

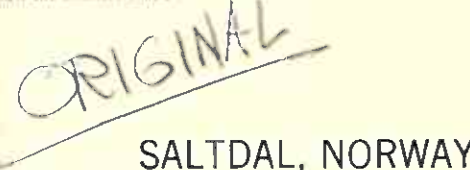


Bergvesenet

Postboks 3021, 7002 Trondheim

Rapportarkivet

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Tittel Rapport fra området øst for Saltdal. (Langvad-Pothus).				
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Fagområde	Dokument type	Forekomster		
Råstofftype	Emneord			
Sammendrag Geologisk beskrivelse av område aust for Vensmoen i Saltdal. Kort skildring av Fauske marmor, amfibolitt- og granittinjiserete skifre, Furulund-, Sjønstå- og Steinkjerringa-gruppen, Pieske (Fauske?) marmor. Tolking av strukturgeologien. Noen få magnetkis-mineraliseringer påvist.				



10th September 1967.

Report and Appendix for 1:50,000 Geological Map.

1:25,000 sections.

1:50,000 S and B-tectonic maps.

by Gordon J. Knox.

Introduction.

The area concerned is part of a region much affected by the Caledonian orogeny and therefore has undergone extensive regional metamorphism and plastic deformation. This has led to some difficulties in the stratigraphy which has been divided on rock units, as many units lens out and reappears in a slightly different stratigraphical position. However, there are enough similarities to assign certain rock groups to the Steinkjerringo, Sjenstå, Furulund and Fauske Marble. The succession is not strictly the same as there is a granite injected zone underlain by amphibolites which cannot be assigned to any of the above divisions. Marble occurs on both east and west sides of the area but whether they are equivalent is a difficult question. For discussion the marble on the west side has been called Fauske Marble while that on the east side has been called Pieske Marble.

The report will be divided into a very brief description of rock types (which will include ore zones) and a discussion of the structure.

The general succession can be divided into the following

- A) Fauske Marble.
- B) Amphibolites and granite injection zones.
- C) Furulund Group.
- D) Sjenstå Group.
- E) Steinkjerringo.
- F) Fauske Marble.

Fauske Marble.

This consists of a various marbles and included bands of amphibolites calcareous schist and biotite schists. The marbles vary texturally from saccharoidal to microcrystalline types.

Colour varies from pure white to pinks, steel blues and browns. The rock is everywhere extensively folded on a minor scale and good examples can be observed on the south side of Svartvatn lake.

The marbles also contain occasional minerals which include haematite, pyrrhotite and pyrites but none of these intrusions were ever very great, except near Svartvatn lake where of a rather granitic rock also appeared to have large bodies of pyrite often 10-20 cm in diameter, but again these were never extensive.

Besides the ore minerals graphitic specks were also present and very occasionally garnets were present where the marble became rather saccharoidal.

Amphibolites and granite injection zones.

The sequence beyond the Fauske Marble consists of the following.
Biotite Schists and Pelites.

"Granite" bodies + garnet mica schists + graphitic schists.

"Tremolite Marble."

"Granite" bodies as (2).

Amphibolite Units.

Fauske Marble.

Fine dark green amphibolite.

Graphite Mica Schist.

Garnet Schist.

Dark Hornblende Quartzite.

Amphibolite Units.

These show variations within themselves and may become very micaceous, garnet ferrous or occasionally quartzite. Within the dark Hornblende quartzite a rotten schist bed contains several rather sheared often atoll garnets of 2 cm occasionally 3 cm across the rhombododecahedron forms. The outcrop was limited to only one stream.

"Granite" injection zone No. 1.

The granite bodies are associated with garnet gneisses, which may laterally change to garnet schists, calcereous schists and graphitic

schists. These granites are much altered and their origin magmatic or otherwise is rather obscure. They are light buff in colour, contain an intergrowth of quartz and feldspar, the dark mineral is biotite. The mineral texture shows an orientation parallel to the strike of surrounding beds therefore it can tentatively be said that granites were pre-main deformation.

"Tremolite" Marble.

This unit generally forms a strong ridge except where a stream crosses its path when it may completely removed except for small outcrops within the stream bed. Besides the main tremolite marble extensive quartz veins is present. Pockets an are present which contain quartz and a dark mineral, probably hornblende. Associated with the marble and running parallel to it for all its length is a graphitic schist which in the north of the area contains a dark psammite containing an ore mineral.

"Granite" injection zone (2)

The granite in this zone have many similarities to those in group (1) but have some apparent differences in hand specimen, they are more quartzitic often texturally and appears to contain much muscovite mica. Schists associated with these may be completely biotitic graphitic but variations occur laterally some beds changing to garnets ferrous gneisses. Some of the "granites" contained small pink garnets.

Biotite Schists and Pelites.

These are predominantly coarse grained occasionally with of biotite to chlorite. Variations occurred in the amount of any light minerals but some schists were calcareous.

Furulund Group.

This units present within this group.

Calcareous mica schists + psammites + amphibolites.

Furulund Gneiss equivalent.

Furulund Gneiss equivalent.

This consists of a garnet mica schist with garnets 2 mm diameter, bounded by graphitic schists which laterally may become biotite schists.

In places the zone forms a ridge like feature and for much of its outcrop was red-stained through gaps may for a hundred or so metres.

This suggested ore minerals and in fact isolated specks were found therefore in discussion with Mr. Needham this is portulated as an ore zone, through probably of no great concentration.

Calcareous mica schist + psammites + amphibolites.

The units distinctly canons weathering. The strike is slightly east of north and has shown a swing to the right composed to the almost north-south strike of previous units occasional psammites are present and also coarse amphibolite bands. The psammites are probably sedimentary in origin being very quartzitic, little biotite being present, and a bounding being present along the direction of the strike.

Sjenstå Group.

A distinct differentiation between this and the Furulund Group was rather difficult but eventually a somewhat artificial division was made on the psammite percentage, i.e. the psammites are far more numerous than the calcareous schists. Amphibolite bands are present of similar coarseness and character to those in the Furulund Group.

For Sjenstå Group can then be divided in the following manner:

- Upper. Psammites + Garnets + amphibolites.
- Lower. Garnet, ferrous Gneiss and schists.

Psammites + Garnets + amphibolites.

The amphibolites and psammites here are the same as those found in the Furulund Group and here need no more description.

Garnetiferous Gneiss.

This shows variations in the mica and quartz contents and also in the degree of contortion, the size of the garnet may show local variations being from 1 mm - 3-4 mm in diameter and they showed both isotetrahedral and rhombododecahedral form. Garnet amphibolites were also present but this one of very local extent. Within the garnet bands more psammites are present but there were never of any great lateral extent. Within the more contorted garnet gneisses

graphitic lenses were present but again these were rarely continuous.

Before leaving the Sjenstå note should be made of the biotite schist underlying the psammites which appears along the eastern outcrop (x-section AB at Tverelven) and which lenses and disappears on the south-western side of Storfjellet.

Steinkjerfjelle Group.

This consists of two definite units and a possible third depending on the structural interpretation.

Marble Unit (Pieske or Fauske)

Graphitic schists and rusty micaceous schists $\pm$ garnets
Amphibolite.

Amphibolite Unit.

This is a very extensive unit but also rather thin and its softer nature relative to the units above and below do not give complete exposure along the length of its outcrop positioning in places was based on fragments in rock debris. The amphibolite becomes graphitic in places though this may be an effect of infolding of graphitic material from below.

Graphitic schists.

These vary somewhat and contain micaceous units with graphitic lenses which on Storfjellet are more extensive than the graphitic schists, where as on Storfjellet the graphite is the more extensive. Garnet may occur in both the micaceous and graphitic bodies.

Marble Unit (Pieske or Fauske).

The marble where it underlies the graphitic schists consists of mica-schists which may laterally change to psammites which are probably calcareous. Then the calcareous nature becomes obvious with a dirty brown biotite marble. Below this it changes to a pure marble. On Storfjellet the marble contains further bands of micaceous psammitic material.

Other Rock Units.

Within the area are certain rock types which are difficult to correlate. A brief description of them is made here and correlation is discussed under the structural section.

Hornblende Psammites.

This is a collection of rock types of which most have or contain some percentage of hornblende. They vary in colour from dark blue-green to various shades of grey. Some are completely pure amphibolites but others (the majority) are obviously psammitic. Biotitic and graphitic bands are occasionally present but never have any great lateral extent. They occupy a wide outcrop from Midtiffjellet to Vassbotnfjell and a characteristic feature is the generally rumpled nature of the outcrop with no definite dip direction more distinct dips could be observed where came this into contact with other rock units but even here the actual dip tended to be confused by minor folding.

Synclinal Psammitic Facies.

This occurs on Midtiffjellet and is associated with biotite schists and other psammites containing occasional thin bands of coarse amphibolite.

"Granites".

Besides the "granites" in the injection zones two other "granite" outcrops were found.

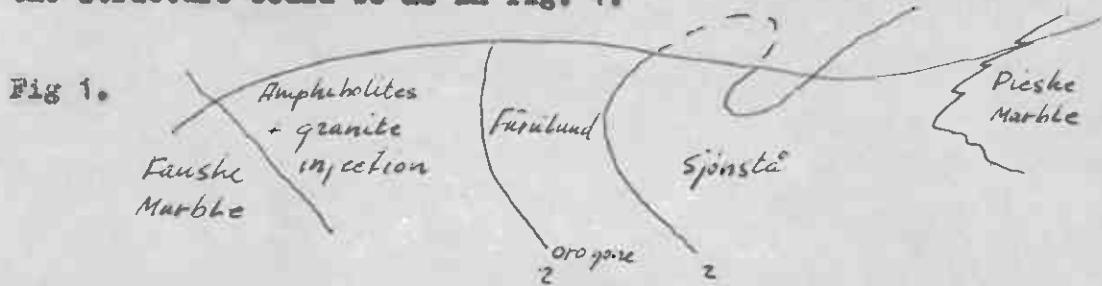
- 1) This occurred in the extreme south-east of the area and underlies the marble unit. This may be basement granite or sparagnite but detailed study is required to confirm this.
- 2) An outcrop of a rather coarse biotite feldspar quartz rock occurs in the north-west corner of the area and lies above the Fauske Marble and below the amphibolite. Where the feldspars becomes concentrated was sometimes observed.

Structure.

Generally in the west the rocks dip steeply to the east and follow a north-south trend in the strike. This relatively simple picture becomes complicated with a sense of major folds which appears to intersect at various points. Study of cross-sections A3 and CD will show that at least two possibilities are present for the overall form. The two possibilities are:

- 1) Straight succession of the form.
Fauske Marble
Furulund Group
Sjenstå Group
Fieske Marble
- 2) Synclinal form with the two marbles on the east and west sides being equivalent.

If the succession is straight then one of the marbles may be expected to be overturned in depth. No evidence could be found on the limited outcrops of the Fauske Marble, but the Pieske Marble shows a folding style of that on the limbs of an anticline therefore a portulate for the structure could be as in fig. 1.



A difficulty with this interpretation is the folding style of Sjenstå which is opposite to the minor folds, however this may be due to different phases of folding.

For a synclinal interpretation the marbles must be considered laterally equivalent, but then the difficulty arises of the correlation between the two limbs. Lateral variation and lensing out are not enough to explain the differences.

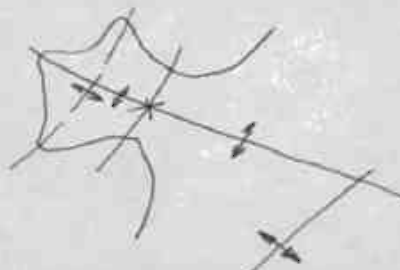
Both interpretations pose problems but in the light of evidence at the moment it seems that a straight sequence may be the correct answer and this is shown in the key.

The correlation of the hornblende psammites poses a second question, considering x-section CD they can be seen to thin greatly towards Storfjellet and therefore the same could be postulated where the outcrops is continued in the air thereby correlating them with the quartz psammites and amphibolites of upper Sjenstå. However, more detailed evidence is required and quite possibly the above is not the real answer.

Lying above the hornblende psammites on Midtjfellet are the quartz psammites associated with amphibolites, biotite schists and some garnetiferous schists. The exact equivalence is difficult to decide but probably they are a local difference in the upper Sjenstå.

It was stated earlier that major fold axis were crossing in the east of the area. Perhaps this is best seen in the outcrop at Tverelven on the AB section where a characteristic outcrop formed from the intersection of the folds can be observed.

Fig. 2.



Ore Zones. The main zone occurs within the Furulund gneiss equivalent but not great ore concentrations are present and other questionable ores occur at the following localities

- 1) Tindgrovatn lake 100 metres E.
- 2) Sletfjellet.
- 3) Svartvatn lake.

None of these were extensive and had only minor concentrations which appeared to consist of only pyrrhotite.

Sample Y₃.

Locality - foldaxis on east Lifjellet.

Rock Type. Garnet mica schist.

Stratigraphic Position. Lower Sjenstå.

Sample Y₂.

Locality Midtlfjellet.

Rock Type fine grained hornblende psammite.

Stratigraphic Position. Upper Sjenstå.

Sample Y₁.

Locality Skrapestua.

Rock Type fine grained psammite.

Stratigraphic Position. Upper Sjenstå.

Sample V₂.

Locality Sletfjellet.

Rock Type occurs on same horizon as a graphitic schist below Tremolite Marble. It contains qz mica and some ore minerals.

Stratigraphic Position. Tremolite Marble.

Sample V₁.

Locality Svartvatn lake.

Rock Type pyrrhotite plus quartzite in boundans within Fauske Marble.

Stratigraphic position. Fauske Marble.

Sample G.

Locality Nesflaaget.

Rock Type "Granite".

Stratigraphic Position. Granite injection zone No. 1.

A2.

Oresone. Fine iron pyrites.

As finely disseminated cristals in quartzite band of the Trembolite Marble.

Locality 395184.

A1.

Oresone. Arsenopyrite, pyrrhotite.

As veins in amphibolites.

Locality 404176.

A3.

Orezone. Arsenopyrite, iron pyrites chalcopyrite.

As large cristal aggregates 3 cm in quartzite band in Furulund.
Locality 383212.

Samples Z₂.

Locality Ørneflåget.

Rock Type coarse amphibolite.

Stratigraphic Position. Lower Sjenstå.

Sample Z₁.

Locality Ørneflåget.

Rock Type coarse garnet amphibolite with qz veining gneissic character.

Stratigraphic Position. Lower Sjenstå.

Sample Z₁ was associated with Z₂.

Sample Y_{2a}.

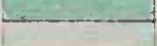
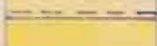
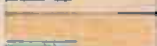
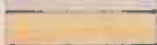
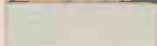
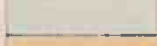
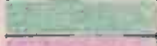
Locality Midtiffjellet.

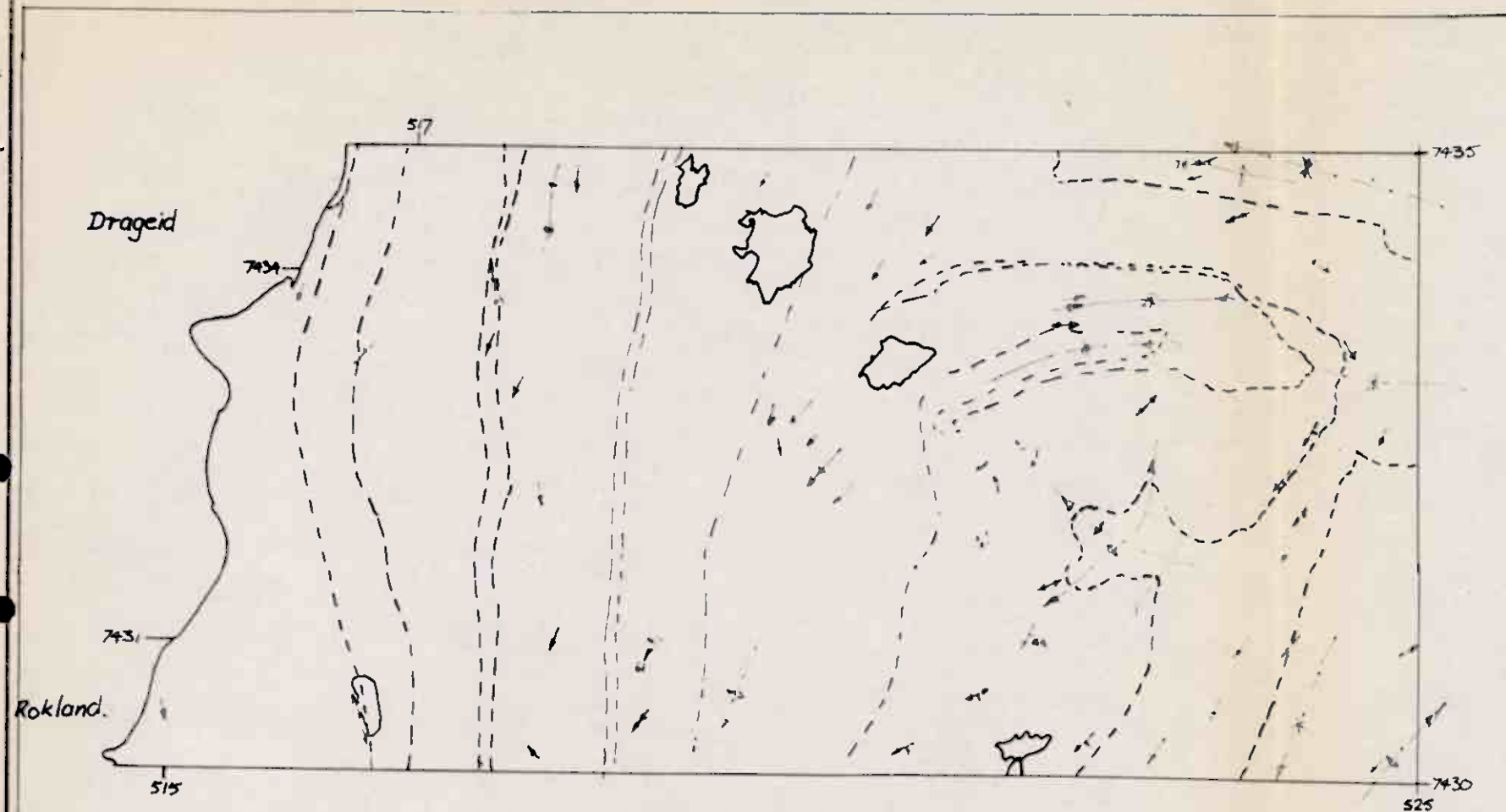
Rock Type garnet amphibolite very local in extent.

Stratigraphic Position. Upper Sjenstå.

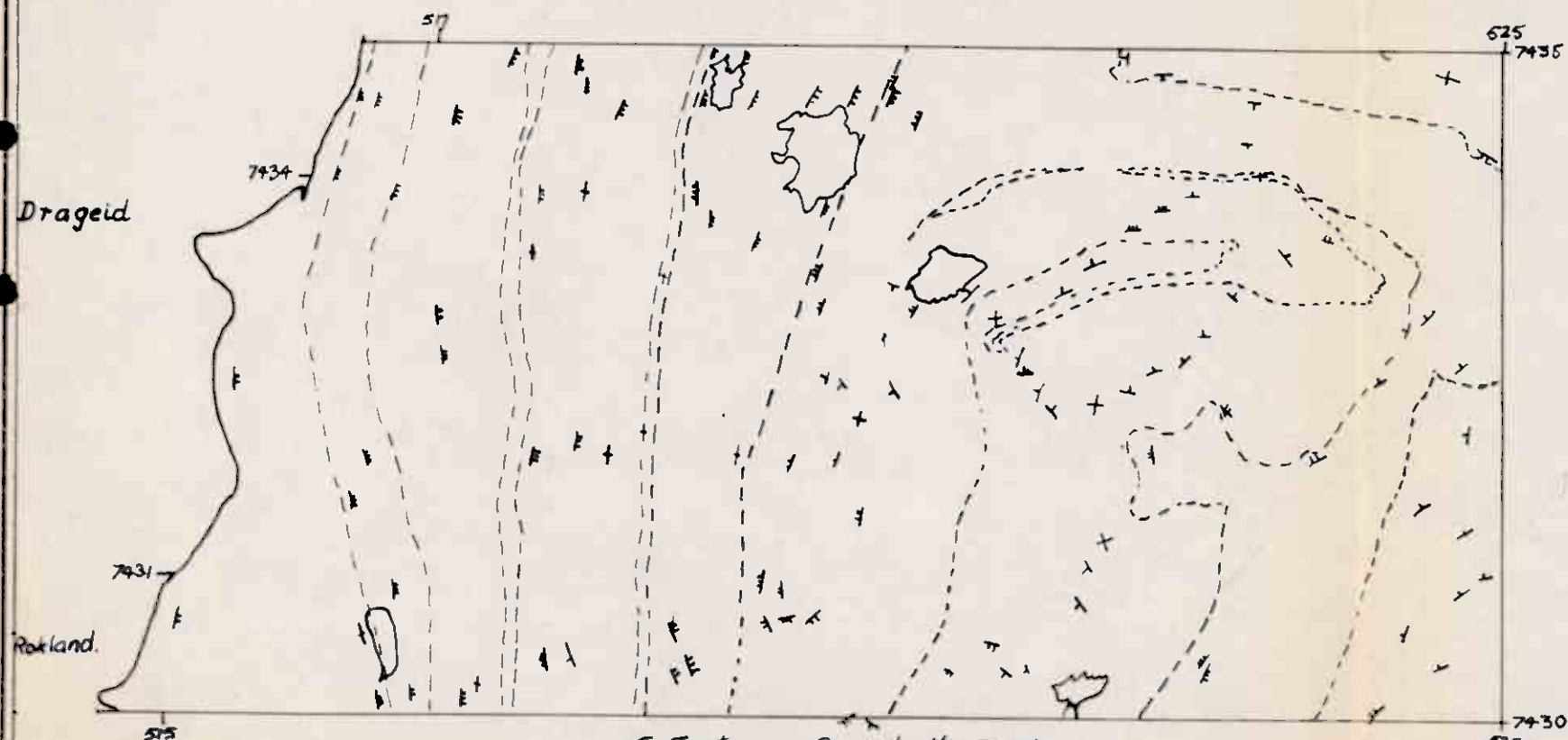
Key to Stratigraphic Rock Units for 1:50000 map and 1:25000 x-sections

General Successions

FAUSKE MARBLE GROUP	Fauske Marble		101/140
	Dark Hornblende Quartzite		999/230
AMPHIBOLITES	Garben Schist		101/21
	Graphitic Mica Schist		101/9
and	Fine dark green amphibolite		
GRANITE	Granite* Injection zone no. 1. plus graphitic, biotitic and garnet Micaschists.		101/7
INJECTION ZONES			
	Tremolite Marble		999/160
	Granite Injection zone no 2. + mica, garnet and graphitic schists.		101/6
	Biotite Schists and Pelites		
FURULUND GROUP	Furulund Gneiss		999/20
	Calcareous mica schists plus amphibolite		101/26
	Psammite plus amphibolite		999/30
Middelfjellat succession.	Quartz Psammite		999/5
	Biotite schists		999/30
	Hornblende		999/180
	Psammite		999/30
	Garnetiferous Gneisses + schists		999/59
SKÖNSTA GROUP	Garnetiferous gneisses and schists		999/59
lower	Amphibolite		101/9
	Graphitic + micaeous schists ± garnet		999/110
	Mica schists and psammite		999/25
PIESKE MARBLE GROUP	Pieske Marble.		101/2
BASEMENT	Basement + Granite		999/70



B Tectonics - Structural Trends.



S. Tectonics - Schistosity Trends.

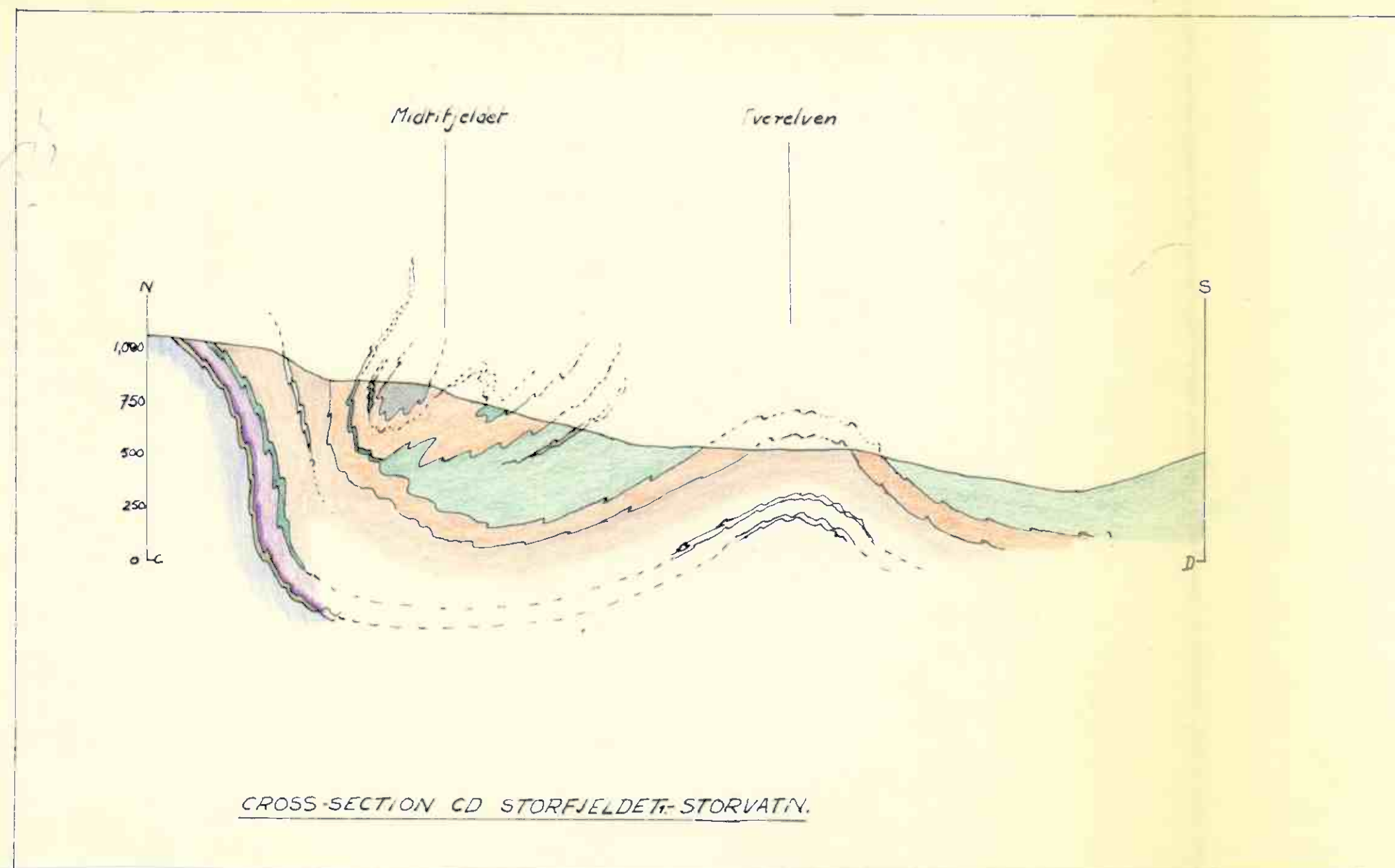
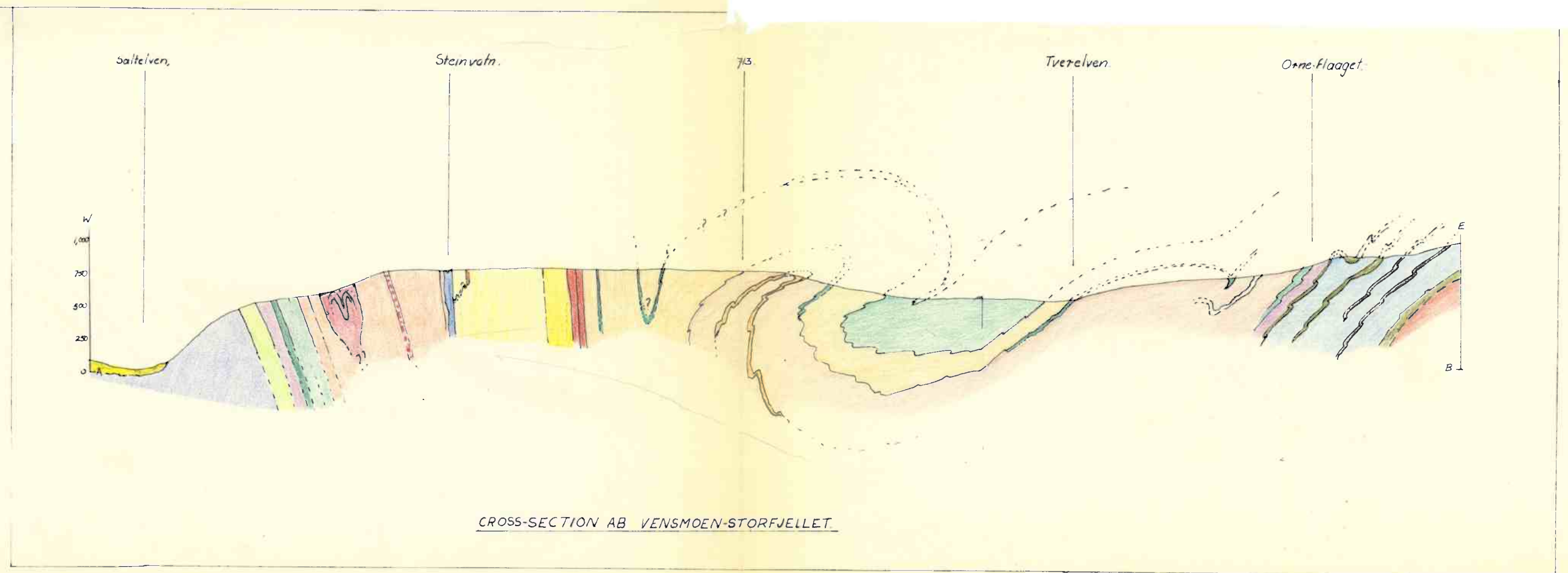
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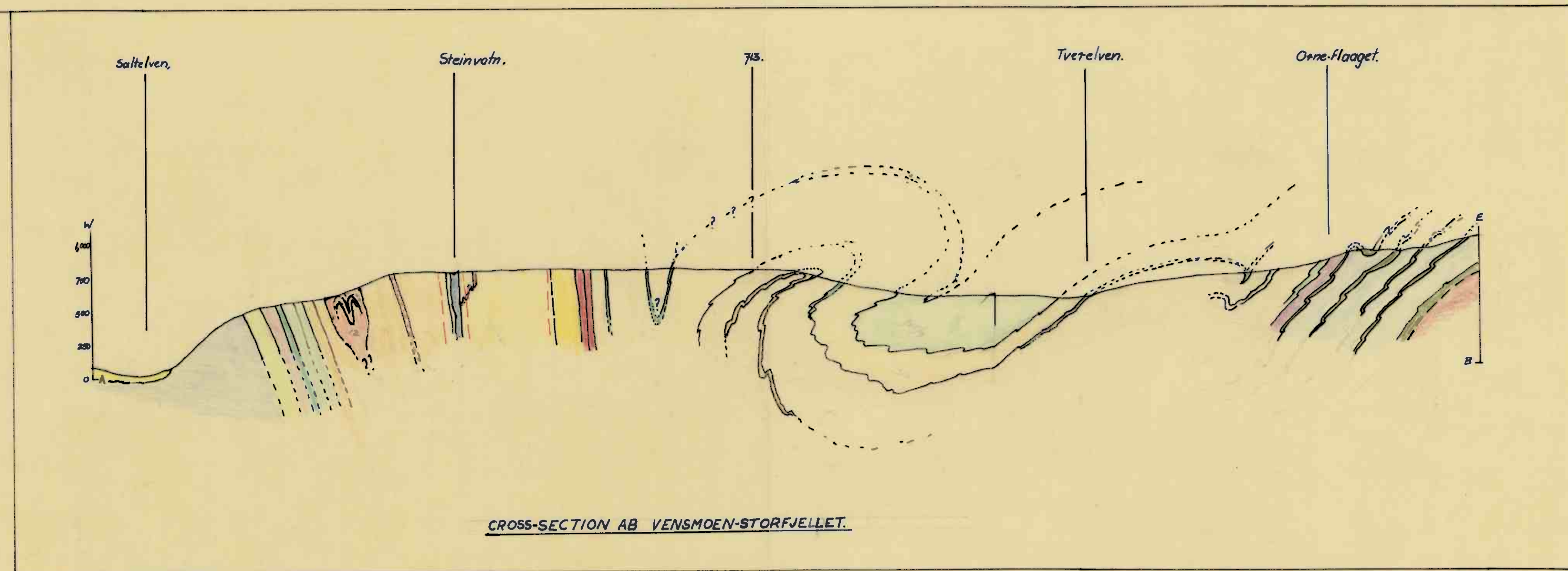
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Gordon Knox

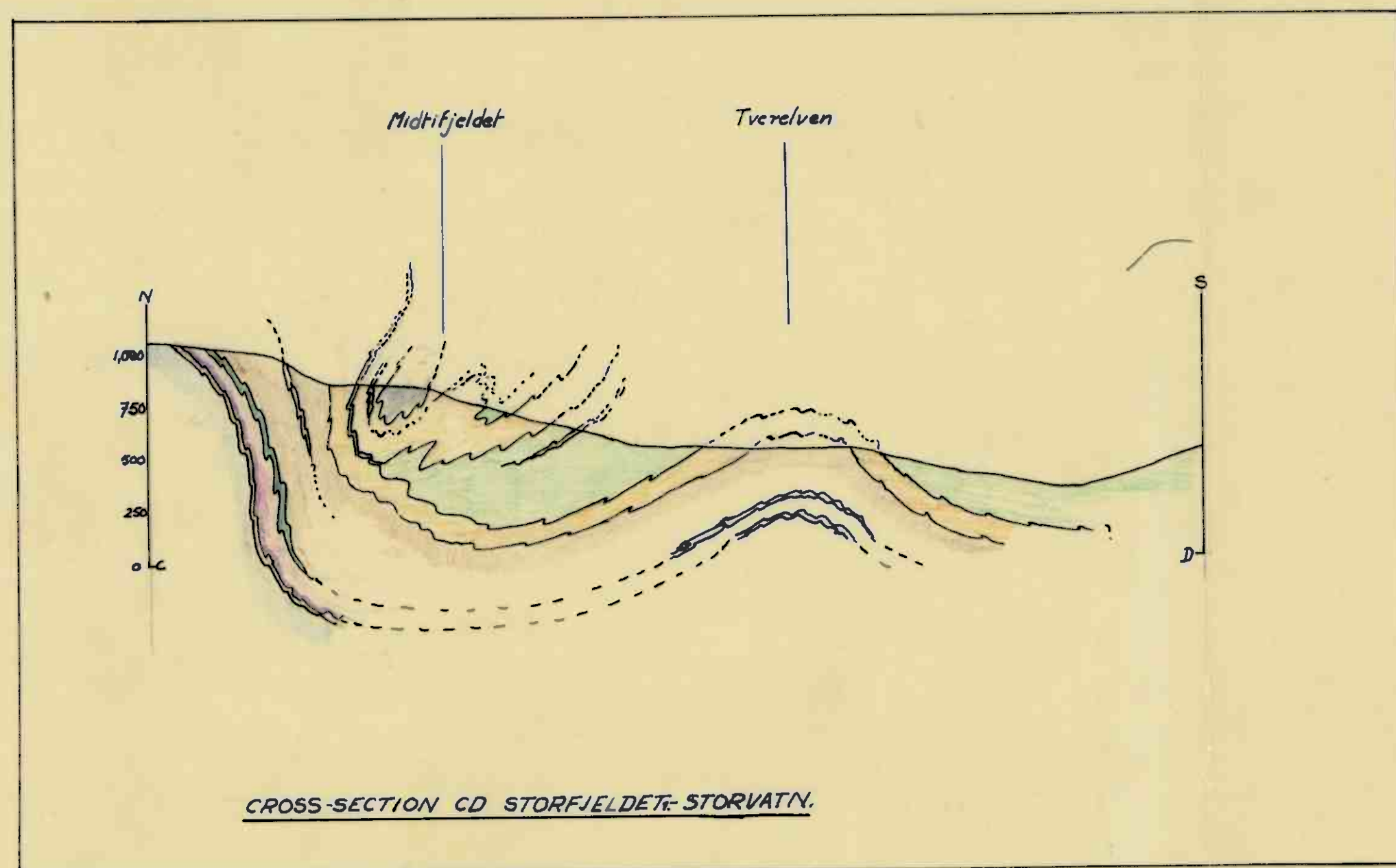
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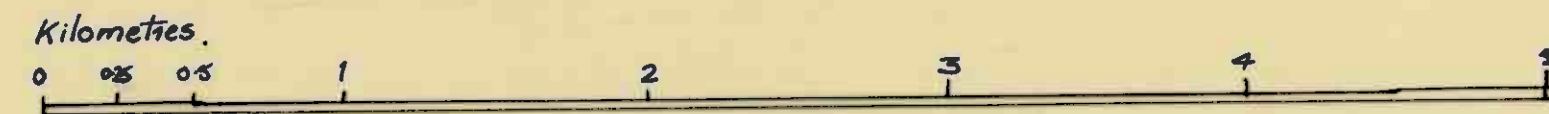
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CROSS-SECTION AB VENS MOEN-STORFJELLET.



CROSS-SECTION CD STORFJELDET-STORVATN.



<u>Scale</u> Horizontal : 1:25,000 Vertical 1:25,000	Målestokk	Tegn.	
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5X

by Gordon J. Knox

Introduction

The area concerned is part of a region much affected by the Caledonian orogeny and therefore has undergone extensive regional metamorphism and plastic deformation. This has led to some difficulties in the stratigraphy which has been divided on rock units, as many units lens out and reappear in a slightly different stratigraphical positions. However, there are enough similarities to assign certain rock groups to the Steinjerring, Spensta, Furuland and Fauske Marble. The succession is not strictly the same as there is a granite injected zone underlain by amphibolites which cannot be assigned to any of the above divisions. Marble occurs on both east and west sides of the area but whether they are equivalent was a difficult question. For discussion the marble on the west side has been termed Fauske Marble while that on the east side has been called Prestke Marble. The report will be divided into a very brief description of rock types (which will include ore zones) and a discussion of the structure.

The general succession can be divided into the following

- A) Fauske Marble
- B) Amphibolites and "granite" injection zones
- C) Furuland Group
- D) Spensta Group
- E) Steinjerring
- F) Fauske Marble

Fauske Marble

This consists of various marbles and includes bands of amphibolites calcareous schists and biotite schists. The marbles vary texturally from saccharoidal to microcrystalline types. Colour varies from pure white to pinks, steel blues and browns. The rock is everywhere extensively folded on a minor scale and good examples can be observed on the south side of Svartvatn lake.

The marbles also contain occasional opaque minerals which include haematite, pyrrhotite and pyrite but none of these inclusions were ever very great except near Svartvatn lake where boudins of a rather granitic rock also appeared to have large holes of pyrite often 10-20cm in diameter, but again these were never extensive.

Besides the ore minerals graphitic specks were also present and very occasionally garnets were present where the marble became rather saccharoidal.

Amphibolites and "Granite" Injection Zones

The sequence beyond the Fauske Marble consists of the following

Biotite Schists and Pelites
 "Granite" bodies ± garnet micaschists ± graphitic schists
 "Tremolite" Marble
 "Granite" bodies as (2)
 Amphibolite Units
 Fauske Marble

Fine dark green amphibolite
 Graphite Mica Schist
 Garnet Schist
 Dark Hornblende Quartzite

Amphibolite Units

These show variations within themselves and may become very micaceous, garnetiferous or occasionally quartzite. Within the Dark Hornblende Quartzite a rotten schist bed contains several rather sheared often atoll garnets of 2cm occasionally 3cm across the rhombododecahedron forms. The outcrop was limited to only one stream.

"Granite" Injection Zone No 1

The granite bodies are associated with garnet gneisses, which may laterally change to garnet schists, calcareous schists and graphitic schists. These granites are much altered and their origin magmatic or otherwise is rather obscure. They are light buff in colour, contain an intergrowth of quartz and feldspar, the dark mineral is biotite. The mineral texture shows an orientation parallel to the strike of the surrounding beds therefore it can tentatively be said that the granites were pre-main deformation.

Tremolite Marble

This unit generally forms a strong ridge except where a stream crosses its path when it may completely removed except for small outcrops within the stream bed. Besides the main tremolite marble extensive quartz veining is present. Pockets and boudins are present which contain quartz and a dark mineral, probably hornblende associated with the marble and running parallel to it for all its length is a graphitic schist which in the north of the area contains a dark psammite containing an ore mineral.

"Granite" Injection Zone (2)

The granites in this zone have many similarities to those in group (1) but have some apparent differences in hand specimen. They are more quartzitic often coarser texturally and appear to contain much muscovite mica. Schists associated with these may be completely biotitic graphitic but variations occur laterally some beds changing to garnetiferous gneisses. Some of the "granites" contained small pink garnets.

Biotite Schists and Pelites

These are predominantly coarse grained occasionally with alteration of biotite to chlorite. Variations occurred in the amount of any light minerals but some schists were calcareous.

② Furulund Group.

This unit mesocent within this group

Calcareous mica schist = psammites + amphibolites

Furulund Gneiss equivalent

~~Calcareous mica schist = psammites + amphibolites~~

Furulund Gneiss equivalent

This consists of a garnet mica schist, with garnets 2mm diameter, bounded by graphitic schists which laterally may become biotite schists. In places the zone forms a ridge like feature and for much of its outcrop was red-stained though gaps may appear for a hundred or so metres.

This suggested the minerals and in fact isolated specks were found therefore in discussion with Mr. Needham this is portended as an ore zone, though probably of no great concentration.

Calcareous mica schist = psammites + amphibolites.

The units distinctly show canon weathering. The strike is slightly east of north and has shown a swing to the right compared to the almost North-south strike of previous units.

Occasional psammites are present and also coarse amphibolite bands. The psammites are probably sedimentary in origin being very quartzitic, little biotite being present, and a banding being present along the direction of the strike.

Sjensta Group

A distinct differentiation between this and the Furulund Group was rather difficult but eventually a somewhat artificial division was made on the psammite percentage i.e. where the psammites are far more numerous than the calcareous schists. Amphibolite bands are present of similar character and character to those in the Furulund Group.

The Sjensta Group can then be divided in the following manner:

Upper. Psammites + garnets + amphibolites

Lower. Garnetiferous Gneisses and schists

Psammites + garnets + amphibolites

The amphibolites and psammites here are the same as those found in the Furulund Group and here merit no more description.

Garnetiferous Gneiss

This shows variations in the mica and quartz contents and also in the degree of contortion, the size of the garnets may show local variations being from 1mm to 3-4mm diameter and they showed both isohedral and rhombic dodecahedral form. Garnet amphibolites were also present but these were very local extent. Within the garnet bands more psammites are present but these were never of any great lateral extent. Within the more contorted garnet gneisses graphitic bands were present but again these were very continuous.

Before leaving the Spensha rock should be made of the biotite schist underlying the psammites which appears along the eastern outcrop (x-section AB at Tverelven) and which lenses and disappears on the south-western side of Storjelleet

Steinheim Group

This consists of two definite units and a possible third depending on the structural interpretation

Marble Unit (Pieske or Fauske)

Graphitic schist and with micaaceous schist $\pm$ garnets

Amphibolite

Amphibolite Unit

This is a very extensive unit but also rather thin and its softer nature relative to the units above and below do not give complete exposure along the length of its outcrop. Positioning in places was based on fragments in rock cebs. The amphibolite becomes graphitic in places though this may be an effect of infolding of graphitic material from below

Graphitic schists

These vary somewhat and contain micaaceous units with graphitic lenses which on Storjelleet are more extensive than the graphitic schists, whereas on Storjelleet the graphite is the more extensive. Garnets may occur in both the micaaceous and graphitic bodies

Marble Unit (Pieske or Fauske)

This marble where it underlies the Graphitic schists consists of mica schists which may laterally change to psammites which are markedly calcareous. Then the calcareous nature becomes obvious with a dirty brown biotite marble. Below this it changes to a pure marble. On Storjelleet the marble contains further bands of micaaceous psammite material

Other Rock Units

Within the area there are certain rock types which are difficult to correlate. A brief description of them is made here and correlation is discussed under the structural section

Hornblende Psammites

This is a collection of rock types of which most have or contain some percentage of hornblende. They vary in colour from ^{dark} blue-green to various shades of grey. Some are completely pure amphibolites but others (the majority) are obviously psammitic. Biotitic and graphitic bands are occasionally present but never have any great lateral extent. They occupy a wide outcrop from Midliffjellet to Vaskognyfjell and a characteristic feature is the generally rumpled nature of the outcrop with no definite dip direction. More distinct dip could be observed where this came into contact with other rock units but even here the actual dip tended to be confused by minor folding

③ Synclinal Psammite Facies

This occurs on Midelfjord and is associated with biotite schists and other psammites containing occasional thin bands of coarse amphibolite.

"Granites"

Besides the "granites" in the injection zones two other "granite" outcrops were found.

1) This occurred in the extreme south east of the area and underlies the marble unit. This may be basement granite or spangsmite but detailed study is required to confirm this.

2) An outcrop of a rather coarse biotite felspar quartz rock occurs in the northwest corner of the area and lies above the Fauske Marble and below the amphibolites. Where the felspars become concentrated fluorite was sometimes observed.

STRUCTURE

Generally, in the west the rocks dip steeply to the east and follow a north-south trend in the strike. This relatively simple picture becomes complicated with a series of major faults which appear to intersect at various points. Study of cross-sections AB and CD will show that at least two possibilities are present for the overall form. The two possibilities are

1) Straight succession of the form

Fauske Marble

Famulund group

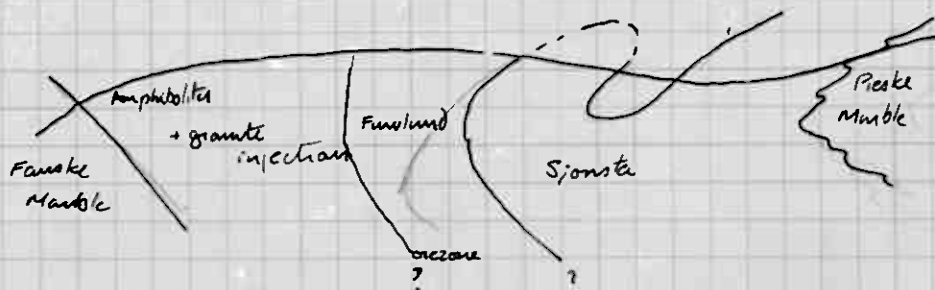
Sjonsta group

Pieske Marble.

2) Synclinal form with the two marbles on the east and west sides being equivalent

If the succession is straight then one of the marbles may be expected to be overturned in depth. No evidence could be found on the limited outcrops of the Fauske Marble, but the Pieske Marble shows a folding style of that on the limbs of an anticline therefore a postulate for the structure could be as in fig 1.

fig 1.



A difficulty with this interpretation is the folding style of Sjonsta which is opposite to the minor folds, however this may be due to different phases of folding.

For a synclinal interpretation the marbles must be considered laterally equivalent, but then the difficulty arises of the correlation between the two limbs. Lateral variation and lensing out are not enough to explain the differences.

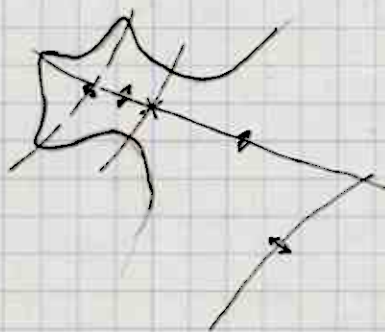
Both interpretations pose problems but in the light of evidence at the moment it seems that a straight sequence may be the ^{more} correct answer and this is shown in the key.

The correlation of the hornblende psammmites poses a second question, concerning x-section CD they can be seen to thin greatly towards Skerfjeldet and therefore the same could be postulated where the outcrop is continued in the air thereby correlating them with the quartz psammmites and amphibolites of the upper Sjonsta. However, more detailed evidence is required and quite possibly the above is not the real answer.

Lying above the hornblende psammmites or Skerfjeldet are the quartz psammmites associated with amphibolites, biotite schists and some garnet-ferrous schists. The exact equivalence is difficult to decide but probably they are a local difference in the upper Sjonsta.

It was stated earlier that major fold axes were crossing in the east of the cule. Perhaps this is best seen in the outcrop at Trevelven on the AB section where a

Fig 2.



characteristic outcrop formed from the intersection of the folds can be observed.

Ore Zones The main zone occurs within the Fannbunnd gneiss equivalent but no great ore concentrations are present and other questionable ones occur at the following localities

1) Tinogrovatn lake 100 metres E

2) Skerfjeldet

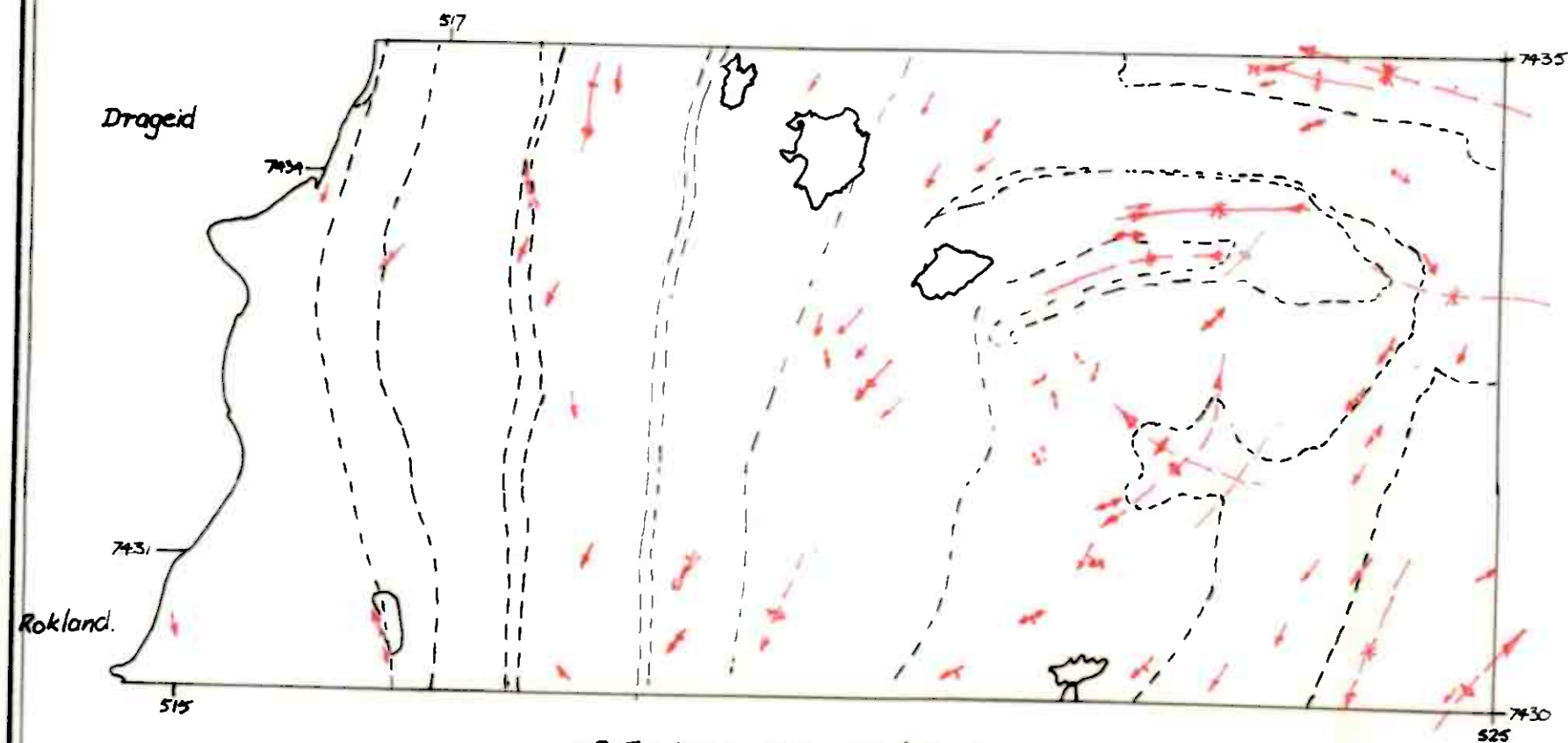
3) Svatra Tyn lake.

None of these were extensive and had only minor concentrations which appeared to consist of only pyrrhotite.

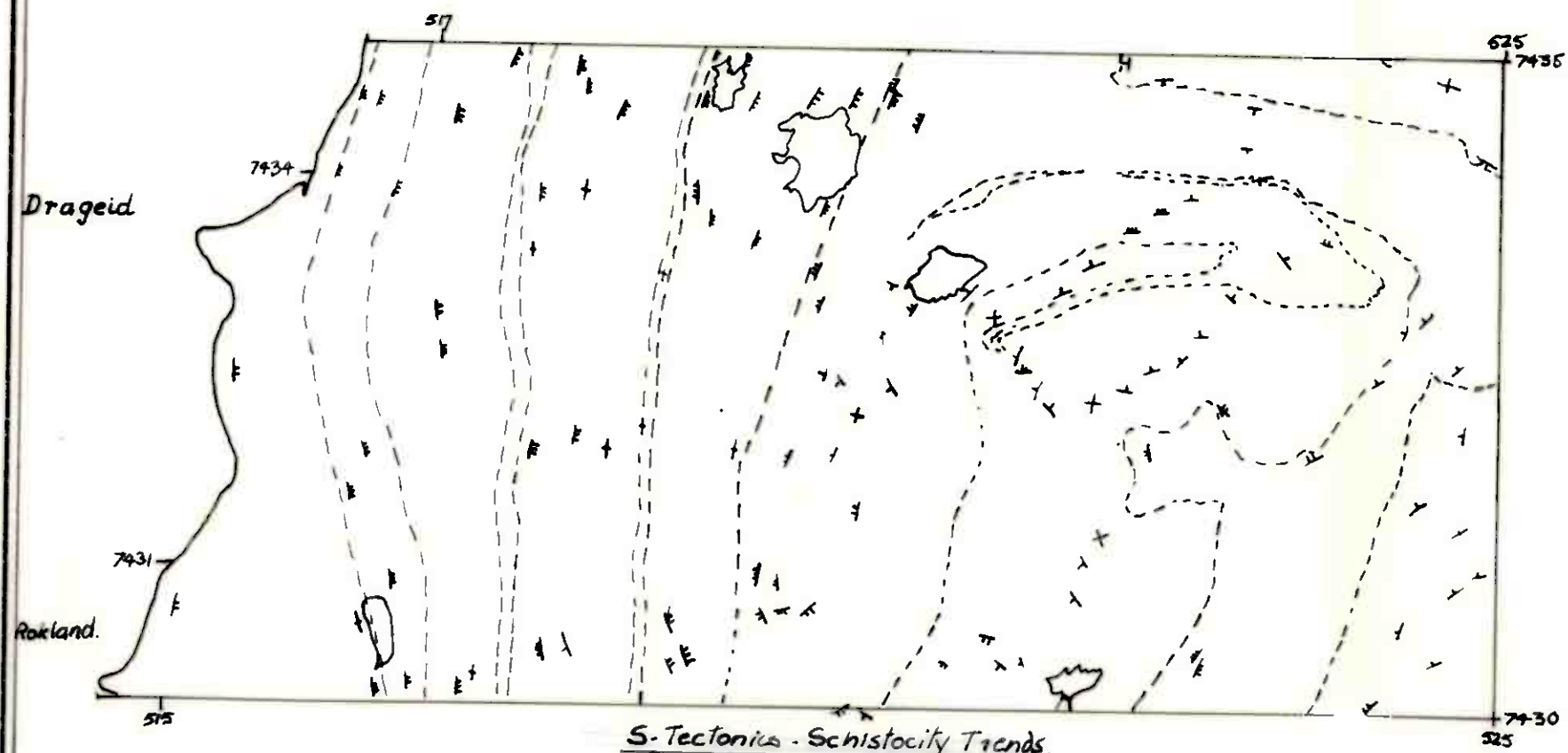
Key to Stratigraphic Rock Units for 1:50000 map and 1:25000 x-sections

General Successions

FAUSKE MARBLE GROUP	Fauske Marble		101/140
	Dark Hornblende Quartzite		999/230
AMPHIBOLITES	Gårben Schist		101/21
	Graphitic Mica Schist		101/9
and	Fine dark green amphibolite		
GRANITE	Granite Injection zone No. 1. plus graphitic, biotitic and garnet Mica schists.		101/7
INJECTION ZONES			
	Tremolite Marble		999/160
	Granite Injection zone no. 2. + mica, garnet and graphitic schists.		101/6
	Biotite Schists and Pelites		
FURULUND GROUP	Furulund Gneiss		999/20
	Calcareous mica schists plus amphibolite		101/26
	psammite plus amphibolite		999/30
Middelfjell succession.	Quartz Psammite		999/5
	Biotite schists		999/30
	Hornblende		999/180
	Psammite		999/30
	Garnetiferous Gneisses + schists		999/59
SJÖNÄS GROUP	Garnetiferous gneisses and schists		999/59
lower	Amphibolite		101/9
	Graphitic + micaceous schists ± garnet		999/110
PIESKE MARBLE GROUP	Mica schists and psammite		999/25
	Pieske Marble.		101/2
BASEMENT	Basement + Granite		999/70



B Tectonics - Structural Trends.



S. Tectonics - Schistosity Trends.

Scale 1:50,000

Målestokk	Tegn.	
	Trac.	
	Kfr.	

Erstatning for:

Gordon Knox

Erstattet av:

10th September 1967.

Report and Appendix for 1:50.000 Geological Map.

1:25,000 sections.

1:50,000 S and B-tectonic maps.

by Gordon J. Knox.

Introduction.

The area concerned is part of a region much affected by the Caledonian orogeny and therefore has undergone extensive regional metamorphism and plastic deformation. This has led to some difficulties in the stratigraphy which has been divided on rock units, as many units lens out and reappears in a slightly different stratigraphical position. However, there are enough similarities to assign certain rock groups to the Steinkjerringo, Sjønstå, Furulund and Fauske Marble. The succession is not strictly the same as there is a granite injected zone underlaid by amphibolites which cannot be assigned to any of the above divisions. Marble occurs on both east and west sides of the area but whether they are equivalent is a difficult question. For discussion the marble on the west side has been called Fauske Marble while that on the east side has been called Pieske Marble.

The report will be divided into a very brief description of rock types (Which will include ore zones) and a discussion of the structure.

The general succession can be divided into the following

- A) Fauske Marble.
- B) Amphibolites and granite injection zones.
- C) Furulund Group.
- D) Sjønstå Group.
- E) Steinkjerringo.
- F) Fauske Marble.

Fauske Marble.

This consists of a various marbles and included bands of amphibolites calcareous schist and biotite schists. The marbles vary texturally from saccharoidal to microcrystalline types.

022.011

Colour varies from pure white to pinks, steel blues and browns. The rock is everywhere extensively folded on a minor scale and good examples can be observed on the south side of Svartvatn lake.

The marbles also contain occasional minerals which include haematite, pyrrhotite and pyrites but none of these intrusions were ever very great, except near Svartvatn lake where of a rather granitic rock also appeared to have large bodies of pyrite often 10-20 cm in diameter, but again these were never extensive.

Besides the ore minerals graphitic specks were also present and very occasionally garnets were present where the marble became rather saccharoidal.

Amphibolites and granite injection zones.

The sequence beyond the Fauske Marble consists of the following.
Biotite Schists and Pelites.

"Granite" bodies + garnet mica schists + graphitic schists.

"Tremolite Marble."

"Granite" bodies as (2).

Amphibolite Units.

Fauske Marble.

Fine dark green amphibolite.
Graphite Micra Schist.
Garben Schist.
Dark Hornblende Quartzite.

Amphibolite Units.

These show variations within themselves and may become very micaeaceous, garnetiferous or occasionally quartzite. Within the dark Hornblende quartzite a rotten schist bed contains several rather sheared often atoll garnets of 2 cm occasionally 3 cm across the rhombododecahedron forms. The outcrop was limited to only one stream.

"Granite" injection zone No. 1.

The granite bodies are associated with garnet gneisses, which may laterally change to garnet schists, calcereous schists and graphitic

schists. These granites are much altered and their origin magmatic or otherwise is rather obscure. They are light buff in colour, contain an intergrowth of quartz and feldspar, the dark mineral is biotite. The mineral texture shows an orientation parallel to the strike of surrounding beds therefore it can tentatively be said that granites were pre-main deformation.

"Tremolite" Marble.

This unit generally forms a strong ridge except where a stream crosses its path when it may be completely removed except for small outcrops within the stream bed. Besides the main tremolite marble extensive quartz veins are present. Pockets of hornblende are present which contain quartz and a dark mineral, probably hornblende. Associated with the marble and running parallel to it for all its length is a graphitic schist which in the north of the area contains a dark psammite containing an ore mineral.

"Granite" injection zone (2).

The granite in this zone have many similarities to those in group (1) but have some apparent differences in hand specimen, they are more quartzitic often texturally and appears to contain much muscovite mica. Schists associated with these may be completely biotitic graphitic but variations occur laterally some beds changing to garnetiferous gneisses. Some of the "granites" contained small pink garnets.

Biotite Schists and Pelites.

These are predominantly coarse grained occasionally with much biotite to chlorite. Variations occurred in the amount of any light minerals but some schists were calcareous.

Furulund Group.

This unit is present within this group.

Calcareous mica schists + psammites + amphibolites.

Furulund Gneiss equivalent.

Furulund Gneiss equivalent.

This consists of a garnet mica schist with garnets 2 mm diameter, bounded by graphitic schists which laterally may become biotite schists.

In places the zone forms a ridge like feature and for much of its outcrop was red-stained through gaps may for a hundred or so metres.

This suggested ore minerals and in facts isolated specks were found therefore in discussion with Mr. Needham this is postulated as an ore zone, through probably of no great concentration.

Calcareous mica schist + psammites + amphibolites.

The units distinctly canons weathering. The strike is slightly east of north and has shown a swing to the right composed to the almost north-south strike of previous units occasional psammites are present and also coarse amphibolite bands. The psammites are probably sedimentary in origin being very quartzitic, little biotite being present, and a bounding being present along the direction of the strike.

Sjønstå Group.

A distinct differentiation between this and the Furulund Group was rather difficult but eventually a somewhat artificial division was made on the psammite percentage, i.e. the psammites are far more numerous than the calcareous schists. Amphibolite bands are present of similar coarseness and character to those in the Furulund Group.

For Sjønstå Group can then be divided in the following manner:

Upper. Psammites + Garnets + amphibolites.

Lower. Garnet, ferous Gneiss and schists.

Psammites + Garnets + amphibolites.

The amphibolites and psammites here are the same as those found in the Furulund Group and here need no more description.

Garnetiferous Gneiss.

This shows variations in the mica and quartz contents and also in the degree of contortion, the size of the garnet may show local variations being from 1 mm - 3-4 mm in diameter and they showed both isotetrahedral and rhombododecahedral form. Garnet amphibolites were also present but this one of very local extent. Within the garnet bands more psammites are present but there were never of any great lateral extent. Within the more contorted garnet gneisses

graphitic lenses were present but again these were rarely continudes.

Before leaving the Sjønstå note should be made of the biotite schist underlying the psammities which appears along the eastern outcrop (x-section AB at Tverelven) and which lenses and disappears on the south-western side of Storfjellet.

Steinkjerringo Group.

This consists of two definite units and a possible third depending on the structural interpretation.

Marble Unit (Pieske or Fauske)

Graphitic schists and rusty micaceous schists + garnets
Amphibolite.

Amphibolite Unit.

This is a very extensive unit but also rather thin and its softer nature relative to the units above and below do not give complete exposure along the length of its outcrop positioning in places was based on fragments in rock debris. The amphibolite becomes graphitic in places though this may be an effect of infolding of graphitic material from below.

Graphitic schists.

These vary somewhat and contain micaceous units with graphitic lenses which on Storfjellet are more extensive than the graphitic schists, where as on Storfjellet the graphite is the more extensive. Garnet may occur in both the micaceous and graphitic bodies.

Marble Unit (Pieske or Fauske).

The marble where it underlies the graphitic schists consists of mica-schists which may laterally change to psammities which are probably calcareous. Then the calcareous nature becomes obvious with a dirty brown biotite marble. Below this it changes to a pure marble. On Storfjellet the marble contains further bands of micaceous psammitic material.

Other Rock Units.

Within the area are certain rock types which are difficult to correlate. A brief description of them is made here and correlation is discussed under the structural section.

Hornblende Psammities.

This is a collection of rock types of which most have or contain some percentage of hornblende. They vary in colour from dark blue-green to various shades of grey. Some are completely pure amphibolites but others (the majority) are obviously psammitic. Biotitic and graphitic bands are occasionally present but never have any great lateral extent. They occupy a wide outcrop from Midtiffjellet to Vassbotnfjell and a characteristic feature is the generally rumpled nature of the outcrop with no definite dip direction more distinct dips could be observed where came this into contact with other rock units but even here the actual dip tended to be confused by minor folding.

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This occurs on Midtiffjellet and is associated with biotite schists and other psammities containing occasional thin bands of coarse amphibolite.

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Besides the "granites" in the injection zones two other "granite" outcrops were found.

- 1) This occurred in the extreme south-east of the area and underlies the marble unit. This may be basement granite or sparagnite but detailed study is required to confirm this.
- 2) An outcrop of a rather coarse biotite feldspar quartz rock occurs in the north-west corner of the area and lies above the Fauske Marble and below the amphibolite. Where the feldspars becomes concentrated was sometimes observed.

Structure.

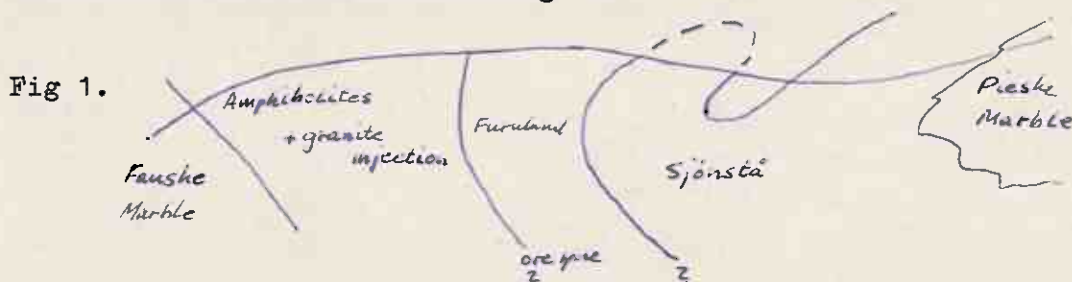
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- 1) Straight succession of the form.

Fauske Marble
Furulund Group
Sjønstå Group
Pieske Marble

- 2) Synclinal form with the two marbles on the east and west sides being equivalent.

If the succession is straight then one of the marbles may be expected to be overturned in depth. No evidence could be found on the limited outcrops of the Fauske Marble, but the Pieske Marble shows a folding style of that on the limbs of an anticline therefore a portulate for the structure could be as in fig. 1.



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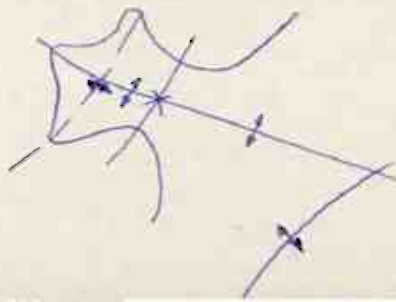
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Fig. 2.



Ore Zones. The main zone occurs within the Furulund gneiss equivalent but not great ore concentrations are present and other questionable ores occur at the following localities

- 1) Tindgrovatn lake 100 metres E.
- 2) Sletfjellet.
- 3) Svartvatn lake.

None of these were extensive and had only minor concentrations which appeared to consist of only pyrrhotite.

Sample Y₃.

Locality - foldaxis on east Lifjellet.

Rock Type. Garnet mica schist.

Stratigraphic Position. Lower Sjønstå.

Sample Y₂.

Locality Midtiffjellet.

Rock Type fine grained hornblende psammite.

Stratigraphic Position. Upper Sjønstå.

Sample Y₁.

Locality Skrapestua.

Rock Type fine grained psammite.

Stratigraphic Position. Upper Sjønstå.

Sample V₂.

Locality Slettfjellet.

Rock Type occurs on same horizon as a graphitic schist below Tremolite Marble. It contains qz mica and some ore minerals.

Stratigraphic Position. Tremolite Marble.

Sample V₁.

Locality Svartvatn lake.

Rock Type pyrrhotite plus quartzite in boundans within Fauske Marble.

Stratigraphic position. Fauske Marble.

Sample G.

Locality Nesflaaget.

Rock Type "Granite".

Stratigraphic Position. Granite injection zone No. 1.

A2.

Orezone. Fine iron pyrites.

As finely disseminated crystals in quartzite band of the Trembolite Marble.

Locality 395184.

A1.

Orezone. Arsenopyrite, pyrrhotite.

As veins in amphibolites.

Locality 404176.

A3.

Orezone. Arsenopyrite, iron pyrites chalcopyrite.

As large cristal aggregats 3 cm in quartzite band in Furulund.

Locality 383212.

Samples Z₂.

Locality Ørneflåget.

Rock Type coarse amphibolite.

Stratigraphic Position. Lower Sjønstå.

Sample Z₁.

Locality Ørneflåget.

Rock Type coarse garnet amphibolite with qz veining gneissic character.

Stratigraphic Position. Lower Sjønstå.

Sample Z₁ was associated with Z₂.

Sample Y_{2a}.

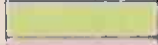
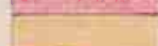
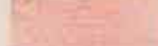
Locality Midtiffjellet.

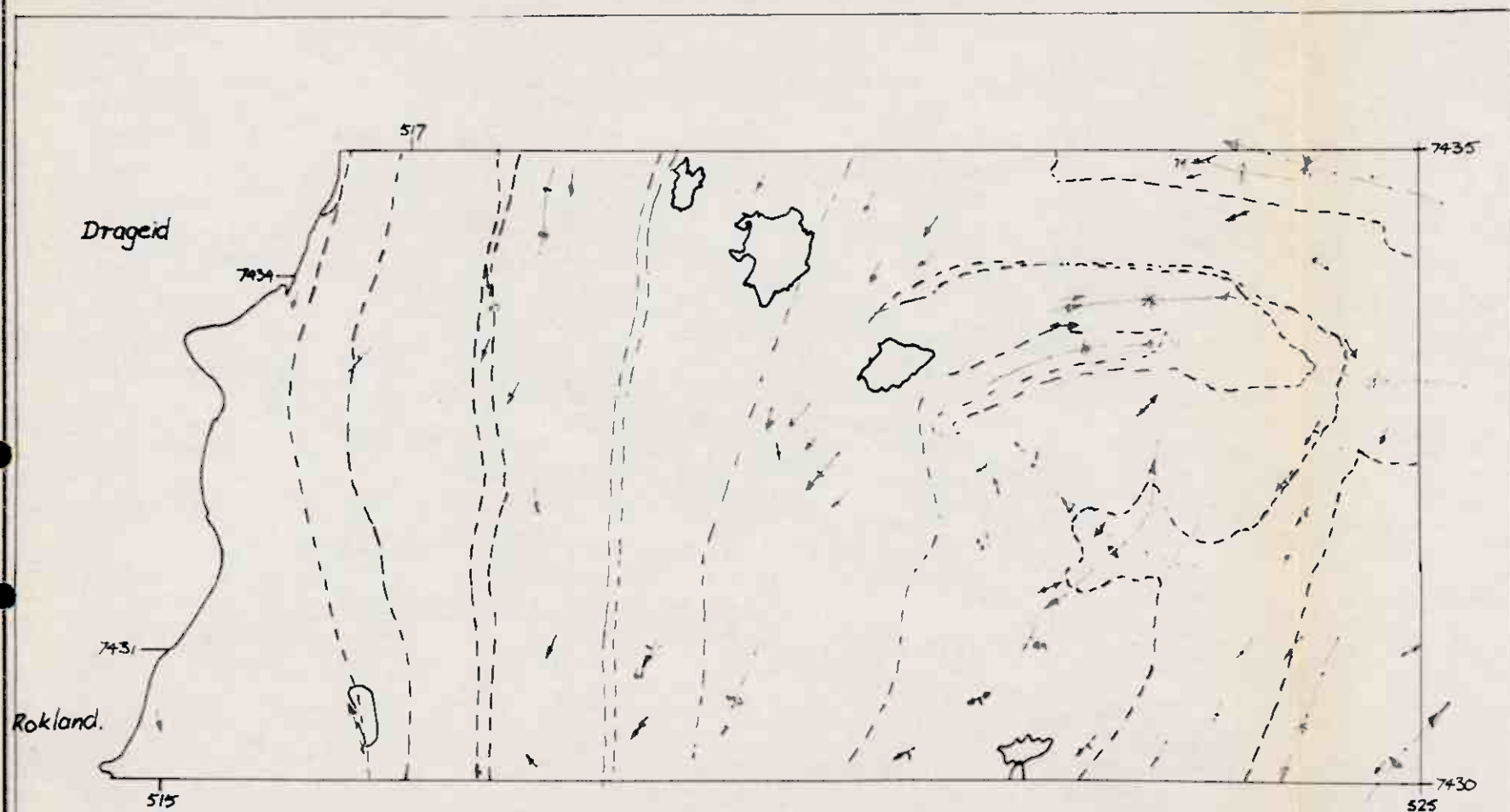
Rock Type garnet amphibolite very local in extent.

Stratigraphic Position. Upper Sjønstå.

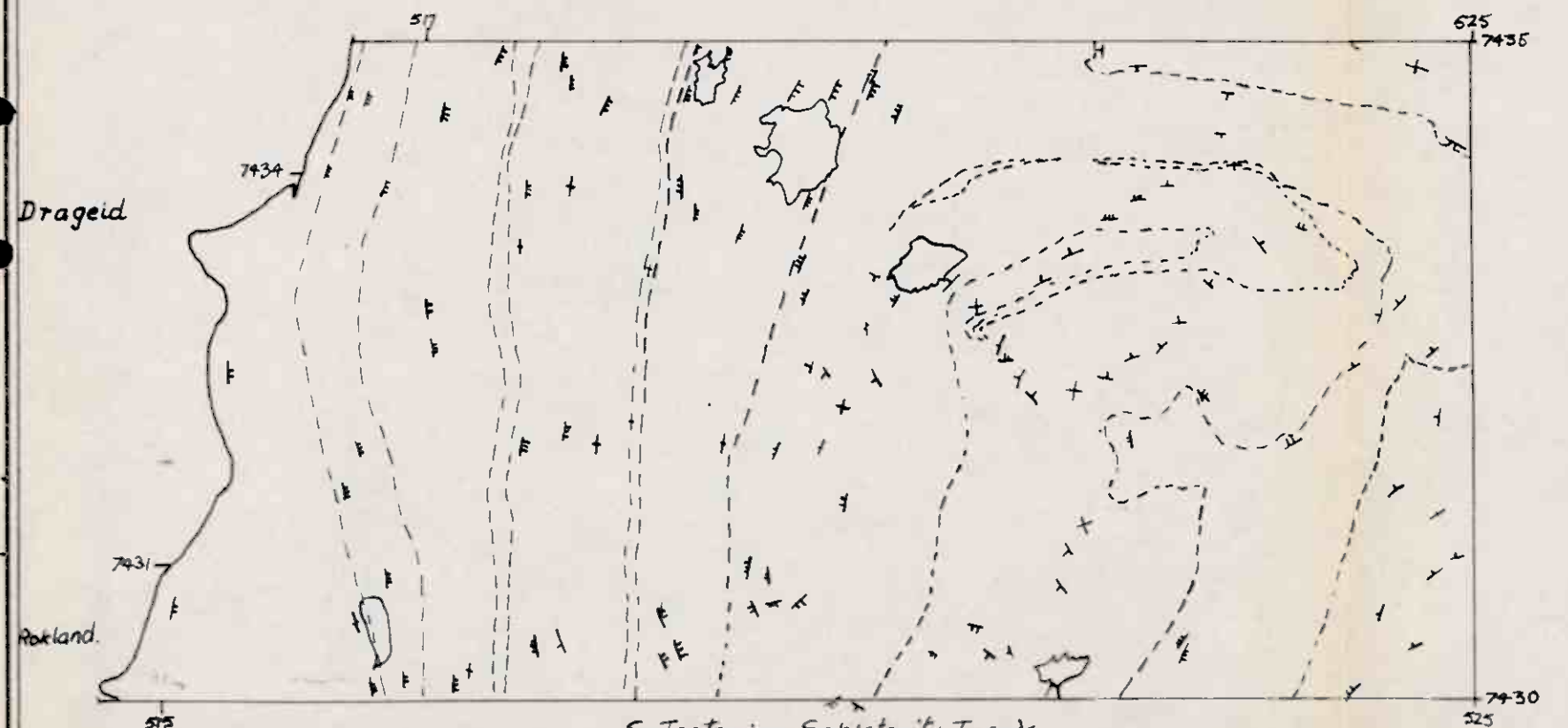
Key to Stratigraphic Rock Units for 1:50000 map and 1:25000 x-sections

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	Graphitic Mica Schist		101/9
and	Fine dark green amphibolite		
GRANITE	Granite Injection zone no. 1. plus graphitic, biotitic and garnet Micaschists.		101/7
INJECTION ZONES			
	Tranolite Marble		999/160
	Granite Injection zone no. 2. + mica, garnet and graphitic schists.		101/6
	Biotite Schists and Pelites		
FURULUND GROUP	Furulund Gneiss		999/20
	Calcareous mica schists plus amphibolite		101/26
	Psammite plus amphibolite		999/30
Middelfjell succession.	Quartz Psammite		999/3
	Biotite schists		999/30
	Hornblende		999/180
	Psammite		999/30
	Garnetiferous Gneisses + schists		999/59
SJÖNSTÄ GROUP	Garnetiferous gneisses and schists		999/59
lower	Amphibolite		101/9
	Graphitic + micaeous schists ± garnet		999/110
	Mica schists and psammite		999/25
PIESKE MARBLE GROUP	Pieske Marble.		101/2
BASEMENT	Basement + Granite		999/70



B Tectonics - Structural Trends



S-Tectonics - Schistosity Trends

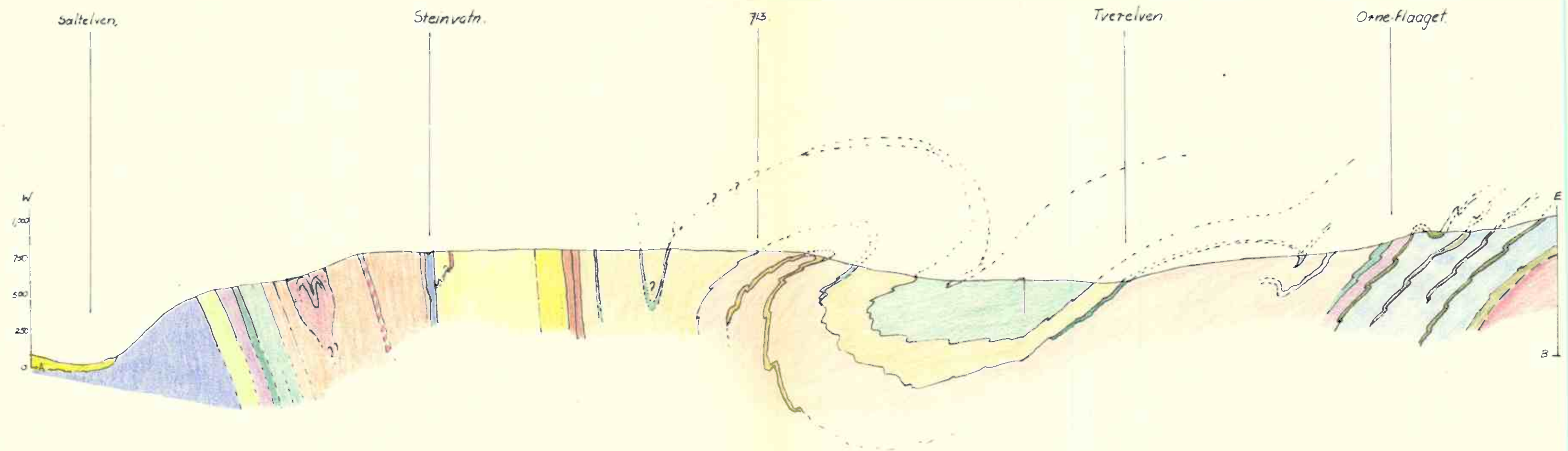
Scale 1:50,000

Målestokk	Tegn.
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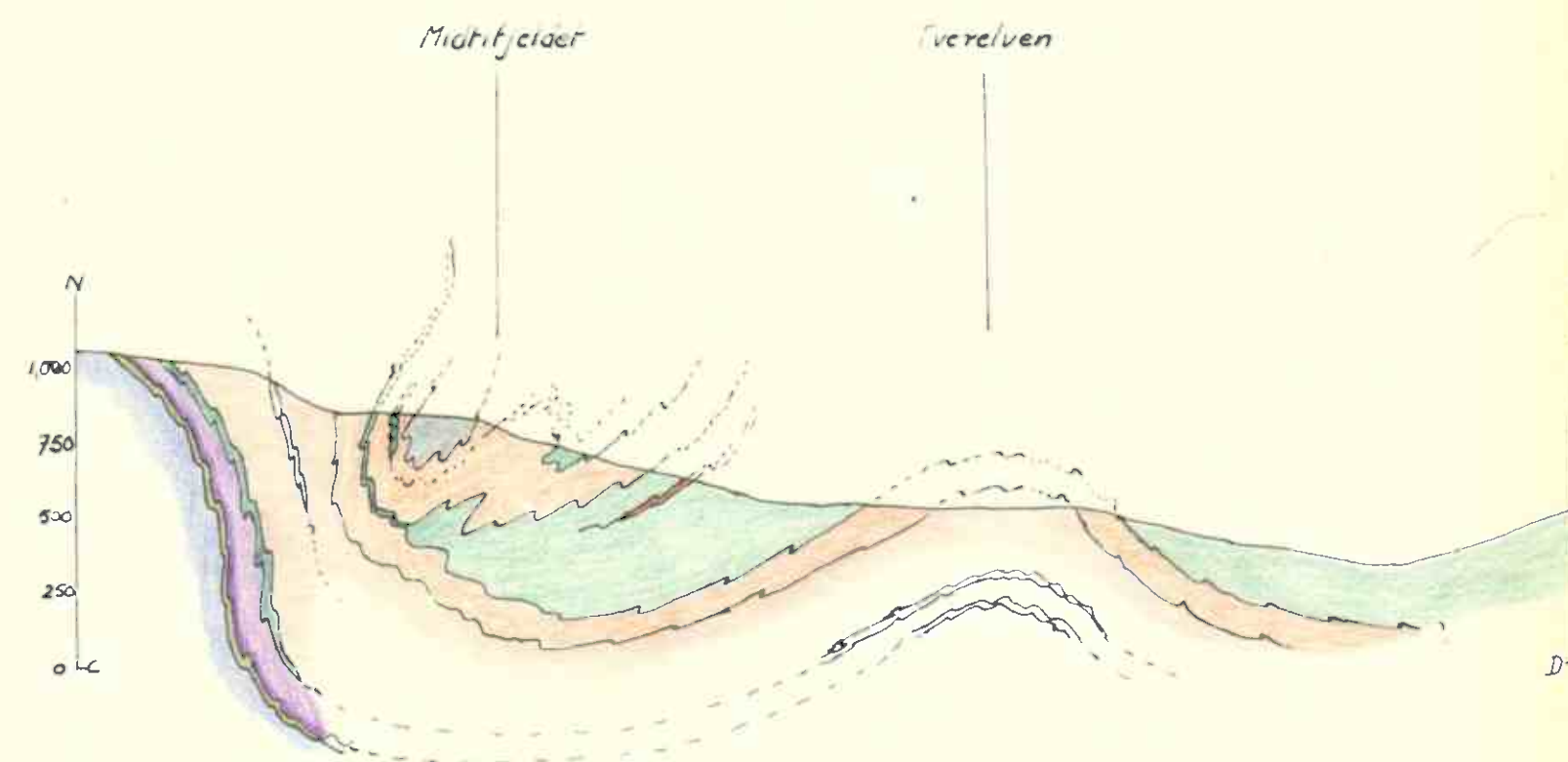
Erstatning for:

Gordon Knox

Erstattet av:



CROSS-SECTION AB VENSMOEN-STORFJELLET



CROSS-SECTION CD STORFJELDET-STORVATN.

Kilometres.



Scale

Horizontal : 1:25,000

Vertical : 1:25,000

Målestokk

Tegn.

Trac.

Kfr.

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