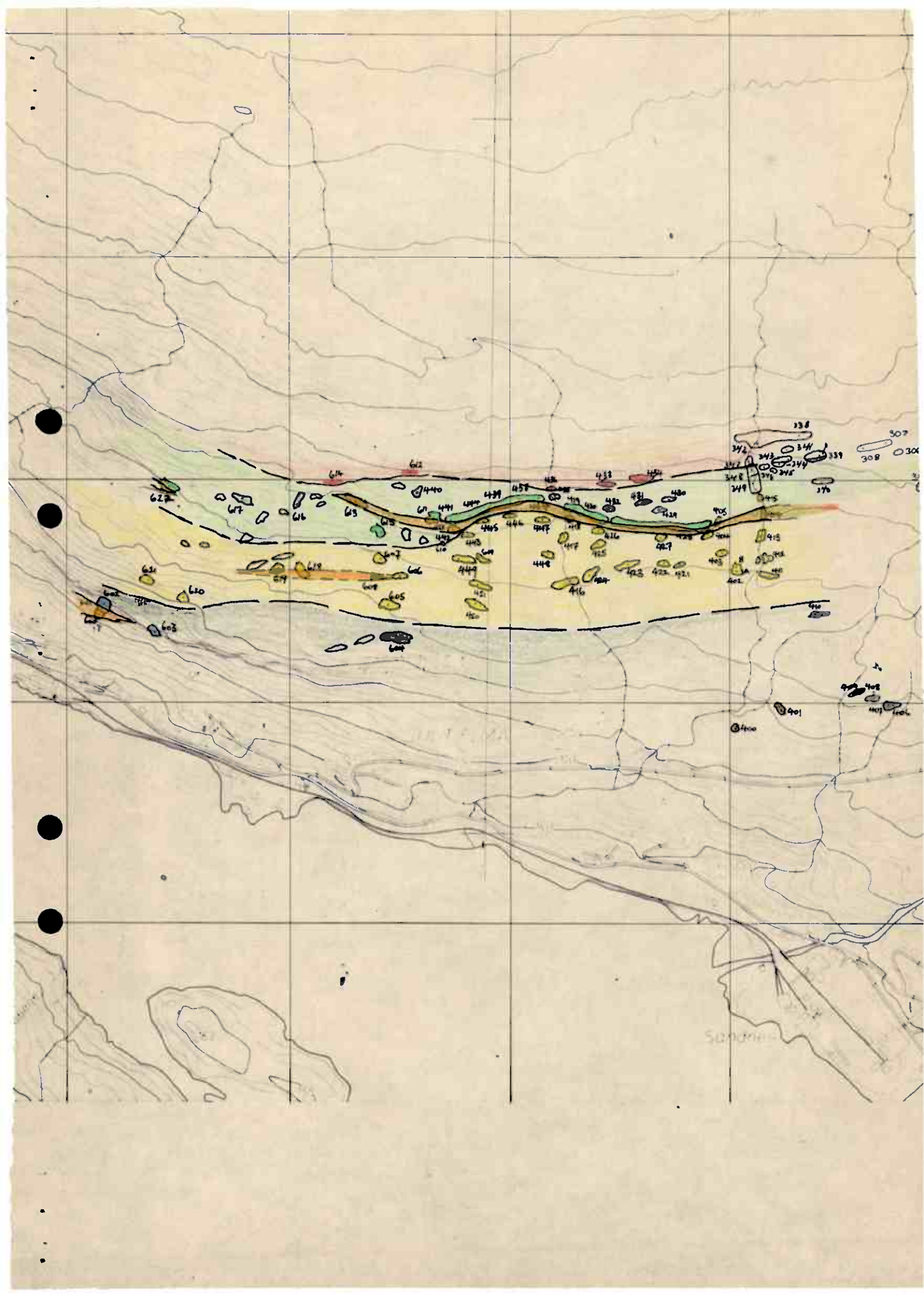
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3.7.1974

A M Bell

C. Gallay



A/S Sulitjelma Gruber,
Prospektering, 1974,
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