BOREHOLE NO. 55.

Petrografical description.

0,00 - 23,60

The tender or more tiny-grained amphibolitic greenstone with small acicular crystales of actinolite or on some places more rodlike or acicular crystales of amphibole with some chlorite, epidote and klinozoisite too and with some big micas of biotite, which are acummulated at some places by some irregular weak intercalations, schliers or pellets etc. Carbonates creat some irregular intercalations, pellets, schliers, lenticles or fulfilling of some transversal or antithetic joints mostly. The mineralization of FeS_2 mostly is very weak only, but on some places is little bit clear with some grains of FeS_2 (max. 1-1,2 mm in average big), exactly between 0,20 - 1,10 m. Between 2,25 - 2,65 m the amphibolitic greenstones breccic is present with quartz - feldspar, quartz or carbonates (small) fulfilling. Some big grains of Fe_3O_4 or FeS_2 are present (1-3 mm in average). Some grains of Fe_3O_4 are little bit or mostly regular and these are breaked bye some joints which are fulfilled by carbonates or by quartz feldspar matter mostly. The biotite's micas (1-2 mm in average large) create some acumulations in some schliers, pellets or irregular intercalations etc. Epidote is present more.
In 1,10 m (2 cm), 1,25 m (5 cm), 1,80 m (7 cm), 2,75 m (5 cm) 3,60 m (5 cm), 6,75 m (3 cm) 7,40 m (2,5 cm), 7,65 m (5 cm), 10,50 m (4 cm), 11,00 m (2 cm), 11,20 - 11,40 m (breccic zone, 11,75 - 11,85 m are some positions of white quartz, with little bit carbonates intercalations, pellets etc. round and on some places in boundarys with more biotites micas and with more epidote etc. The some carbonate's veins (the fulfilling of joints mostly have more epidote some small acicular crystales of amphibole or actinolite and with a lot of small grains of pink or white-pink garnet. The total colour of this rock is green or gray-green. The average gradient of foliation is 55° round (?)

23,60 - 24,70

The tiny-grained or medium-grained amphibolitic greenstone with very strong mineralisation of carbonates with some irregular positions, schliers etc. of carbonates, with some weak irregular intercalations or schliers of biotite's micas, with some irregular intercalations, pellets, schliers of quart and with some feldspar, with a lot of small crystales (acicular) of amphibole and smaller and longer actinolite and with some grains of garnet and with much epidote. The total colour of this rock is bright green-gray. The structure is pell-mell mostly. The some mineralisation of sulphides is very scarce only.

24,70 - 35,80	The tiny-grained amphibolitic green-stone as well as in 0,00 - 23,60 m. In 34,55 - 34,90 m is some irregular fulfilling of some dislocation (antithetic which is created by white, quartz with some irregula pellets or schliers of carbonates in within some mineralisation of sulphides etc.
35,80 - 37,10	The tiny-grained or medium-grained amphibolitic, strongly carbonatic greenstone as well as in 23,60 - 24,70 m, but with more chlorite. At some places biotite micas creat 2-4 mm thickness irregular intercalations (in example in 36,90 m round).
37,10 - 37,30	The tiny-grained amphibolitic green-stone as well as in 0,00 - 23,60 m.
37,30 - 37,40	Just the same type of rock as in 23,60 - 24,70 m
37,40 - 38,20	The tiny-grained amphibolitic green-stone as well as in 0,00 - 23,60 m
38,20 - 38,55	The tiny-grained and medium-grained, strongly carbonatic amphibolitic greenstone as well as in 23,60 - 24,70 m.
38,55 - 44,70	The tiny-grained amphibolitic greenstone as well as in 0,00 - 23,60 m. The average gradient of foliation is 40°-45° round (?)
44,70 - 45,40	The tiny or medium-grained amphibolitic greenstone with aktinolite, epidote, some chlorite and with some irregular or regular grains of carbonate with some small white-pint or bright pint grains of garnet. The mineralisation of some sulphides is very scarce only.
45,40 - 48,55	The tiny or tender-grained amphibolitic greenstone as well as in 0,00 - 23,60 m but with very small some carbonates intercalations, pellets etc.
48,55 - 54,70	The tiny and medium-grained amphibolitic greenstone with aktinolite, trenolite, with some grains (small and irregular) of carbonates, with some note much irregular intercalations, schliers, pellets etc. of carbonates, with a lot of small grains of pint garnet. The some impregnation of FeS_2 but FeS too is present but very poor only. The structure is pell-mell mostly. The total colour of rock is green.
55,70 - 58,50	The tiny- and tender-grained amphibolitic greenstone with klinozoisite, aktinolite, some epidote, with not much irregular intercalations or pellets of carbonates. The mineralisation of sulphides is very weak only. The total colour of this rock is bright gray green.
58,50 - 58,65	The strongly chloritic greenstone with aktinolite, klinozoisite, epidote, some irregular schliers or pellets of carbonates, with little bit quartz too and with some impregnation of FeS_2 or FeS too but weak only. The total colour of this rock is bright gray-green. The schistosity isn't clear.

58,65 - 58,70	The very bright green or white-green quartz with some feldspar and with some small, acicular crystals of amphibole and some aktinolite too. The some impregnation of FeS_2 only is poor only and the irregular grains of FeS_2 are protracted to some direstions (schistosity maybe ?). Some irregular weak interlcations, pellets etc. are present too but not so much. Chlorite present too.
58,70 - 58,80	The strong impregnation of FeS_2 (with some $CuFeS_2$- very poor) in white gray quartz with some irregular very weak pellets or intercalations of carbonates and some feldspar is little bit present too maybe.
58.80 - 59,45	Just the same quartz with some poor impregnation of FeS_2 as well as in 58.65 - 58,70 m.
59,45 - 59.70	The epidotic greenstone with acicular crystales of amphibole, aktinolite with klinozoiste and with some carbonates, but not so much and with some impregnation of FeS_2 only, but poor only.
59,70 - 67.25	The tiny-grained amphibolitic greenstone with aktinolite, some epidote and klinozoisite, with not so much irregular pellets, schliers or some intercalations of carbonates. The some impregnation of sulphides is very weak only. Some schistosity ins't clear. The total colour of this rock is bright gray-green or bright green or green too. In 60.00 - 60,30 m is some position of chlorite greenschist with some sericitic, quartz, aktinolite, klinozoisite, with some micas of biotite and with some irregular grains pellets or schliers of carbonates. Some mineralisation of sulphides os very scarce only. Between 60,30 - 63,20 m isn't present some core.
67,25 - 67,70	The strongly carbonatic epidotic greenstone with a lot of acicular crystales of amphibole and aktinolit with some klinozoisite, with some micas of biotite and with some poor impregnation of FeS_2 mostly.
67,70 - 68.10	The tiny-grained amphibolitic greenstone as well as in 59,70 - 67,25 m.
68,10 - 69,00	The tender or tiny-grained amphibolitic, greenstone with a lot of chlorite, aktinolite, with some epidote and clinozoisite, with a lot of weak, mostly irregular intercalations, positions or schliers of carbonates, with a lot of small grains of garnet (pint colour). Biotite's micas creat, on some places strong concentration in some schliers or pellets etc Some mineralisation (impregnation) of FeS_2 mostly in very weak only. The schistose structure is very clear. The total colour of this rock is green or little bit gray-green too. The average gradient of foliation is 50^{o} round.
69,00 - 69.45	The strongly carbonatic epidotic greenstone as well as in 67,25 - 67,70 m.

69,45 - 74,20 The tender or tiny-grained amphibolitic greenstone as well as in 68,10 - 69,00 m. The average gradient of foliation is 50° round. In 71,80 - 71,90 m and in 71,95 - 72,00 m are thick intercalations of carbonates without some impregnation of sulphides.

This borehole no. 55 was finished at 74,20 m.

(M. Motys).

Borhull nr. 51, H J E R K I N N .

Petrografical description.

0,00 - 6,70	The chloritic greenschist with chlorite actinolite, some epidote, klinozoisite and with albite and sericite too. This rock has a lot of very weak positions and veins (0,5 cm in average) and a lot of some grains (0,5 - 2 mm in average) of carbonate or carbonatic-dolomite. The schistosity is very cleae. The carbonatic positions and grains are clongation along schistosity. The total colour of this rock is green or dark green Average gradient of foliation is 40°-45° about.
6,70 - 7,30	The complex not thick positions amphibolitic, with chlorite and klinozoisite and the other carbonates too, greenschist and medium grained chloritic and klinozoisite-epidotic amphibolitic greenstone with the strong ore mineralization of FeS_2 (grains 1-2 mm in average) and of Fe_3O_4 (the positions which follow the schistosity of rock, 2, 5 mm and somewhere more in average. Average gradient of schistosity and foliation is 55° about.
7,30 - 21,80	The chloritic greenschist, just the same as between 0,00 - 6,70 m. The quartze veins or positions are in metrage 15,10 - 15,25 m (with large plates of ilmenite) 15,40 - 15,75 m and 16,57 - 17,00 m. The quartze has white or yellow-white colour. The total colour of chloritic greenschist is green or dark green somewhere. Average gradient of foliation is 45° round.
21,80 - 22,55	The complex of the other type of rocks carbonatic dolomite (bright green-gray colour), chloritic medium-grained or coarse-grained amphibolitic greenstone (amphibolite, garnet, magnetit with the other minerals - biotite, klinozoisite, epidote etc. The impregnation of FeS_2 is present too but weak only, and green schist with chlorite albite some biotite and a lot of weak positions or clongation grains of carbonates or dolomite. Fe_3O_4 creat the weak parallel positions (2-5 mm in average thickness) mostly in amphibolitic carbonatic greenstone only. The average gradient of foliation is 55° round.
22,55 - 23,15	The chloritic, albitic, carbonatic greenschist with some biotite somewhere. The carbonatic grains or positions (weak 1-2 mm in average thickness only) are clongating along schistosity of rock. The schistosity is very clear too. The total colour of this rock is green, gray-green or bright gray-green. Average gradient of foliation is 60°-65° round.

23,15 - 24,00 The complex of rocks where exchange not thick so parallel positions amphibolitic medium-grained or somewhere coarse-grained greenstone(amphibolite, magnetit, garnet that creat grains ans flocking of grains clongat along foliation or schistosity. The other minerals are carbonates and carbonatic-dolomite, biotite and epidote-klinozoisite little too.), carbonatic-chloritic or amphibolitic-chloritic, dolomite and amphibolitic-carbonatic greenschist. The impregnation FeS_2 and FeS is present little only too. The average total colour of this rocks are bright green gray, green-gray and very dark green. The average gradient of foliation is 60° round.

24,00 - 26,00 The chloritic and carbonatic greenschist with a lot of biotite, somewhere with weak positions of Fe_3O_4 and with garnet's grains too somewhere (1 mm in average - may be andradite). The very much carbonatic and dolomite-carbonatic schliers are in green schist too and glongate along schistosity. The total colour of this rock is dark green. The average gradient of foliation is 60° or 65° about. The impregnation of FeS_2 and little FeS is very weak only. Fe_3O_4 (tiny or tender-grained) clear the schliers or positions 2-5 mm thickness in average.

26,00 - 65,90 The chloritic-carbonatic greenschist with biotite and sericite somewhere too. The carbonates or dolomitic carbonates creat grains, schliers or parallel positions which follow by clongation schistosity. The plagioclase (albite) is present too and clear porphyroblasts very clongate along schistosity. The impregnation of FeS_2 or FeS is present in rock too but very, very weak only. In metrage 32,05 - 32,32 m and 36,60 - 36,90 m the positions (1-3 cm thickness in average) of chloritic carbonates or carbonatic feldspatic-dolomite exchange chloritic-carbonatic greenschist. These two parts have some more impregnation of FeS_2 and FeS too. The more strong impregnation of FeS and FeS_2 is in parts between 42,90 - 43,30 m, 48,00 - 48,60 m and 49,70 - 50,80 m where exchange a lot of not thick positions feldspatic-carbonatic greenschist and dark greenschist with chlorite and biotite too and carbonatic or carbonatic-dolomitic. The white quartz, filling of some joints, without some mineralisation is between 48,15 - 48,25 m with average angle of dip 25°-30° round. The average total colour of rock is green or gray-green. The average gradients of foliation are in 27 m 55°, in 36 m 55° in 48 m 55°, in 57 m 55° and in 65 m 55°

65,90 - 72,30 The chloritic-amphibolitic tiny-grained greenstone or greenschist. This rock has more amphibole that creat tiny acicular crystals. The rock is very strong carbonatic too. The albit as present too in. The impregnation of FeS_2 and FeS is more strong than in the rocks before. In 68,60 - 68,65 m, 68,85 - 68,98 m and 69,20 - 69,45 m is the strong mineralisation of FeS_2 and FeS too in laminated

weak positions of greenschist, greenstone and carbonates or carbonate-dolomites. From these positions is one very interesting because over ther the rocks little positions have been folding to little folds of cm amplitude. The mineralization of FeS_2 and FeS too in laminated weak positions of greenschist, greenstone and carbonates or carbonate dolomites. From these positions is one very interesting because overthere the rocks little positions have been folding to little folds of cm amplitude. The mineralization of FeS_2 and FeS have been showing overthere syngenetic may be (?) In 68,90 - m is joint, which fill carbonates with limonite, dip angle of this joint is 25° and the other 60° about. The total colour of this rock is dark green and dark gray-green. The average gradient of foliation is 65° about.

72,30 - 74,30 — The position where exchange positions of carbonatic or carbonatic-dolomitic rocks and chloritic tiny-grained greenstone or greenschist. These every types of rock have very strong mineralisation (or impregnation) of FeS_2 and FeS. The schistosity is very clear. Average gradient of foliation is 60° or 65° round.

74,30 - 86,00 — The medium-grained amphibolitic and chloritic greenstone, on some place more greenschist for more chlorite, sericite and biotite too. These rocks are very strong carbonatic or carbonate-dolomitic. This carbonatic and dolomitic matter creat a lot of weak positions, schliers and grains clongated along schistosity. The impregnation of FeS_2 and FeS too is little strong or very weak somewhere. In 78,05 - 78,15 m is very strong mineralisation FeS_2 and FeS in exchangeing positions of greenstone, greenschist and carbonatic-dolomite etc. The mineralization just the same but more poor is in 83,80 - 84,30 m. The same joint, which is filling by carbonates and limonite is in 75,80 m. The dip angle of this joint is 10° and 25° about. Round this joint exist some more strong epidatization. The total colour of rock is green or dark gray-green. The general average is 65° and 70° round.

86,00 - 87,35 — The chloritic-epidotic greenstone without clear schistosity. The rock is strong calcarcous.

87,35 - 105,50 — The carbonatic, chloritic and sericitic greenschist with a lot of positions, schliers of carbonates or carbonatic-dolomite. The schistosity is very clear. Somewhere amphibolitic small acicular crystals are present. The impregnation of FeS_2 is very very weak on some without this one. In 90,70 - 91,05 m, 92,30 - 92,40 m and 99,90 - 100,15 m are clear some mineralisation of FeS_2 and FeS but very poor only. Some exchanging of carbonatic, carbonate-dolomitic, medium-grained or coarse-grained greenstone and chloritic greenschist are there. Very nice the positions of carbonates and dolomite (5-8 cm thick in average) and coarse-grained amphibolitic greenstone with big rodlike or acicular crystals are in 90,70 - 91,05 m. The total colour of rocks

are green, gray-green and bright or dark gray-green too. The average gradient of foliation is 75°, 80°, or 85° too round.

105,50 - 105,70 The coarse-grained amphibolitic-chloritic greenstone with klinozoisite, albite and a lot of carbonates too. The schistosity isn't clear. The total colour of rock is dark gray-green. Contact with the other next rock has angle of dip 25° about.

105,70 - 105,90 The tiny-grained very strong carbonatic, chloritic-amphibolitic greenstone (the small acicular of amphibolite have been exchangeing to chlorite). The contact with the other next type of rock has the angle of dip 35° round.

105,90 - 107,55 The coarse-grained amphibolitic-chloritic greenstone, just the same as between 105,50 - 105,70 m.

107,55 - 107,70 It is just the same type of tiny-grained strong carbonatic, amphibolitic-chloritic greenstone of gray or green-gray colour. Contacts with both rocks in overliying and substratum have the same angle of dip, it is 80° round.

107,70 - 109,08 The very strong amphibolitic and chloritic greenschist (the amphibole creat acicular porphyroblasts 3-5 mm long in average, which clongat to all directions). This rock is very strong calcarcous with a lot of weak positions and schliers of carbonates. The impregnations is not present in. The total colour of this rock is gray-green. The average gradient of foliation is 80°-85° about.

109,08 - 109,50 The positions feldspatic schist with biotite and quartz, greenschist, tiny-grained greenstone, carbonate and carbonatic-dolomite, which exchange and together have some weak or little bit strong mineralization of FeS_2 and FeS somewhere. The colour of rock is gray or dark gray. The schistosity is very clear in. The total average gradient of foliation is 75° round.

109,50 - 112,08 The chloritic mica greenschist that is strong calcarcous, with a lot of positions and schliers of carbonates or carbonatic-dolomite. From minerals are present chlorit, muscovite, little biotite, klinozoisite, epidote, albite and amphibolite too. The mineralization (impregnation) is not present or very weak only somewhere. The total colour of rock is dark gray-green or gray-green. The schistosity is very clear. Average gradient of foliation is 80°-85° about.

The borehole was finished at 112,08 m. The angle of dip this hole is 50°.

(M. Motys).

BORHULL nr, 116, STORMYRA.

0,00 - 9,60	The core from this metrage isn't present.
9,60 - 21,90	The chloritic and sericitic micaschist, with quartz and with a lot of garnet (bright pink or pink colour 1 mm in average big but max. 2 mm - 3 mm). Some carbonates creat some irregular pellets, schliers or intercalations, weak only. White or white-gray quartz, creat irregular intercalations os some big positions of basement rock (breccic maybe). Thsi type of quartz, commemorate secretion quartz too. Some more, thick position of this quartz are in 13,55 m (10 cm) 13,65 m (5 cm), 14,15 - 14,40 m and 18,60 m (7 cm). This basement micaschist have biotites micas too, but not so much. The some impregnation of sulphides isn't present or is very scarce only. The structure of this rock is irregular mostly - phacoidal or phacoidal-schistose, but schistosity is clear. The total colour of this rock is bright little bit green-gray and green or green-gray on some small places where the chlorite is more present. The average gradient of foliation is round 10 m 30^{o} and after 45^{o}-55^{o} about. Some foulding is present round 18 m. Type of foulding round 18 m
21,90 - 28,60	The chloritic and sericitic micaschist with little bit biotite, a lot of quartz, garnets grains (pink or very bright pink, 1-2 mm in average but 3 mm scarcely too.) In some places, the amphiboles acicular crystales (small) are present too. In 21,90 - 22,10 m, 22,20 - 22,30 m, 22,70 - 22,95 m, 23,10 - 23,30 m, 23,80 - 24,30 m and in 26,50 - 26,75 m are irregular thick positions of quartz with some carbonates, pellets etc., with sericitic micaschist with more acicular crystales of amphibole and with big grains of garnet (3 mm). Into is more chlorite too. Phacoidal schistose structures clear. Some weak irregular pellets, schliers or intercalations of carbonates are present too. The mineralisation of FeS_2 is very weak only (some grains 1-2 mm in average), mostly is special positions in the basement micaschist. The total colour is bright green-gray. The average gradient of foliation is 45^{o}-50^{o} round.
28,60 - 29,45	The biotitic micaschist with sericite, chlorite and with a lot of small grains of garnet (round 1 mm in average), with a lot of parallel weak positions, intercalations, pellets etc. of carbonates and quartz too. Schistose structure is very clear. The mineralisation of the sulphides isn't present or is very scarce only. The total colour os this rock is gray and bright gray. The average gradient of foliation is 85^{o}-90^{o} round.
29,45 - 37,50	The chloritic and sericitic micaschist with biotite

as well as in 9,60 - 21,90 m. In 34,60 m (10 cm) the position of white quartz is present. The mineralisation of sulphides is very scarce only. The average gradient of foliation is 80°-90° round.

37,50 - 38,45 The sericitic micaschist with some chlorite and biotite little bit too, with a lot of quartz and with some weak irregular intercalations, pellets etc. of carbonates. Granet is present scarcely only. The mineralisation of sulphides isn't present. The structure is schistose little bit irregular only. The total colour of this rock is bright grey mostly. The average gradient of foliation is 85°-90° round.

38,45 - 40,05 The sericitic micaschist with chlorite and little bit biotite too and with a lot of grains of garnet (bright pink 1 - 2 mm but 3 mm too in average). This type of rock is little bit just the same as in 9,60 - 21,90 m. The average structure is phacoidal and phacoidal schistose. Some thick positions of quartz are present too in 38,50 - 38,60 m. Some foulding is present in 38,90 m round.
Type of foulding:

The average gradient of foliation is 75°-90° round mostly.

40,05 - 49,35 The strongly calcarous chloritic and biotitic mica schist or greenschist with a lot of irregular and parallel intercalations mostly, pellets, schliers, lenticles or grains of carbonates. But quartz is strongly present too. Some very small acicular or rodlike crystales of amphibole or aktinolite are strongly present. The total colour of this rock is little bit dark green-gray. The some mineralisation of sulphides isn't present or very scarcely. The structure is irregular and parallel schistose. Some recumbent folding of dm amplitude with strong little oblique folding is present in 40,30 - 40,70 m round. The average gradient of foliation is 80°-85° round mostly.

49,35 - 49,70 The tiny-grained and medium-grained amphibolitic greenstone with aktinolite, biotite and chlorite little bit too. Carbonates creat a lot of irregular schliers, pellets, lenticles etc. Some mineralisation of sulphides isn't present. The total colour of this rock is dark green-gray. The average gradient of foliation isn't very clear but 80°-85° round.

49,70 - 51,30 The strongly calcarous chloritic and biotitic micaschist or greenschist as well as in 40,05 - 49,35 m. The average gradient of foliation is 70°-75° round.

51,30 - 51,45 The amphibolitic and chloritic greenschist with biotite and with a lot of weak irregular intercalations, schliers, pellets etc., of carbonates and with weak, parallel positions of tiny- or tender-grained amphibolitic greenstone. The

mineralisation of sulphides isn't present or is very scarce only. The total colour of this rock is green-gray. The average gradient of foliation is 70° round.

51,45 - 52,60 The strongly calcarcous chloritic and biotitic micaschist or greenschist as well as in 40,05 - 49,35 m. The average gradient of foliation is 45° 60° and 75° round (exchange).

52,60 - 52,70 The tiny-grained amphibolitic greenstone with a lot of irregular weak intercalations etc. of carbonates as well as in 49,35 - 49,70 m. The average gradient of a foliation is 80° round.

52,70 - 54,20 The position of white quartz (the hydrothermal vein maybe, without some mineralisation).

54,20 - 60,00 The tiny-grained amphibolitic greenstone, with klinozoisite and with some weak intercalations and pellets or schliers of carbonates (min. thickness is 1-2 mm , max. scarcely 2 cm). In 56,00 m is position of white-gray quartz. Some mineralisation of sulphides is very scarce in this rock. The total colour of this rock is green-gray. The average gradient of foliation is 80° round.

60,00 - 63,70 The strongly calcarcous medium-grained amphibolitic greenstone with a lot of micas of biotite, with some chlorite, epidote, klinozoisite and with a lot of weak intercalations, pellets, schliers etc. of carbonates, but quartz too. The total colour of this rock is dark green-gray. The some mineralisation of sulphides isn't present or is very, very scarcely only. Some positions of tiny-grained amphibolitic greenstone are present too. The average gradient of foliation is 70°-75° round.

63,70 - 68,10 The tiny-grained on some places tender-grained amphibolitic greenstone with a lot of intercalations etc. of carbonates as well as in 54,20 - 60,00 m. The average gradient of foliation is 75°-80° round.

68,10 - 70,40 The medium-grained or coarse-grained carbonatic amphibolitic greenstone with biotite, chlorite, epidote, klinozoisite and with a lot of weak intercalations, pellets, schliers, etc. of carbonates but quartz too. Amphibole creat some rodlike or acicular crystales max. 2-5mm in average. Some positions are created by the tiny-grained amphibolitic greenstone as well as in example in 63,70 - 68,10 m. The mineralisation of sulphides is very scarce only. The total colour of this rock is dark green-gray. The average gradient of foliatio are 75°-85° round.

70,40 - 80,80 The tiny-grained amphibolitic greenstone as well as in 54,20 - 60,00 m. On some-places the very weak mineralisation of FeS_2 mostly is present, but scarcely only. The average gradient of foliation is 80°-85°, but 90° too round.

80,80 - 81,10 The chloritic greenschist with quartz, carbonates, dolomite little bit too, with small acicular crystales of aktinolite and amphibole too. Carbonates creat some weak parallel or irregular intercalations (max. thickness 0,5 cm). The some mineralisation of FeS is present and FeS creat some very thin lenticles or scales which have been following foliation mostly. The total colour of this rock is little bit green-gray. The average gradient of foliation is 75°-80°.

81,10 - 83,35 The chloritic greenschist with aktinolite (small acicular crystales), klinozoisite, with quartz and some carbonates. Sericite, chalcomite, epidote are present very little too. Carbonates creat also weak parallel or irregular intercalations, schliers pellets etc. Some mineralisation of sulphides is very scarce. FeS only creat small irregular scales, which follow foliation but scarcely present only. The total colour of this rock is bright green-gray. The average gradient of the foliation is 70°-80° round.

83,35 - 84,40 The sericitic and biotitic micaschist, with klinozoisite and chlorite, but not much, with quartz and with some feldspar (not much). Garnet is present very strongly and creat grains which are more big than 2 mm in average (5 mm in average too) FeS only creat some irregular scales, very thin, which follow a foliation or axactly lie on foliation plates. More strongly garnet is present from 83,80 m to 84,30 m. From 84,30 - 84,40 m this micaschist cross to greenschist with more chlorite and aktinolite and without garnet. The total colour of this micaschist is gray. The average gradient of foliation is 80°-90° round.

84,40 - 86,70 The tiny-grained and tender-grained amphibolitic greenstone with a lot of weak parallel or oblique intercalations, positions or schliers etc. of carbonates. Some thin positions or intercalations of greenschist (as well as in 81,10 - 83,35 m) are present too. This some mineralisation of sulphides is very poor scarce only. The total colour of this rock is green-gray. The average gradient of foliation is 70°-80° round.

86,70 - 111,50 The motley serie, in which exchange some positions or intercalations of chloritic and or biotitic chloritic greenschist, strongly calcarcous, with a lot of weak parallel, irregular intercalations, schliers, pellets etc. of carbonates. These the various types of greenschist have some intercalations of tiny-grained or tender-grained too amphibolitic greenstone, but with small thickness only. The total mineralisation of FeS only is very weak only. FeS creat some irregular small and thin lenticles and more creat some small also irregular scales. More strong acumulation of FeS is in 110,20 m (2 cm) only. In 108,60 - 108,70 m is position of carbonates. The total colour of this

motley serie of greenschists is green-gray or bright green-gray. The average gradient of foliation is 80°-85°-90° round.

111,50 - 120,10 The tiny-grained or tender-grained amphibolitic greenstone with some weak intercalations, schliers or pellets of carbonates. The mineralisation of some sulphides is very scarce only. Between 115,00 m and 115,60 m is position which is affected by some big stres. The total colour of this rock is more, gray-green. The foliation isn't clear but average gradient of foliation is 80° round.

120,10 - 123,00 The chloritic, strongly calcarcous amphibolitic greenschist with a lot of siliumcarbonates and with a lot of irregular or parallel thin intercalations or positions, schliers, pellets etc. of carbonates (max. thickness 1 cm.). The schistose structure is very clear. Some mineralisation of FeS mostly is very scarce only. The total colour of this rock is green or gray-green mostly. The average gradient of foliation is 70°-85° round.

123,00 - 124,70 The strongly chloritic and biotitic micaschist, also very strongly calcarcous with a lot of irregular intercalations, pellets, schliers, lenticles, grains etc. of carbonates and with some veins or irregular intercalations of quartz, but very thin only. Some mineralisation of sulphides is very poor. Some small grains of FeS_2 are present somewhere only. This rock has pell-mell structure and have been bringing a clue after very strong folding. Some little bracly syndimal or bracly anticlinal closures are very good vivible on some irregular veins or intercalations of quartz. The total colour of this rock is green-gray or gray-green. The average gradient of foliation is 75°-80° round (?)

124,70 - 153,90 The sericitic micaschist with the small micas of biotite, with a lot of grains of pink (bright pink) garnet, with quartz, little bit carbonate silicates, chlorite and eith a lot of irregular intercalations (weak only) mostly parallel, schliers, pellets etc. of carbonates. The schistose structure is very clear. Some mineralisation of sulphides isn't present or is very scarce only. The total colour of this rock is bright gray. The average gradient of foliation is 80°-85° round. Between 138,00 - 142,00 m is this type of micaschists more strongly calcarcous and angle of dip of foliation is in this metrage 60°-50° round, but 40° and 35° round too but after stabilisate on 80°-85° round. In 150,00 m (4 cm) and in 153,20 m - 153,30 m are position of white quartz.

153,90 - 172,30 The strongly garnetic and biotitic micaschist as well as in 124,70 - 153,90 m but with more biotite and garnet (grains' garnet are 1-2 mm in average big max.). The mineralisation of some sulphides isn't present or is very scarce only. The total

colour of this rock is gray. The average gradient of foliation is 80° round. In 155,30 m (7 cm), 157,35 m (4 cm), 158,10 m (2 cm), 158,25 m (2 cm), 158,40 m (5 cm), 158,50 m (5 cm) are white or white-gray quartz positions.

172,30 - 176,50 The strongly carbonatic and chloritic micaschist with biotite and some carbonatesilicates. The carbonates creat parall positions (2-5 mm but 1-2 cm thickness max.) Some intercalations are created by chloritic greenschist with small acicular crystals of amphibole (weak only). Garnet is present too but very scarcely and creat some big porphyroblasts (3-5 mm in average). Some mineralisation of FeS_2 mostly are present too but very weak only. The total colour of this rock is very bright green-gray. The average gradient of foliation is 70°-75° round. In 172,60 - 173,10 m and 175,00 - 175,60 m are positions of biotitic micaschist with garnet as well as in 153,90 - 172,30 m.

176,50 - 182,50 The sericitic and biotitic micaschist with a lot of garnet as well as in 124,70 - 153,90 m. The structure of this rock isn't parallel schistose so clear, but more phacoidal schistose or pell-mell little bit too. On some places are footprint after the some strong folding.
Type of foulds.

The average gradient of foliation is 70°-75° mostly, but 80° and minimally 60°-55° round too.

182,50 - 240,65 The sericitic and biotitic micaschist with more chlorite on some places with a lot of garnet and about the other as well as in 176,50 - 182,50 m. In some places are some positions (thickness 20 cm - but max. 80 cm) where is present more carbonates positions, schliers, pellets etc. and more irregular weak veins, intercalations of quartz, with little bit more big grains of garnet and with some rodlike or less acicular crystales of hornblende (1-3 mm in average big). These positions with more chlorite and with bornblende are in 182,50 m - 182,70 m, in 183,20 - 183,30 m, in 192,70 - 192,80 m, in 193,65 m (5 cm mostly quartz only), 194,10 - 194,40 m (mostly quartz and some irregular pellets and schliers which are created by biotites micas and in 222,20 - 222,35 m. This micaschist, biotitic, sericitic and chloritic has some positions (irregular) of white or gray white quartz in example in 202,30 m (10 cm), 217,50 m (10 cm). Some positions or intercalations which have more chlorite, less garnet and a lot of parallel positions of carbonates (2-5 mm but 1-2 cm max. too thickness), but without amphibolitic are in 226,50 - 226,70 m in 228,10 - 228,50 m and in 236,20 - 236,40 m. In 212,10 - 212,50 m is some faulted some (core is strongly broken). The average gradient of foliation is 190,00 m 75°, 200,00 m 80° in

230 m 60° round, in 240 m about 75° round.

240,65 - 243,00 The strongly chloritic greenschist with a lot of biotite epidote, klinozoisite etc., with not much irregular very weak intercalations, pellets or schliers of carbonates. With some small crystales (acicular) of amphibole and aktinolite, without some garnet. The acumulations of biotites micas creat some irregular pellets or schliers too. The strongly faulted zones with a core which is broken are in 240,65 - 240,70 m, 242,20 - 242,70 m, 243,10 - 243,70 m. The some mineralisation of sulphides is very poor only. FeS only creat some small and irregular scales which follow basement foliation. The total colour of this rock is green gray or little bit dark green gray. The average gradient of a foliation is 70°-75° round.

243,00 - 247,10 The tiny-grained and tender-grained too amphibolitic greenstone with very small acicular crystales of hornblende and aktinolite too. Carbonates creat some very weak, mostly irregular intercalations or positions and fullfilling of little joints. Some mineralisation of sulphides is very scarce only. Some micas of biotite are present too somewhere. The total colour of this rock is gray-green. The schistose structure isn't good clear but a average gradient of foliation is 75° round.

247,10 - 250,40 The strongly calcarcous sericitic little bit biotitic micaschist with a lot of parallel mostly positions or intercalations of carbonates. The average thickness of these positions is 2-5 mm but 1-3 cm max. too. The pink or very bright pink small grains of garnet are present too but not so much. FeS mostly creat some small scales or irregular small grains, but very poor only. The total colour of this rock is bright gray. The average gradient of foliation is 80° round. In 248,90 - 249,35 m is position which is created by medium-grained or little bit coarse-grained amphibolitic greenstone, with rodlike crystales of hornblende, with a lot of micas of biotite, without systematic orientation, with some chlorite, epidote and with the other carbonatsilicates FeS creat irregular grains or some small scales, but very poor (scarcely) only. Some weak intercalations or sulphides and pellets are created by carbonates. The total colour of this rock is gray-green.

250,40 - 253,90 The biotitic amphibolitic greenschist with some intercalation of tiny-grained amphibolitic greenstone as well as in 243,00 - 247,10 m. FeS mostly creat some thin scales but scarcely only. Some weak intercalations, pellets etc. and filling of some joints are created by carbonates. The parallel schistose structure is little bit clear. The total colour of this rock is green-gray. The average gradient of foliation is 55°-65° round. In 250,80 - 251,70 m is some faulting zone. The core is broken very strongly. From 252,50 m tiny-grained amphi-

bolitic greenstone mostly, as well as in 243,00 - 247,10 m.

253,90 - 254,60 The biotitic micaschist with some sericite, chlorite calcitic silicates with not so much grains of garnet and with quartz and with a lot of irregular intercalations, pellets, schliers etc. of carbonates. This rock has some footprint after strong stres. The mineralisation of sulphides isn't present or is very scarce only. The total colour of this rock is gray. The schistosity is clear but phacoidal-schistose structure mostly. The average gradient of foliation is 55°-60° round.

254,60 - 255,00 The tender-grained or tiny-grained amphibolitic greenstone as well as in 243,00 - 247,10 m but big footprint after strong stres.

255,00 - 256,00 The biotitic and sericitic micaschist with chlorite, some calciticsilicates, with quartz and with feldspar and garnet but not so much. Carbonates creat some weak irregular intercalations veins, pellets etc. and filling of little joints. The schistose structure is clear. The total colour of this rock is gray.

256,00 - 262,00 The biotitic micaschist with sericite, little bit chlorite too, with quartz and with a lot of grains of garnet of very bright, or white pink colour mostly (ca. 1 mm in average big). Some feldspar is somewhere present too. The mineralisation of sulphides isn't present mostly or is very scarce only. Some very weak parallel veins or irregular intercalations schliers or pellets are created by carbonates (max. thickness is 1-2 mm but 1 cm scarcely too.) The total colour of this rock is gray. The average gradient of foliation is ca. 80°-85° round.

262,00 - 262,30 The chloritic greenschist with little bit biotite grains of garnet, with some small and not much rodlike irregular crystales of hornblende, with quartz and small feldspar too. Some calcitic-silicates are present too. This rock is strongly calcarcous. Some grains of garnet are 2-3 mm in average big. The schistose structure isn't so clear. The total colour of this rock is bright green-gray.

262,30 - 264,90 The biotitic micaschist as well as in 256,00 - 262,00 m. The average gradient of foliation is 80° round.

264,90 - 265,35 The strongly chloritic greenschist with not so much biotite with very little acicular crystales of hornblende and aktinolite, with some calcitic-silicates, with smaller quartz and with not so much grains of garnet (2-3mm max. big in average). Some very weak irregular veins, intercalations, pellets etc. are created by carbonates. Some mineralisation of sulphides is very scarce only, but isn't present mostly. The parallel schistose

structure is little bit clear. The total colour of this rock is green-gray or little bit dark green-gray. The average gradient of foliation is 80°-85° round.

265,35 - 269,30 The biotitic and sericitic micaschist as well as in 256,00 - 262,00 m. On some places with more chlorite and with some weak irregular positions of white or gray-white quartz. The average gradient of foliation is 70°-80° round.

269,30 - 269,65 The sericitic rock with quartz, little bit feldspar, with few biotite, with not so much little acicular or rodlike crystales of amphibolite, with not so much grains of garnet, with few chlorite. This rock little bit remind some type of keratophyre. The schistose structure isn't so clear. The total colour of this rock is white gray or gray-white.

269,65 - 272,50 The biotitic and sericitic micaschist as well as in 256,00 - 262,00 m. The average gradient of a foliation is 75°-80° round.

272,50 - 272,65 The strongly chloritic greenschist the same as ins 264,90 - 265,35 m.

272,65 - 288,55 The biotitic and sericitic micaschist the same as in 256,00 - 262,00 m. The average gradient of foliation is 80°-85° round.

288,55 - 288,90 The sericitic rock which remaind some type of keratophyre the same as in 269,30 - 269,65 m with some irregular positions of dolomite mostly with some quartz, chlorite and with some scales of FeS, but very poor only. The some schistosity isn't so clear. The total solour of this rock is gray-white.

288,90 - 293,70 The biotitic and sericitic micaschist as well as in 256,00 - 262,00 m. The average gradient of foliation is 80° round.

293,70 - 294,10 The position of medium-grained or little bit coarse-grained amphibolitic greenstone, with a lot of micas of biotite and deferitication biotite, with a lot of rodlike small crystales of hornblende, with some chlorite and calciticsilicates with some quartz and with a lot of irregular weak intercalations, schliers, pellets etc. of carbonates. This rock is very strongly calcarcous. Some various between greenstone and greenschist are little bit present too. Some mineralisation of sulphides is very scarce only. The schistosity isn't clear. The total colour of this rock is dark green-gray.

294,10 - 299,20 The biotitic and sericitic micaschist with some more chlorite and grains of garnet but for the other just the same as in 256,00 - 262,00 m. The average gradient of foliation is 80°-85° round.

In 295,00 m is 7 cm position of white quartz.

299,20 - 299,45 The biotitic micaschist with sericite and chlorite, with some rodlike crystales of hornblende, with some grains of garnet and with some parallel positions or intercalations of graphitic schist, which are little bit disharmonic folding mostly. This part is total folding.

The type of folding.

In graphitic schist is present some poor impregnation of FeS only. The schistose structure is clear. The total colour of this rock is gray. The average gradient of foliation exchange 50°-60° on both side and 70°-75° round after.

299,45 - 299,90 The biotitic and sericitic micaschist as well as 256,00 - 262,00 m. The average gradient of a foliation is 65°-70° round.

299,90 - 300,40 The sericitic and biotitic micaschist with chlorite not much garnet, with quartz, with some weak intercalations, schliers or pellets of carbonates and with a lot of positions or intercalations (parallel) of graphitic schliers (2-5 mm but 1-1,5 cm max. thickness too). Some poor impregnation of FeS only is in graphitic schliers intercalations only. FeS creat some irregular scales, which follow foliation. The schistose structure is very clear. The total colour of this rock is gray or little bit dark gray too. The average gradient of foliation is 60°-65° round.

300,40 - 303,20 The chloritic and biotitic micaschist with garnet quartz, some calciticsilicates, with a lot of schliers, pellets or weak intercalations of carbonates, with some small rodlike crystales of amphibole with weak intercalations (parallel) of graphitic schist and green schist too, but not so much. Some mineralisation of FeS only, very poor is in some graphitic weak intercalations. Schistose structure is on some places clear but on the other not so much. The total colour os this rock is gray. The average gradient of foliation is 70° round. In 301,20 m is position of white quartz 7 cm.

303,20 - 304,80 The sericitic and biotitic micaschist with a lot of parallel positions or intercalations of graphitic schist with FeS impregnation into as well as in 299,90 - 300,40 m. The average gradient of foliation is 80°-65° round.

304,80 - 305,90 The biotitic and sericitic micaschist with a lot of grains of garnet, with calaticsilicates with some weak irregular intercalations, schliers, pellets or grains of carbonates, and with quartz.

All the grains of minerales are little bit more coarse. The schistose structure is very clear. The total colour of this rock is gray. The average gradient of foliation is 60°-65° round. The some mineralisation of the sulphides isn't present or is very scarce only.

305,90 - 310,00 The biotitic and sericitic micaschist as well as in 256,00 - 262,00 m. The average gradient of a foliation 60°-65° round.

310,00 - 314,70 The medium-grained, but on some places coarse grained amphibolitic greenstone, strongly calcarcous, with rodlike crystales of hornblende, with calciticsilicates, with biotite (somewhere very strongly) and with a lot of schliers, pellets, lenticles or irregular intercalations of carbonnates, which have often many inclusions, which are created micas of biotite. The mineralisation of the sulphides is very scarce only. The some schistosity isn't clear. This rock is mostly compact. The total colour of this rock is green-gray or dark green and dark green-gray too.

314,70 - 315,40 The biotitic, strongly calcarcous greenschist with small rodlike crystales of amphibole, with chlorite calciticsilicates and with a lot of irregular intercalations, pellets, schliers, lenticles etc. of carbonates, and with much quartz. Some mineralisation of the sulphides isn't present or is very scarce only. The schistose structure is clear only little bit. The total colour of this rock is bright green-gray.

315,40 - 316,50 The coarse-grained or medium-grained amphibolitic greenstone as well as in 310,00 - 314,70 m.

316,50 - 316,80 The strongly biotitic, coarse-grained or medium-grained amphibolitic greenschist, strongly calcarcous too, with some very weak intercalations of carbonates. Chlorite, quartz calciticsilicates are present too. Some mineralisation of the sulphides is very scarce only. The schistosity is clear but not so much. The total colour of this rock is dark green-gray.

316,80 - 366,90 The biotitic and sericitic micaschist as well as in 256,00 - 262,00 m. Between 318,50 - 319,20 m some intercalations of a graphitic schist are present as well as in 300,40 - 303,20 m. In 320,80 m (5 cm), in 323,70 m (5 cm) the position of white quartz are present. The average gradient of foliation is 80°-90° round. In 340,20 m (5 cm) white-gray quartz. In some places more chlorite is present in basementic rock. In 347,10 m is some intercalation of greenschist with more chlorite and with some small rodlike crystales of amphibole. This type of rock is disharmonic folding. The some irregular intercalations or veins of quartz are present too.

366,95 - 367,25	The coarse-grained amphibolitic greenstone with rodlike crystales of hornblende with big grains of garnet (max. 5 mm in average big, but more too) and with not much micas of biotite too. Carbonates and quartz mostly creat parallel and irregular woak intercalations of schliers etc. On the both boundaries of this greenstone is amphibolitic greenschist with parallel intercalations of quartz with big grains of garnet and with chlorite. The some mineralisation of the sulphides isn't present. The total colour of this rock is green-gray and dark green-gray too. The average gradient of a foliation is 60^{o}-65^{o} round.
367,25 - 373,80	The biotitic and sericitic micaschist as well as in 256,00 - 262,00 m, but with more big grains of garnet. In 374,40 m the weak intercalation (2 cm) of graphitic schist are present, but with very poor impregnation of graphite and with very weak impregnation of FeS only (some weak scales). The average gradient of a foliation is 75^{o}-90^{o} round mostly.
373,80 - 374,25	The coarse-grained amphibolitic greenstone as well as in 366,95 - 367,25 m.
374,25 - 375,60	The biotitic and sericitic micaschist as well as in 367,25 m - 373,80 m.
375,60 - 375,75	The coarse-grained amphibolitic greenstone the same as in 366,95 - 367,25 m.
375,75 - 376,90	The biotitic and sericitic micaschist the same as in 367,25 - 373,80 m.
376,90 - 377,25	The coarse-grained amphibolitic greenstone as well as in 366,95 - 367,25 m.
377,25 - 377,60	The biotitic and sericitic micaschist the same as 367,25 - 373,80 m with very big grains of garnet (max. 1 cm. big in average).
377,60 - 377,70	The position of white quartz.
377,70 - 378,30	The coarse-grained amphibolitic greenstone as well as in 366,95 - 367,25 m.
378,30 - 378,60	The biotitic and sericitic micaschist the same as in 367,25 - 373,80 m.
378,60 - 379,25	The coarse-grained amphibolitic greenstone as well as in 366,95 - 367,25 m. In 378,80 m round the position of white quartz is present.

379,25 - 387,60 The biotitic and sericitic micaschist the same as in 256,00 - 262,00 m. In 382,70 m round the some very weak intercalations (parallel) of graphitic schist are present but with very poor impregnation of C. The average gradient of foliation is 80^{o}-90^{o} round mostly.

387,60 - 388,00 The medium-grained and coarse-grained amphibolitic greenstone as well as in 366,95 - 367,25 m.

388,00 - 397,10 The biotic and sericitic micaschist with a lot of garnet as well as in 256,00 - 262,00 m. The average gradient of foliation is 75^{o}-85^{o} round.

397,10 - 397,60 The chloritic and biotitic greenschist with the small rodlike crystales of hornblende, with a lot of grains of garnet and with much intercalations or schliers of carbonates and of quartz more. The schistosity is very clear. Some mineralisation of the sulphides is very scarce only. The total colour of this rock is bright green-gray. The average gradient of foliation is 80^{o}-75^{o} round.

397,60 - 419,78 The biotitic and sericitic micaschist with a lot of grains of garnet and on some places with more chlorite but for the other just the same as ins 256,00 - 262,00 m. In 405,50 - 405,65 m is position of medium-grained or coarse-grained amphibolitic greenstone as well as in 366,95 - 367,25 m. In 406,30 m is position of white quartz 10 cm. In 404,20 - 404,60 m, in 406,30 - 406,60 m and in 413,00 - 416,00 m are the footprints after folding. The average gradient of foliation is 75^{o}-85^{o} round mostly, but in places where are clear the footprints after folding is the gradient of incline of foliation very different.

The borebole no. 116 (Stormyra) was finished in 419,78 m.

(M. Motys).

Borehole no. 76, HJERKINN.

(Petrographical description.)

0,00 - 7,00

The chloritic and little bit sericitic greenschist with some intercalations, pellets or schliers of carbonates (max. 1-1,5 mm average thickness.) In this rock are present quartz, klinozoisite, feldspar (weak only), actinolite, amphibolitic, epidote very rare too. The schistose structure is very clear in this rock. The mineralisation or impregnation is very scarce only in (FeS_2 or FeS too). Some intercalations, pellets, schliers are thick more 1,5 mm (2-5 mm) on some places. These intercalations are created by carbonates. The total colour of this rock is green, bright green or grey green. The average gradient of foliation is 35^0-40^0 round.

7,00 - 12,60

The tender or tiny-grained amphibolitic and amphibolitic-chloritic greenstone with some intercalations of coarse grained and medium-grained amphibolitic greenstone, not thickness enough, 1-3 cm max. These positions of coarse-grained amphibolitic greenstone have a lot of big rodlike or acicular crystales of amphibole, some more intercalations, schliers or pellets of carbonates with FeS_2 mineralisation (schliers of FeS_2 grains - 1-2 mm thickness). These positions of coarse-grained amphibolitic greenstone are at 7,70 m round, 8,00 m round, 8,45 m round. The other basementic rock of tender-tiny and medium grained amphibolitic greenstone have a lot of acicular crystales (1-3 mm but 5 mm too) of amphibolle and a lot of intercalations, schliers, pellets, lenticles or grains of carbonates (1 mm thickness in average, but some more thickness 0,5 - 1 cm and in 9,70 m, 9,80 m, 9,95 m, 10,50 m and 11,45 m round the positiones of carbonates have thickness 3-5 cm. The mineralisation, impregnation of FeS_2 or FeS is very, very weak only. The total colour of this rock is green, gray-green or dark green too. The average gradient of foliation is 40^0 round (on some places is not clear schistosity of rock).

12,60 - 15,60

The medium-grained or little bit medium-coarse-grained amphibolitic calcarscous greenstone with actinolite, klinozoisite, epidote and little bit, chlorite and feldspar too. Some not thick intercalations or weak joints are filled by carbonates. The mineralisation or impregnation of FeS_2 is very weak - scarce only. The total colour of this rock is green or little bit dark ore grey-green too The structure is porphyroblastic and foliation is clear round some intrrcalations of tiny grained amphibolitic greenstone only or along clongation of graines. The average gradient of foliation is 35^0 round.

15,60 - 17,20

The coarse-grained amphibolitic calcarcous greenstone with rodlike and acicular crystales of

amphibole, with actinolite, klinozoisite, epidote and with some schliers or pellets or joints which are filled by carbonates. The mineralisation or impregnation of FeS_2 only is very scarce but little bit strongly round some intercalations of medium-grained amphibolitic greenstone (some graines 1 - 1,5 or 2 mm in average). The total colour of this rock is dark green or dark grey-green too. The structure is porphyroblastic. The average gradient of foliation isn't clear 40° round (along clongation of porphyroblasies only).

17,20 - 18,50 — The medium-grained calcarcous amphibolitic greenstone as well as in 12,60 - 15,60 m. In 18,50 m round is some dislocation, which is filling by quartz and limonitic coat. The angle of dip of this dislocation is 65° - 70° round, thickness 1-2 cm round.

18,50 - 19,40 — The medium-grained calcarcous amphibolitic greenstone as well as in 17,20 - 18,50 m but with much more chlorite and with some lot of not thick intercalations of tiny or tender-grained chloritic amphibolitic greenstone. The total gradient of foliation is 30°-35° round.

19,40 - 19,60 — The medium-grained calcarcous amphibolitic greenstone as well as in 17,20 - 18,50 m.

19,60 - 21,15 — The coarse-grained amphibolitic greenstone with rodlike or acicular crystales of amphibole, with aktinolite, klinozoisite, chlorite, feldspar, some carbonates and with some impregnation of FeS_2 (1-2 mm in average - the graines of FeS_2). The epidote present too. The structure is porphyroblastic. The total colour of this rock is dark green. The average gradient of foliation is 40° round (not very clear).

21,15 - 21,95 — The medium-grained calcarcous amphibolitic greenstone as well as in 19,40 - 19,60 m.

21,95 - 22,90 — The chloritic and chloritic-amphibolitic greenstone and greenschist with some thin intercalations or schliers of carbonates and with some weak impregnation of FeS2 mostly. The schistose structure is very clear. Amphibole creat some not big acicular, crystales. The feldspar and quartz are present little bit only but too. The total colour of this rock is dark green. The average gradient of foliation is 40° round, but in 22,50 m, 30° in 22,70 m is some bracly acticlinale, but after 5 cm inclination to the same clipetion as before 22,70 m with angle of dip 60° round. In 22,40 - 22,45 m is some position (pellets) of white quartz.

22,90 - 24,00 — The tiny-grained or medium-grained calcarcous amphibolitic greenstone with chlorite, klinozoisite epidote with a lot of graines, schliers and pellets of carbonates and with some weak impregnation of FeS_2. Amphibole creat some not big rodlike or

acicular crystales. The total colour of this rock is dark green. The average gradient of foliation is 45° round. Garnet is present too but scarcely only.

24,00 - 24,50 The medium-grained or tiny-grained amphibolitic greenstone with some thin intercalations or pellets of carbonates with some chlorite with a lot of graines of garnet with acicular crystales of amphibole and with very strong mineralisation of Fe_3O_4 (positions 1-4 mm thickness) and FeS (also some positions 1 mm thickness max. of graines Garnets graines creat some intercalations or schliers. Round carbonatic schliers, pellets, intercalationes or round filling (carbonatic) of joints (antithetic or transversal) is present some more strong mineralisation (graines) of FeS_2 but $CuFeS_2$ is present too may be. The total colour of this rock is dark and black green. The average gradient of foliation is 40°-45° round.

24,50 - 25,70 The chloritic greenschist with some a lot of schliers, pellets, lenticles of carbonates, with klinozoisite, amphibole acicular crystales, with biotite. The mineralisation of FeS_2 is very scarce only. The schistose or phacoidal-schistose structure is very clear. The total colour of this rock is grey-green or bright grey-green. The average gradient of foliation is 40°-45° round. In 24,50 m is some fault with some parallel system of joints with carbonatic filling and with some mineralisation of FeS_2 (may-be $CuFeS_2$) Maine this fault is filled by carbonates with limonitic coates. The angle of dip of this fault is 10° round.

25,70 - 26,90 The carbonatic and dolomitic coarse-grained amphibolitic greenstone with big rodlike minerales of amphibole, with aktinolite, biotite and klinozoisite, epidote and with sericite too and with some a lot of schliers, pellets etc. of carbonates. The mineralisation of FeS_2 mostly is very scarce only. The structure of rock is porphyroblastic. The total colour of this rock is grey-green or bright gray-green.

26,90 - 27,65 The chloritic calcarcous greenstone and greenschist as well as in 24,50 - 25,70 m.

27,65 - 27,90 The carbonatic and dolomitic amphibolitic coarse-grained greenstone as well as in 25,70 - 26,90 m but with little bit smaller graines.

27,90 - 28,70 The carbonatic and dolomitic amphibolitic coarse-grained greenstone as well as 25,70 - 26,90 m.

28,70 - 29,10 The chloritic-calcarcous greenstone and greenschist as well as 26,90 - 27,65 m.

29,10 - 30,90 The carbonatic and dolomitic amphibolitic coarse-grained greenstone as well as in 25,70 - 26,90 m.

30,80 - 31,40 The rock as well as in 28,70 - 29,10 m but with more chlorite.

31,40 - 31,70 The position in which exchange biotitic amphibolitic greenstone, coarse-grained amphibolitic greenstone, chloritic amphibolitic greenstone with some carbonatic positioned, schliers etc. with strong mineralisation of FeS mostly. In every types of these rocks are present a lot of big rodlike or acicular crystales of amphibole. The average gradient of foliation is 50° round.

31,70 - 37,20 The carbonatic chloritic amphibolitic greenschist or chloritic carbonatic amphibolitic tiny-grained or medium-grained greenstone with clear schistosity. These types of rocks are just the same as in 28,70 - 29,10 m. In 32,00 - 32,10 m is the same position as in 31,40 - 31,70 m. In 33,65 m round is some (1 cm) intercalation with strong mineralisation of FeS_2 in carbonates.

37,20 - 44,72 The tiny-grained or tender-grained chloritic amphibolitic greenstone with a lot of small graines of Fe_3O_4 with carbonatic schliers, pellets etc., with klinozoisite, epidote. This type of amphibolitic greenstone (20 cm, 50 cm, or 1 m thickness) which are created by the same types of amphibolitic greenstone as well as in 27,65 - 27,90 m and 28,70 - 29,10 m. The mineralisation of FeS_2 or FeS is very very weak only. The total colour of this rock is grey-green. The average gradient of foliation is 50° round.

44,72 - 50,20 The tiny-grained amphibolitic greenstone with a lot of intercalations, schliers, pellets or grained or filling of some jointes of carbonates. This greenstone has much chlorite. Some mineralisation (impregnation) of FeS_2 or FeS is very very weak only but round some carbonatic positions or in is some strong impregnation of FeS_2, exactly in 49,50 m, 49,80 m and 49,90 m. Ca. from 48,30 m some Fe_3O_4 impregnation are begun by small graines (max. 1 mm in average). Round 49,60 - 50,00 m are present a lot of some thick positions or intercalations of carbonates (average thickness 1-5 cm max.) On some places greenstone has very clear schistosity, on some places not. The total colour of this rock is dark green or green. The average gradient of foliation is 55°-60° round.

50,20 - 50,90 Some very strong impregnation of FeS_2 mostly, but also with few $CuFeS_2$ in carbonates position with a lot of acicular crystales or weak intercalations of amphibole. Chlorite, epidote, klinozoisite are present too on some places.

50,90 = 51,55 The very strongly calcarcous medium-grained or little bit coarse-grained amphibolitic greenstone, with chlorite, klinozoisite, very relation of greenstone in 26,90 - 27,65 m but with more

chlorite and with some little bit more strong impregnation of FeS and FeS_2. The total colour of this rock is green and dark green. Schistosity isn't clear.

51,55 - 56,00 The tender or tiny-grained amphibolitic greenstone with a lot of chlorite and with some more little bit strongly impregnation of FeS and FeS_2 and Fe_3O_4 graines (1 mm in average max.). Carbonates create some filling of little joints or schliers intercalations etc. Schistosity isn't clear. The total colour of this rock is dark green.

56,00 - 56,60 The position tiny-grained amphibolitic and chloritic greenstone with intercalations of carbonates with very strong mineralisation of FeS_2, but with little bit $CuFeS_2$ (5-10 %). Some positions of ore are very homogenitic (thick 10-15 cm).

56,60 - 59,40 The carbonatic chloritic amphibolitic greenstone with biotite, with a lot of parallel positions intercalations, pellets, schliers etc of carbonnates with some very weak impregnation of FeS_2 mostly. On some places are positions and intercalationes of coarse-grained amphibolitic greenstone or biotitic and chloritic mica schist are present. The schistose or phacoidal-schistose structure is clear. The total colour of this rock is grey-green. The average gradient of foliation is 45^0-55^0 round.

59,40 - 61,35 The tender or tiny-grained amphibolitic greenstone as well as in 51,55 - 56,00 m. In 61,10 - 61,20 m is some homogenitic position of impregnation FeS_2 in carbonates or strong calcarcous greenstone.

61,35 - 62,90 The biotitic greenschist with chlorite, amphibole, actinolite with a lot of schliers, pellets, lenticles of carbonates. The impregnation of FeS or FeS_2 is weak only, but in 62,05 m, 62,10 m and 62,35 m are some weak positions (1-1,2 cm) of very strong impregnation of FeS mostly. This rock has phacoidal-schistose structure. The total colour of this rock is dark green or grey-green. The average gradient of foliation is 55^0-60^0 round.

This borehole of no. 76 was finished at 62,90 m.

(M. Motys).

FOLLDAL VERK A/S

BORHULL NR. 60, GRISUNGDALEN.

VESLEKNATTEN

0,00 - 13,30

The rock, which is created by quartz, some feldspar by not much dolomitic and carbonatic irregular schliers, pellets, but intercalations too by the other, byt chlorite, sericite little bit. The other minerales like amphibole creat some acicular or rodlike crystales (max. 1 cm long), garnet creat small grains (but max. 0,5 mm in average big too). The structure is phacoidal schistose mostly.This type of rock commemorate some complex of keratophyre and methaquartzite. The total colour of this rock is white-gray or white green-gray. In this rock are present some positions or intercalations (max. 10 cm thickness irregular) which are created by medium grained and little bit coarse-grained amphibolitic greenstone with the rodlike or acicular crystales of hornblende, with not much grains of garnet, with quart with calcatic silicates and with some weak intercalations of quartz and quartz with some feldspar and with some weak intercalations of carbonates too. The both types of these rocks have at some mineralisation of sulphides. The average gradient of foliation is 50^{o} round.

13,30 - 15,10

The sericitic and chloritic micaschist with parallel intercalations of quartz which has a lot of weak irregular inclusions - pellets, schliers of carbonates. Some biotites micas are present too. Magnetite creat small grains, but not so much, very few only. The parallel schistose structure is very clear. The total colour of this rock is very bright green-gray. The average gradient of a foliation is 35^{o} round. The some mineralisation of sulphides isn't present.

15,10 - 20,10

The sericitic and chloritic greenschist with a lot of micas of biotite (some transversal too). Quartz some calcitic silicates are present too. The mineralisation of some sulphides is very, very scarce only, but on some places the very small grains of Fe_3O_4 are present, but very scarce only too. The schistose structure is also clear in this rock. The total colour of this rock is bright green-gray. The some veins or intercalation of white quartz with small thickness mostly (1-2 cm, but 5-10 cm max. too) are present on some places. In example in 16,20 m (10 cm), in 18,55 m (5 cm), in 19,20 m (10 cm + commemorate more keratophyre rock). The average gradient of foliation is 35^{o} round.

20,10 - 44,60

The sericitic and chloritic greenschist with a lot of micas of biotite (transversal too), with some small, mostly irregular grains of magnetite (1-1,5 mm in average). The mineralisation of some sulphides isn't present or is very scarce only. This rock is well as in 15,10 - 20,10 m but has

more Fe_3O_4 grains and has a lot of big grains of garnet (pink or bright-pink colour). The total colour of this rock is bright green gray. In some places the veins or parallel intercalations of white quartz are present, in example in 29,50 m (10 cm), in 30,40 m (7 cm) and in 30,70 m (7 cm). This quartz has some small irregular inclusions of basement rock, some grains of garnet and weak schliers or pellets of carbonates. The average gradient of foliation is 40°-45° round.

44,60 - 86,20 — The sericitic and chloritic greenschist or micaschist as well as in 20,10 - 44,60 m, but with more grains of garnet and with more big this one in average (3-5 mm in average max. too). The grains of magnetite are present little bit fewer. But in this rock's complex the some weak intercalations of keratophyre and keratophyric luphite are present mostly between 50-60 m, exactly in 54,20 - 54,70 m (luphite of keratophyre - sericitic, chloritic sericitic, chloritic micaschist with some biotitic weak parallel intercalations) in 54,40 (5 cm), keratophyre, in 57,50 - 57,60 m keratophyre. Some veins or positions of white quartz, mostly with some small inclusions of carbonates are present in 53,90 m (5 cm), 53,95 m (5 cm), 56,95 m (5 cm), and 77,40 - 77,55 m (complec of veins of white quartz with a lot of inclusion of carbonates with some aureole, which is created by biotites micas round). The average gradient of foliation is 55°-60° round.

86,20 - 90,00 — The sericitic and chloritic micaschist with biotite garnet and quartz and with some calcitic minerales Magnetites grains are present very, very scarce only. The mineralisation of sulphides isn't present mostly. This rock has a lot of weak intercalations of white quartz with some carbonates which are inclosed in mostly. The total colour of this rock is bright green-gray. The average gradient of foliation is 60° round.

90,00 - 91,50 — The sericitic and chloritic greenschist and micaschist as well as in 44,60 - 86,20 m.

91,50 - 98,50 — The sericitic and chloritic micaschist as well as in 86,20 - 90,00 m. In 91,85 m (5 cm) the position of white quartz is present, just the same in 93,70 m (5 cm) and in 98,20 m. In 96,10 - 96,30 m is much more quartz present in basement rock.

98,50 - 129,40 — The sericitic and chloritic greenschist and micaschist as well as in 44,60 - 86,20 m, but mostly sericitic and garnetic micaschist with biotite. Some grains of Fe_3O_4 are scarce only. The mineralisation of some sulphides also isn't present or is very scarce only too. The much intercalations or positions of keratophyre and luphite of keratophyre are present mpstly between 100,00 m and 110 m, and some clear important positions of keratophyre are exactly present in 101,00 - 101,15 m, in 103,45 - 103,70 m, in 106,30 - 106,55 m, in

106,70 - 106,90 m and in 107,20 - 107,45 m. On the other places these intercalations of keratophyre are not so clear and not so thick. This type of keratophyre has mostly quartz and the other some feldspar, less sericite and the other minerales, which are enclosed by the keratophyre basement materiale. The micas of biotite, some grains of garnet and after some rodlike or acicular crystales of hornblende, but scarce only and some very weak and poor mineralisation of FeS (creat small scales) and FeS_2 (creat small irregular grains). The total colour of keratophyre is white or gray-white. The average gradient of a foliation of this sericitic micaschist is 55°-60°-65° round.

129,40 - 135,50 — The sericitic micaschist with a lot of grains of garnet and with some micas of biotite and with quartz mostly, without some sulphides mineralisation, without some grains of magnetite, but with a lot of intercalations or positions of keratophyre and luphite of keratophyre. This keratophyre has clear schistose structure and a lot of small micas of biotite and sericite which creat the cover of foliation plates mostly. The total colour of this types of keratophyre is white-gray mostly. Some mineralisation of sulphides isn't present. Some thick position of keratophyre rock are in 129,80 - 130,10 m, in 130,30 - 131,80 m, 132,15 - 132,60 m. In 130,10 - 130,25 m the white quartz position is present. The average gradient of foliation is 60° round.

135,50 - 143,40 — The sericitic micaschist with some biotite with grains of garnet with quartz mostly, with some chlorite and calcitic silicates minerales and with some mineralisation of FeS_2 mostly, but very very poor only. The structure is phacoidal schistose. Some weak intercalations or little veins are created by quartz mostly, but by carbonates lessly too. The total colour of this rock is very bright green-gray. The average gradient of foliation is 65° and 70° round.

143,40 - 147,35 — The sericitic and chloritic micaschist with some micas of biotite, with quartz, with garnet, but scarcely only and with some acicular crystales of aktinolite and hornblende but scarcely only too. The quartz mostly creat some pellets, schliers, veins or little bit thick positions in example in 144,75 m (5 cm) and in 145,20 (3 cm), and in 146,50 m (5 cm) and in 147,15 m (6 cm). The schistose structure is little bit clear, but not so much, more phacoidal or pell-mell structure too. The total colour of this rock is bright green-gray. The average gradient of foliation is 60° but 70° round too.

147,35 - 148,20 — The chloritic and sericitic greenschist with some but not so much micas of biotite, without grains of garnet, with some calcitic silicates and with

some acicular small crystales of aktinolite and hornblende. Quartz creat some weak irregular intercalations, veins, schliers etc. The some mineralisation of FeS_2 mostly creat the irregular small grains, but in average is very very poor only. The structure of this rock is pell-mell or pahcoidal too, but schistosity is little bit clear The total colour of this rock is bright green-gray The average gradient of a foliation is 70° round.

148,20 - 150,70 The tiny-grained amphibolitic greenstone mostly with some acicular or rodlike crystales of hornblende with some calcitic silicates and with littl bit chlorite and with a lot of irregular schliers pellets, veins, weak intercalations of quartz mostly but of carbonates lessly too. Some mineralisation of sulphides, FeS_2 mostly is very scarce only. The total colour of this rock is green-gray or bright green gray too. The schistosity isn't clear. In 148,25 m (2 cm), in 148,35 - 148,50 m, in 148,70 - 148,85 m and in 149,00 m (5 cm) is white quartz position present without some footprint of some impregnation etc.

150,70 - 154,40 The keratophyre or luphite of keratophyre, which have quartz mostly, some feldspar, sericite, with calcitic silicates and chlorite and on some places with more chlorite, sericite, calcitic silicates and acicular crystales of hornblende (in 150,90 m, in 152,85 m and 152,85 m, in 153,10 m, in 153,20 m, in 153,55 - 153,75 m, in 153,80 m and in 153,90 m). In this keratophyre are some intercalations of chlorite and sericitic micaschist with small biotite too. The mineralisation of some sulphides is very scarce only. The total colour of this rock is very bright green-gray. The schistosity isn't so much clear. The average gradient of foliation is 60° round.

154,40 - 160,50 The motley complex of weaks intercalations of keratophyre or luphite of keratophyre as well as in 150,70 - 154,40 m and sericitic-chloritic and chloritic-sericitic micaschist and greenschist too with few biotite and without garnet, which are exchanged. On some places is mostly keratophyre or white quartz (in example in 159,40 - 159,60 m and in 160,20 - 160,50 m). This motley complex of rocks has some strongly impregnation of FeS_2 mostly, but of FeS too. The total colour of these rocks is bright green-gray. Schistose structure is on some places clear, but mostly pell-mell only. The average gradient of foliation is 50°-60° round.

160,50 - 173,30 The chloritic and biotitic greenschist with quartz calcitic silicates, with some irregular pellets, schliers or some intercalations of quartz, with intercalations of keratophyres or luphite of keratophyres material (and with strong carbonatic

impregnation. The amphibole or actinolite too creat a lot of small acicular crystales. Some strongly impregnation of FeS (creat some scales) mostly but FeS_2 is present too (creat small irregular grains). The schistose structure isn't much clear, the pell-mell or phacoidal structure ore present mostly. Between 154,80 - 167,10 m this rock commemorate more medium-grained greenstone. The mineralisation of sulphides is more weak. The total colour of this rock is bright green-gray or green-gray too. The FeS_2 mineralisation concentrate mostly in the positions or intercalations of keratophyre and round them and in or round the intercalations veins or positions of the white-gray quartz. More FeS and FeS_2 little bit lessly are present in the positions or intercalations of greenschist, micaschist or greenish schist. The average gradient of foliation is 70°(?) The mineralisation of sulphides follows a foliation mostly. In FeS_2 mineralisation $CuFeS_2$ is present too but scarce only.

173,30 - 175,30 — The rock with feldspar, quartz with small (medium-grained) acicular or rodlike crystales of hornblende and with the other minerales like chlorite carbonates grains or lenticles and pellets, with small grains of garnet and with some mineralisation of FeS_2 or little bit FeS but scarcely only. This rock commemorate a amphibolitic keratophyre. The structure is pell-mell mostly. The total colour is white green-gray.

175,30 - 179,55 — The tiny-grained amphibolitic greenstone, with some irregular grains, lenticles, schliers, pellets etc. of carbonates, but of quartz too, but some porphyroblasts of fedlspar are present scarcely too Chlorite, calcitic silicates etc. are present too, but very few only. The mineralisation of sulphides is very scarce only, but on some places are present very small grains of Fe_3O_4 but scarcely only too. The total colour of this rock is green-gray. The schistosity isn't clear.

179,55 - 185,00 — The same complex of rocks as well as in 160,50 - 173,30 m with just the same mineralisation of sulphides.

(M. Motys).

Borhull nr. 17 (Hjerkinn).

0,00 - 17,75 The sericitic micaschist with mostly quartz and with chlorite, few biotite and on some places with some very small grains of garnet, but in weak micas intercalations only. Feldspar is present too but small only as well as carbonates, which are present scarce only. The schistose structure is very clear. The total colour of this rock is bright, little bit green-gray. The average gradient of foliation is 45^{o} round. In 17,55 m is some intercalations of white quartz with average thickness 3 cm. Some mineralisation of sulphides isn't present.

17,75 - 18,00 The biotitic micaschist with quartz, a lot of small grains of garnet (max. 1 mm in average), with some chlorite, not much feldspar and few sericite too. The schistose structure is very clear. Some mineralisation of sulphides isn't present. The total colour of this rock is gray or little bit dark gray. The average gradient of foliation is 40^{o} round.

18,00 - 18,95 The strongly chloritic greenschist with quartz, biotite, with a lot of irregular grains, pellets, schliers and irregular weak intercalations of carbonates, with small rodlike and acicular crystales of amphibole and with not so much aktinolite too. The schistose structure is clear. The total colour of this rock is gray-green or green and dark green too. Some mineralisation of sulphides isn't present. The average gradient of foliation is 45^{o} round.

18,95 - 19,60 The chloritic and biotitic micaschist with quartz and with some lenticles, pellets, schliers, weak irregular intercalations or some irregular grains of carbonates (in 19,35 m and 19,40 m are some intercalations of carbonates, which have the average thickness 1,5 cm) and with some small rod-like or acicular crystales of amphibole and with not so much aktinolite too. The schistose structure is clear. The total colour of this rock is very bright green-gray. The some mineralisation of sulphides isn't present. The average gradient of foliation is 50^{o} and 55^{o} round.

19,60 - 20,45 The strongly biotitic micaschist with quartz, feld-spar, chlorite and with small grains of garnet very scarcely only. The schistose structure is very very clear. The total colour of this rock is gray and dark gray, little bit bright green. The some intercalations or positions of chloritic and chloritic-biotitic micaschist as well as in 18,95 - 19,60 m are present too. In 20,00 m round is present a white quartz with some small enclosures of base-ment rock (biotitic micaschist). This quartz creat perhaps some filling (breccic) of some dislocation. The limonitic impregnation or covers are present

too. The average gradient of foliations of this rock is 40° round. The some impregnation of sulphides isn't present.

20,45 - 28,50 The chloritic and biotitic micaschist with quartz, a lot of schliers, pellets, weak intercalations or irregular grains of carbonates, with not so much aktinolite and with some albite. The schistosity is very clear. The total colour of this rock is bright green gray. The some mineralisation of sulphides isn't present. The average gradient of foliation is 50° round.

28,50 - 36,10 The chloritic and biotitic micaschist with quartz and with a lot of very small grains of garnet of pink colour mostly, and pink - more white too (max. grains are big 1 mm in average). The carbonates, grains, pellets, schliers or weak intercalations are present too, but not so much. Between 31,20 - 31,80 m is position of chloritic - amphibolitic micaschist, but better chloritic greenschist with small a lot of acicular crystales of amphibole, with aktinolite, with some grains and small pellets or schliers of carbomates, with very small and not so much grains of garnet. Biotite is very scarce only. The some mineralisation of sulphides isn't present in both types of rock. The total colour of this both types of rock is gray, green and little bit dark gray-green. The average gradient of foliation is 45° round.

36,10 - 36,60 The biotitic micaschist with quartz, some sericite, scarcely with feldspar and with chlorite, small acicular crystales of amphibole very scarcely only. The total colour of this rock is gray. The schistose structure is very clear. Some mineralisation of sulphides isn't present. Garnet isn't present. The average gradient of foliation is 60°-65° round.

36,60 - 37,70 The strongly amphibolitic micaschist with biotite, quartz and with not so much intercalations or lenticles of carbonates. Chlorite, aktinolite and epidote are present too, but not much, scarcely only. Amphibole creat small acicular or rodlike crystales (max. 2-3 mm long). The some mineralisation of sulphides isn't present. The total colour of this rock is little bit green-gray. The schistosity isn't clear.

37,70 - 40,00 Biotitic strongly amphibolitic micaschist with quartz, a lot of sericite, a lot of big and small grains of pink garnet (3-5 mm in average max.). Amphibole creat big rodlike or acicular crystales (0,5 - 1 cm big max.). Some pellets, schliers or intercalations and lenticles are created by carbonates. Some mineralisation of sulphides isn't present. The total colour of this rock is green gray or dark gray. The schistosity isn't clear.

40,00 - 42,45 The biotitic and sericitic micaschist with quartz, a lot of big or small grains of white-pint or pint garnet and with a lot of small crystales (acicular or rodlike) of amphibole (max. 3 mm long). The schistose structure of this rock is little bit clear. Some mineralisation of sulphides isn't present. The total colour of this rock is gray. The average gradient of foliation is 50°-60° round.

42,45 - 43,20 The biotitic and sericitic micaschist with quartz and some grains of garnet (1-2 mm in average). The schistosity is very clear. Some mineralisation of sulphides isn't present. The total colour of this rock is gray og dark gray too. Some very thin little scales of FeS are present on some places, but very scarcely only. The average gradient of foliation is 55° round.

43,20 - 48,85 The biotitic and sericitic micaschist as well as in 42,45 - 43,20 m but with garnet scarcely only. But in 45,15 - 45,60 m this has more biotite and more carbonatic intercalations, pellets etc. and a lot of pint grains of garnet. The average gradient of foliation is 55° round.

48,85 - 49,15 The sericitic and biotitic micaschist with a lot of grains (white or whitepink) of garnet, with a lot of irregular grains, pellets etc. of carbonates with some poor impregnation of FeS (creat some scales or covers on foliations's plates mostly). Graphite creat some weak intercalations (1-2 mm average thickness) or weak impregnation. The schistose structure is clear. The total colour of this type of rock is gray, dark gray and black gray too. The average gradient of foliation is 70° round.

49,15 - 50,00 The rock, which is created by quartz, carbonates, garnet (a lot of grains, some from that are big 0,5 cm in average), epidote, aktinolite, some little crystales of amphibole and with not much plagioblase too. This rock has some impregnation of FeS/FeS creat some thin scales or some not coherent covers on the foliation's planes. On some places graphite is present and creat some very thin scales or very thin not coherent coats on foliation's planes. But graphite is scarce only and mineralisation of FeS is very very poor and weak only.The total colour of this rock is bright brown gray or white-gray. The structure is pell-mell only.

50,00 - 50,20 The very strongly biotitic micaschist with quartz, some schliers, pellets and weak irregular intercalations of carbonates and with a lot of grains of garnet of pink colour (some grains are 0,5 cm big in average, the others 2-3 mm in average). The schistose structure is little bit clear. The total colour of this rock is black or black-gray. The average gradient of foliation is 40°-45° round.

50,20 - 53,50 Sericitic micaschist with quartz and feldspar and with some thin parallel positions or intercalations

of carbonates. On some places the biotite's micas are present and transversal biotites micas are somewhere present too but not much. This rock commemorate little bit keratophyre. The schistosity is little bit clear only. The total colour of this rock is white-gray. The avarage gradient of foliation is 40° (?).

53,50 - 61,10 The biotitic micaschist with chlorite (not much) quartz, with sericite, feldspar little bit too and with some irregular intercalations, schliers and joints filling of carbonates. The some mineralisation of sulphides isn't present. The total colour of this rock is little bit green bright gray. The average gradient of foliation is 40° round. In 55,75 - 55,95 m and 56,50 - 56,75 m are present the positions of rock, which is created by quartz, some feldspar and with some acicular crystales of amphibole (very small), some intercalations of schliers etc. of carbonates scarcely only. This rock has a gray-white colour. The schistosity isn't clear. Some very small biotites micas and some very very weak impregnation of FeS are present too, but very weak only. This type of rock is keratophyre perhaps too.

61,10 - 65,50 The sericitic micaschist with quartz with fewly the small micas of biotite with some feldspar scarcely and with some positions (1-2 cm thickness) intercalations, schliers or small, lenticles of carbonates. This type of rock as well as in 50,20 - 53,50 m. The schistosity is clear. The total colour of this rock is very bright or white-gray. The average gradient of foliation is 45°-50° round. Some impregnation of sulphides isn't present or it's very very scarce only (FeS very small irregular grains or scales).

65,50 - 65,91 The biotitic micaschist or gneissicmicaschist with quartz, some feldspar, with a lot of white-pint grains of garnet and with some impregnation of FeS, which is created by some small scales or little bit by some not coherent coats on the foliation's planes. In the basic part of this biotitic micaschist some few impregnation of graphite's scales or weak intercalations of graphite are present. The schistosity is little bit clear in this rock. The total colour of this rock is dark gray. The average gradient of foliation is 50° round.

65,91 - 66,15 The graphitic schist with some very weak intercalations of biotitic micaschist, or quartz or carbonates. Carbonates creat some pellets, lenticles or grains too. The mineralisation of FeS only is present but very weak only and FeS creat some small scales or not coherent weak intercalations. The structure is phacoidal schistose or schistose. The total colour of this rock is blau-gray or black. The average gradient of foliation is 50° round.

66,15 - 66,70 The biotitic micaschist with a lot of white-pint grains (1 mm in average) of garnet, with quartz,

feldspar scarcely only and with some not coherent weak intercalations, lenticles or pellets of carbonates. The schistose structure is clear. Some impregnation of FeS only is very very scarce only (some small and thin scales). The total colour of this rock is dark gray. Some small scales of graphite are present too but without some coherence. The average gradient of foliation is 55° round.

66,70 - 66,80 The biotitic micaschist as well as in 66,15 - 66,70 but with more some intercalations or lenticles of carbonates and with some weak intercalations of graphitic schist (average thickness is 0,3 - 0,5 mm in max.). The average gradient of foliation is 50° or 55° round.

66,80 - 66,95 The strongly graphitic schist with some not strong mineralisation of FeS only and with some very weak and not cohent irregular intercalations of biotitic, chloritic micaschist and carbonates or quartz scarcely too. The structure is pell-mell, phacoidal and phacoidal-schistose mostly. The total colour of this type of rock is black gray. The average gradient of foliation is 50°-55° round.

66,95 - 67,10 The sericitic micaschist with quartz, some feldspar some chlorite and biotite, with a lot of grains of garnet (small, 1 mm max., white colour) and with some lenticles or schliers of carbonates. Some impregnation of FeS mostly, but only perhaps is little bit more strongly present. The structure is phacoidal or phacoidal-schistose. The total colour of this rock is gray or little bit dark gray. The average gradient of foliation is 50° round. Some very, very weak impregnation of graphite is present too perhaps.

67,10 - 67,50 The gray quartz with some poor impregnation of FeS_2 mostly.

67,50 - 69,30 The sericitic micaschist with quartz, little chlorite and biotite very small only, with some not thick irregular intercalations, schliers or lenticles of carbonates (1-2 mm scarcely 1 cm or more in average thickness). Feldspar is little bit present too. Some mineralisation of sulphides is very scarcely only. Some very small grains of Fe_3O_4 are scarcely present too in this rock. The schistose or phacoidal-schistose structure is clear. The total colour of this rock is bright gray or gray. The average gradient of foliation is 55° round. In 68,00 - 68,10 m is position of white quartz with some lenticles of carbonates. In 68,50 - 68,55 m is position of gray quartz. In 68,70 m (2 cm) is position of white quartz and 68,80 m (1 cm) and 68,85 m the same. In 68,90 - 69,05 m the strong concentration of big biotite's micas (1-2 mm, but 5 mm in average).

69,30 - 70,75 The biotitic and chloritic greenschist with quartz,

aktinolite, epidote some feldspar and with a lot of grains, irregular intercalations, schliers or lenticles and pellets of carbonates. The phacoidal schistose structure is clear. The some mineralisation (impregnation) of sulphides is very scarce only. The total colour of this rock is bright green-gray. In 69,55 - 70,35 m is biotitic and sericitic micaschist with some rodlike or acicular crystales of amphibole (max. 1 cm long) and with a lot of intercalations of biotitic and chloritic greenschist as well as the basement rock of this position. The average gradient of foliation is 55° round.

70,75 - 73,35 The tiny-grained amphibolitic greenstone with a lot of biotite, with aktinolite, chlorite and quartz and little bit feldspar too. Carbonates creat some weak irregular intercalations or schliers, some filling of joints and position (7 cm thickness) in 72,40 - 72,47 m. Some mineralisation of sulphides is very very scarce only. The schistosity isn't clear. The total colour of this rock is gray-green.

73,35 - 73,75 The rock which is created by quartz mostly, some little bit only feldspar, with a lot of irregular intercalations, schliers, pellets etc. of carbonates, with a lot of grains of garnet (1-2 mm in average, bright pint colour) with some not much chlorite and biotite. The some very poor impregnation of FeS mostly is present too., but some very small grains of Fe_3O_4 is also present very scarcely only. The some weak intercalations of tiny-grained amphibolitic greenstone, greenschist and biotitic micaschist are round the both boundarys of this positions. The total colour of this type of rock is white or white-gray.

73,75 - 77,45 The biotitic micaschist with quartz, little bit with feldspar, scarcely with chlorite. Carbonates creat some weak intercalations, lenticles or weak schliers and position in 74,20 - 74,30 m. More chlorite is present from 76,40 m ca. The schistose and little bit phacoidal schistose structure is clear. The total colour of this rock is dark gray and dark green-gray after too. The average gradient of foliation is 45°-50° round.

77,45 - 78,90 The biotitic micaschist with a lot of quartz, with some chlorite and with some little sericite. The some mineralisation of sulphides is very scarce only. The schistose structure is little bit clear. The total colour of this rock is white gray or very bright gray. The average gradient of foliation is 50° round. Much more chlorite is present ca. from 78,35 m. In 78,50 - 78,75 m is peeition of tiny-grained amphibolitic greenstone as well as 70,75 - 73,35 m.

78,90 - 79,50 The tiny-grained amphibolitic greenstone with a lot of biotite and some chlorite as well as in 70,75 - 73,35 m.

79,50 - 80,35 The coarse-grained calcarcous amphibolitic greenstone with aktinolite, epidote, klinozoisite some chlorite and with a lot of biotite's small micas. Carbonates creat some irregular thin intercalations, schliers or pellets. Some mineralisation of sulphides is very, very scarce only. The structure is pell-mell. Amphibole creat some rodlike or acicular crystales (0,5 - 1 cm big max.) The total colour of this rock is bright green-gray.

80,35 - 80,77 The tiny-grained amphibolitic greenstone as well as in 70,75 - 73,35 m.

80,77 - 100,75 The coarse-grained amphibolitic greenstone as well as in 79,50 - 80,35 m. In 84,45 - 86,10 m is position of chloritic and sericitic greenschist with a lot of acicular crystales of amphibole and aktinolite too. Quartz, some biotite's micas and some irregular intercalations, schliers, pellets etc. of carbonates are present too. Some mineralisation of sulphides is very scarce only. The total colour of this rock is bright gray. The average gradient of foliation is 50^{o} round. In 90,75 - 92,10 m, in 93,85 - 94,45 m, in 97,70 - 98,10 m and in 98,65 - 99,30 m are positions of tiny-grained amphibolitic greenstone as well as in 70,75 - 73,35 m. In 90,10 - 90,15 m and in 90,20 - 90,30 m are some positions of white or white-gray keratophyre with some chlorite and with some small acicular crystales of amphibole and aktinolite too. Some irregular lenticles or intercalations are created by carbonates. Some mineralisation of sulphides is very, very scarce only.
In 88,20 m and 88,45 m are some position of white quartz, with some big grains (irregular) of FeS_2 in carbonates lenticles. The grains of FeS_2 are 1-2 mm in average big, but mineralisation is very, very, poor only.
In 91,00 - 91,40 and in 98,60 - 98,85 m are some transversal joints with the angles of dip 0^{o}-5^{o}-10^{o} round, which are fullfilled by carbonates.

(M. Motys).

Borhull nr. 46, TVERRFJELLET.

(Petrographical description).

0,00 - 2.90 The tender or tiny-grained amphibolitic greenstone with a lot of chlorite, aktinolite and with epidote and klinozoisite, but with little bit albite and quartz too. The some very weak intercalations or schliers, pellets, lenticles etc. of carbonates are present too. The same mineralisation of FeS_2 or FeS are present too but very weak only (some grains are big max. 1-2 mm in average). The total colour of this rock is dark green-gray or green-gray.

2.90 - 4,05 The very strongly carbonatic coarse-grained and medium-grained amphibolitic greenstone with some biotite's micas, with chlorite, aktinolite, some epidote and klinozoisite, but with a lot of intercalations pellets, schliers, lenticles or graines of carbonnates and little bit dolomite too. These some intercalations of carbonates have some maximally thickness 1-2 mm, but 1-2 cm somewhere too. The impregnation of FeS mostly, but FeS_2 too is present little bit more strongly. The grains (1-2 mm in average) of FeS or FeS_2 are irregular mostly. The total colour of this rock is dark green-gray or green-gray The average gradient of foliation is 45° round.

4.05 - 6.40 The tiny-grained amphibolitic greenstone as well as in 0,00 - 2,90 m but with little bit more strongly impregnation of FeS_2 mostly. The average gradient of foliation is on some plaues 15°-20° on the other 40-45° round.

6.40 - 10,70 The coarse-grained, strongly carbonatic amphibolitic greenstone with big rodlike or acicular crystales of amphibole, with some biotite (on some places acumulation of biotite's micas (with a lot of grains lenticles, pellets, schliers etc. of carbonates or dolomite too. The impregnation of FeS_2 mostly is present (some irregular grains 1-2 mm big in average. Some carbonatic intercalations or positions have average thickness 2-3 cm. The total colour of this rock is dark green-gray or gray-green. The average gradient of foliation is 40° round.

10.70 - 13.30 The coarse-grained amphibolitic greenstone with rodlike or acicular crystales of amphibole. The some schistosity isn't clear. The mineralisation of FeS or FeS_2 is very scarce only. The total colour of this rock is dark gray-green.

13.30 - 16.20 The strongly carbonatic, coarse-grained amphibolitic greenstone with more strongly impregnation of FeS_2 mostly as well as in 6,40 - 10,70 m.

16.20 - 17.00 The strongly carbonatic coarse-grained and medium-grained amphibolitic greenstone as well as in 2,90 - 4,05 m, with more clear schistosity.

17,00 - 17,80 The strongly carbonatic, coarse-grained amphibolitic greenstone as well as in 6,40 - 10,70 m. In 17,70 - 17,80 m is position of carbonatic-dolomite with some impregnation of FeS_2 and with some inclusions of chlorite mostly. In 17,40 m round is some more strong impregnation of FeS_2.

17,80 - 18,00 The carbonatic coarse-grained and medium-grained amphibolitic greenstone with little bit more clear schistosity as well as in 2,90 - 4,05 m.

18,00 - 18,70 The strongly carbonatic coarse- and medium-grained amphibolitic greenstone as well as in 17,00 - 17,80 m

18,70 - 19,60 The medium-grained amphibolitic greenstone with a lot of grains, pellets, schliers or intercalations of carbonates or dolomite too. The mineralisation of FeS_2 or FeS is very weak only. The total colour of this rock is dark green or dark gray-green. The schistose structure is more clear in this type of rock too. The average gradient of foliation is 40°-45° round.

19,60 - 21,35 The strongly carbonatic or dolomitic coarse-grained or medium-grained little bit too amphibolitic greenstone as well as in 6,40 - 10,70 m. In 20,05 - 20,15 m is position coarse-grained amphibolitic greenstone with big acicular or rodlike crystales of amphibole and with some more strongly impregnation of FeS2 mostly. In 21,25 m is present little bit strong impregnation of FeS_2.

21,35 = 31,85 The strongly carbonatic or carbonate-dolomitic medium-grained or on some places more tiny-grained amphibolitic greenstone, with a lot of acicular crystales of amphibole, with some aktinolite and epidote and with some very weak impregnation of FeS_2 mostly. Some intercalations or positions of carbonnates have the average thickness 2-5 cm, but 10 or more too. In example the positions of carbonates in 23,15 = 23,35 m, 23,40 - 23,50 m, 24,00 - 24,20 m, 24,30 - 24,40 m, 25,25 - 25,30 m, 27,00 - 27,05 m, 27,25 - 27,30 m, 27,40 - 27,48 m, 30,20 - 30,26 m, 30,55 - 30,70 m, In 25,00 - 25,25 m and 25,30 - 25,35 m the positions carbonatic coarse-grained amphibolitic greenstone are present. The some more strong strong impregnation of FeS_2 mostly are present in some arabonatic intercalations in 25,25 m (1 cm), in 30,60 m (1,5 cm) and in 31,00 m round (2 cm). The total colour of this rock is dark gray-green. The average gradient of foliation is 45°-50° round.

31,85 - 35,60 The medium-grained amphibolitic greenstone on some places with a lot of schliers, intercalations, pellets, grains etc. of carbonates. The intercalation of the strongly carbonatic medium-grained amphibolitic greenstone as well as in 19,60 - 21,35 m are present too, but thin only. The impregnation of FeS2 mostly is very weak only. The schistose structure is clear on some places only. The total colour of this rock is dark green or dark gray-grenn. The average gradient of foliation is 50° round.

35,60 - 37.70 The thick nosition of carbonates or dolomitic-carbonates. The some impregnation of FeS_2 mostly is very scarce only. The some small inclusions of chlorite are present on some places. The total colour of this rock is gray or bright blue-gray. In 37,60 m the position of coarse-grained amphibolitic greenstone is present

37.70 - 40,30 The medium-grained or tiny-grained amphibolitic greenstone with aktinolite, chlorite, klinozoisite and epidote, with acicular crystales of amphibole (2-5 mm long)and with some small very weak intercalations of carbonates. The schistose is more clearly. The same impregnation of FeS_2 mostly is very scarce only. The total colour of this rock is gray-green or bright gray-green. The average gradient of foliation is 40°-45° round.

40,30 - 41,00 The tiny-grained amphibolitic greenstone with chlorite and with clear schistose structure and with a lot of thin intercalations of carbonates. The impregnation of FeS_2 is very weak only. The total colour of this rock is dark green or dark gray-green. The average gradient of foliation is 50° round.

41.00 - 41,65 The strongly carbonatic medium or tiny-grained amphibolitic greenstone with some weak intercalations of carbonates too as well as in 21,35 - 31.85 m.

41,65 - 42,90 The chloritic tiny-grained amphibolitic greenstone with a weak impregnation of FeS, but FeS_2 mostly. The schistose structure is little bit more clear. The total colour of this rock is dark grenn. The average gradient of foliation is 45° round. In 41,95 m - 42,00 m the position of carbonates is present. On the boundary of this position is some mineralisation of FeS_2, but very thin only.

42,90 - 45 80 The strongly carbonatic medium-grained amphibolitic greenstone as well as in 21,35 - 31,85 m with a lot of intercalations of coarse-grained amphibolitic greenstone and carbonates, which have some little bit strongly impregnation of FeS_2 mostly, but weak only in average. The coarse-grained amphibolitic greenstone positions are in 43.15 m (5 cm), 43.60 m (5cm), 43,65 m (5 cm), 43,90 m (3. cm), 44,00 m (1 cm), 44,25 m (5 cm), 44,45 m (8 cm), 44,75 m (1 cm), 45,75 m (2 cm). The carbonatic positions are in 43,05 m (3 cm), 43 85 m (3 cm), 44,05 - 44,25 m (with some weak impregnation), 44.30 - 44.35 m (with weak impregnation of FeS_2) and in 45.70 m round (3 cm with strong impregnation of FeS_2). The total colour of this rock is gray-green. The average gradient of foliation is 45° round.

45,80 - 47,30 The sericitic-biotitic micaschist with quartz, albite some chlorite etc. The mineralisation of FeS or FeS2 isn't present or is very scarce only. The schistose is very clear. The total colour of this rock is bright gray. The average gradient of foliation is 45° round.

47,30 - 48,60 The position of quartzy keratophyre with clear foliation, with chlorite and some intercalations of chloritic-biotitic micaschist or amphibolitic schist. Some position between 47,50 - 48,10 m is created by feldspar-quartz keratophyre with big acicular crystales of amphibole. Some mineralisation of FeS_2 or FeS isn't present. The total colour of this rock is very bright gray or orange-gray white too. The average gradient of foliation is 55°-60° round.

48,60 - 50,60 The biotitic and chloritic micaschist with feldspar and quartz. This type of rock has porphyroblaste - schistose structure. The biotite's micas is very large (1-2 mm in average). The same mineralisation of sulphides isn't present. The total colour of this rock is dark gray. The average gradient of foliation is 50°-55° round.

50,60 - 51,15 The quartz-feldspar keratophyre with chlorite and biotite on some places round the both boundary of this position. The total colour of this rock is white or little bit gray-white.

51,15 - 54,50 The chloritic-biotitic micaschist with feldspar, quartz,and some sericite. Very scarce only are present some thin intercalations of carbonates. The total colour of this rock is bright green-gray or little bit green-gray. The average gradient of foliation is 50°-55° round.

54,50 - 60,75 The sericitic micaschist with chlorite and very scarce biotite, with a lot of very thin intercalations, schlieres or lenticles of carbonates. The impregnation of FeS_2 mostly is little bit strongly. Fe_3O_4 very small grains (0,5 mm - 1 mm max.) are present too, but not scarce only. FeS_2 irregular grains mostly, but regular grains too are 1 - 2 mm or more big in average. The schistose structure is very clear. The total colour of this rock is gray and bright gray. The average gradient of foliation is 55° round.

60,75 - 60,95 The strong impregnation of FeS_2 ($CuFeS_2$ scarce only) in a blue quartz. This impregnation creat ore horizont.

60,95 - 66,50 The biotitic micaschist with chlorite, quartz, scarcely feldspar, epidote or amphibole too. The some grains, schliers or pellets of carbonates are present very much. This rock has phacoidal schistose structure. In 63,00 m round has this type of rock a lot of very big rodlike and acicular crystales of amphibole (5 mm and max. 1 cm. big.) The some positions of dolomitic carbonates are present in 65,90 m (5 cm thick), and in 66,00 m (5 cm thick, but with some weak mineralisation of FeS_2 mostly.) The total colour of this rock is little bit green gray. The average gradient of foliation is 30° round.

This borehole was finished at 66,50 m.

Borehole no. 47, Tverrfjellet.

Petrografical description.

0,00 - 14,50 The tiny or tender-grained amphibolitic greenstone with a lot of grains and pellets, schliers, intercalations (1-3 cm thickness maximally) and the filling of joints of carbonates. The mineralisation of FeS_2 mostly is weak. The some intercalations of greenschist, biotitic and actinolitic greenschist and strongly carbonatic greenschist are present in this basement greenstone too mostly from 8,00 m. Some mineralisation FeS_2 but FeS too is concentrated round or on boundary of these greenschists intercalations or in mostly and round or in some carbonatic medium-grained greenstone's intercalations. Epidote, klinozoisite or aktinolite and chlorite are mostly present in greenschists intercalations. This mineralisation of sulphides is weak too but it's more clear than in basement rock. The total colour of this rock is dark green or dark gray-green. The average gradient of foliation is 30° round, but on some places 40° round.

14,50 - 18,50 The medium-grained and coarse-grained amphibolitic and strongly carbonatic greenstone with some big rodlike or acicular mostly crystales of amphibole (3-5 mm, but 1 cm too long), with a lot of regular crystales, irregular grains, schliers, pellets or intercalations of carbonates (some carb.crystales or grains are 2-3 mm big in average). Biotite (big micas 1-3 mm in average)klinozoisite, chlorite, aktinolite and little epidote are present too. Very strongly quartz is present. The mineralisation of FeS_2 and FeS is present more strongly. FeS_2 or FeS irregular grains mostly are very small but 1-2 mm in average big too. The little bit more strongly mineralisation of FeS_2 and FeS (50 % is present in some strongly quartzy position with some carbonates and feldspar too in 14,60 m round (ca. 5 cm). The total colour of this rock is gray-green. The structure of this rock is porphyroblastose and pell-mell porphyroblastose too.

18,50 - 19,40 The medium-grained amphibolitic greenstone very strongly carbonatic too, with a lot of regular crystales, irregular grains, pellets or schliers of carbonates. Amphibole creat acicular or rodlike crystales (max. 1-2 mm big). This rock has sheaf-like and pell-mell structure. The mineralisation of FeS_2 or FeS is very scarce only. The total colour of this rock is dark gray-green.

19,40 - 20,25 The medium-grained and coarse-grained strongly carbonatic amphibolitic greenstone as well as in 14,50 - 18,50 m.

20,25 - 24,85 The medium-grained strongly carbonatic amphibolitic greenstone as well as 14,50 - 18,50 m, but with smaller crystales and with very weak impregnation of FeS_2 or FeS. In 22,25 - 22,30 m is parallel position of quartzy and little bit feldspatic rock (keratophyre) with weak impregnation FeS_2 mostly.

24,85 - 25,25 The tiny-grained amphibolitic greenstone with a lot of grains, pellets and weak intercalations of carbonates. The total colour of this rock is dark gray-green. The mineralisation of FeS_2 or FeS is scarce only. The average gradient of foliation is 35^{o}-40^{o} round.

25,25 - 26,35 The medium-grained strongly carbonatic amphibolitic greenstone as well as 20,25 - 24,85 m. In 25,40 - 25,45 m is parallel position of strongly quartzy and little bit feldspatic rock (keratophyre) with very weak impregnation of FeS_2 mostly.

26,35 - 29,25 The tiny-grained amphibolitic greenstone as well as 0,00 - 14,60 m. In 27,90 m (5 cm), 28,55 m (2 cm) and 28,90 - 28,95 m (6 cm) are present some weak positions of strongly quartzy rock with little bit feldspar (keratophyre) with little bit more strongly but poor mineralisation of FeS and FeS_2 mostly.

29,25 - 30,60 The tiny-grained amphibolitic greenstone with some schliers, pellets, grains or weak intercalations of carbonates. The impregnation of FeS2 mostly but FeS too is very weak only. In 29,95 m round (5 cm) the parallel position of carbonates is present. The schistose structure isn't clear. The total colour of this rock is dark green or dark gray-green.

30,60 - 32,20 The medium-grained and coarse-grained strongly carbonatic amphibolitic greenstone as well as in 14,50 - 18,50 m. In 31,95 m (2 cm) is more strongly impregnation of FeS_2 mostly, but with some FeS too.

32,20 - 43,10 The tiny-grained and medium-grained amphibolitic greenstone with a lot of irregular grains, pellets or small schliers of carbonates. The structure is phacoidal mostly. Amphibole creat small acicular crystales. The impregnation of FeS2 or FeS is very scarce only. The some not parallel positions of quartz (secretion or vein ?) are present in 36,45 m (7 cm) 37,35 m (8 cm) and in 40,70 - 40,80 m. The total colour of this rock is dark gray-green. The average gradient of foliation is 30^{o}-35^{o} round.

43,10 - 43,70 The position of gray or blue-gray quartz with very weak impregnation of FeS_2 mostly, but little bit FeS too.

43,70 - 43,95 The coarse-grained amphibolitic greenstone with a lot of big biotite's micas with klinozoisite, epidote, aktinolite and with a lot of carbonates, schliers, pellets and grains. Quartz is present too little bit. The same strong impregnation of FeS_2 mostly is in 43,70 - 43,80 m. The total colour

of this rock is dark gray-green. The average gradient of foliation is 25° round. Amphibole creat big rod-like and acicular crystales.

43,95 - 48,10 The tiny-grained amphibolitic and chloritic greenstone with epidote, klinozoisite and some aktinolite. The carbonates pellets, schliers, grains or intercalations are not so much, small or scarce only. The some thin intercalations of quartz with not much feldspar somewhere and with poor impregnation of FeS_2 mostly, are present mostly. In this type of rock is more clear schistose structure. Some foulding are present too in 46,00 - 47,00 m mostly. The impregnation of sulphides is more strongly, mostly FeS_2. The total colour of this rock is dark green or dark gray-green. The average gradient of foliation is 40° round.

48,10 - 48,75 The amphibolitic greenschist with chlorite, actinolit big rodlike and mostly acicular crystales of amphibole and epidote and klinozoisite present too. Carbonates are very scarce only. The mineralisation (impregnation) of FeS_2 mostly is very poor only. The schistose structure is very clear. The total colour of this rock is gray-green or bright gray-green. The average gradient of foliation is 40° round.

48,75 - 49,30 The tiny-grained amphibolitic greenstone with actinolite, chlorite and little bit epidote and klinozoisite too and with a lot of schliers, pellets grains, weak intercalations or filling of some joints etc. of carbonates. The impregnation of sulphides is very, very weak only. The schistose structure is little bit clear. The total colour of this rock is dark green or dark gray-green. The average gradient of foliation is 25°-30° round.

49,30 - 49,85 The sericitic mica schist with biotite, some chlorite and scarce amphibolite or actinolite too. The quartz is mostly present too. The schistose structure isn't much clear. The total colour of this rock is bright gray. The average gradient of foliation is 60° round. This rock is without any impregnation of sulphides.

49,85 - 50,35 The tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m. The average gradient of foliation is 50° round.

50,35 - 50,65 The medium and coarse-grained, strongly carbonatic amphibolitic greenstone as well as 14,50 - 18,50 m but with very, very weak impregnation of sulphides only.

50,65 - 51,45 The tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m. The average gradient of foliation is 40°-45° round.

51,45 - 51,60 The medium-grained biotitic micaschist with quartz or gneissicschist, some feldspar and scarce chlorite

too. The schistose structure isn't very clear. The total colour of this rock is gray. The average gradient of schistosity is 60° round.

51,60 - 52,30 The sericitic micaschist as well as in 49,30 - 49,85 m. The average gradient of foliation is 60° round.

52,30 - 52,70 The rock, which are created by quartz and feldspar with very small biotite and with very weak impregnation of FeS_2 mostly. (Keratophyre).

52,70 - 53,00 The tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m. The average gradient of foliation is 50° round.

53,00 - 53,80 The medium- and coarse-grained strongly carbonatic amphibolitic greenstone as well as in 50,35 - 50,65m.

53,80 - 54,00 The sericitic micaschist as well as in 49,30 - 49,85 m. The average gradient of foliation is 60° round.

54,00 - 54,40 The tiny-grained amphibolitic greenstone as well as 48,75 - 49,30 m. The average gradient of foliation is 25°-30° round.

54,40 -55,00 The sericitic and biotitic micaschist as well as in 49,30 - 49,85 m. The average gradient of foliation (?) is 60° round.

55,00 - 55,25 The keratophyre with some micas of biotite very scarce and with some small irregular grains of FeS_2 scarce only too. This rock is created by quartz and feldspar only. Amphibole's acicular small crystales and some chlorite are present too in this rock. The total colour of this rock is white or gray-white.

55,25 - 55,65 The tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m. The average gradient of foliation is 30°-35° round.

55,65 - 56,10 The sericitic biotitic micaschist as well as 49,30 - 49,85 m. The average gradient of foliation is 55°-60° round.

56,10 - 56,35 The medium and tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m, but with more chlorite and some very weak mineralisation of FeS_2 only. The average gradient of foliation is 55° round.

56,35 - 56,60 The sericitic and biotitic micaschist as well as in 49,30 - 49,85 m. The average gradient of foliation is 60° round.

56,60 - 56,70 The keratophyre as well as in 55,00 - 55,25 m. The average gradient of foliation is 40°.

56,70 - 57,16 The sericitic and biotitic micaschist (? may be keratophyre too), with quartz, feldspar and

chlorite, aktinolite. This type of rock hasn't clear schistosity. The total colour of this rock is bright gray. The average gradient of foliation is 50° round.

57,16 - 57,35 The biotitic micaschist with quartz, chlorite and some feldspar. The schistosity is more clear in this rock. The total colour of this rock is gray. The average gradient of foliation is 45° round.

57,35 - 57,40 The coarse-grained strongly carbonatic amphibolitic with rodlike or acicular crystales of amphibole as well as 50,35 - 50,65 m. The mineralisation of FeS_2 is very scarce only.

57,40 - 57,65 The keratophyre as well as in 56,60 - 56,70 m. The average gradient of foliation is 45° round.

57,65 - 57,70 The tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m. The average gradient of foliation is 40° round.

57,70 - 57,85 The sericitic micaschist as well as in 56,70 - 57,16 m. The average gradient of foliation is 45° round.

57,85 - 58,15 The coarse-grained or medium-grained strongly carbonatic amphibolitic green-stone as well as in 50,35 - 50,65 m.

58,15 - 58,30 The tiny-grained chloritic-amphibolitic greenstone where the positions of more chloritic and more epidotic exchange. Carbonates intercalations or grains etc. are scarce only in this type of rock. The total colour of this rock is very dark green. Some impregnation of FeS_2 mostly is present, but very poor only and also present some graines of Fe_3O_4 (only very small). The average gradient of foliation is 50° round.

58,30 - 58,70 The sericitic micaschist as well as in 56,70 - 57,16 m. The average gradient of foliation is 55° - 60° round.

58,70 - 58,95 The tiny-grained amphibolitic greenstone as well as in 48,75 - 49,30 m. The average gradient of foliation is 25°-30° round.

58,95 - 59,05 The biotitic micaschist as well as in 57,16 - 57,35 m. The average gradient of foliation is 60° round.

59,05 - 61,00 The sericitic and little bit chloritic micaschist with much quartz and feldspar and scarcely with biotite. The schistosity isn't clear. The total colour of this rock is bright gray little bit white-gray.

61,00 - 61,45 The sericitic micaschist with quartz and feldspar as well as in 56,70 - 57,16 m. (Keratophyre ?).

61,45 - 63,80 The sericitic and little bit chloritic micaschist as well as in 59,05 - 61,00 m. The average gradient of foliation is 60°-65° round.

63,80 - 64,25 Keratophyre with some biotite's micas. This rock is created by quartz and feldspar. The total colour is white-gray.

64,25 - 65,00 The biotitic-chloritic micaschist with sericitic, actinolite, little epidote and klinozoisite, with quartz and some fedlspar and with some grains, pellets, schliers or irregular intercalations of carbonates. The schistose structure is little bit clear. Some impregnation of sulphides isn't present in this rock. The total colour of this rock is little bit green bright gray. The average gradient of foliation is 60°-65° round.

65,00 - 65,85 The keratophyre, the same type as in 63,80 - 64,25 m.

65,85 - 68,65 The biotitic-chloritic micaschist as well as in 64,25 - 65.00 m, but with some parallel or not parallel positions of white quartz in 66,35 - 66,40 m in 66,60 - 66,65 m and 66,75 - 66,80 m. The average gradient of foliation is 40°-45° round.

68,65 - 68,75 The keratophyre, just the same type as in 63,80 - 64,25 m and 65,00 - 65,85 m.

This berehole number 47 was finished at 68,75 m.

(M. Motys).

The borehole no. 62, H J E R K I N N .

(The petrographical description).

0,00 - 16,80 The chloritic and biotitic greenschist with some small acicular crystales of actinolite and hornblende, with calcitic silicates and on some places with a lot of parallel weak positions or intercalations of carbonates (1-5 mm but 1 cm is the average thickness). Carbonates creat also some irregular schliers, pellets etc. but not so much. Some mineralisation of sulphides os very very poor only. FeS creat some small scales and FeS_2 creat small irregular grains. The scales of FeS follow the foliation. (In 11,80 m the very weak. oblique vein of quartz is present with some inclosings aureolitic field of micas of biotite on the both sides. The average thickness of this vein is 1-2 mm. In this weak vein of quartz is present irregular small grain of $CuFeS_2$ in 11,80 m). The parallel schistose structure is very clear. The total colour of this rock is green-gray. The average gradient of foliation is 65° round.

16,80 - 18,45 The very strongly calcarcous, chloritic and biotitic greenschist with some small rodlike crystales of hornblende, but very few only present and with a lot of epidote and the others calcitic silicates. Carbonates creat the parallel intercalations or positions 2-5 mm but mostly 1-2 cm average thickness. The mineralisation of sulphides is scarce only or isn't present. The schistose structure is very clear. The total colour of this rock is white green-gray. The average gradient of foliation is 65° round.

18,45 - 19,20 The white-gray or gray biotitic quartzite, with some very weak, little bit parallel, but irregular mostly intercalations of micas of biotite (the thickness is maximally 1 mm). Biotite creat also some small micas the oblique too, which are impregnated in the basement quartzitic material. Chlorite is little bit present too. The schistosity is little bit clear. Some mineralisation of sulphides isn't present or is very scarce only. The average gradient of foliation is 55° and 60° round.

19,20 - 26,30 The chloritic and biotitic quartzite. Biotite and chlorite creat the cover of foliation plates mostly, together with sericite too but micas of biotite mostly, the oblique too, creat some impregnation in the basement quartzitic material. The schistose structure is very clear. Some mineralisation of sulphides isn't present or is very scarce only. The total colour of this rock is white or white-gray. The average gradient of foliation is 50°-55° round.

26.30 - 36 10 The white-gray or gray biotitic and chloritic quartzite the same as in 18.45 - 19.20 m. The average

gradient of foliation is 55° and 50° round. The pell-mell or phacoidal structure are present oftenly.

36,10 - 40,50 The sericitic and chloritic micaschist with quartz mostly and with not much the small grains of pink garnet. Biotit is present very few only. The phacoidal and phacoidal schistose structure is clear. The total colour of this rock is very bright gray. The average gradient of foliation is 60° and 65° round. Some mineralisation of sulphides isn't present or is very, very scarce only (From 38,00 - 40,00 m the loosing of the boreholes core is very big.)

40,50 - 40,70 The chloritic and epidotic micaschist with a lot of graphitic substance (graphitic schliers etc. - very weak). On some places the micas of biotite and the grains of garnet are more present too. The impregnation of graphite is poor altogether. The mineralisation of FeS mostly, but of FeS_2 too is present more strongly in this type of rock. The schistosity parallel and little bit phacoidal schistose structure is very clear. The total colour of this rock is dark gray or black gray too. The average gradient of a foliation is 65° round.

40,70 - 41,60 The sericitic and chloritic micaschist as well as in 36 10 - 40,50 m, but with more biotite and garnet.

41,60 - 42,50 The quartzy keratophyre with few biotites micas and sericite. The some mineralisation of sulphides isn't present. The schistose structure isn't clear. The total colour of this rock is gray and bright gray. In some places are present small acicular crystales of hornblende and some grains of pinkt garnet.

42,50 - 43,00 The sericitic and biotitic micaschist with some chlorite, epidote and with small rodlike and irregular crystales of hornblende. Garnet is also strongly present and creat some big grains oftenly (5 mm in average). Actinolite and the others calcitic silicates are present too. The mineralisation of sulphides is very scarce only, but isn't present mostly. The total colour of this rock is gray or little bit green-gray too. The schistosity isn't so clear but the average gradient of foliation is 50° and 55° round.

43,00 - 43,45 The keratophyre as well as in 41,60 - 42,50 m.

43,45 - 43,60 The sericitic and biotitic micaschist with garnet as well as in 42,50 - 43,00 m.

43,60 - 45,50 The keratophyre as well as in 41,60 - 42,50 m, but with more acicular crystales of hornblende, grains of garnet and with some intercalations of sericitic and chloritic micaschist.

45,50 - 45,70 The sericitic, biotitic and chloritic micaschist with a lot of garnet as well as in 42,50 - 43,00 m.

45,70 - 46,30 Just the same complex - motley complex as well as in 43,60 - 45,50 m.

46,30 - 46,60 The keratophyre as well as in 41,60 - 42,50 m.

46.60 - 49,70 The biotitic micaschist with sericitic and chlorite, mostly with quartz. Garnet is present very few only. Some weak intercalations of keratophyre as well as in 41,60 - 42,50 m are present but not so much. The schistose structure is very clear. The mineralisation of sulphides isn't present mostly. The total colour of this rock is gray. The average gradient of foliation is 50° round.

49.70 - 50.30 The biotitic and chloritic quartzite, white-gray or gray as well as in 18.45 - 19,20 m.

50,30 - 52.85 The biotitic and sericitic micaschist with some chlorite and epidote, klinozoisite too and with a lot of small pink grains of garnet. The parallel schistose structure is little bit clear. The same mineralisation of sulphides isn't present. The total colour of this rock is gray or bright gray. The average gradient of foliation is 60° and 65° round. In 52,70 m (7 cm) and in 52,80 m (10 cm) are some position of white quartz.

52,85 - 53,00 The sericitic, biotitic and chloritic micaschist with garnet and with acicular crystales of hornblende as well as in 42,50 - 43,00 m.

53,00 - 66.00 The sericitic and biotitic, tiny-grained micaschist with a lot of small grains of pink garnet, with chlorite, epidote and klinozoisite etc. few too. On some places and mostly from 64,50 m is this rock more calcarcous. The schistosity isn't so clear. The some mineralisation of sulphides is very scarce only and mostly isn't present. The total colour of this rock is bright gray or gray. The average gradient of a foliation is 45°, 50° round. In 56,60 - 56,80 m, in 57,15 m - 57,25 m and in 57,45 - 57,60 m are some positions of chloritic and amphibolitic greenschist with some small grains of garnet, with acicular or rodlike crystales of hornblende but with a lot of parallel and irregular intercalations of quartz. In 61,50 - 61,60 m and in 63,00 - 63,15 m are some intercalations of keratophyre with a lot of grains of garnet and with some micas of biotite and chlorite? very small only and not so much.

This borehole no. 62 was finished in 66,00 m.

(M. Motys).

Borhull nr. 59, H J E R K I N N .

(Petrografical description).

0,00 - 1,60 The chloritic greenschist with sericitic, epidote and klinozoisite and with not so much micas of biotite (1 mm in avreage). The same acicular crystals of amphibole are present too on some places but too scarce only. Some intercalations, schliers, pellets etc. of carbonates (1-2 mm thickness in average max.) are present rather plantifully. One some place these carbonates positions (paralell with schistosity) have thickness 1-2 cm. The mineralisation or impregnation of FeS_2 mostly is very very weak only. In 0,75 m, 0,80 m, 1.03 m and 1,50 m are some lenticles or veins of white quartz but without mineralisation etc. and not thick too (1-2 cm max.). The total colour of this rock is gray or green-gray. The avereage gradient of schistosity (foliation) is 55^{o} round.

1,60 - 11,80 The chloritic greenschist as well as 0,00 - 1,60 m. on some places and chloritic micaschist or greenschist with quartz, epidote, klinozoisite etc., which has dark green or dark green gray colour. The mineralisation of FeS_2 only is very very poor (weak). The structure of rock is phacoidal-schistose, schistose or pell-mell-schistose too on some place. On some places, are some not thick lonticles or pellets of carbonates or quartz. The average gradient of foliation is 55^{o} round..

11,80 - 12,50 The chloritic greenschist as well as in 0,00 - 1,60 m. In 12,10 - 12,40 m some grains of Fe_3O_4 are present, but not so much (1 mm max. in average). The average gradient of foliation is 55^{o} round.

12,50 - 13.10 The tiny-grained or tender-grained amphibolitic and chloritic greenstonr with biotite, epidote and klinozoisite and with some schliers, intercalations or pellets of carbonates. The quartz and plagioblase are present too but not much. The mineralisation (impregnation) of FeS_2 only is very very weak. The total colour of this rock is green-gray or dark gray-green. The average gradient of foliation is 55^{o} round.

13.10 - 13,66 The homogenitic impregnated ore of FeS_2 mostly in quartzite, quartzy greenschist or greenstone (these rocks exchange). In homogenetic ore of FeS_2 are present a lot of rodlike or acicular crystals of amphibollite (3-5 m , max. 1 cm long).

13,66 - 18,95 The tiny-grained or tender-grained amphibolitic and chloritic greenstone as well as in 12,50 - 13,10 m. The very strong mineralizations of FeS_2 (ore position) are in 13,92 m (1 cm), in 14,90 m - 15,00 m (some not homogeneitic impregnation FeS2, in position with pell-mell structure with carbonates

and greenstone, but with o,5 cm intercalations FeS_2 too) and in 15,40 m (three homog. positions of FeS_2 but max. 1 cm thickness in average, which are exchanged by carbonates schliers or intercalations). The total colour of this greenstone is dark gray-green. The mineralisation is weak only. The average gradient of foliation is 55° round.

18,95 - 20,45 The coarse-grained carbonatic amphibolitic greenstone with epidote, klinozoisite and chlorite. Smphibolle is created by big rodlike minerals. Carbonates creat some schliers intercalations, pellets abd on some places thick positions or thick lenticles (1-2 cm in average). The mineralizarion isn't present or is very weak only. The total colour of this rock is green or gray-green. The foliation is not clear (structure is porphyroblastic) but average gradient of foliation is 55° along the amphibollite's grain clongation.

20,45 - 23.73 The strong mineralisation of FeS_2 mostly, FeS, CuFeS maybe, homogenitic ore positions of FeS_2 etc. in 20,60 - 20,66 m, 21,65 - 21,75 m, 22,oo - 22,05 m, 22,10 - 22,15 m, 22,30 - 22,35 m, 22,42 - 22,52 m, 22,57 - 22,65 m, 22,78 - 22,85 m and 23,60 - 23,65 m in chloritic greenschist, carbonatic intercalations, greenstone and quartzy chloritic micaschist, which are exchanged between themself. but more are present chloritic greenschist. The average gradient of foliation is 50°-55° round.

23,73 - 81,60 The tiny-grained or tender-grained amphibolitic greenstone with chlorite, klinozoisite, epidote and with phagioklase too. The mineralisation of FeS_2 or FeS maybe too is very very weak only, but the magnetite's grains, big or some places (1-2 mm in average are present like as some impregnation on some places rather strong. In this greenstone are a lot of positions, intercalations, schliers, pellets or lenticles which are created by carbonates. The average thickness is 1-2 mm, but some positions 1-2 cm and some thick positions or lenticles 5 - 10 cm and more (in 29,40 m, 29,95 m, 30,85 m, 34,85 m etc.). In carbonates matter are some FeS_2, chlorite, epidot klinozoisite etc.. The total colour of this rock is gray-green or little bit dark gray-green. The average gradient of foliation is 40°-45° round in 30 m. The other carbonatic positions are in 60,00 m (10 cm) with some mineralisation of FeS_2 round boundary, in 67.10 m (10 cm), in 68,60 m (10 cm) and in 73,70 m (10 cm). The other some mineralisation of FeS_2 is in 61,25 m (2 cm).Some dislocation zone is in 79,70 m, with some carbonatic filling and with some little caverns which are created by water leaching. The average angle of dip of this dislocation is 0°-5° round. It is some transversal dislocation. The average gradient of foliation in 70 m is 55° round and in 80 m 50° round.

This borehole are finished in 81,60 m.

(M. Motys).

THE BOREHOLE NR. 65, KVITDALEN.

The petrographical description.

0,00 - 11,50 — The epidotic-greenschist with a lot of epidote, klinozoizite atc. little chlorite and biotite. Aktinolite creat much small acicular crystals. Quartz is present very strongly from ca. 6,70 m to 11,50 m, and creat many paralel weak intercalations and also it is present very strongly in the masement matter of this rock. Biotite is very strongly present ca. from 7,00 m to 11,50 m with more chlarite too. The paralel schistose structure is also very clear after 7,00 m to 11,50 m. From 0,00 to 7,00 m the zone positions (weak only) or intercalations of tiny-grained greenstone are present but not so much and weak only and they cross to greenschist fluently. The mineralisation of some sulphides is very scarce or isn't present mostly. Carbonates creat some irregular weak intercalations, mostly from 7,00 - 11,50 m, some schliers or pellets, lenticles and irregular grains, but they are not so much present. The total colour of this rock is green-gray and bright green-gray. The average gradient of this foliation is 40^{o}-45^{o} around mostly.

11,50 - 17,10 — The biotitic and sericitic micaschist with a lot of quartz, which creat the homogenetic weak, paralel intercalations (1-2 mm in average thickness) and also with some few schliers of carbonates. Garnet creat the small grains, which are present very few only. The paralel schistose structure is very clear. On some places is clear the recumbent folding with mm amplitude. The total colour of this rock is gray. The average gradient of a foliation is 30^{o} and 35^{o} around.

17,10 - 19,70 — The chloritic greenschist with a lot of epidote, klinozoizite act just the same as in 0,00 - 11,50 m. A lot of paralel positions of quartz are present between 17,20 - 18,40 m (the thickness of quartz positions is 1-2 cm in average). The average gradient of a foliation is 40^{o} and 45^{o} around.

19,70 - 20,40 — The biotitic micaschist with a lot of very small grains of garnet, with quartz mostly, with some sericitic and with some calcitic silicates and chlorite, but scarcely only. Some weak paralel intercalations are created by quartz, but by some carbonates not so much too. The mineralisation of some sulphides

isn't present mostly. The total colour of this rock is gray. The schistose structure and little bit phacoidal schistose structure are clear. The average gradient of a foliation is 45° round.

20,40 - 20,95 — The sericitic and biotitic micaschist strongly calcarcous, with a lot of small grains of garnet, but white and pink-white colour. Carbonates creat the paralel weak intercalations or positions, pellets etc. and grains too. The some mineralisation of some sulphides is scarce only. The paralel schistose structure is clear. The total colour of this rock is gray or bright gray. The average gradient of a foliation is 40° and 45° round.

20,95 - 25,40 — The sericitic and biotitic micaschist as well as in 20,40 - 20,95 m but with little bit more chloritic and with epidote, klinozoisite etc. and with small acicular crystals of actinolite, but hornblende scarcely too. This rock commemorate on some places more greenschist. The mineralisation of sulphides is scarce only. The total colour of this rock is gray and little bit greengray too. The average gradient of foliation is 45° round.

25,40 - 27,65 — The tender-grained or tiny-grained amphibolitic greenstone, with a lot of very weak intercalations or paralel veins and grains of carbonates. The schistose structure is very clear. The small micas of biotite is present too, but not so much. Epidote, chlorite and the other calcitic silicates are present strongly. Some impregnation of FeS_2 mostly is present, but very poor only. The grains of FeS_2 are irregular and oblate (shaped) mostly. The total colours of this rock is green-gray or gray-green. The average gradient of this foliation is 45° around.

27,65 - 30,00 — The biotitic mica-schist with sericite, with quartz mostly, with some chlorite and some calcitic silicates, but very few only. Garnet is present scarce only. Carbonates creat not much very weak veins, schliers or some grains. The little, tender phacoidal schistose structure is clear. The some mineralisation of sulphides is very scarce only. The total colour of this rock is gray. The average gradient of the foliation is 45° around.

30,00 - 36,10 — The tender-grained or little bit tiny-grained amphibolitic greenstone just the same as in 25,40 - 27,65 m, but with more weak intercalations of carbonates and with some strongly impregnation of FeS_2 in carbonates

intercalations mostly (in example in 30,90 round and in 34,55 m and 34,75 m round.) This weak positions with carbonates and with strong impregnation of FeS_2 are 0,5 cm or 1 cm maximally thickness. The average gradient of the foliation of this rock is 45° round.

36,10 - 36,50 — The chloritic, epidotic and biotitic greenschist as well as in 0,00 - 11,50 m, but strongly calcareous. The average gradient of foliation is 40° and 45° round.

36.50 - 42,70 — The biotitic micaschist the same as in 27,65 - 30.00 m, but with more irregular little veins of carbonates and of quartz (white) too. The average gradient of foliation is 45° round. The phacoidal and phacoidal schistose structure is present mostly.

42.70 - 42,90 — The chloritic micaschist with a lot of grains of pink garnet with some small or big acicular crystals of hornblende, with epidotid and with the other calcitic silicates but with very strong impregnation of FeS only. The entire structure is phacoidal schistose, but round 42,80 m has this rock the strong tiny-folding (the amplitude mm - cm only). The total colour of this rock is dark gray - little bit green. The average gradient of a foliation is 40° round.

42,90 - 43.20 — The very strong mineralisation of FeS only, but after FeS_2 only in micaschist as well as in 42,70 - 42,90 m, but mostly after in gray quartz (FeS_2).

43,20 - 45,60 — The biotitic and chloritic micaschist with some calcitic silicates, with a lot of grains, irregular schliers, pellets and irregular little veins of carbonates and with a lot of weak intercalations or weak lenticles of quartz. Garnet is very scarce only. Some mineralisation of FeS_2 mostly is very poor only. The combination of paralell schistose and phacoidal structure is very typical for this rock. The total colour of this rock is gray and very few green-gray too. The average gradient of a foliation is 40° - 45° round.

45,60 - 45,80 — The strongly chloritic greenschist with some biotite, allinotite, epidote atc. the others calcitic silicates, but not so much. The mineralisation of some sulphides is very scarce, only. The paralell schistose structure is clear. The total colour of this rock is green. The average gradient of foliation is 45° round.

45,80 - 46,20	The strongly chloritic greenschist, with some small micas of biotite (transversal too), wit not much the others calcitic silicates. Carbonates creat a lot of grains, irregular little veins, schliers, pellets or some lenticles, intercalations etc. The mineralisation of FeS_2 mostly is present, but very poor only.
46,20 - 46,70	The biotitic and chloritic micaschist as well as in 43,20 - 45,60 m. The average gradient of foliation is 45° round.
46,70 - 47,00	The biotitic micaschist with little sericite, with quartz mostly, with some grains or weak intercalations, schliers and pellets of carbonates. Garnet isn't present. Some mineralisation of sulphides is very scarce only. Amphibole or abtinolite creat very little acicular crystals, but scarcely only. Some, not much very little grains creat magnetite. The schistose structure is clear. The total colour of this rock is gray. The average gradient of the foliation is 50° - 55° round.
47,00 - 49,85	The biotitic micaschist as well as in 46,70 - 47,00 m, but with more paralell intercalations, positions or veins of white or white gray quartz and with strong impregnation of FeS_2 mostly, but FeS (creat some scales) is present lessly too. Between 48,50 - 48,70 m is present quartz or quartzite only, with FeS_2 impregnation too.
49,85 - 50,05	The strongly chloritic and calcarcous greenschist as well as in 45,80 - 46,20 m.
50,05 - 51,20	The sericitic micaschist with a lot of acicular crystals of abtinolite and hornblende, with a lot of grains of pink garnet with epidote and the others calcitic silicates and with chlorite, but few only. The mineralisation of some sulphides is scarce only. The schistosity isn't much clear. Carbonates creat some paralell weak intercalations or schliers, but not so much. The total colour of this rock is gray. The average gradient of a foliation is 50° round.
51,20 - 57,05	The strongly chloritic greenschist the same as in 45,80 - 46,20 m. In 52,90 m is position of carbonates 5 cm.
57,05 - 57,55	The sericitic micaschist the same as in 50,05 - 51,20 m. In 57,20 m round is some little bit strong impregnation of FeS_2 mostly (the thickness of field of this impregnation is 3-5 cm only). The average gradient of a foliation is 50° round.

57,55 - 57,80	The gray quartz or quartzite with little bit strong impregnation of FeS_2 mostly. In some places are present small grains of pink garnet. (57,60 m round).
57,80 - 60,20	The tender-grained or tiny-grained strongly calcareous amphibolitic greenstone with some rodlike or acicular crystals of hornblende and with some chlorite, epidote etc. and with a lot of mostly irregular intercalations veins, positions, pellets, schliers or lenticles etc. of carbonates. The same mineralisation of FeS_2 mostly is very poor or scarce only altogether, but between 57,80 and 58,05 m is little bit strong. The schistosity isn:t clear. The total colour of this rock is green. In 58,60 - 58,80 m and in 59,40 - 59,50 m are positions of carbonates with some inclocions of basement rock (follow foliation).
60,20 - 61,40	The sericitic micaschist the same as in 50,05 - 51,20 m. The average gradient of foliation is 40^{o}-45^{o} round.
61,40 - 61,70	The sericitic and biotitic micaschist with quartz mostly, with some small grains of pink garnet. The structure is schistose too, but more. The total colour of this rock is bright gray. The average gradient of foliation is 50^{o} round.
61,70 - 63,90	The white and gray-white quartz with some impregnation of FeS_2 mostly. This FeS_2 impregnation creat some intercalations or positions, which mostly follow a direction of foliation (1 cm maximally - thickness). Chlorite and some pellets, schliers etc. of carbonates are present too, but not so much.

The borehole no. 65 was finished in 63,90 m.

(M. Motys).

Borhull nr. 75, Hjerkinn.

(Petrografical description.)

0,00 - 2,03 The chloritic micaschist with sericite, biotite garnet, quartz, epidote, klinozoisite and feldspar too. The carbonates' intercalations, pellets, schliers lenticles etc. which follow schistosity (thickness 1-2 mm, but 0,5 cm or more too in average) are present a lot of in this micaschist. The mineralisation of FeS_2 is very weak only. The total colour of rock is gray-green, bright green-gray and on the beginning of this borehole bright brown-grey or yellow-gray because this part is slight stale. The average gradient of foliation is 30^0 round.

2,03 - 3,45 The position of white quartz with a very scarce some impregnation of FeS_2 and with some limonitic carpets on joint's places.

3,45 - 5,90 The chloritic micaschist as well as in 0,00 - 2,03 m, but with some rodlike or acicular crystales of amphibole (max. 1 mm) and with some small grains of Fe_3O_4 too. The structure of this rock is more phacoidal or phacoidal-schistose, with some folding which is been details rugose. The average gradient of foliation is 0^0 - 5^0 round on both direction (down or up).

5,90 - 6,17 The position of white quartz as well as in 2,03 - 3,45 m.

6,17 - 8,13 The chloritic micaschist as well as in 3,45 - 5,90 m, but with more grains of Fe_3O_4 (1 mm in average too). In some places this rock is stale, it is round some transversal (vertical) dislocations (angle of dip = 10^0,0^0,5^0), in 6,60 - 6,90 m and in 7,90 - 8,13 m. More limonite, epidote and sericite, klinozoisite etc. are present in these places. The mineralisation of FeS_2 etc. and of Fe_2O_4 is very very weak only but clear for a first lokk. The average gradient of foliation is in 6,20 m 35^0, but after 5^0,10^0 or 0^0 round on both side (up or down).

8,13 - 9,60 The white or blue quartz with a weak impregnation of FeS_2(grains 1-2 mm in average) with a lot of faults or joints which are filled by limonite, (angle of dip - 10^0,20^0,40^0 round). On the both boundarys of quartz) is impregnation little bit more strong (0,5-1 cm).

9,60 - 15,87 The chloritic micaschist with a lot of grains of garnet (on some places 0,5 cm in average) with more, but weak impregnation of FeS_2 and Fe_3O_4 (magnetites grains are 1-2 mm in average big too). For the other is this rock just the same as in 6,17 - 8,13 m. The structure of this rock is phacoidal and phacoidal schistose. This rock has recumbeut folding, which is detail rugose. The average fradient of foliation is 0^0,5^0,10^0 or 15^0 round on both direction (up or down).

15,87 - 18,98	The thick position of white quartz with very scarce only FeS_2, which is stale, or with some limonite filling in joints.
18,98 - 20,25	The chloritic mica schist as well as in 9,60 - 15,87 m with phacoidal or phacoidal-schistose structure or with pell-mell structure too. The average gradient of foliation is 10^0-35^0 round.
20,25 - 20,52	The white quartz as well as in 15,87 - 18,98 m.
20,52 - 20,62	The chloritic micaschist as well as in 18,98 - 20,25 m with pell-mell structure. Foliation isn't clear.
20,62 - 21,97	The white quartz as well as in 20,25 - 20,52 m.
21,97 - 22,33	The chloritic micaschist as well as in 18,98 - 20,25 m but with more clear schistose structure or phacoidal schistose structure. The average gradient of foliation is 60^0 round.
22,33 - 22,50	The white quartz as well as in 20,62 - 21,97 m.
22,50 - 22,65	The chloritic micaschist as well as in 21,97 - 22,33 m with folding in boundary with quartz and with some big grains of FeS_2 and big acummulation of biotite in some pellets there too. The average gradient of foliation is 5^0 or 0^0 round.
22,65 - 23,12	The white quartz as well as in 22,33 - 22,50 m. In 22,67 m is some pellets of biotite (0,5 cm in average) which is closed in.
23,12 - 23,44	The chloritic micaschist as well as in 21,97 - 22,33 m. The average gradient of foliation is 50^0-55^0 round.
23,44 - 23,89	The white quartz as well as in 22,33 - 22,50 m but with some littel fragments of chloritic micaschist and with some schliers or pellets of chlorite which are closed in.
23,89 - 24,08	The chloritic micaschist as well as in 18,98 - 20,25 m. The average gradient of foliation is 45^0 round.
24,08 - 24,32	The white quartz as well as in 23,44 - 23,89 m, with some fragments of micaschist or with schliers etc. of chlorite are closed in too.
24,32 - 28,50	The chloritic micaschist as well as in 9,60 - 15,87m with phacoidal schistose and phacoidal structure only, with more strong impregnation of FeS_2 in some positions or schliers with Fe_3O_4 grains or some few schliers and with much more biotite too. The average gradient of foliation is 10^0 or 5^0 in both directions (up or down). Some more strong mineralisation of FeS_2 is in 27,00 m round (1 cm. position).
28,50 - 34,40	The chloritic greenschist with a lot of biotite and with a lot of schliers, pellets or lenticles of carbonates, also some joints are filled by

carbonates. The mineralisation of FeS_2 is very weak but on some places more strong (31,10 m round, 33,80 - 34,10 m round carbonatic pellets, schliers etc.). The total colour of this rock is dark green or dark gray-green. The average gradient of foliation is 25° round.

34,40 - 34,92 The chloritic micaschist as well as in 24,32 - 28,50 m, but with more clear schistose structure. The average gradient of foliation is 20°-25° round.

34,92 - 38,60 The chloritic greenschist as well as in 28,50 - 34,40 m. The average gradient of foliation is 30° round.

38,60 - 50,35 The chloritic micaschist as well as in 34,40 - 34,92 m, but with much more biotite. The average gradient of foliation is 35° round. Ca. from 40,00 m chloritic greenschists intercalations are more present in micaschist. In some places the impregnation of FeS_2 or FeS is present in some schliers, pellets etc. but not thick(impregnation in average is very weak only). Some more strong impregnation of mostly FeS is in 42,85 m round, 43,40 m - 43,55 m round, 44,40 m round, 44,70 - 44,80 m round, 46,85 - 47,10 m round, 47,30 - 47,35 m, 47,50 - 47,55 m, 48,15 m round, 48,30 - 48,40 m, 48,90 m round, 49,30 - 49,40 m round and 49,75 m round. In this rock the impregnation of FeS and FeS_2 too is little bit more strong than in type of rock before.

50,35 - 54,40 The tender or tiny-grained amphibolitic greenstone with some a lot of positions, schliers, pellets etc. of carbonates, with a lot of small acicular crystales of amphibolite, with epidote, chlorite and klinozoisite too and with impregnation of Fe_3O_4 grains (0,2 - 0,5 mm in average), but in 52,70 - 54,20 m some grains of Fe_3O_4 are 1-2 mm in average. The mineralisation of FeS_2 or FeS is very weak only. In 52,60 m and 52,75 m round are some intercalations of carbonates 1-2 cm in average thickness. Some joint with millonitic filling is between 50,60 - 51,35 m. Angle of dip of this joint is 5°-10°-0° round. Some more strong impregnation of FeS_2 is in 53,00 m round (2 cm) in carotates intercalation. The total colour of this rock is green or little bit grey-green. The average gradient of foliation is 45°-50° round.

54,40 - 58,35 The biotitic micaschist and chloritic-biotitic greenschist with some more strong impregnation as well as in 38,60 - 50,35 m. Some positions with little bit more strong impregnation of FeS_2 and FeS too are in 55,30 m round (1 cm), 56,40 m round (4-6 mm), 56,50 - 56,70 m round, 56,90 m round (1 cm), 57,00 m round (2 cm), 57,15 - 57,40 m round, 57,50 m round (2 cm), 57,70 - 57,75 m round. The total colour of this rock is gray-green or green-grey. The average gradient of foliation is

58,35 - 59,30 The tiny-grained amphibolitic greenstone with a lot of carbonates, with schliers, pellets etc. of carbonates too, with epidote, klinozoisite and

chlorite too. The mineralization of FeS or FeS_2 is very, very weak only. Some impregnation of FeS_2 is in 58,35 - 58,45 m (grains of FeS_2 1-2 mm in average). The total colour of this rock is gray-green or green-gray. The average gradient of foliation is 45°-50° round.

59,30 - 59,65 The biotitic micaschist with chlorite and sericite, with some intercalations, schliers, pellets of carbonates. The schistose structure is very clear. The impregnation of FeS_2 or FeS is very very weak or not present, but in some positions with some greenschist's intercalations is little bit this impregnation of FeS_2 mostly more strong. The total colour of this rock is green-grey or grey. The average gradient of foliation is 45° round.

59,65 - 60,10 The very strong impregnated ore of FeS_2 mostly in quartz or quartzy micaschist.

60,10 - 61,30 The biotitic micaschist, just the same as in 59,30 - 59,65 m with some more strong impregnation of FeS_2 mostly in. The average gradient of foliation is

61,30 - 61,90 The very strong impregnated ore of FeS_2 mostly in quartz or quartzy micaschist, but between 61,70 - 61,90 m in homogenet FeS_2 ore body.

61,90 - 63,20 The biotitic micaschist but more biotitic greenschist which are exchange. This type of rock is the same as in 60,10 - 61,30 m with strong impregnation of FeS_2 mostly. Strong impregnated ore of FeS_2 is between 62,25 - 62,35 m, 62,55 m round (2 cm), 62,65 m round (2 cm), 62,80 - 62,95 m round. The total colour of this rock is green-gray or bright green-grey. The average gradient of foliation is 25° round. In 61,90 - 62,05 m is position of carbonates with some impregnation of FeS and FeS_2 and with 3 intercalations (1 cm thickness) of FeS2 mostly.

63,20 - 63,65 The carbonatic tender or tiny-grained greenstone as well as 58,35 - 59,30 m. The schistosity isn't clear.

63,65 - 65,15 The carbonatic greenstone and biotitic carbonatic greenschist which are exchange, with some intercalations, pellets, schliers etc. (0,5 m - 2 cm thickness in average) of carbonates. The impregnation of FeS and FeS_2 is very weak only. The total colour of this rock is gray-green or bright green-gray too. The average gradient of foliation is 30° round.

65,15 - 66,90 The carbonatic tender or tiny-grained greenstone as well as in 63,20 - 63,65 m. In 66,00 m round is some joint with limonitic filling and with angle of dip 10° round (the oblique joint).

66,90 - 84,50 The carbonatic greenstone with some intercalations of biotitic carbonatic greenschist or micaschist (1-2 cm thickness in average). The mineralisation of FeS_2 isn't present or is very weak only. The total colour of this rock is bright green-gray. The average gradient of foliation is 30°-35° round.

Some transversal or antithetic joints with limonitic or carbonate-limonitic filling are in 72,70 m (15°-20°), 75,50 m (10°), 75,80 m (15°), 76,10 m (10°), 76,55 m (15°).

84,50 - 100,90 — The biotitic greenschist with some not thick intercalations of greenstone and with a lot of positions, intercalations (1 cm thick in average max.), schliers, pellets etc. of carbonates. Biotites micas are present very much and creat often 1-5 mm thick positions or intercalations. Some micas of biotite is transversal too. The mineralisation of FeS is very weak, but in some places are present some FeS grains mostly only FeS_2 are very scarce. Some grains of Fe_3O_4 are present too, but only between 94,00 - 96,00 m (1 mm in average but much more smaller). This impregnation of Fe_3O_4 is very clear in 95,00 m - 95,40 m round. This biotitic greenschist has very clear schistose structure. The total colour of this rock is green-gray. The average gradient of foliation is 30°-35° round.

100,90 - 104,00 — The carbonatic greenstone with some intercalations of carbonatic-strongly biotitic greenschist as well as in 66,90 - 84,50 m. The impregnation of FeS mostly, but FeS_2 too in very weak, but in 101,15 - 101,25 m is position of very strong impregnation of FeS_2 mostly. The total colour of this rock is bright green-grey or green-grey. The average gradient of foliation is 40°-45° round.

104,00 - 104,30 — Carbonatic greenstone breccic in some dislocation zone with general average angle of dip 0°-5°.

104,30 - 105,80 — Biotitic and chloritic greenschist with a lot of intercalations, schliers, pellets etc. of carbonates, with very, very weak mineralization of FeS mostly but FeS_2 too. This type of rock is the same as in 84,50 - 100,90 m. The average gradient of foliation is 40° round.

105,80 - 106,75 — The dislocation millonitic, carbonatic greenstone or greenschist breccic with some parallel joints with angle of dip 5°-10° round, without some mineralisation.

106,75 - 111,90 — The biotitic, chloritic and strong carbonatic micaschist or gneissic micaschist with some intercalations of greenschist or greenstone (1-2 cm thickness) on some places. The carbonates creat some a lot of intercalations, pellets, schliers or lenticles (1-3 mm thickness max.). In this rock feldspar, quartz and a lot of sericite present too. The total structure of this rock is schistose or little bit phacoidal-schistose too. The total colour of this rock is gray or little bit dark gray too. The mineralisation or impregnation of FeS or FeS_2 too is very, very weak only. The average gradient of foliation is 35°-40° round.

111,90 - 112,90 Carbonatic greenstone with biotite and with some intercalations of biotitic-carbonatic greenschist as well as in 100,90 - 104,00. The mineralisation of FeS and FeS_2 is very, very weak only. The average gradient of foliation is 45° round.

112,90 - 113,60 The biotitic, sericitic and chlorite and very strong carbonatic micaschist or gneissicmicaschist as well as in 106,75 - 111,90 m. The mineralisation of FeS or FeS_2 is very, very weak only. The average gradient of foliation is 45° round.

113,60 - 126,65 The biotitic and very strong carbonatic greenstone with some intercalations of strong biotitic greenschist as well as 66,90 - 84,50 m. The mineralisation of FeS or FeS_2 is very, very weak only. The average gradient of foliation is 55°-60° round.

126,65 - 129,65 The biotitic, sericitic and chloritic and very strong carbonatic micaschist or gneissic schist with some weak intercalations of greenschist as well as 106,75 - 111,90 m. The mineralisation of FeS or FeS_2 is very, very weak only or isn't present. The average gradient of foliation is 40°-45° round.

129,65 - 135,10 The carbonatic tender or tiny-grained amphibolitic greenstone with a lot of intercalations, schliers, pellets etc. of carbonates (1-2 mm but 1 cm too in average thickness). On some places the some impregnation of FeS_2 mostly is in these carbonates intercalations in 133,50 m, 134,50 m, 134,65 m in example. The impregnation of Fe_3O_4 grains. (1 more mm in average.) is present from 133,60 m round. Before the Fe_3O_4 grains are present too, but more small and more scarce. The total colour of this rock is green or gray-green. The average gradient of foliation is 40°-45° round.

This borehole of no. 75 was finished at 135,10 m.

Borhull nr. 57. HJERKINN.

Petrographical description.

0.00 - 1.00 The biotitic gneissic micaschist with feldspar (plagioklase) and quartz. Chlorite is present very scarce. The mineralisation isn't present in. The total colour of this rock is dark-gray or black-gray. The average gradient of foliation is 40^{o} about.

1.00 - 32.60 The chloritic and biotitic micaschist with little porphyroblasts of quartz and plagioklase but with a lot of parallel positions, schliers, pellets and lenticulars, which follow schistosity of micaschist. The biotite's mica (1 mm in average) follow schistosity more, but to be transversal some where too. The total colour of rock is green-gray or bright green-gray. The average gradient of foliation is 30^{o}-35^{o} round. In 4,50 m is some joint (dipping this on against the foliation) with angle og dip 45^{o} round and with carbonatic and limonitic filling. With the same filling some joints are in 7,25 m and 7.55 m antithetic too with angle of dip 45^{o} and 50^{o} round. The other antithetic faults are in 5,90 m (35^{o} round) and 29.90 m (35^{o}-40^{o} round). From 23,50 m some mineralisation FeS and little bit FeS_2 begins and also some green schists or greenstones positions (1-2 mm thickness in average max.) with little bit more strong mineralisation round or in (in example in 25,65 m round.)

32.60 - 36.10 The biotitic gneissicmicaschist with plagioklase and quartz, just the same rock as in 0,00 - 1,00 m. but with a lot of positions, schliers, pellets, lenticulars or grains which is creat carbonates and which are parallel with schistosity or follow this one. The total colour of this rock is dark gray. The average gradient of foliation is 45^{o} round. In 32.60 m. 32.70 m and 32 90 m and in 33,60 m. 34 40 m. 34.90 m and 35.85 m are some antithetic and transversal joints or faults, which have carbonatic and limonitic filling and the angle of dip 30^{o},30^{o},50^{o}, 45^{o}. 35^{o},40^{o},70^{o},30^{o} round gradually. The mineralisation is not present or is very, very poor.

36.10 - 37.36 The strong mineralisation (impregnation of FeS, FeS_2 and $CuFeS_2$ too in biotitic, quartz-feldspatic paragneiss. On the same place is this mineralisation homogen. - the same as in mineralisated ore. Some much transversal or antithetic joints with limonitic filling are in this ore position. The total colour of ore is dark yellom gray.

37.36 - 39.85 The biotitic and chloritic gneissic micaschist with a lot of positions, schliers etc. of carbonates, just the same rock as in 32.60 - 36.10 m, but with some little bit more chlorite some where only too. In 37,70 m. 37,90 m, 37.20 - 37,40 m and 37.95 m and 37,98 m are some transversal or antithetic joints or faults with caronatic and limonitic filling, whicl

have the angle of dip 30°,40°,20°,30°,55°,20° and 35°. Especially the fault in 37,90 m with angle of dip 40° round has mylonitic dislocation brecciation filling with strong FeS_2 mineralisation (the average thickness of this filling is 1-2 cm). The average gradient of foliation of this rock is 50°-55° round. Without some mineralisation.

39,85 - 46,05 The chloritic and biotitic micaschist as the same as in 1,00 - 32,60 m. very rich of carbonates too with some positions of greenschist or greenstone with klinozoisite, epidote and little bit tiny-grained amphibolite too. The mineralisation is very weak or isn't present. The total colour of this rock is gray-grenn, green or dark gray-green. The average gradient of foliation is 55° round. The some joints or faults which have carbonatic and limonitic filling are antithetic or transversal and are presen in 41,90 m (25°), 42,00 m (35°), 44,20 m (50°) and 44,50 m (40°).

46,05 - 49,60 The biotitic gneissic micaschist with a lot of carbonatic positions, schliers, pellets or lenticulars and without some mineralisation or with very weak this one. This rock is just the same as in 32,60 - 36,10 m. The average gradient of foliation is 50° round. Some transversal or antithetic joints or faults with carbonatic and limonitic filling are in 46,40 - 46,50 m, 46,70 m, 48,30 m and 48,50 m with average angle of dip 30°-40° round.

49,60 - 58,25 The biotitic gneissic micaschist with plagioklase and quartzite and more weak carbonatic, without carbonates somewhere. This type os rock is very relation with type in 0,00 - 1,00 m. The mineralisation isn't present or is very poor. The total colour of this rock is gray or dark gray. The average gradient of foliation is 45°-50° about. The some transversal and antithetic joints or faults are in 51,20 m (10°), 54,00 m (55°), 54,25 m (50°) and 54,60 m (35°). These every have carbonatic and limonitic filling: With $Fe2O_4$ grains.

58,25 - 61,37 The same biotitic gneissic micaschist as in 49,60 m - 58,25 m, but with more, not thick carbonatic positions, schliers, pellets etc. with a lot of garnet and with some mineralisation (impregnation) of FeS_2 but poor and weak. The pyritic grains have on some places crystales plates (grain is 3-5 mm large in average). The average gradient of foliation is 50°-55° round. A lot of magnetite are present too On some places the not thick parallel positions are very relation of greenschist or greenstone with chlorite, klinozoisite, epidote and little tiny amphibolite and with FeS mineralisation only (58,70 - 59,10 m round).

61,37 - 61,90 The same type of rock with a lot of garnet as in 58,25 - 61,37 m but without mineralisation or with very weak. The average gradient of foliation is 50° round.

61,90 - 68,40 The chloritic greenschist with a lot of parallel positions, schliers, pellets or clongatic grains of carbonates (also magnetite is present). The epidotite and klinozoisite are present little bit too. The mineralisation og FeS_2 isn't present. The total colour of rock is green or gray-green. The average gradient of foliation is 50^{o} round. In 64,50 - 64,90 m round the green-schist present to carbonatic, tiny-grained amphibole-chloritic greenstone with klinozoisite and epidote.

68,40 - 77,50 The biotitic micaschist with magnetite and with a little bit garnet somewhere and with chlorite. On the same place are some intercalation, schliers or pellets schloritic-amphibolitiv greenschist and little bit greenstone too. The same mineralisation of FeS_2 most and some garnet are present round or in these positions. This mineralisation is strongly in 71,34 - 71,42 m, where quartz is present too in 71,40 and 72,00 m. Some joints or faults are present in 69,40 m (10^{o}), 69,80 m (35^{o}), 74,20 m (45^{o}), 74,40 m and 75,60 m (50^{o}). These joints or fault are antithetic or transversal with carbonatic and limonitic filling. The total colour of this rock is gray or dark-gray. The average gradient of schistosity is 45^{o}.

77,50 - 78,41 The chloritic greenschist or greenstone on some place, with a lot of garnet some little bit biotite and with klinozoisite and epidote. Some a lot of schliers, pellets etc. of carbonate or carbonate-dolomite, are present too. The mineralisation of FeS_2 most is very very weak. The total colour of this rock is green-gray, dark gray-green and gray-green. The average gradient of foliation is

78,41 - 79,61 The position of the quartz with a not much strong mineralisation of FeS_2 mostly. Chlorite is little bit present too.

79,61 - 80,05 The biotitic micaschist with magnetite and with chlorite and garnet and quartz. This rock has some schliers or intercalations of carbonates or carbonate-dolomite. The mineralisation isn't present or is very weak only. The total colour of this rock is bright green-gray or gray. The average gradient of foliation is 55^{o} round.

80,05 - 80,85 The blue or gray quartz with a weak impregnation of FeS_2 only with some chlorite, somewhere. The quartz has a lot of transversal (dislocations) joints, which are filled by limonite, quartz and some carbonates. The angle of dip of these joints in average is 5^{o}-10^{o} round. Some system of joints is in 80,30 - 80,45 m.

80,85 - 88,35 The biotitic micaschist with magnetite and with chlorite and with quartz and with carbonatic schliers positions, pellets etc. Type of this rock as well as in 68,40 - 77,50 m. The mineralisation of FeS_2 is very very weak only. The average gradient of foliation is 60^{o} round.

88.35 - 91.75 The chloritic micaschist with some little bit magnetite, with garnet, quartz, klinozoisite or epidote on some place only. This rock has a lot of some intercalations, schliers, pellets etc. of carbonates. The mineralisation is only very very weak or not present in. The total colour of rock is green-gray. The average gradient of foliation is 60° round.

This hole was finished in 91,75 m.

(M. Motys).

Borhull nr. 58, HJERKINN.

Petrografical description.

0,00 - 1,60 The biotitic-chloritic greenschist with klinozoisite and little bit epidote too. Biotite creat some big micas, transversal somewhere too. There a lot of intercalations, schliers, pellets, or lenticles are created by carbonates. This rock has phacoidal - schistoso structure. The total colour of this rock is green-gray or dark green-gray. The average gradient of schistosity is 70° round. This rock is without mineralisation or has very weak somewhere only.

1,60 - 20,40 The chloritic greenschist with not much biotite's micas (max. 1 mm in average), with klinozoisite and epidote and with a lot of intercalations, schliers, pellets and lenticles, which are created by carbonates (average thickness of them is 0,5 mm to max. 1-2 cm). The mineralisation of FeS_2 mostly is very, very weak, without importance. From 18,00 m biotites micas are very scarce. The total colour of this rock is gray-green. The average gradient of foliation is 65° round. The some transversal fault is in 19,20 - 19,50 m, with quartz, carbonatic or limonitic filling. In 19,50 - 19,95 m is position of white quartz with chlorite, epidote, klinozoisite and with some lumps of greenschist in. It is dislocation breccic perhaps. The angle of dip of joint in 19,20 - 19,50 m is 5°-10° round. In 20,20 m is position of white quartz with chlorite and carbonates in as well as in 19,50 - 19,95 m.

20,40 - 39,15 The tiny-grained or tender-grained amphibolitic and chloritic greenstone with some a lot of not thick positions, intercalations (1-2 mm in average), schliers, pellets etc. (max. thickness 5-10 mm in average) of carbonates. Amphibole is created by small acicular crystals (in 20,50 - 20,60 m etc.), biotitesmicas are very scarce, klinozoisite and epidote are present. The mineralisation (impregnation) of FeS_2 mostly is present on some places in not thick positions (1-1,5 cm), without some importance, in 23,25 m, 23,70m, 23,90 m, 24,30 m, 24,40 m too. Some joints or faults, which are transversal or amphibolitic, are in 22,55 m (10° with limonite and pyrite filling), 23,30 - 23,40 m (75° and 60° with limonitic filling) in 25,10 - 25,75 m is a joint or fault zone (10°-70° with limonitic filling) 28,50 - 28,70 m is joint or fault zone (30° with limonitic and carbonatic filling) and in 29,10 m (10° with carbonatic and limonitic filling. The total colour of this rock is green, gray-green or dark gray-green. The average gradient of foliation is 55° round. The other joints or faults are in 30,00 - 30,35 m (5° round, with carbonatic and limonitic filling), 35,00 m (20°), 35,80 m (15°), 37,00 m (30°) and 38,70 m (25°). Every joints or fault have limonitic

rock somewhere (not thick - 2-5 mm max.) After 56,00 m some more and more grains of Fe_3O_4 are showen in rock (1 mm - 2 mm maximally). The mineralisation of FeS, FeS_2 etc. is not present or is very, very weak only. The total colour of this rock are gray, dark gray and green dark gray. The entire average gradient of foliation is 55° - 60° round.

60,55 - 61,05 The position of blue quartz with some intercalations schliers, or positions of magnetite (Fe_3O_4) and of garnet which exchange between them. (Average thickness of these positions of Fe_3O_4 is 0,5 - 1 cm) These magnetite's positions not follow only foliation.

61,05 - 61,30 The chloritic and sericitic micaschist with very clear schistose structure, with quartz, feldspar and with very little magnetite grains. The total colour of this rock is bright green gray. The average gradient of foliation is 55° round. In 61,25 - 61,30 m is a white quartz.

61,30 - 64,30 The chloritic and chloritic-sericitic micaschist with quartz, epidote, klinozoisite, garnet (creat weak positions or schliers), with some schliers or pellets of carbonate and with a lot of big grains (1 mm, max. 2 mm in average) of Fe_3O_4. Feldspar perhaps present too. The total colour of this rock is gray, dark gray or dark green gray. The mineralisation of FeS_2, FeS etc. isn't present or is very, very weak only. The structure of this rock is phacoidal-schistose. The average gradient of foliation is 65° round.

64,30 - 66,20 The chloritic micaschist with quartz, feldspar, carbonates some amphibole, epidote, klinozoisite and garnet and with very tender-grained impregnation of Fe_3O_4. Mineralisation of FeS, FeS_2 is not present or is very weak only. The structure of this rock is phacoidal - pell-mell. The total colour of rock is dark gray. In 64,80 - 65,10 m is some dislocation zone with some angle's of dip 5°,10°, 20°,30°.

66,20 - 67,75 Amphibolitic and chloritic micaschist with biotite, a lot of garnet (creat some schliers by grains), with quartz feldspar and some intercalations, schliers or pellets of carbonates. In this rock is some impregnation of FeS_2 and some positions and schliers of Fe_3O_4 (1-3 mm thickness). The total colour of this rock is dark green gray. The average gradient of foliation is 55° round. The structure is phacoidal-schistose.

67,75 - 73,00 The chloritic and chloritic-sericitic micaschist with quartz, epidote, klinozoisite, little amphibole, biotite and with a lot of garnet (creat some intercalations or schliers too.) Carbonates creat some schliers, pellets or intercalations too, but not much and with very weak thickness. In this type of micaschist are a lot of some intercalations

schliers or positions of Fe_3O_4. In 68,10 - 70,00 m are these exactly. Magnetite's positions are 2-5 mm thickness in average. (in 68,20 m round is som thick komplex, little bit homogenetic of Fe_3O_4 positions). The mineralisation of FeS_2 is very, very poor (weak) only. The total colour of this rock is gray or bright gray and dark gray too. The average gradient of foliation is 50° round.

73,00 - 73,57 The white quartz (may be hydrothermal dislocation breccic) with some positions of Fe_3O_4 and amphibolite, chlorite, feldspar, garnet and FeS_2. The positions or schliers of Fe_3O_4 have thickness 2-5 m or 1 cm and more. The garnet creat grains 1 mm and max. 2 mm in average.

73,57 - 73,76 The homogenitic impregnated ore of FeS_2 mostly.

73,76 - 77,34 The chloritic or chloritic-sericitic micaschist just the same as well as in 67,75 - 73,00 m, but without impregnation of FeS_2, FeS and Fe_3O_4 too. On the finish of this rocks position is beginning some mineralisation of FeS_2 and little bit Fe_3O_4 too from 77,10 m (this type just the same as well as in 66,20 - 67,75 m). The average gradient of foliation is 45° round.

77,34 - 80,10 The white or blue quartz with a lot of schliers or parallel positions too of Fe_3O_4, which are changed by garnets positions or schliers or by chloritic-amphibolitic greenschist with garnet, epidote, biotite etc. and with some mineralisation of FeS_2. Teh average thickness of Fe_3O_4 positions is 1 mm, but 1-2 cm too. Garnet creat some big crystals 2-5 cm in average) in some parallel more thick positions of Fe_3O_4. Average gradient of foliation is 55° round.

80,10 - 81,73 The chloritic micaschist with biotite and sericite, with garnet, quartz and some schliers or intercalations of carbonates. The biotite creat some big micas (1 mm, but more in average). The schistose structure is very clear. The total colour of this rock is gray or green gray. The average gradient of foliation is 55° round. In 80,55 - 80,80 m is position with more big micas of biotite (transversal too), with a lot of grains of garnet, with more chlorite, some epidote, klinozoisite amphibolite and with some not thick schliers of Fe_3O_4.

81,73 - 83,60 The position of blue quartz or quartzite with a lot of parallel positions (1-3 mm but 1-3 cm too in average thickness) of Fe_3O_4, with some not thick positions greenschist or greenstone with epidote amphibolite, chlorite, garnet and with more strong mineralisation of FeS_2 (1 cm average thickness of greenschist etc.)

83,60 - 83,85 The chloritic and biotitic greenschist with a lot of grains of garnet. The mineralisation of FeS_2 is very weak only or isn't present. The total colour of this rock is green or gray-green. The average gradient of foliation is 70° round.

83,85 - 84,02 The same quartz with Fe_3O_4 positions as well as in 81,73 - 83,60 m.

84,02 - 86,72 The chloritic greenschist with biotite, epidote, klinozoisite, feldspar and with some carbonates schliers or weak intercalations. The mineralisation of FeS_2 follow schistosity and it is very weak only. In this rock is a lot of big grains (1-2 mm in average of Fe_3O_4). The little bit more strong mineralisation of FeS_2 is begun in 85,40 m and exactly FeS_2 creat some not thick homogenithick positions in 85,95 m (2 cm), in 86,05 m 81,5 cm) and in 86,60 m (1 cm). The total colour of this rock is green or gray-green.

86,72 - 87,95 The white or blur quartz or quartzite with a lot of positions or schliers of Fe_3O_4 (thickness 1-2 cm) with impregnation of Fe_3O_4 grains and on some place with impregnation of FeS_2 (very weak). In 87,08 - 87,22 m is homogenitic impregnated ore of FeS_2. In 87,42 m is parallel position of impregnation of FeS_2(1 cm thickness).

87,95 - 90,00 The chloritic and sericitic micaschist with quartz feldspar and some carbonates' schliers too and with a lot of very small grains of Fe_3O_4 (0,5 mm in average). Biotite micas are present too. The total colour of this rock is gray. The average gradient of schistosity (foliation) is 65°-70° round.

This borehole was finished in 90,00 mm.

(M. Motys).

FOLLDAL VERK A/S

DIAMOND DRILL HOLE 65

Kvitdal, øst for Hjerkinnseter
Date og drilling: 21.10.65
Location: 10.000 Ø/1.480 N
Azimuth: grid north
Inclination: 50°
Total length: 67,50 m

Description:

4,00	overburden

MMS-formation until 22,90 m

0,00 - 10,70	high calcareous amphibole bear. biotite-chlorite schist/gneiss (metamor. carbonate banded calcareous pelite) grgn, distinct cm-banding but sometimes with schlieren structure, bands and schlieren of pure marble in rhythmic alternation with schistose bands composed of fine crystalline chlorite and biotite which sporadically carry acicular crystals at amphibole. 4,00 - 6,50: core missing Compositional banding: 40°.
10,70 - 16,75	high calcareous biotite - chlorite schist (metamor. calcareous pelite) Browngn, distinct lamination often passing into lenticular structure, thin bands or schlieren of fine crystalline phyllosilicates in close alternation with laminae or lenses of pure marble or phyllosilicate bear. marble. 11.70 - 13,50: core missing Folitaion and compositional banding: 40 - 45°. Sharp contact.
16,75 - 18,75	high calcareous biotite bear. chlorite schist (metamor. carbonate banded calcareous pelite) gr with faint yellowish tint and abundant gn schlieren and bands, distinctly layered but locally with schlieren structure bands and lenses of pure marble in alternation with stringers or bands of fine crystalline chlorite with subordinate biotite which cary in places acicular crystals of amphibiole. Compositional banding: 40 - 45°.
18,75 - 20,20	calcareous garnet bear. biotite-amphibole-chlorite-qtz gneiss (metamor. mafic volcanogenic sediment mixed with chemical precipitates, supp. mafic tuff) browngn, distinct compositional banding which transgoes into a crudely developed lamination, porphyroblastic texture, interlocked qtz crystals as lenses and tiny bands in nonrhythmic alternation with schlieren and trains of flakes of biotite and layers composed of fine crystalline

chlorite and porphyroblasts of amphibole,, garnet occurs as tiny round globular spots which are widely scattered. Low-grade py dissemination throughout.
Compositional banding: 44°
Sharp contact.

20,20 - 22,90 high calcareous amphobole - biotite - chlorite schist
(metamor. calcareous pelite)
similar: 10,70 - 16,75 m.
Compositional banding: 45 - 50°.

FMB-sequence until end of DDH.

22,90 - 23,60 mt-bear. quartzite
(metamor. chemical precipitate)
gr, distinct compositional banding but locally with schlieren structure, cm-to dm-thick bands of dense quartzite which show trains of granules and schlieren of both magnetite and pyrite alternate with cm-thick layers composed of biotite or sericite and chlorite which contain porphyroblasts of amphibole.
Compositional banding: 45°
Sharp contact.

23,60 - 25,00 calcareous biotite - amphibole - chlorite shict/gneiss
(metamor. mafic volcanogenic sediment)
grgn, distinctly banded sections passing into intervals with schlieren structure being similar that of 20.20 - 22,90 m rock. Porphyroblastic texture, fine crystalline chlorite with scattered randomly oriented porphyroblasts of amphibole as cm.thick bands in alternation with bands or schlieren composed of biotite and chlorite and layers or lenses of pure marble. At several locations spotted round globular crystals of carbonate. Interlayers of quartzite (meta-chert) with sparse crystals of pyrite between: 23,90 - 23,92 m and 24,22 - 24,30 m. Low-grade dissemination of pyrite between: 24,30 - 24,45 m. Medium-grade concentration of pyrite within quartzite (meta-chert) of 2 cm thickness located at the border towards following rock.
Compositional banding: 45 - 50°.

25,00 - 25,55 core missing

25,55 - 27,60 schistose amphibolite
(meta-basalt flow)
gn, fine crystalline, homogeneous, nematoblastic texture pyrite forming trains of granules within a quartz matrix occurs at several locations.
Schistosity: 45°.
Sharp contact.

27,60 - 29,00 slightly calcareous garnet bear. biotite-qtz-fspar schist
(meta-tuff or matamor. silicate facies BIF)
grbrown, lamination which often passes into a lenticular or schlieren structure, strongly parallel aligned flakes of biotite concentrated within mm-thick bands and schlieren alternate with lenses or bands of qtz and fspar (?) which contain subordinate biotite, reddish brown garnet forms tiny round globular crystals being widely scattered.
Schistosity: 46°.

29,00 - 29,90	core missing
29,90 - 36,50	schistose amphibolite (meta-basalt flow) gn, fine crystalline, homogeneous but locally crudely laminated by carbonate which forms tiny schlieren and bands. Several max. 10 cm thick interlayers with medium-grade pyrite mineralization. 33,20 - 33,65: core missing Schistosity: 45°
36,50 - 39,30	garnet-magnetite-chlorite bear. biotite - quartz schist (metamor. silicate facies BIF deluted with epiclastic sedimentary material) brownishgr, distinct schlieren structure, interlocked qtzgrains as lenses and bands in close alternation with schlieren and laminae composed of biotite but locally of biotite and chlorite, sparse round globular spots - minor 0,1 cm in diameter - of garnet which are widely scattered, magnetite crystals of about the same size like garnet are widely scattered and in homogeneously distributed. Sparse occurence of pyrite which is concentrated within areas enriched in chlorite. Schistosity: 45°.
39,30 - 41,00	core missing
41,00 - 41,80	garnet - biotite - sericite schist (meta-pelite) brownishgr with slight greenish tint, distinctly banded, in places schlieren structure, slightly porphyritic crystals of biotite and round globular spots of garnet (minor 0,1 cm in diameter) set in a matrix of fine fibrous sericite, several interlayers or schlieren of extremely fine crystalline qtz. Schistosity: 50°. Sharp contact.
41,80 - 42,10	garnet - chlorite - qtz rock (metamor. mafic volcanogenic sediment) gngr, distinct schlieren structure, bands, lenses and schlieren of fine - fibrous chlorite and scattered porphyroblast of garnet, alternate with bands and lenses composed of qtz.
42,10 - 43,00	core missing.
43,00 - 45,80 Chemical analysis	biotite - chlorite - sericite schist (meta-pelite with several interlayers exhalative sulphide Similar: 41,00 - 41,80 m but without compositional banding. Locally high amounts of fspar which point to felsic volcanic activity while the deposition of pelitic material. Several bands of medium-grade pyrite mineralization occuring within a qtz matrix. Schistosity: 50°
45,80 - 46,50	calcareous biotite bear. chlorite schist (metamor. highly altered mafic volcanite) fibrous chlorite and slightly porphyritic biotite are interlayered

AA chloritization biotitization	by schlieren and tiny bands of qtz which often is accompanied by dusty carbonate, carbonate also forms 0,15 cm large porphyroblasts which are inhomogeneously distributed. Schistosity: 65° Gradational boundary.
46,50 - 49,00	amphibole bear. qtz-rich garnet-biotite-sericite schist (weakly altered meta-pelite)
chemical analysis	browngn sometimes brown, crude development of textural and composotional banding, slightly porphyritic biotite crystals set in a fine crystalline matrix composed of sericite, interlayers and lenses made by qtz and qtz plus phyllosilicates. Tiny round globular crystals of garnet which are equally distributed. At several locations dissemination of mt-crystals. Several interlayers with medium-grade pyrite mineralization. Schistosity: 65 - 70°
49,00 - 49,15	sulphide-rich quartzite (metamor. chemical precipitate)
chemical analysis	gr with abundant gn schlieren and bands of metallic lustre, extremely fine crystalline quartzite interfingered and interlayered by nearly massie pyrite which often is accompanied by acicular crystals of amphibole. Sharp contact.
49,15 - 50,20	qtz-fspar rich amphibole-chlorite schist (metamor. mafic volcanogenic sediment) (close to banded amphibole)
	gn, porphyroblastic texture, crude development of compositional banding, mm- og cm-thick layers made by fine crystalline chlorite and scattered porphyroblasts of amphibole alternate with lenses and sometimes bands composed of qtz and fspar. Gradational contact.
50,20 - 51,85	garnet bear. sericite - biotite rich quartz gneiss/schist (metamor. semi-pelite slightly deluted by chemical precipitates)
chemical analysis	browngr, distinct lamination or compositional banding which locally transgo into schlieren structure, interlocked qtz crystals as lenses and laminae in close alternation with mm-thick layers and schlieren of biotite, tiny round globular spots of garnet which are widely scattered. Low - to medium grade pyrite mineralization at: 51,50 - 51,55 m and 51,68 - 51,78 m. Lamination: 50° Sharp contact.
51,85 - 60,18	high calcareous biotite bear. chlorite schist (metamor. altered mafic volcanite)
AA chloritization biotitization chemical analysis	gn, schlieren structure but locally with compositional banding, fine crystalline chlorite and slightly porphyritic biotite as layers and schlieren in alternation with lenses and sometimes band composed of qtz and/or catbonate, carbonate occurs also as spotted idioblast at several locations. In places acicular crystals of amphibole which are randomly oriented. Widely scattered pyrite within 54,68 - 54,80 m and 57,85 - 57,93 m. medium-grade pyrite mineralization within a 1,5 cm thick interlayer at 55,00 m and between 55,27 - 55,59 m. Sharp contact.

60,18 - 60,50	garnet bear. biotite-sericite schist (meta-pelite)
chemical analysis	brownishgr with faint greenishtint, schlieren structure, bundles of biotite set in a matrix composed of fine crystalline sericite, widely scattered tiny round globular spots of garnet. Medium-grade sulphide mineralization at two locations: 60,26 - 60,29 m po, 60,45 - 60,50 m py. Schistosity: 52° Sharp contact.
60,50 - 63,46	mt-bear quartzite (metamor. chemical precipitate with several dm-thick interlayers of weakly altered volcano-sedimentary deposits)
chemical analysis	gr with faint bluish tint, extremely fine crystalline qtz crudely banded by trains of granules of magnetite and sulphides and interfingered by pyrite and po alternates with dm-thick sections of garnet-amphibole-chlorite-biotite-sericite schist which in places is rich in carbonate. Several cm-thick bands of medium-grade py mineralization. Banding: 50°
63,40 - 63,50	biotite-sericite-chlorite schist (meta-pelite)
chemical analysis	grgn, schlieren structure, bundles and schlieren of bitotite set in in a fine crystalline matrix of chlorite. Low concentration of carbonate which occurs as widely scattered round globular spots.

63,50 end of DDH 65.

Frank D. Priesemann
November 1987

DDH 65

Suszeptibility

Results in 10^{-3} cgs

10,00	0,1	38,90	0,2
11,00	0,2	39,10	4,2
13,50	0,2	39,80	3,2
14,00	0,3	41,10	0,4
15,00	0,2	41,50	1,3
16,00	0,2	41,90	0,3
17,00	0,2	43,00	0,4
18,00	0,1	43,50	0,3
19,00	0,2	43,80	0,3
19,50	0,1	44,00	0,2
19,90	0,4	44,50	0,1
20,10	0,3	44,80	0,1
20,50	0,3	45,00	0,1
21,00	0,0	45,50	0,2
21,50	0,2	46,00	0,2
22,00	0,4	46,50	0,2
22,50	0,2	47,50	0,4
23,00	2,3	47,90	0,5
23,30	12,8	48,10	0,5
23,50	6,8	48,50	0,4
23,70	0,7	48,80	0,3
23,90	1,6	49,10	0,6
24,10	0,4	49,30	0,3
24,35	0,4	49,80	0,4
24,45	0,3	50,10	0,2
24,90	0,3	50,50	0,1
25,60	0,1	50,85	0,0
26,00	0,2	51,10	0,0
27,00	0,3	51,50	0,3
27,50	0,3	51,90	0,0
27,90	0,6	52,10	0,0
28,30	4,7	53,00	0,0
28,50	2,1	54,00	0,0
28,85	3,0	55,00	0,0
30,00	0,0	55,30	0,1
31,00	0,0	55,50	0,3
32,00	0,0	55,80	0,0
33,00	0,0	56,00	0,0
34,00	0,0	57,00	0,0
35,00	0,0	58,00	0,0
36,00	0,0	59,00	0,0
36,50	0,2	60,00	0,0
36,80	0,1	60,20	0,4
37,10	0,2	60,50	0,2
37,50	3,2	60,65	1,3
37,80	1,7	60,85	11,0
38,05	0,9	61,20	0,5
38,60	1,0	61,50	0,1

61,80	1,2
62,10	0,6
62,50	0,4
62,80	1,2
63,10	2,2
63,35	5,2
63,45	0,2

DDH 65

CHEMICAL ANALYSIS OF MINERALIZED SECTIONS

METER	% Cu	% Zn	% S
34,98-		0,07	18,9
36,40-		0,02	26,3
43,00-43,16		0,03	25,8
47,48-47,55		0,04	4,81
47,94-48,00		0,02	20,8
48,06-48,27		0,03	13,9
49,00-49,31		0,02	14,5
51,68-51,74		0,02	15,3
54,67-54,80		0,02	09,0
57,86-57,90		0,01	14,5
60,23-60,30		0,03	10,3
60,43-60,56		0,03	10,3
60,56-60,72		0,03	2,76
60,86-61,01		0,02	
61,13-61,35		0,03	10,8
61,54-62,00		0,03	6,89
62,00-62,23		0,03	3,53
62,23-62,51		0,01	7,73
62,65-63,13		0,02	09,8
63,17-63,32		0,02	19,1

DIAMOND DRILL HOLE 62

Location:	South Rollstadseter
Grid koordinates:	4150 V, 2650 N
Date of drilling:	23.09 - 26.09.65
Azimuth:	Grid north
Inclination:	50°
Total length:	66,00 m

Description:

11,00 m	overburden
Blåhøi-group	
11,00 - 18,40	calcareous amphibole schist (meta-basalt flow) (similar amphibolites from DDH 66, 46 and 47) gn with abundant grwhite stripes, mostly fine crystalline and with nematoblastic taxture, locally medium crystalline and with crudely developed leopard texture (mottled) frequent schlieren and bands (max. 1 cm thick) of carbonate being parallell to the major foliation of the rock. Banding schistosity: 11,00 m 67°, 12,50 m 69°, 14,30 m 69°, 15,50 m 67°, 16,50m 69°, 17,50 m 65°, 18,20 m 66°, 18,40 m 66° (contact). Sharp contact.
18,40 - 40,50	phyllisilicate bear. quartzite (metamor. qtz-arenite) gr, schlieren structure but also continuous or discontinous laminated fine crystalline qtz crystals as lenses and bands in rhythmic alternation with schlieren and fine layers made bye sericite and biotite. 27,00 - 29,30: core missing. Lamination: 18,50 m 64°, 19,50 m 63°, 20,50 m 59°, 21,50 m 50°, 22,50 m 60°, 23,50 m 62°, 24,50 m 61°, 26,50 m 63°, 27,00 - 32,20 m strongly folded, 32,50 64°, 33,50 m 62°, 34,50 m 65°, 35,50 m 68°, 36,60 m 62°, 37,40 m 64°, Sharp contact.
40,50 - 41,30	calcareous garnet bear. phyllisilicate-qtz schist (metamor. epiclastic sediment diluted by chemical precipitates) gngr, distinct schlieren structure, fine crystalline qtz and carbonate as schlieren and lenses in close alternation with schlieren and laminae max. 0,15 cm large porphyroblasts of reddishbrown garnet. Lowgrade po mineralization, the sulphide forming spots, stringers and nerve-like features.

AA	Calcareous garnet-biotite-sericite-chlorite schist (metamor. highly altered mafic volcanite) occurs as max. 15 cm thick layers as an envelope around tje mineralized phyllosilicate-qtz shict. Schistosity: 69°. Sharp contacts.
41,30 - 48,70	high calcareous qtz-sericite phyllite in alternation with garnet-amphibole-biotite-sericite schist (similar: HJE-56 a.58) (meta-pelite and calcareous meta-pelite to pelite calcareous sediment) high calcareous qtz-sericite phyllite: brownish gr, fine crystalline, closely packed tiny flakes of sericite set in a matrix composed of carbonate and qtz. Sporadically minor bundles or flakes of biotite. garnet-amph.-biotite sericite schist: browngn. bundles and schlieren of biotite are scattered within a fine-fibrous sericite matrix. Widely scattered porphyroblasts of garnet and locally lense-like blasts of amphibolite (garbenschist). Schistosity: 48,60 m 70°, 47,40 - 48,00 m folded and partly sheared, 47,30 m 66°, 46,50 m 73°, 47,50 m 68°, 42,50 m 60°, 41,60 m 63°. Knife sharp contact.
48,70 - 52,65	phyllosilicate rich quartzite (metamor. qtz-arenite) brownishgr, interlocked fine crystalline qtz crystals as lenses and continious laminae in close alternation with parallel schlieren of biotite or sericite. Schistosity: 48,80 m 70°, 49,50 m 65°, 52,00 m 81°. Gradational contact.
52,65 - 53,60	garnet-biotite-qtz-sericite schist (metamor. semipelite) gr, slightly striped, homogeneous distribution of biotite patches and tiny porphyroblasts of garnet within a fine crystalline qtz-sericite groundmass. Strongly schistose with biotite being aligned at 75°. Gradational contact.
53,60 - 66,00	garnet-chlorite-biotite-sericite schist (Blåhø mica schist) (metamor. pelite or semi-pelite) brownishgreenisggr, schlieren structure, equal distribution of porphyroblasts of garnet within a schistose groundmass composed in decreasing order of sericite, biotite and chlorite. Minor interlayers of amphibole banded quartzite (meta-chert with mafic volcanite): 57,05 - 57,10 m and 57,20 - 57,25 m. Often small scale folded.

66,00 m end of DDH.

Dezember 1987
Frank D. Priesemann

DIAMOND DRILL HOLE 137.

(Kolla 137)

Location: Southeast of Kolla
Grid koordinates: 0 EV, 4425 N
Date og drilling: 30.07. - 31.07.69
Azimuth: Grid north
Inclination: 50°
Total length: 41,20 m

Description:

5,00 m	overburden
Blåhøi group	
0,00 - 5,00	garnet mica schist (meta-pelite) greenisggr, homogeneous but also laminated, scattered tiny porphyroblasts of garnet within a schistose biotite-sericite grondmass which sometimes is laminated by tiny qtz bands. Schistosity, lamination: 90 - 85°. Gradational contact.
5,00 - 6,90	phyllosilicate rich quartzite (metamor. qtz-arenite) gr, distinct lamination by phyllosilicates which sometimes are accompanied by porphyroblasts of garnet. Lamination: 85 - 90°. Sharp contact.
6,90 - 10,65	garnet-sericite-qtz-biotite schist (meta-pelite) grbrown, distinct schlieren texture, sometimes "chicken wire" texture interlocked qtz crystals as tiny lenses and sometimes bands surrounded by biotite flakes. Abundant scattered porphyroblasts of garnet. Schistosity: 85°.
10,65 - 11,15	core missing
11,15 - 20,50	phyllosilicate rich quartzite (metamor. qtz-arenite) gr, laminated and homogeneous, fine crystalline, strongly sheared and with textonic brecciated structure at several locations between: 13,00 - 14,50m. At several places graphite on slichensided fault or shear planes. Sparse schlieren or spots og po. Sharp contact.
20,50 - 23,80	garnet-mica schist (meta-pelite) similar: 0,00 - 5,00 m Schistosity: 50° Sharp contact.
23,80 - 25,25	biotite bear. garnet-amphibole gneiss (meta-basalt flow) gn, distinctly layered, interlocked amphibole and biotite crystals accompanied by porphyroblasts of garnet, as max. 10 cm thick bands in alternation with max. 1 cm thick layers composed of qtz and/or fspar. Banding: 85°.

25,25 - 29,45	garnet bear. phyllosilicate rich quartzite (metamor. qtz- arenite or semi-pelite) gr sometimes brownishgr, distinctly laminated, varying amounts in phyllosilicates, continuous even and uneven parallel lamination of sericite and biotite, scattered porphyroblasts of garnet. Lamination: 85 - 90°.
29,45 - 30,35	biotite bear. amphibole gneiss (meta-basalt flow) similar: 23,80 - 25,25 m, at several locations po mineralization, cm-thick bands of chert at: 29,85 m. Banding: 85°. Sharp contact.
30,35 - 31,85	garnet bear. phyllosilicate rich quartzite (metamor. semi-pelite and qtz-arenite) similar: 25,25 - 29,45 m. Lamination: 85°. Sharp contact.
31,85 - 32,90	slightly calcareous biotite - amphibole gneiss (meta-basalt flow) similar: 23,80 - 25,25 m, sparse spots sometimes trains of granules of pyrite. Banding: 85°. Gradational contact.
32,90 - 33,65	calcareous garnet bear. sericite - biotite schist (metamor. mafic volcanite diluted with material from nonvolcanic sources, supp. hydrothermally altered). similar: biotite gneisses from DDH 139. greenishrbwon, browngr, either banded or with schlieren texture, sometimes distinct "chicken wire" texture where qtz and carbonate from clots being surrounded by biotite banded sections show an alternation of qtz-bands with schistose schlieren composed of sericite and biotite. Abundant tiny porphyroblasts of garnet. Schistosity, banding: 85 - 90°.
33,65 - 37,70	garnet - magnetite bear. quartzite (meta-chert) gr with reddish brown and black spots discontinuous lamination, trains of granules of magnetite and schlieren of amphibole or biotite and garnet set in a fine crystalline qtz-groundmass. Locally dm-thick interlayers of garnet-biotite-sericite schist (meta-pelite) Lamination: 80 - 85°.

37,70 m end of DDH.

Frank D. Priesemann
Dezember 1987

DIAMOND DRILL HOLE 17

Location: Grisungdal, northslope of Vålåsjøhø
Grid koordinates: 5400 V, 1320 N
Date of drilling: mai - juni 1958
Azimuth: grid north
Inclination: 50°
Total length: 100,75 m

Description:

9,00 m	overburden

MMS-formation until 28,30 m

0,00 - 17,75	phyllosilicate bear. quartzite (metamor. qtz-arenite) gr, distinct compositional banding, extremely fine crystalline qtz as cm-thick bands in rhythmic alternation with laminae composed of sericite and biotite. Compositional banding: 3,00 m 50°, 7,20 m 49°, 8,50 m 43°, 9,80 m 47°, 12,40 m 45°, 13,70 m 53°, 17,00 m 44°. Sharp contact.
17,75 - 28,30	calcareous to high calcareous amphibole bear. biotite - sericite schist (meta-pelite or calcareous meta-pelite) brownishgr and grgn, distinct schlieren structure, often with porphyroblastic texture, fine fibrous sericite with 0,05 cm large bundles of biotite as schlieren and laminae in close alternation with schlieren and lenses of qtz and/or carbonate, local occurrence of acicular and lense-like crystals of amphibole 0,15 cm in long dimension which tend to be not aligned the major foliation of the rock. Sometimes intersections of coarse biotite-chlorite schist which may stand for hydrothermal altered rock. 17,00 - 17,20; slightly calcareous schistose amphibolite (meta-basalt flow) gn, medium crystalline, nematoblastic texture. 22,90 - 22,95: phyllosilicate bear. qtz - fspar rock (metamor. felsic volcanite, supp. qtz keratophyr) grwhite, estremely fine crystalline, some schlieren and bands rick in phyllosilicates. Schistosity: 19,50 m 48°, 20,20 m 48°, 22,48 m 54°, 25,18 m 50°, 27,20 m 60°, 28,00 m 57°. Gradually passing into following rock

LMV-formation:

28,30 - 35,10	calcareous garnet-biotite bear. amphibole sericite - chlorite schist (greenschist) (metamor. epiclastic volcanogenic sediment supp. diluted with materials from nonvolcanic sources, may be even mafic tuff or tuffite) Gn. fine crystalline, homogeneous, bundles of biotite and tiny crystals of garnet are equally distributed within a fine fibrous groundmass mainly composed of phyllosilicates and enriched by tiny acicular

crystals of amphibole. Within the center of the layer the matrix is dominated by amphibole while sericite and chlorite are scarce.
Schistosity: 28,50 m 57°, 31,20 m 49°, 32,20 m 50°.
Gradational boundary.

35,10 - 36,85 — qtz-fspar- amphibole-biotite schist
(metamor. mafic volcanite)
greenishbrown, medium crystalline. homogeneous, slightly porphyritic flakes and bundles of biotite and acicular crystals of amphibole are equally distributed within a sparse matrix of fine crystalline qtz and fspar.
Schistosity: 36,50 m 68°.
Gradational contact.

36,85 - 38,00 — qtz-fspar-biotite rich amphibolite
(meta-basalt flow)
grgn, porphyroblastic texture, homogeneous, flakes of biotite and needles of amphibole surrounded by fine crystalline qtz and fspar.
Gradually passing into following rock.

38,00 - 42,30 — calcareous garnet bear. sericite-biotite-amphibole-qtz-fspar rock/schist
(metamor. mafic volcanogenic sediment supp. of epiclastic origin)
(sometimes similar banded amphibolite)
brownishgn, greenishgr, porphyroblastic texture, homogeneous but locally with crudely developed compositional banding, needles and lense-like crystals of amphibole from 0,1 cm to 1,0 cm in long dimension and flakes of biotite are surrounded by abundant groundmass composed of qtz, fspar and carbonate but sometimes of sericite. In places the amount in biotite is strongly reduced while amphibole is enriched.
Schistosity: 40,20 m 48°, 41,00 m 49°.
Transgoing into following rock.

42,30 - 47,90 — slightly calcareous garnet bear. qtz-fspar-amphibole-biotite schist
(metamor. mafic volcanite)
similar: 35,10 - 36,85 m but with scattered tiny porphyroblasts of garnet and spots of il.

45,07 - 45,70: amphibole banded quartzite (meta-chert)
Schistosity: 42,75 m 55°, 43,80 m 51°, 45,07 m 62°, 46,00 m 36°, 47,50 - 47,90 m 30°.
Sharp boundary.

47,90 - 48,85 — slightly calcareous biotite-sericite phyllite
(meta-pelite)
greenishgr, homogeneous, slightly porphyritic flakes of biotite are scattered within a groundmass of fine crystalline sericite.

48,85 - 49,95 — amphibole bear. qtz-cummingtonite garnet gneiss
(metamor. silicate fazies BIF)
reddishbrown spots and palegreen spheriltes within a white groundmass, compositional cm-banding, porphyroblastic texture, bands rich in round globular crystals of garnet and sperulites of cummingtonite alternate with qtz bands and tiny layers of po.

49,95 - 61,00	high calcareous biotite-sericite schist/phyllite (metamor. calcareous pelite) gngr, often with schlieren structure but also homogeneous, locally with prophyroblastic texture, fine crystalline sericite with bundles and porphyritic flakes of biotite as schlieren in close alternation with lenses and schlieren of carbonate. Locally interlayers of slightly calcareous biotite-sericite schist and cm-thick bands of pure marble. Schistosity: 51,30 m 60°, 56,00 m 60°, 59,00 m 65°.
61,00 - 65,50	biotite bear. sericite-carbonate rock and biotite bear. carbonate-sericite phyllite (metamor. calcareous pelite) gr with faint greenish tint, schlieren structure and compositional banding, fine crystalline sericite with sparse tiny flakes of biotite which locally form bigger spots and abundant carbonate as schlieren and bands in close alternation with bands and lenses of pure marble. Schistosity: 62,50 m 51°, 63,50 m 50°,56,00 m 60°, 65,50 m 48°.
61,00 - 65,50	biotite bear. sericite-carbonate rock and biotite bear. carbonate-sericite phyllite (metamor. calcareous pelite) gr with faint greenish tint, schlieren structure and compositional banding, fine crystalline sericite with sparse tiny flakes of biotite which locally form bigger spots and abundant carbonate as schlieren and bands in close alteration with bands and lenses of pure marble. Schistosity: 62,50 m 51°, 63,50 m 50°, 64,70 m 56°, 65,50 m 48°. Sharp boundary.
65,50 - 67,00	graphitic garnet bear. biotite - amphibole schist/gneiss (metamor. epiclastic volcanogenic and bituminous sediment diluted with material from nonvolcanic sources) blackishgn, distinct schlieren structure, interlocked crystals of biotite and amphibole accompanied by scattered tiny round globular spots of garnet as schlieren and bands in alternation with lenses and schlieren of qtz. Locally interlayers rich in graphite which contain also pyrrhotite. Sparse bands of po-bear. quartzite (meta-chert). Schistosity: 49° throughout.
67,00 - 67,35	po-bear. quartzite (metamor. chemical precipitate) gr, homogeneous, extremely fine crystalline qtz as groundmass inetelayered by schlieren and trains of granules of po which amounts to about 1 % by volume of the rock.
67,35 - 69,00	calcareous biotite-sericite phyllite (metamor. calcareous pelite) similar: 49,95 - 61,00 m Banding: 55°. Sharp boundary.
69,00 - 69,70	carbonate-phyllosilicate bear. quartzite (metamor. qtz-arenite) gr with faint greenish tint, distinct schlieren structure, fine fibrous sericite with subordinate biotite as schlieren in alternation with cm-thick bands of pure qtz, some clusters of carbonate. Schistosity: 53°. Transgoing into following rock.

69,70 - 70,10 high calcareous biotite-sericite schist
(metamor. calcareous pelite)
similar: 17,75 - 28,30 m
Schistosity: 55°
Gradually passing into following rock.

70,10 - 71,00 high calcareous amphibole-chlorite-qtz-fspar schist/gneiss
(metamor. mafic volcanogenic sediment)
(banded amphibolite)
gn, grgn, distinct schlieren structure with transition into cm-compositional banding, porphyroblastic texture, fine fibrous chlorite with subordinate biotite as schlieren and bands in alternation with lenses of carbonate and schlieren and bands composed of qtz, fspar, carbonate and phyllosilicates. Scattered lense-like porphyroblasts of amphibole.
Banding: 49°.
Gradual boundary.

71,00 - 73,40 biotite bear. amphibole schist
(meta-basalt flow)
gn, homogeneous, equal distribution of tiny bundles of biotite within ab amphibolitic groundmass. Sparse occurrence of cm-thick layers of carbonate.
Sharp boundary.

73,40 - 73,60 pyrrhotite bear. quartzite
(metamor. chemical precipitate)
similar: 67,00 - 67,35 m.

73,60 - 76,20 calcareous sericite-biotite schist/phyllite
(metamor. volcano-sedimentary deposit)
greenishbrown, schlieren structure which transgoes into a compositional banding, fine crystalline biotite and sericite as schlieren and bands in alternation with bands of carbonate and schlieren and lenses of qtz and/or carbonate. Tiny widely scattered spots of il.
Schistosity: 56° throughout.
Gradational boundary.

76,20 - 78,05 slightly calcareous amphibole bear. biotite-qtz-fspar schist
(metamor. volcano-sedimentary deposit)
brownishgr, porphyroblastic texture, bundles of biotite and lense-like crystals of amphibole are scattered within a groundmass of fine crystalline qtz and carbonate. Several dm-thick interlayers of biotite bear. amphibole schist.

78,50 - 91,89 slightly calcareous plagioclase amphibolite
(partly leopard amphibolite)
(meta-basalt flow)
grgn, bundles or lense-like crystals of amphibole embedded in a sparse matrix of carbonate and plagioclase.

91,89 m end of DDH.

Frank D. Priesemann
November 1987.

DIAMOND DRILL HOLE 139

(Kolla 139)

Location:	Southeast of Kolla
Grid koordinates:	100 V, 4385 N
Date of drilling:	06.08.69
Azimuth:	Grid north
Inclination:	50°
Total length:	30,35 m

Description:

4,50 m	overburden
Blåhoi-group	
0,00 - 6,10	garnet-mica schist (meta-pelite) Brownishgr with faint greenish tint, laminated and banded but sometimes homogeneous, close alternation of qtz dominated bands with schistose layers and laminae composed of serisite and biotite, homogeneous distribution of porphyroblasts of garnet on average 0,15 cm across. Lamination: 85°
6,10 - 9,60	garnet-mica schist (meta-pelite) Similar: 0,00 - 6,10 m, several max. 10 cm thick interlayers of phyllosilicate bearing quartzite (metamor. qtz-arenite) and some schlieren and cm-thick bands with low amount of graphitic carbon: 6,10 - 6,25 m, 7,15 - 7,30 m. 7,00 - 7,15: biotite-garnet-amphibole rock (meta. mafic volcanite deluted with nonvolcanic material) distinct porphyroblastic texture due to scattered huge hypidiomorphic crystals of garnet set in a matrix of biotite and amphibole. Abundant spots and schlieren of po. Layering: 80 - 85° Gradational contact.
9,60 - 14,75	phyllosilicate bear. quartzite (metamor. qtz-arenite) gr, fine-crystalline, continuous and discontinuous even and uneven lamiation of phyllosilicates (biotite and sericite), within fine crystalline qtz, from 12,45 m down drill hole occurs graphitic carbon on slickensided fault and shearplanes. Lamination: 56 - 80°. Sharp contact.
14,75 - 17,40	slightly calcareous sericite - biotite gneiss (metamor. pelitic sediment diluted with materials from volcanic sources) grbrown, brownishgr with faint greenish tint, homogeneous but also banded or with schlieren texture, irregular alternation of

sericite-biotite schist, bands of calcareous-qtz-fspar rock and schistose sections dominated by sericite which are characterized by spotted biotite crystals.

Lamination, banding and schistosity 70 - 85°
Sharp contact.

17,40 - 19,25 — pyrrhotite bear. sericite schist
(metamor. mudstone rich in organic material decomposed to iron-sulphide)
greenishgr, fine crystalline, slightly striped by laminae and schlieren of qtz. Abundant tiny schlieren and flasers of po which are parallel the major foliation of the rock.

Schistosity: 65 - 70°
Gradational contact.

19,25 - 25,85 — calcareous garnet - amphibole - sericite - biotite - qtz - fspar gneiss
(metamor. pelitic sediment diluted with materials from volcanic sources).
similar: 14,75 - 17,40 m but with scattered porphyroblasts of garnet and dm-intersections of qtz-amphibole gneiss.

Banding: 65 - 85°

25,85 m end of DDH.

Dezember 1987

Frank D. Priesemann

FOLLDAL VERK A/S

DIAMOND DRILL HOLE 55.

Location: North slope Hjerskavlen
Grod location: 1800 Ø , 3220 N.
Date of drilling: 01.07. - 11.07. 1965.
Azimuth: Gird north.
Inclination: 50°.
Totalt lenght: 84,20 m.

Description:

10,00 m UMV - formation	overburden
0,00 - 48,60 m	amphibolite, schistose amphibolite (meta-basalt flow) gn, fine crystalline, often homogeneous but sometimes with schlieren texture, tiny discontinuous bands of carbonate and bundles or schlieren and minor clusters of biotite. Often strongly folded and with occurrences of qtz-carbonate as clusters and bands. Some carbonate and chlorite alteration between 10,00 - 11,10 m. Po-mineralization: 13,30 m. 23,70 - 24,80: biotite bear. chlorite - epidote - amphibole gneiss/rock (metamorf. mafic volcanogenic sediment, may be altered (spilizitation) roof of a flow unit) gn with faint yellowish tint, crude development of banding, porphyroblastic texture, scattered needles of amphibole max. 1,2 cm in length within a fine crystalline matrix composed of epidote and qtz (may be fspar) and locally made by fine fibrous chlorite. Sharp foldcontrolled contacts. 35,75 - 37,10: amphibole bear. biotite - epidote - chlorite schist (metamorf. mafic volcanite, supp. altered roof of a flow unit) gn with abundant brown spots, locally with porphyroblastic texture, huge patches of biotite and locally porphyroblasts of amphibole set in a fine crystalline matrix of chlorite and epidote. Always strongly folded. Thin interlayer of felsic volcanite composed of biotite, qtz and fspar. 38,15 - 38,55: same as 35,75 - 37,10 m, repetition by folding Sharp contact.
48,60 - 54,00	plagioclase amphibolite (meta-basalt flow) (leopard amphibolite) gn, massive and schistose, more or less homogeneous, locally with clusters of qtz and carbonate, lense-like crystal aggregates of amphibole set in a fine crystalline matrix of fspar, epidote and qtz. Sharp contact.

54,00 - 54,05	calcareous, cummingtonite bear. pyrrhotite-quartzite (metamorf. chemical precipitate) gr and brown with metallic lustre, qtz, carbonate and amphibole represent the groundmass for a schlieren-like, high-grade po mineralization. Sharp contact.
54,05 - 60,00	plagioclase amphibolite (meta-basalt flow) gn, crudely developed leopard texture, distinct lineation of tiny lense-like crystal aggregates of amphibole which are surrounded by sparse matrix composed of fspar and epidote. 58,60 - 59,45: amphibole bear. qtz-fspar rock (metamorf. felsic volcanite, supp. qtz-keratophyr) gr, extremely fine crystalline, porphyroblastic texture, widely scattered 0,3 cm large amphibole needles embedded in a groundmass composed of qtz and fspar. Sparse tiny spots of py. Medium-grade py dissemination between: 58,60 - 58,66 m. Gradational boundary.
60,00 - 60,20	calcareous to high calcareous amphibole bear. chlorite phyllite (metamorf. mafic volcanite) grgn, homogeneous, spots of carbonate and rods of po set in a fine crystalline fibrous chlorite matrix with subordinate amounts of amphibole which forms tiny needles.
60,20 - 63,20	Core missing
63,20 - 67,00	schistose amphibolite (meta-basalt flow) similar: 54,05 - 60,00 m, tectonic brecciation between: 65,45 - 65,75 m, 66,90 - 67,00 m.
67,00 - 68,10	biotite bear. amphibole - qtz - fspar - chlorite gneiss (banded amphibolite) (metamorf. mafic volcanogenic sediment) gn, grgn, distinct compositional and textural banding, porphyroblastic texture, chlorite-amphibole layers in rhythmic alternation with qtz - carbonate bands, sparse interlayers of coarse crystalline biotite - chlorite schist. Knife sharp contact.
68,10 - 68,50	schistose amphibolite (meta-basalt flow) gn, homogeneous, some tiny spots of carbonate Knife scharp contact.
68,50 - 69,65	high calcareous biotite - chlorite - amphibole gneiss (metamorf. hyaloclastite) gn, grgn, distinctly banded, stretched amphibolite

	fragments set in abundant matrix of carbonate, chlorite and biotite. Locally intersections with banded amphibolite similar 67,00 - 68,10 m. Knife sharp contact.
68,50 - 69.65	high calcareous biotite - chlorite - amphibole gneiss (metamorf. hyaloclastite) gn, grgn, distinctly banded, stretched amphibolite fragments set in abundant matrix of carbonate, chlorite and biotite. Locally intersections with banded amphibolite similar 67,00 - 68,10 m.
69.15 - 74,20	schistose amphibolite (meta-basalt flow) gn, nematoblastic texture, at several locations clusters and interlayers of qtz-carbonate.
74,20	End of DDH.

Dezember 1987

Frank D. Priesemann

DIAMOND DRILL HOLE 66.

Location: Stormyr, Grisungdalen
Grid location: 3600 V, 1975 N
Date of drilling: 17.09. - 26.09.1965.
Azimuth: grid north.
Inclination: 50°
Total length: 248,80 m

Description:

6,05 m	overburden
Hjerkinn-group	
30,00 - 31,00	phyllosilicate bear. quartzite (metamor. qtz-arenite) gr with gn schlieren and laminae, distinct schlieren texture, interlocked qtz crystals as lenses, bands and schlieren in alternation with schlieren and laminae composed in decreasing order of chlorite, biotite and sericite. Schistosity: 61°
31,00 - 38,00	garnet - biotite - sericite schist (meta-pelite) gr with faint greenish tint, strong foliation, distinct lepidoblastic texture, closely packed crystals of sericite accompanied by single crystals of biotite as schlieren and laminae in close alternation with lenses an schlieren mainly composed of qtz. Garnet forms scattered 0,15 cm large porphyroblasts. Locally spotted carbonate. Due to the variation in the amount of quartz there occurs in places qtz-rich schists (metamor. semi-pelites) or even phyllosilicate rich quartzites (metamor. qtz-arenite). Schistosity: 80°
38,00 - 38,60	missing core
38,60 - 38,90	garnet - biotite - sericite schist (meta-pelite) similar: 31,00 - 38,00 m
38,90 - 40,00	missing core
40,00 - 41,40	high calcareous biotite - amphibole gneiss (metamor. mafic volcanogenic sediment) browngn, distinct compositional banding, amphibole and biotite surrounded by carbonate, qtz and fspar as cm-thick layers in alternation with max. 1 cm thick carbonate bands. Layering: 67°
41,40 - 42,60	missing core
42,60 - 50,00	carbonate rich plagioclase amphibolite (meta-basalt flow) gn, grgn, coarse crystalline, locally with distinct leopard texture, porphyroblastic texture, closely packed bundles of amphibole embedded in sparse to abundant matrix composed of carbonate, qtz

fspar. In places distinct carbonate banding.
Layering: 80 - 90°, from 47,70 m down drillhole folded and with layering running parallell to core axis.

50,00 - 71,30 amphibolite
(meta-basalt flow)
gn to grgn, mostly coarse crystalline and with distinct leopard texture, locally mm-thick bands of carbonate.
Strongly folded.

71,30 - 78,20 schistose amphibolite
(meta-basalt flow)
gn, medium crystalline, homogeneous but with clusters and crosscutting veinlets of qtz. In places strongly tectonized (mylonite)

78,20 - 79,00 garnet - biotite bear. qtz-fspar rock
(metamor. felsic volcanite, supp. qtz-keratophyr)
gr with brown schlieren and patches extremely fine crystalline, interlocked qtz and fspar crystals as cm-thick bands in alternation with schlieren and sometimes bands composed of biotite which may be accompanied by garnet. Sparse tiny spots and schlieren of py and po.
Banding: 85 - 90°.

79,00 - 79,70 slightly calcareous graphite bear. phyllite
(metamor. carboniferous pelitic sediment) (correlation DDH 116 83,35 - 84,40 m)
gr with faint greenish tint, locally darkgr, schlieren texture, fine crystalline groundmass of sericite and qtz. Schlieren and laminae of graphite and patches and schlieren og po and py (1 Vol-%)

79,70 - 80,50 schistose amphibolite
(meta-basalt flow)
gn, fine and medium crystalline, nematoblastic texture, homogeneous.

80,50 - 82,40 calcareous amphibole bear. biotite - chlorite schist
(metamor. highly altered mafic volcanite)
AA
carbonatization
biotitization
chloritization
browngn, coarse crystalline, chaotic due to small scale folding, closely spaced bundles of biotite and fibrous crystal aggregates of chlorite set in a fine grained matrix composed of carbonate and some qtz and fspar. Sparse needles of amphibole. Locally rich in round globular spots of garnet. Occurrence of one 4 cm thick interlayer of quartzite (meta-chert) which shows sparsely distributed schlieren of po.

82,40 - 83,00 biotite - chlorite - amphibole schist
(metamor. weakly altered mafic volcanite)
AA
chloritization
biotitization
gn, medium crystalline, closely packed tiny bundles of amphibole and phyllosilicates surrounded by little matrix of qtz and fspar.

83,00 - 83,70 biotite - sericite phyllite
(meta-pelite)
gngr, schlieren texture, interlocked biotite and sericite crystals as schlieren and laminae in alternation with lenses composed of qtz and carbonate.

83,70 - 104,40 schistose amphibolite
(meta-basalt flow)
gn, fine grained, nematoblastic texture, homogeneous but sometimes banded by carbonate layers.
90,00 - 91,00: garnet - chlorite - amphibole - qtz - fspar rock
(metamor.felsic or intermediate volcanite) gngr, porphyroblastic

texture, homogeneous distribution of tiny needles of amphibole, tiny round globular spots of garnet and fibrous aggregates of chlorite within a fine crystalline qtz-fspar matrix.
102,05 - 102,45: biotite bear. qtz - fspar rock
(metamor. felsic volcanite, supp. qtz-keratophyr) grwhite, extremely fine crystalline, crudely laminated, interlocked qtz and fspar crystals sporadically interlayered by tiny flakes of biotite which at one location forms bundles being accompanied by fine fibrous chlorite.
Lamination: 51°
Schistosity: 100 m 78°, 101,00 m 76°, 103,40 m 79°
Gradational contact.

104,40 - 107,20 calcareous plagioclase amphibolite
(meta-basalt flow, may be either roof or bottom of a flow unit)
grgn, medium and coarse crystalline, often with leopard texture, lense-like crystals aggregates of amphibole set in little matrix composed of carbonate, qtz and fspar. Frequent occurrence of bands and crosscutting veins of carbonate. In places biotite and chlorite alteration.
Schistosity: 75°

107,20 - 114,40 schistose amphibolite
(meta-basalt flow)
gn, fine crystalline, nematoblastic texture, abundant schlieren and laminae of carbonate.
Schistosity: 75 - 90°.
Gradational contact.

114,40 - 118,10 calcareous to high calcareous qtz rich biotite-sericite phyllite
(metamor. pelitic sediment)
greenishgr, fine crystalline, interlocked sericite and biotite crystals as tiny lenses and schlieren embedded in a fine crystalline matrix composed of carbonate and qtz, crudely developed banding due to variation in carbonate content. Several interlayers of coarse crystalline calcareous biotite - chlorite schist (extremely altered rock): 116,75 - 117,28 m, 117,94 - 118,10 m.
114,73 - 114,77: quartzite (meta-chert)
gr, homogeneous, dense, sparsely distributed spots of po which show a slight tendency to concentrate within tiny bands.
Sharp contacts: 85°
Schistosity: 85 - 90°, calcareous biotite - chlorite schists are chaotically folded.
Sharp contact.

118,10 - 123,50 garnet biotite - sericite schist/phyllite
(meta-pelite)
gr with faint greenish tint, homogeneous, scattered bundles of biotite subparallel to the major foliation of the rock and round globular crystals of garnet embedded in a fine crystalline schistose matrix composed of sericite and qtz.
Schistosity: 85°. Strongly folded between: 120,67 - 121,75 m.
Tectonic brecciated structure between: 119,80 - 120,67m, 123,05 - 123,50 m.

Blåhøy-group
123,50 - 230,30 qtz rich garnet - sericite - biotite schist
(meta-pelite, meta-semipelite)
brownishgr with faint greenish tint homogeneous but also banded or laminated, closely packed crystals and crystal aggregates og biotite

and sericite and round globular crystals of garnet on average 0,17 cm across surrounded by fine crystalline interlocked qtz crystals. Local occurrence of porphyroblasts of amphibole, the crystals are normally bound to zones being characterized by a high amount of quartz which is supposed resulting from chemical precipitations: 142,10 - 142,20, 147,45 - 147,60 m, 148,65 - 149,00 m, 155,30 m, 155,95 m, 156,95 m, 158,25 - 158,35 m, 160,45 - 160,50 m (meta-chert), 162,50 - 162,65 m, 163,75 - 164,05 m, 164,50 - 164,65 m marble bands in alternation with layers of quartzite amphibolite and biotite schist, 165,10 - 167,30 m garnet-amphibole-biotite schist with abundant max. 1 cm thick interlayers of marbel, 171,00 - 172,00 m, 180,50 - 180,80 m, 190,20 - 190,55 m at several locations, 191,35 m, 191,75 m, 191,90 m, 192,07 - 192,20 m, 192,75 m, 193,30 m, 193,65 - 193,90 m, 194,50 m, 195,80 - 196,00 m at several locations 1 cm thick interlayers with bundles of amphibole, 196,87 m, 197,00 m, 197,15 m, 198,25 m, 201,65 m, 201,75 m.

Foliation; 123,95 m 85°, 125,20 - 130,40 m small scale folding, 130,50 m 48°, 131,50 m [illegible], 132,50 m 41°, 132,80 - 135,10 m [illegible], 135,20 m 72°, 136,40 - 154,00 m [illegible], 154,00 - 159,40 m 85°, 169,40 - 171,00 m [illegible], 171,00 - 209,00 m 85°, 209,00 - 230,30 m [illegible].

Tectonic brecciated structure: 124,00 - 125,20 m, 136,00 - 136,40 m.

230,30 - 232,50 <u>garnet - chlorite - sericite bear. quartzite.</u>
(metamor. qtz-arenite)
gr with lightgn schlieren and laminae interlocked qtz crystals as lenses and bands in alternation with schlieren and laminae composed of phyllosilicates which locally carry some garnets.

232,50 - 235,85 <u>ganret bear. biotite-serisite-amphibole svhist/gneiss.</u>
(metamor. mafic volcanogenic sediment or altered top unit of mafic lavaflow)
grgn, medium crystalline homogeneous but locally with distinct compositional banding, bundles of amphibole set in a matrix composed either of qtz and plagioclase or of fine fibrous sericite which is accompanied by garnet.
Comp.banding: 85°

235,85 - 242,75 <u>schistose amphibolite</u>
(meta-basalt flow)
gn, fine crystalline, homogeneous, sparse crosscutting veinlets of qtz.
Schistosity: 85°.

242,75 m end of DDH.

Dezember 1987

Frank D. Priesemann

DIAMOND DRILL HOLE 138

(Kolla 138)

Location:	Southeast of Kolla
Grid koordinates:	10 V, 4255 N
Date of drilling:	04.08.69
Azimuth:	Grid north
Inclination:	50°
Total length:	29,20 m

Description:

4,00 m	overburden
Blåhøi-group	
0,00 - 2,10	biotite bear. garnet - amphibole schist (meta-basalt flow) gn, brownishgn, homogeneous, mottled due to scattered reddishbrown porphyroblasts of garnet. Sharp contact.
2,10 - 18,80	garnet - mica schist (meta-pelite) brownishgr and with faint greenish tint, homogeneous but also slightly striped, scattered porphyroblasts of reddish brown garnets. Schistosity: 85° Sharp contact.
18,80 - 19,35	garnet bear. pyrrhotite rich qtz-biotite schist (meta-chert diluted with epiclastic sedimentary material) grbrown, homogeneous and also banded, mainly qtz-biotite schist rich in stringers and spots of po which is interstratified by max. 10 cm thick bands of pure qtz. Locally cm-thick layers of garnet-biotite - po rock. Layering: 85° Sharp contact.
19,35 - 19,60	biotite - garnet - qtz gneiss (metamor. hydrothermally altered cherty pelitic sediment) browngr distinctly striped, interlocked qtz crystals as max. 1 cm thick bands in alternation with trains of granules of garnet and biotite-garnet bands. Banding: 85° Sharp contact.
19,60 - 21,30	garnet - biotite - amphibole gneiss (metamor. mafic volcanite, supp. basalt flow) brownishgn, medium crystalline, indistinct compositional banding, cm-thick layers of amphibolite or garnet-amphibolite alternate discontinuously with bands of garnet - biotite schist which always contain some amphibole crystals.

20,20 - 20,50: garnet - cummingtonite - biotite - qtz gneiss (metamor. silicate facies BIF) close alternation of qtz-bands and schistose layers composed of biotite, amphibole and garnet.

Layering: 85 - 90°

20,90 - 21,00: amphibole banded quartzite (meta chert)

21,30 - 25,20 biotite - amphibolite
(meta-basalt flow)
brownishgn, medium crystalline, homogeneous, scattered flakes of biotite set in an amphibole matrix. Biotite decreases in amount down drill hole.

Schistosity: 85° but sometimes distributed.

25,20 end of DDH.

Dezember 1987

F.D.P.

Frank D. Priesemann

KAKELLDALEN BH. 99.

10.400 X, + 230 Y, geofys. basisnet 1964. NGU's nett?

00,00 - 2,50 m	Finfoliert mörkegrön grönskifer.
2,50 - 7,40 m	Karbonat-hornblende porfyroblast-feldspat grönskifer.
7,40 - 13,30 m	Finfoliert mörkegrön grönskifer. Ved 13,25 m enkelt ansamling af pyrit med kobberkis.
13,30 - 17,00 m	Glimmer-feldspat-hornblende grönskifer.
17,00 - 17,70 m	Magnetkis (med beskeden mængde kobberkis) feldspat sliret hornblende grönskifer.
17,70 - 18,50 m	Magnetkis-muscovit-granat-hornblende-feldspat grönskifer.
18,50 - 39,50 m	Feldspat-hornblende grönskifer, stedvis med mindre mængde magnetkis.
39,50 - 42,50 m	Knusnings-skifrighedszone.
42,50 - 47,50 m	Mörkegrön feldspat-hornblende grönskifer.

Beskrevet august 1976.

S. Schack Pedersen.

FOLLDAL VERK A/S

KAKELLDALEN BH. 100.

10,700 X, ÷ 650 Y,

00,00 - 1,00 m	Metakvartskeratophyr med muscovit og sulfider, fortrinnsvis magnetkis.
1,00 - 1,50 m	Hornblende-feltspat grönnskifer.
1,50 - 3,00 m	Metakvartskeratophyr.
3,00 - 5,70 m	Hornblende-klorit-feldspat skifer.
5,70 - 8,30 m	Magnetkis foliert klorit-glimmer-feldspat skifer. Stedvis med kobberkis og omkring 7,8 m med grafitskifer innslag. Stedvis fuchsit förende.
8,30 - 9,80 m	Mellomkornet-finkornet velfoliert feldspat-klorit-hornblende grönskifer.
9,80 - 12,00 m	Lys grönn sericit-epidot-klorit-amfibol-feldspat grönnskifer. Mellomlejret i grönnskiferen findes magnet-grafit skifer.
12,00 - 19,40 m	Karbonat-feldspat-klorit-hornblende grönskifer.
19,40 - 19,70 m	Magnetkis-grafit-glimmerskifer.
19,70 - 22,70 m	Karbonat-feldspat-klorit-hornblende grönskifer.
22,70 - 36,00 m	Karbonat-granat-hornblende porfyroblast keratophyr-feldspat skifer med spredte spor af magnetkis.

Beskrevet august 1976.

S. Schack Pedersen.

FOLLDAL VERK A/S

KAKELLDALEN BH. 101.

10.100 X, + 570 Y, geofys.basisnet NGU 1964.

00,00 - 4,00 m	Karbonat förende hornblende-granat feldspat skifer.
4,00 - 13,00 m	Båndet-finfoliert feldspat-hornblende-klorit skifer.
13,00 - 15,40 m	Epidot-klorit-fin til mellemkornet keratophyr-feldspat skifer. Thrusting og isoklinale folder findes spredt fordelt.
15,40 - 16,00 m	Magnetkis-grafit-klorit skifer. Magnetkisen findes som få mm brede foliationer. Epidot-feldspat bånd viser isoklinal fold.
16,00 - 18,40 m	Epidot-feldspat-hornblende-klorit skifer. Lys fin til mellemkornet bjergart med mindre indslag af biotit. Ved 16,8 m grafit-magnetkis.
18,40 - 18,50 m	Magnetkis foliert grafitskifer.
18,50 - 21,70 m	Fin til mellemkornet feldspat-klorit-hornblende skifer.
21,70 - 22,00 m	Epidotbåndet, magnetkis foliert grafit-klorit-skifer. Magnetkisindholdet er anslået til 20 %.
22,00 - 23,90 m	Epidot-feldspat-hornblende-kloritskifer. Ved 23,2 m foldelukning. Fra 23,2 - 23,7 m findes diskordante kvarts-feldspat årer med pyrit, kobberkis og zinkblende.
23,90 - 33,80 m	Finfoliert feldspat-epidot-hornblende-klorit skifer. Fra 23,9 - 24,9 m kvartsfeldspat breccie. Stedvis indslag of biotit.
33,80 - 34,10 m	Keratophyr båndet, mellemkornet hornblende porfyroblast grönskifer.
34,10 - 38,30 m	Hornblende porfyroblast klorit-feldspat skifer med indslag af karbonat og biotit. Ved 35,65 m indslag of magnetkis-grafit-foliation.

Beskrevet august 1976.

S. Schack Pedersen.

KAKELLDALEN BH. 102.

10.850 X, ÷ 750 Y, geofys.basisnet 1964 .

0,00 - 3,70 m	Biotit-klorit-hornblende-feldpsat grönskifer.
3,70 - 5,50 m	Hornblende porfyroblast feldspat grönskifer.
5,50 - 7,00 m	Fuchsit-klorit-hornblende metakeratophyr.
7,00 - 9,00 m	Hornblende-feldspat grönskifer.
9,00 - 12,30 m	Finfoliert mörkegrön grönskifer.
12,30 - 22,00 m	Finfoliert mörkegrön grönskifer.
22,00 - 40,00 m	Finfoliert mörkegrön grönskifer.
	Fra 36,20 - 36,50 m og fra 36,80 - 37,50 m hornblende porfyroblast keratophyr.

Inge- el. Lindel

Beskrevet august 1976.

S. Schack Pedersen.

KAKELLDALEN BH. 103.

8780 X, ÷ 810 Y, geofys. besisnet NGU 1964.

00,00 - 13,00 m	Karbonat-granat-epidot-klorit-hornblende-feldspat grönskifer.
13,00 - 14,70 m	Amfibol-biotit-klorit-feldspat skifer. Ved 13,5 m pyrit (med magnetkis-zinkblende).
14,70 - 16,00 m	Klorit-muscovit-hornblende-feldspat skifer. finfoliert med granat-hornblende porfyro-blaster ved 15,5.
16,00 - 26,00 m	Muscovit-epidot-feldspat glimmerskifer med magnetkis-grafit skifer. Mellom 18,3 - 18,8 m mobilisert kvarts. Ved 19,7 m isoklinal foldelukning.
26,00 - 26,50 m	Albit-kvarts porfyroblast biotit-feldspat skifer (keratophyr ?).
26,50 - 34,00 m	Klorit-amfibol-feldspat grönskifer.

Beskrevet august 1976.

S. Schack Pedersen.

FOLLDAL VERK A/S

KAKELLDALEN BH. 104.

8915 X, 770 Y, geofys.net 1964.

00,00 - 11,50 m	Metakvartskeratophyr. Ved 3,25 m parasitisk fold, der viser antiformlukning nedefter. Magnetkisförende grafitskiferindslag findes ved 4,5, 5,3, 5,5 - 6,0, 8,0 - 8,1, 10,2 og 11,3. Alle steder ses tætte isoklinale folder.
11,50 - 12,40 m	Magnetkisförende grafitskifer. Ved 11,9 m findes et par cm bredt grönskiferbånd.
12,40 - 12,60 m	Grönskifer.
12,60 - 13,10 m	Klorit-grafit skifer med magnetkis.
13,10 - 13,70 m	Lys grön sericit-klorit grönskifer.
13,70 - 14,30 m	Grafit-klorit-glimmerskifer med foldelukning.
14,30 - 19,30 m	Lys grön klorit-feldspat glimmerskifer med spredte bånd mindre end 1 cm brede af grafit.
19,30 - 22,90 m	Lys grön-grå biotit-klorit feldspat glimmerskifer. Ved 20,30 parasitfold, der viser antiformlukning opefter.
22,90 - 23,00 m	Grafitskifer med feldspat slirer.
23,00 - 23,40 m	Biotit-klorit-fedlspatskifer, der slutter i hornblende porfyroblast feldspatskifer.
23,40 - 24,00 m	Finfoliert lys grön feldspat-klorit skifer.
24,00 - 24,50 m	Biotit-klorit-feldspat glimmerskifer.
24,50 - 25,50 m	Keratophyrisk feldspatskifer.
25,50 - 28,00 m	Feldspatbåndet biotit-klorit grönskifer. Ved 26,4 m parallell skifrighed m. kernen.
28,00 - 28,20 m	Hornblende porfyroblast feldspatskifer.
28,20 - 29,60 m	Biotit-feldspat-klorit grönskifer med karbonat.
29,60 - 38,50 m	Båndet keratophyr-hornblende porfyroblast granat-feldspatskifer. Fra 33,0 - 33,3 m foldelukning. Ved 37,8 m grafitskiferindslag.

38,50 - 41,00 m	Finfoliert biotit-feldspat-klorit grönskifer, der viser antiform opefter.
41,00 - 42,20 m	Biotit-klorit-feldspat skifer.
42,20 - 44,00 m	Hornblende porfyroblast-feldspat skifer med granat og epidot.

Beskrevet august 1976.

S. Schack Pedersen.

KAKELLDALEN BH. 105.

9400 X, ÷ 230 Y, geofys.net 1964.

00,00 - 2,00 m	Hornblende porfyroblast skifer med granat og karbonat. Fra 0,0 - 0,3 m foldelukning.
2,00 - 3,00 m	Finfoliert grönskifer.
3,00 - 8,20 m	Hornblende porfyroblast epidot-klorit-feldspat skifer, stedvis 1 cm store granat porfyroblaster og magnetkis langs kvarts årer. Ved 3,8 m parasitfold, der viser synform nedefter. Ved 8,0 m parasitfold, der viser antiform nedefter.
8,20 - 12,00 m	Finfoliert grönskifer med 2 mobiliserte kvartsårer på 40 cm bredde ved 8,4 - 8,8 og 9,7 - 10,1.
12,00 - 13,50 m	Grafit-klorit glimmerskifer med båndede indslag af hornblendeporfyroblast-feldspat. Magnetkis följer grafitskirigheden.
13,50 - 14,20 m	Granat-hornblendeprofyroblast-biotit-feldspat skifer.
14,20 - 20,60 m	Granat-hornblendeporfyroblast keratophyr. Gennemsnitlig 10-15 % magnetkis indtil 16,0 ved 15,5 kompakt magnetkis.
20,60 - 35,00 m	Biotit-klorit-feldspat-hornblende grönskifer. Fra 26,7 - 27,0 folation parallell med kerne. Parasitfolder viser formodet sunform nedefter. Ved 28,0 m parasitfolder, der viser synform nedefter Ved 32,2 m parasitfolder viser antiform nedefter.

Beskrevet august 1976.

S. Schack Pedersen

KAKELLDALEN, BH. 106.

9500 X, + 430 Y, geofys. basisnet 1964.

00,00 - 11,00 m	Sulfidmalm-karbonat förende grönskifer. Ved 5,2 m keratophyrbånd 10 cm bredt med kobberkis, zinkblende, glyglans og pyrit. Sulfidindholdet varierer fra 5-10 %.
11,00 - 12,30 m	Sulfidförende metakvartskeratophyr.
12,30 - 20,60 m	Mellemkornet grönskifer stedvis med 5-10 % sulfider (magnetkis, kobberkis, zinkblende). Fra 16,5 - 17,0 m parasitfolder, der viser synform nedefter.
20,60 - 21,10 m	Biotit förende metakvaryskeratophyr.
21,10 - 21,70 m	Finfoliert grönskifer.
21,70 - 22,40 m	Kobberkis-magnetkis förende (5-10 %) meta-kvartskeratophyr.
22,40 - 32,00 m	Kobberkis-magnetkis förende grönskifer.
32,00 - 39,50 m	Biotit-klorit-feldspat-hornblende grönskifer.

Beskrevet august 1976.

S. Schack Pedersen.

FOLLDAL VERK A/S

KAKELLDALEN BH. 107.

8700 X, ÷ 107 Y, geofys.net. 1964.

00,00 - 00,60 m	Granat-hornblende-feldspat skifer.
00,60 - 1,30 m	Muscovit skifrig metakeratophyr med magnetkis.
1,30 - 7,00 m	Hornblende-feldspat grönskifer. Fra 3,30 - 3,40 m magnetkis i feldspat-kvartsrig parti, ved 4,3 m det samme.
7,00 - 7,80 m	Muscocitskifrig metakeratophyr.
7,80 - 8,20 m	Hornblende-feldspat grönskifer.
8,20 - 10,00 m	Muscovit skifrig metakeratophyr. Ved 9,0 m findes 10 cm kobberkis-magnetkis grafitglimmerskifer.
10,00 - 14,60 m	Hornblende-klorit-feldspat grönskifer, stedvis med magnetkis, kobberkis i mindre mængde.
14,60 - 15,30 m	Biotit-klorit-feldspat grönskifer.
15,30 - 16,00 m	Sulfidförende metakeratophyr.
16,00 - 16,70 m	Magnetkis förende (15 %) biotit-klorit- feldspat grönskifer.
16,70 - 18,20 m	Klorit-muscovit skifrig metakeratophyr med få spredte korn af sulfid.
18,20 - 22,50 m	Klorit-hornblende-feldspat grönskifer.
22,50 - 24,00 m	Finfoliert grönskifer.
24,00 - 24,20 m	Keratophyr med lidt sulfid.
24,20 - 26,40 m	Magnetkis-biotit-klorit feldspat grönskifer.
26,40 - 27,00 m	Metakeratophyr med få 1 cm store svovelkis-kobberkis korn.
27,00 - 27,50 m	Biotit-klorit-feldspat grönskifer.
27,50 - 29,20 m	Metakeratophyr med karbonat og sulfid.
29,20 - 35,50 m	Hornblende-feldspat grönskifer. Ved 29,5 og 35,0 og 35,5 10 cm brede indslag af keratophyr.

35,50 - 37,70 m Magnetkis-svovelkis-biotit-klorit-hornblende -feldspat grönskifer.

Beskrevet august 1976.

S. Schack Pedersen.

FOLLDAL VERK A/S

KAKELLDALEN BH. 108.

00,00 - 13,40 m	Feldspat-hornblende mörkegrön grönskifer. Omkring 6,0 m foldelukning.
13,40 - 14,00 m	Hornblende-hornblendeporfyroblast-feldspat skifer. Enkelt mineralisert kvarts-karbonat åre ved 13,9 m.
14,00 - 15,20 m	Karbonat-feldspat-hornblende grönskifer.
15,20 - 17,00 m	Hornblendeporfyroblast-feldspat grönskifer.
17,00 - 18,30 m	Mellem til finkornet grönskifer.
18,30 - 19,60 m	Hornblendeporfyroblast-feldspat grönskifer.
19,60 - 20,70 m	Finfoliert mörkegrön grönskifer med mindre indhold af sulfid (5 %).
20,70 - 21,80 m	Grönskiferbåndet granat-hornblendeporfyroblast keratophyr.
21,80 - 23,80 m	Grönskifer, finfoliert med enkelt keratophyrbånd.
23,80 - 31,00 m	Hornblendeporfyroblast-feldspat grönskifer.
31,00 - 32,10 m	Finfoliert grönskifer.
32,10 - 35,50 m	Karbonat-biotit-klorit-hornblende-feldspat grönskifer.

Ingen el. leder

Beskrevet august 1976.

S. Schack Pedersen

K. Carlsen
8.77

BORHULL NR. 1, VERKENSETER.

0,00 - 39,25 Tilsammen 7,50 m med sterkt oppknust kjerne. Grønnskifer. Lokale partier med amfibol, glimmer og kloritt. Hyppige kvarts- og karbonat-laminater parallelt skifrigheten. Finkornig. Fargen er grønn. Skifrighet 5 - 10 grd. Lokale, svake impregnasjoner av svovelkis, magnetkis og kobberkis.

39,25 - 39,35 Grafitt-skifer med magnetkis. Finkornet. Sort farge.

39,35 - 46,65 Som 0,00 - 39,25. Skifrighet 15 grd. 41,50 - 45,50: Sterkt oppknust parti.

46,65 - 47,85 Kvarts-sericitt-skifer. Kvarts og muskovitt med meget spredte granater opptil 4mm. Finkornig. Grå-hvit farge. Skifrighet 5 - 10 grd.

47,85 - 55,30 Grønnskifer. Sericittisk og klorittisk. Lokalt finnes meget kvarts-rike partier. Finkornig. Fargen er lys grønn. Skifrighet 10 - 15 grd. Svake impregnasjoner av magnetkis. 52,45 - 52,75: Hydrotermal kvarts.

55,30 - 62,20 Som 46,65 - 47,85. Sericittisk, men uten granater. Skifrighet 10 grd.

62,20: Avslutning av borhull nr. 1, Verkenseter.

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BORHULL NR. 2. VERKENSETER.

0,00 - 12,00 Tilsammen ca. 1 m med sterkt oppknust kjerne. Kvarts-sericitt-skifer. Finkornig. Fargen er lys grå - hvit. Dårlig foliasjon.

12,00 - 17,00 Grønnskifer. Granater opptil 5 mm finnes som øyne i små kvartslinser i bergarten. Ellers finkornig. Grå-grønn farge. Skifrighet 15 grd. Sterkt oppknust kjerne.

17,00 - 33,00 Grønnskifer. Sericittisk med lokale kvartsrike partier. Noe biotitt på skifrighetsplanene. Små og fåtallige soner med porfyroblastiske granater opptil 6 mm. Finkornig. Grønn - grå farge. Skifrighet 5 - 15 grd. Lokale svake kis-impregnasjoner.

33,00 - 35,00 Gradvis overgang fra grønnskifer til kvarts-sericitt-skifer.

35,00 - 42,10 Kvarts-sericitt-skifer. Kloritt på skifrighetsplanene. Finkornig. Grå - hvit farge. Skifrighet 0 - 5 grd. Små mengder svovelkis i krystaller mindre enn 1 mm.

42,10 - 48,52 Som 17,00 - 33,00. Skifrighet 0 - 5 grd. Sterkt oppknust.

48,52: Avslutning borhull nr. 2, Verkenseter.

R. Hagen
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BORHULL NR. 115, RISMOEN.

0,00 - 2,65 Grønnskifer med kloritt og amfibol. Årer og slirer av kvarts, karbonater og epidot. Grønn farge. Finkornig. Varierendeskifrighet på grunn av foldestrukturer. 1,00 - 1,65: Svak impregnasjon av svovelkis.

2,65 - 2,85 Keratofyr. Med kvarts og feltspat. Også middelkornige porfyroblaster av amfibol og granat. Lys grå farge. Dårlig skifrighet. Svakt impregnert av svovelkis.

2,85 - 7,65 Som 0,00 - 2,65.

7,65 - 9,00 Grønnskifer med biotitt og feltspat. Finkornig. Grå-grønn farge. Innenolder intense foldestrukturer. Impregnasjoner av svovelkis og magnetkis.

9,00 - 9,75 Som 2,65 - 2,85.

9,75 - 16,90 Grønnskifer. Vekslende mellom grønnskifer medbiotitt og feltspat og grønnskifer med kloritt og amfibol. Også keratofyriske partier med kvarts, amfibol og granater. Lokalt finnes glimmer-rike soner. Fin- til middel-kornig. Vekslende farger i grønt. Skifrighet ca. 5 grd. Svakt impregnert av svovelkis og magnetkis.

16,90 - 17,40 Som 2,65 - 2,85.

17,40 - 19,30 Som 9,75 - 16,90.

19,30 - 23,00 Amfibol-skifer. 2 - 5 mm. lange amfibol-nåler i grunnmasse som veksler mellom kvarts-rik og feltspat- og kloritt-rik. Lys grå-grønn farge. Foliasjon 5 grd.

23,00 - 28,50 Som 9,75 - 16,90.

28,50 - 31,80 Som 2,65 - 2,85. Fattig på granater.

31,80 - 51,70 Grønnskifer med kvarts-linser og -slirer. Finkornig. Mørk grønn farge. Viser intense foldestrukturer.

51,70: Avslutning av bornull 115, Rismoen.

BH 135, Skarvåsen.

The brief petrografical description.

0,00 - 0,30	The white gray quartz, without some impregnation.
0,30 - 0,65	The strongly chloritic-epidotic and amphibolitic greenschist, with some impregnation of FeS_2 and with some little intercalations of the tiny-grained and tender-grained, but medium-grained too, amphibolitic and epidotic greenstone, with the some little irregular intercalations or schliers and pellets of quartz. The total structure is the phacoidal schistose. The average gradient of this foliation is 40° - 50° around.
0,65 - 0,75	The white gray quartz with some irregular schliers or pellets of carbonates near the boundarys of this foliation.
0,75 - 2,55	The amphibolitic-epidotic greenschist as well as in 0,30 - 0,63 m, but with more intercalations, schliers and pellets or irregular lenticles of quartz and with some grains or little spots and schliers from the garnet.
2,55 - 2,75	The white quartz, as well as in 0,00 - 0,30 m.
2,75 - 8,40	The motley serie of the amphibolitic - epidotic and chloritic greenschists as well as 0,30 - 0,65 m but with some more intercalations of the tiny-grained amphibolitic and epidotic and epidotic greenstones. The structure is little bit the phacoidal-schistose and phacoidal too. Locally are present some the clear foulding of the cm and dm amphlitude. The average gradient of this foliation is 35° - 40° but somewhere 15° - 20° about.
8,40 - 9,50	The keratophyres rock with a lot of small acicular crystales of the hornblende, with not so much chlorite and with some small grains of garnet. The schistosity is clear enough. Locally commemorate this rock some the methaquartzite more.
9,50 - 12,60	The motley serie of the zone positions of greenschists and the tiny-grained greenstones, which are exchanged, as well as in 2,75 - 8,40 m. The average gradient of this schistosity is 40° about.

12,60 - 12,90	The sericitic keratophyre, the same as in 8,40 - 9,50 m, but with very weak and poor impregnation of FeS_2 mostly.
12,90 - 14,90	The medium-grained an tiny-grained amphibolitic and chloritic greenstone, which are strongly infiltrated by quartz-feldspar matter, and with some very poor and very weak impregnation of FeS_2 only. The average gradient of this foliation is 50^o about.
14,90 - 15,75	The keratophyre as well as 8,40 - 9,50 m.
15,75 - 20,60	The strongly quartzy, epidotic-chloritic and amphibolitic greenschist with some micas of biotite and with not so much, mostly little intercalations of the white-gray and gray quartzite. The some weak impregnation of FeS_2, but more of $CuFeS_2$ and little bit of FeS are present too. The average gradient of this foliation is 55^o about.
20,60 - 20,90	The keratophyre as well as in 8,40 - 9,50 m, but without chlorite and without some amphibole porphyroblasts, but with some little micas of biotite.
20,90 - 21,00	As well as 15,75 - 20,60 m. The average gradient of this foliation is 60^o about.
21,00 - 21,20	The keratophyre as well as 20,60 - 20,90 m.
21,20 - 21,40	As well as 15,75 - 20,60 m.
21,40 - 22,30	The keratophyre as well as 6,40 - 9,50 m.
22,30 - 45,10	The motley serie of the amphibolitic-epidotic and strongly chloritic green-schists sericitic-epidotic chloritic green-schists, more strongly quartzy with some strongly FeS_2 impregnation, but in the total very poor with some rodlike acicular porphyroblasts of hornblende and locally with some very poor impregnation of $CuFeS_2$. Ca 26,40 - 26,50 m, 28,20 - 28,40 m are position of the keratophyre. As well as 21,40 - 22,30 m. Ca 29,30 - 29,40, 36,05 - 36,10, 41,90 - 42,00 are present some irregulare position of white quartz without some impregnation of ore minerals. Between 41,00 - 45,10 m are present very clear foulding of the cm - dm amphitude. The average of this foliation is 50^o about.

Ca. to 41,00 m impr. more strongly, after very weak and very poor only.

This borehole no. 135 was finished at 45,10 m.

The petrografical profile of the borehole nr. 135., Skarvåsen

K. Carlsen
8.77

BORHULL NR. 136, SKARVÅSEN.

0,00 - 26,55 Grønnskifer. Sterkt klorittisk. Inneholder også endel amfibol. Uregelmessige årer og slirer av kvarts og karbonater med mektighet mindre enn 10 cm finnes. Finkornig. Mørk grønn farge. Bergarten viser meget intense folde-strukturer. 14,40 - 23,50: Bergarten er impregnert av magnetkis og kobberkis. 23,50 - 26,55: Meget svak impregnasjon av magnetkis.

26,55 - 27,50 Biotittskifer. Rik på 1 - 2 mm store granater. Middel- til finkornig. Rødlig, gråsort farge. Skifrighet 30 grd. Impregnert av magnetkis og kobberkis.

27,50 - 29,80 Grønnskifer. Finkornig. Grønn farge. Kvarts-årer danner meget intense foldestrukturer. Svake impregnasjoner av magnetkis.

29,80 - 34,00 Grønnskifer. Klorittisk med mye amfibol. Uregelmessige, smale kvarts-årer. Finkornig. Mørk grønn farge. Skifrighet 30 grd.

34,00: Avslutning borhull 136, Skarvåsen.

R. Hagen
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BORHULL NR. 137, KOLLA.

0,00 - 16,00 Glimmerskifer med granater mindre enn 4 mm. Biotitt-rik. Lokale partier med høyt innhold av kvarts, andre med høyt innhold av kloritt. Middelkornig. Grå - sort farge. Skifrighet 5 - 10 grd. Svake impregnasjoner av magnetkis. 6,40 - 10,60: Sterkt oppknust bergart. 12,50 - 16,00: Grafitt- og magnetkis-førende partier.

16,00 - 18,95 Glimmerskifer. Rik på kvarts og muskovitt. Middelkornig. Lys grå farge. Dårlig skifrighet. Svakt impregnert av magnetkis.

18,95 - 19,70 Grafitt-skifer med noe kvarts og glimmer. Inneholder magnetkis, svovelkis og litt kobberkis. Finkornig. Grå-sort farge. Dårlig skifrighet 20 - 40 grd.

19,70 - 23,75 Glimmerskifer. Med biotitt, kvarts og noe kloritt. Fin- til middel-kornig. Grå farge. Skifrighet 30 grd.

23,75 - 25,20 Glimmerskifer med granater mindre enn 10 mm. Klorittisk. Lokale soner med høyt innhold av biotitt. Inneholder spredte, smale kvarts-årer parallelt skifrigheten. Finkornig. Grønn-grå farge. Skifrighet 15 grd.

25,20 - 29,40 Som 19,70 - 23,75. Spredte granater mindre enn 5 mm. Også svak impregnasjon av magnetkis. Skifrighet 15 grd.

29,40 - 30,35 Grønnskifer med høyt amfibol-innhold. Finkornig. Grønn farge. Skifrighet 5 - 10 grd. Lokale soner med glimmer.

30,35 - 31,80 Som 25,20 - 29,40.

31,80 - 33,60 Som 29,40 -30,35.

33,60 - 37,70 Kvarts-skifer. Inneholder noe glimmer. Lokalt finnes opptil 10 mm. porfyroblaster av granat, samlet i klyser. Også litt amfibol. Middelkornig. Grå-hvit farge. Dårlig skifrighet. Svak magnetkis-impregnasjon.

37,70: Avslutning av borhull 137, Kolla.

K. Carlon
8-77

BORHULL NR. 138. KOLLA.

0,00 - 2,90 Glimmerskifer. Klorittisk med granater opptil 5 mm. Middelkornig. Mørk grønn farge. DÅrlig skifrighet. Uregelmessige, smale årer av kavrts. Lokale impregnasjoner av magnetkis langs sprekker og spalteflater.

2,90 - 18,70 Glimmerskifer. Rik på biotitt og granater opptil 5 mm. Middel- til grovkornig. Grå-sort farge. Skifrighet 20 grd. Inneholder tynne kvarts-årer parallelt foliasjonen.
17,70 - 17,78: Sterk impregnasjon av magnetkis i kvarts.

18,70 - 22,55 Gradvis overgang fra glimmerskifer til grønnskifer.

22,55 - 25,20 Grønnskifer. Med kloritt, amfibol og noe glimmer. Fin- til middelkornig. Mørk grønn farge. Skifrighet 30 grd.

25,20: Avslutning borhull 138, Kolla.

Lenger nord av de 3 borhullene i dette området.

R. Hagen
8.77

BORHULL NR. 139. KOLLA.

0,00 - 9,50 Glimmerskifer med granater mindre enn 4 mm. Høyt innhold av biotitt. Lokale kloritt-rike partier. Middelkornig. Fargen er mørk grå. Skifrighet 15 grd. Lokale kvarts og kloritt-rike soner med svak magnetkis-impregnasjon.

9,50 - 12,00 Kvartsrik glimmerskifer med kloritt. Finkornig. Grå-grønn farge. Svært dårlig skifrighet. Svak impregnert av magnetkis. 8,00 - 13,00: Sterkt oppknust bergart.

12,00 - 14,60 Grafitt-skifer. Med noe kvarts, glimmer og litt kloritt. Magnetkis-førende. Finkornig. Grå-sort farge. Skifrighet 30 grd.

14,60 - 17,40 Glimmerskifer med biotitt. Også kvarts, feltspat, kloritt og amfibol. Middelkornig. Grå-sort farge. Skifrighet 20 grd. Meget svake impregnasjoner av kobber- og magnetkis.

17,40 - 19,00 Glimmerskifer med muskovitt og kloritt. Finkornig. Fargen er grå-grønn. Skifrighet 30 grd. Magnetkis-impregnert.

19,00 - 25,85 Glimmerskifer. Biotitt-rik. Lokale partier med mye kloritt og noe amfibol. Hyppige, 10 mm. brede kvarts-årer parallelt skifrigheten. Fin- til middel-kornig. Grå - sort farge. Skifrighet 20 -35 grd. 20,00 - 25,85: Opptil 10 mm. porfyroblaster av granat.

25,85: Avslutning av borhull 139, Kolla.

lenger nytt av de 3 borhullene.

R. Hagen
8.77

BORHULL NR. 150, RØDALEN.

0,00 - 0,30 Granat-glimmerskifer med høyt kvarts-innhold. Granater med idiomorf krystallform mindre enn 5 mm. Fargen er rød-spraglet grå. Svært dårlig skifrighet.

0,30 - 14,30 Grønnskifer, med kloritt, glimmer og kvarts. Finkornig. Grønn farge. Dårlig skifrighet 54 grd. Smale sekundære sprekkefyllinger av kvarts og karbonater. 3,90 - 4,00: Sterk impregnasjon av magnetkis.

14,30 - 18,80 Grønnskifer. Biotitt-rik. Kvarts-årer danner laminater i skifrigheten. Lokalt finnes meget kloritt-rike partier. Også lokale partier med granater mindre enn 3 mm. Bergarten er finkornig. Fargen er grå-grønn til sort. Få-tallige sekundære sprekkefyllinger av kvarts. Impregnert av magnetkis. 16,00 - 16,20: Sterk magnetkis-impregnasjon.

18,80 - 40,70 Grønnskifer. Lokale partier med høyt biotitt-innhold. Inneholder kvarts-årer som for det meste ligger parallelt skifrigheten, men også noen få sekundære, smale sprekkefyllinger. Finkornig. Mørk grønn farge. Skifrighet 5 - 10 grd. Bergarten er meget svakt impregnert av magnetkis. 21,10 - 21,75, 24,80 - 25,20, 26,60 - 26,70, 27,10 - 27,40, 30,20 - 30,70 og 30,95 - 31,05: Soner med porfyroblaster av granat (mindre enn 4 mm.) og med sterk impregnasjon av magnetkis. 34,00 - 40,70: Økende hyppighet av biotitt-rike partier.

40,70 - 74,00 Glimmerskifer. Lokale partier med høyt biotitt-innhold. Også partier med amfibol og granat. Overgang fra kloritt-rik glimmerskifer ved 40,70 til glimmerskifer nesten uten kloritt ved 46,40. Lokale kvarts-rike partier som fører granater mindre enn 2 mm. Bergarten er rik på 5 - 10 mm. brede kvarts-slirer parallelt skifrigheten. Fargen varierer fra grønn-grå til grå. Finkornig. Skifrighet omlag 30 grd. 67,35 - 67,50: Kvarts-åre.

74,00: Avslutning av borhull 150, Rødalen.

BORHULL NR. 150, RØDALEN. 2005 - 1356

0,00 - 0,30 Granat-glimmerskifer. Kvartsrik. Granater mindre enn 5 mm. Fargen er rød-spraglet grå. Bergarten viser svært dårlig foliasjon.

0,30 - 14,30 Grønnskifer, med kloritt, glimmer og kvarts. Finkornig med dårlig skifrighet. Grønn farge. Foliasjon 55 grd. Sekundære sprekkefyllinger av kvarts og karbonater. 3,90 - 4,00: Sterk impregnasjon av magnetkis.

14,30 - 18,80 Grønnskifer med biotitt. Finkornet. Lokale meget kloritt -rike partier. Også lokale partier med granater opptil 3 mm. Kvarts-årer danner laminater parallelt foliasjonen. Fargen er grå-grønn til sort. Fåtallige, smale sekundære sprekkefyllinger av kvarts. Bergarten er magnetkis-impregnert. 16,00 - 16,20: Sterk magnetkisimpregnasjon.

18,80 - 40,70 Grønnskifer, rik på kloritt og amfibol. Lokale partier med høyt innhold av biotitt. Mørk grønn farge. Skifrighet 5 -10 grd. Inneholder kvartsårer som for det meste ligger parallelt medskifrigheten, noen få smale sprekkefyllinger. Bergarten er meget svakt impregnert av magnetkis. 21,10 - 21,75, 24,80 - 25,20, 26,60 - 26,70, 27,10 - 27,40, 30,20 - 30,70 og 30,95 - 31,05: Soner med porfyroblaster opptil 5 mm. av granat og med sterk impregnasjon av svovelkis. Fra 34,00: Økning av biotitt-rike partier.

40,70 - 74,00 Glimmerskifer. Lokale partier med høyt biotitt-innhold. Også partier med amfibol og granater. Overgang fra klorittisk glimmerskifer ved 40,70 til ren glimmerskifer ved 46,40. Rik på 5 - 10 mm brede kvartslinser parallelt skifrigheten. Mørk grønn farge. Skifrigheten varierer omkring 20 grd. 45,80 - 46,20: Særlig kloritt-rike partier. Fra 48,50: Homogen glimmerskifer med muskovitt, biotitt og kvarts. 67,35 - 67,50: Kvarts-linse.

74,00: Avslutning av borhull 150, Rødalen.

BORHULL NR. 151, RØDALEN. 035° S - 20° V

0,00 - 3,70 Glimmerskifer, biotitt-rik med kloritt og amfibol. Finkornet. Lokale partier med granater opptil 2 mm. Spredte kvarts og karbonat årer. Grå-grønn farge. Dårlig skifrighet, 70 grd. 2,25 - 2,45: Kvarts-rik sone med impregnasjon av magnetkis.

3,70 - 26,65 Glimmerskifer. Rik på både muskovitt og biotitt. Også kvarts og kloritt. Inneholder uregelmessige kvarts og karbonat årer. Grå farge. Lokalt dårlig skifrighet, 30 grd. 3,70 - 6,10: Lokale partier med høyt magnetitt-innhold, også impregnasjon av magnetkis.

26,65 - 28,95 Magnetitt-sone. Massiv finkornet magnetitt med biotitt og svovelkis. Sort farge. 26,95 - 27,55: Som 3,70 - 26,65, men magnetitt-førende.

28,95 - 33,05 Glimmerskifer med magnetitt. Inneholder porfyroblaster av granat og svovelkis opptil 3 mm. Skjæres av ujevne, smale årer av kvarts og karbonater. Fargen er grå-sort. Fra 31,50: Avtagende magnetitt-innhold.

33,05 - 35,30 Grønnskifer. Rik på amfibol. Inneholder spredte små granater. Middelkornig. Inneholder årer av kvarts og karbonater som for det meste ligger parallelt skifrigheten. Mørk grønn farge. Varierende skifrighet. Svak impregnasjon av sulfider.

35,30 - 38,80 Magnetitt-sone. Massiv, finkornet med kvarts, biotitt og svovelkis. Inneholder også millimeter-store granater. Skjæres av smale kvarts-årer.

38,80 - 41,10 Glimmerskifer med kloritt. Granater finnes i finkornige masser. Også fine laminater av kvarts parallelt skifrigheten som danner en vinkel på 10 grd. Fargen er grå. Inneholder tydelige foldestrukturer.

41,10: Avslutning av borhull 151, Rødalen.

R. Flagen
8.77

BORHULL NR. 172, MOSENG.

0,00 - 52,50 Grønnskifer med høyt innhold av kloritt og amfibol. Bergarten inneholder ikke særlig hyppige, smale kvarts-årer, de fleste parallelt skifrigheten. Finkornig. Mørk grønn farge. Skifrigheten varierer fra 5 til 40 grd., beroende på foldinger. 1,75 - 5,10: Parti med porfyroblaster av granat (opptil 5 mm.) og amfibol. Dette partiet er magnetkis-impregnert. 9,70 - 9,90: Sone med ren kvarts, med noe magnetkis i overgangene. 23,50 - 26,05: Parti med granater, opptil 4 mm. 26,00 - 31,00 og 33,50 - 41,60: Partier med intense folde-strukturer og hyppige kvartsårer. Ved omlag 39,00: Overgang til en lysere feltspatholdig grønnskifer. Ved 43,00, 44,50, 44,80 og 45,50: Omlag 10 cm. brede bånd av feltspatholdig amfibol-biotitt-skifer som er svakt impregnert av magnetkis. 45,60 - 52,50: Intense folde-strukturer. 46,30, 49,00, 52,10 og 52,20: 10 - 15 cm. brede kvartsbånd.

52,50: Avslutning av borhull 172, Moseng.

BORHULL NR: 173, RISMOEN.

4000 V - 980 N
NGU 1970

0,00 - 4,10 Klorittisk grønnskifer i veksling med amfibol-rik glimmerskifer. Sistnevnte inneholder granater opptil 2 mm. Bergarten inneholder smale årer og slirer av kvarts som følger lagningen. Det finnes også spredte uregelmessige opptil 30 cm store linser av kvarts. Fargen er vekslende grå - grønn. Bergartene viser intense foldestrukturer i amfibolnålene. Uregelmessig foliasjon 10 - 15 grd.

4,10 - 7,80 Glimmerskifer, rik på kloritt og amfibol. Inneholder også korn av feltspat og granat. Finkornet. Fargen er grønn - mørk grå. Skifrighet 10 grd.

7,80 - 9,50 Klorittisk glimmerskifer i 5 - 10 mm. mektige lag i veksling med feltspat-rik amfibolskifer i 3 - 10 mm. lag. Grønn - grå farge. Foliasjon 20 grd. Svak impregnasjon av svovelkis og magnetkis.

9,50 - 15,15 Som 7,80 - 9,50, men med sterkt varierende vekslinger. Amfibolskifer med små granater i opptil 30 cm mektighet. Dessuten uregelmessige kvartslinser opptil 5 cm. Ved 9,75 og 11,15 1 cm brde årer av karbonater konkordant foliasjonen. Fargen er vekslende grå - hvit / mørk grønn. Skifrigheten er middels god og danner 10 grd. Svak impregnasjon av magnetkis og kobberkis.

15,15 - 18,85 Amfibolskifer med små korn av feltspat og granat. Lokale kloritt-rike lag. 18,40 - 18,55 kvartslinse. Bergarten har grå - grønn farge. Middels skifrighet, 5 grd.

18,85 - 33,60 Klorittisk grønnskifer vekslende med 0,5 - 5 cm mektige lag av amfibolskifer med feltspat og granat. Lokale partier med 2 - 3 mm fenokrystaller av feltspat. Ganske hyppige slirer og linser av kvarts, opptil 3 cm. 27,90 - 28,00 ~~og 32,85 - 33,05~~ består av hydrotermal kvarts. Fargen er vekslende grønn - grå. Foliasjon: 5 - 10 grd. Lokale svovelkisimpregnasjoner langs foliasjonsplanene. 32,85 - 33,05 sone med kvartskeratofyr inneholder amfibolnåler, 4 - 8 mm og granater opptil 5 mm.

33,60 - 38,00 Grønnskifer, klorittisk med amfibol, 2 - 3 mm og fenokrystaller av feltspat. 0,5 - 3,0 cm store slirer av kvarts. Fargen er grå-grønn. Foliasjon mindre enn 5 grd.

38,00 avslutning av borhull 173, Rismoen.

BOREHOLE NO. 174 - KORSVOLL

4515 V - 795 N

The brief petrografical description.

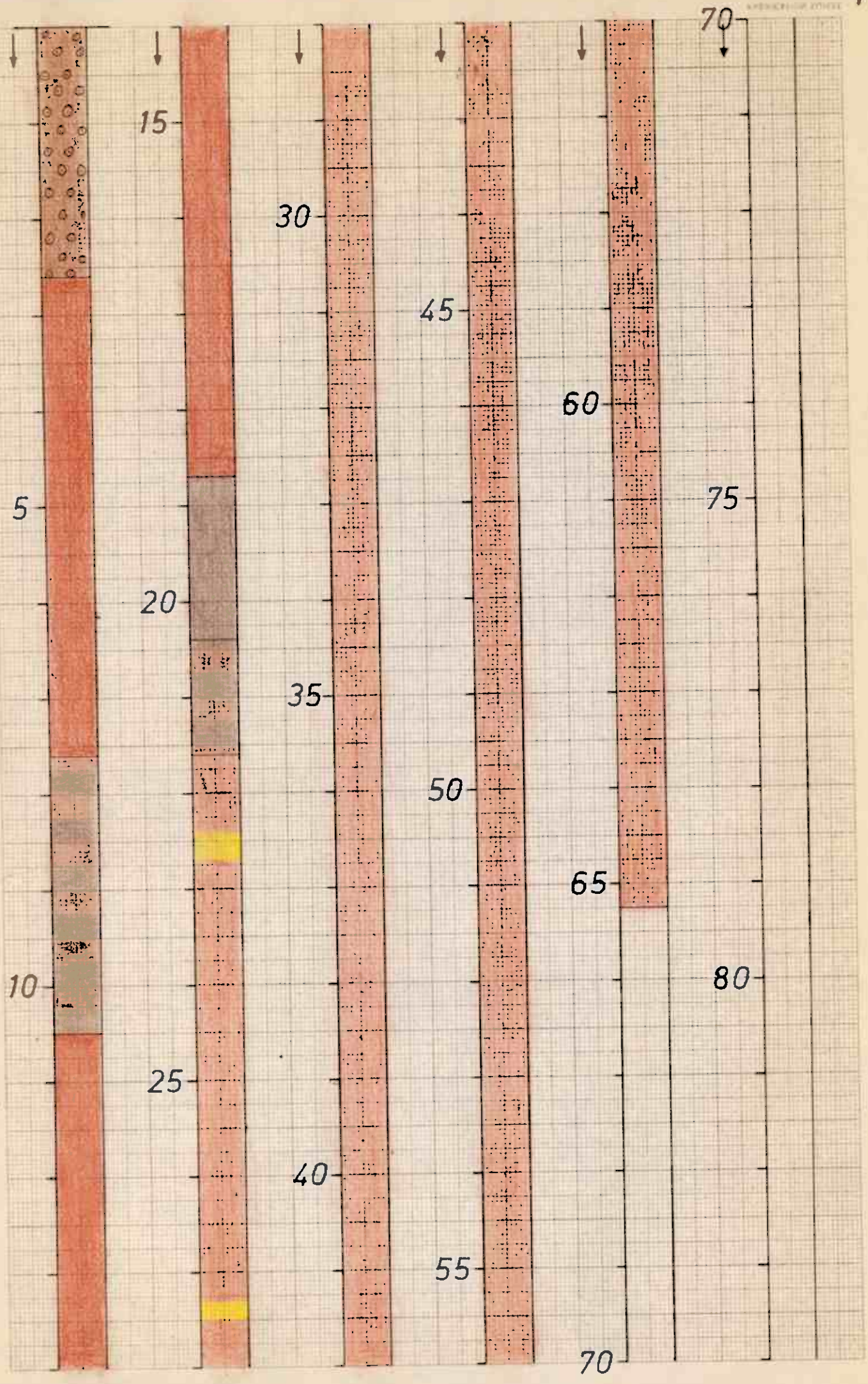
0,00 - 2,60	The medium grained amphibolitic greenschist, strongly infiltrated by quartz - feldspatic matrix, with a lot of small and little grains of garnet. The structure is fluidial schistose.
2,60 - 7,60	The chloritic, amphibolitic greenschist, locally with a lot of spots or grains of carbonates and with a lot of little schliers and little intercalations of quartz, quartz-cabonatic and scarcely of quartz-feldspatic matrix too. The structure is parallel schistose and sheeting. The average gradient of this foliation is 70^{o} - 75^{o} about.
7,60 - 10,50	The tiny-grained and medium-grained amphibolitic greenschist, strongly infiltrated by quartz-feldspatic matrix as well as in 0,00 - 2,60 m, but oftenly with bigger grains of garnet.
10,50 - 18,70	The chloritic, amphibolitic greenschist as well as in 2,60 - 7,60 m. The average gradient of this foliation is 75^{o} - 85^{o} about.
18,70 - 20,40	The tiny-grained amphibolitic greenstone with a parallel banking structure, with a lot of little grains of garnet and with a lot of little grains of $FeO + Fe_2O_3$.
20,40 - 21,60	The tiny-grained and medium-grained amphibolitic greenschists, strongly infiltrated by quartz-feldspatic matrix as well as in 7,60 - 10,50 m but locally with some poor impregnation of pyrrhotite(in example in 20,60 - 20,90 m and in 21,10 - 21,40 m). The average gradient of this foliation is 70^{o} - 75^{o} about.
21,60 - 65,25	The mptley serie of a chloritic amphibolitic greenschist with a lot of little schliers and little intercalations of quartz, quartz-cabonatic and scarcely quartz-feldspatic matrix. Thsi rock is like the same in example in 2,60 - 7,60 m. The average gradient of this foliation is 70^{o} - 75^{o} about, but locally more than 80^{o} too. Locally is this rock strongly folded by folds of a mm, cm and dm amplitude (in example between 47,00 - 49,00 m and between 62,00 = 65,25 m).

Between 22,40 - 22,70 m and 27,30 - 27,50 m are present the positions of white barren secretion quartz which has around of bordres some chambres of pyrrhotite and locally some grains of carbonates too (ancerite). In 22,90 - 22,95 m is present some poor impregnation of pyrrhotite. Between 49,00 - 57,00 m are present in rock a lot of hypidiomorphic and allotriomorphic grains of FeS_2 mostly (maximally size 1-2 mm).

The borehole was finished at 65,25 m on June 11th 1970.

(Milosh Motys).

The petrografical profile of the borehole nr. 174., Korsvoll



800 x - 350 Y

BOREHOLE NO. 175 SKARVÅSEN.

The beginning of incline of this borehole is - 50°.

The brief petrografical description.

0,00 - 17,40	The motley serie of a tiny-grained, feldspatic amphibolitic greenstone, with a lot of schliers and pellets and little intercalations of quartz-matrix, scarcely of quartz-feldspatic matrix too. Very much little spots or little lenticles are created by soda-lime feldspar. The structure is banding and maculose with a clear schistosity. The average gradient of this foliation is65° - 70° about.
17,40 - 19,70	The keratophyre rock with infiltration of chlorite, with little irregular porphyroblasts of hornblende, and with some little flakes of biotite too. In this rock is present some very poor impregnation of FeS_2 mostly only. Locally is present some little bit clear grain clongation. The structure is massive and sheeting. Locally is this rock folded by folds of a cm and dm amplitude. The average gradient of this foliation is 40° - 50° about, but locally 15° too.
19,70 - 20,80	The strongly chloritic , little bit amphibolitic greenschist, with a lot of little schliers and pellets and little intercalations of a quartz-feldspat matrix. The structure is parallel schistose, locally little bit phacoidal achistose too. The average gradient of this foliation is 25° about.
20,80 - 21,60	The keratophyre rock as well as in 17,40 - 19,70 m.
21,60 - 24,60	The chloritic and amphibolitic greenschist with a lot of schliers, pellets and intercalations irregular oftenly of a quartz, quartz-feldspatic and scare carbonatic (ancerite) matrix. Some sulphidic mineralisation isn,t present mostly. The structure is parallel schistose. Locally is this rock folded by flat folds of a cm and dm amplitude. The average gradient of this foliation is 30° - 65° about.
24,60 - 25,20	The keratophyre as well as in 17,40 - 19,60 m but with more clear massive structure and without a grain clongation of the little acicular and rodlike porphyroblasts of hornblende. Some hypidiomorphic little grains of FeS_2 are present too, but not so much.
25,20 - 28,60	The tiny-grained amphibolitic greenstone, little bit chloritic, with a lot of spots or eyes or very little chambres of soda-lime feldspatic matrix and with ancerite. The structure is

banking and maculose. Some mineralisation of the ore sulphides is present scare only.

28,60 - 31,60 — The biotitic, keratophyre gneiss locally with sericite and with some little chambres or spots (very flat) of chloritic matrix too. The structure is phacoidal-schistose. Some schliers or irregular chambres, small or little only of a phyritic mineralisation are present too, but locally only (in example between 29,10 - 29,30m and at 29,40 around). The average gradient of this foliation is 70° - 75° about. Some very flat folds (mm and cm amplitude) are present locally too.

31,60 - 36,90 — The hornblende gneissic schist with chlorite and sericite and with some flakes of a deferificated biotite and with a lot of schliers and pellets or flat chambres of zoisite-epidotic matrix. The hornblende creats very much acicular and rodlike (more scare) porphyroblasts, chrushed oftenly too. Some pellets or chambres are created by quartz, white and barren only. The structure is sheeting and little bit banking too. The grain elongation of hornblende porp yroblasts isn't clear. The average gradient of this foliation is 20° - 25° about. Some very poor impregnation of FeS and FeS_2 are present scare and locally only (little allotriomorphic grains or amorphic forms). Some little spots of bright-blue malachite are present scare and locally only.

36,90 - 38,20 — The strongly chloritic, amphibol tic and feldspatic (soda-lime feldspars) greenschist with some spots or irregular grains of carbonates too (ancerite-dolomite). Some little irregular flakes or amorphic little *chambres* of chalcopyrite are present locally only. Some schliers or intercalations of a ceratophyre are present locally only too. The structure is maculose-schistose and phacoidal schistose. The average gradient of this foliation is 45° about.

38,20 - 39,40 — The keratophyre gneiss as well as in 28,60 - 31,60 m. The average gradient of this foliation is 70° - 80° about.

39,40 - 40,10 — The hornblende gneiss with a lot of acicular and rodlike porphyroblasts of amphibole (chrushed too), without some clear grain elongation. Some irregular little grains or little flakes of FeS_2 and FeS are present scare only. The structure is pell-mell and sheeting locally too.

40,10 - 45,10 — The strongly chloritic greenschist as well as in 36,90 - 38,20 m, but with much more acicular and rodlike, very little porphyroblasts of hornblende. The average gradient of this foliation is 60° - 70° about.

45,10 - 45,60 — The biotitic, seritic, chloritic and hornblende

keratophyre mica schist with very much little grains of garnet. The structure is banking. The average gradient of this foliation is 75° - 80° about.

45,60 - 46,30 The strongly chloritic and amphibolitic gneissic greenschist, with a lot of schliers, pellets and irregular lenticles of a quartz-feldspatic matrix. This rock has some little bit clear irregular impregnation of pyrite, pyrrhotite and very scare of chalcopyrite too. These sulphides creat some allotriomorphic and hypidiomorphic grains, lenticles, flakes or amorphic irregular chambres. The structure is pell-mell and phacoidal-schistose. The average gradient of this foliation is 70° - 80° about. Locally is this rock folded little bit too. The result of the chemical analyse from this position between 45,60 - 46,30 m is:
Cu = 0,30 %
Zn = 0,20 %
S = 3,00 %

46,30 - 47,80 The biotitic, seritic, chloritic and hornblende keratophyre-mica schist, with garnet as well as in 45,10 - 45,60 m.

49,00 - 49,50 The chloritic and hornblende gneissic greenschist, with a lot of little acicular and rodlike porphyroblasts of hornblende with a clear a total grain clongation. Locally only and scare are present some irregular chambres of pyrrhotite with chalcophyrite, very scare together too. The structure is sheeting and parallel schistose. The average gradient of this foliation is 50° - 55° about.

49,50 - 51,80 The biotitic and chloritic gneissic schist with a lot of little flakes and little amorphic chambres of pyrrhotite and locally only and more scarce with some allotriomorphic grains or very little amorphic forms of FeS_2 and more scarce with some very little amorphic grains of $CuFeS_2$. The structure is fluidial and phacoidal-schistose. This rock is locally strongly folded by the diagonal folds of a dm, cm, mm amplitude.

51.80 - 52,90 The sericitic and chloritic gneissic keratophyre schist or keratophyre with some irregular grains of garnet and locally with some little acicular and rodlike porphyroblasts of hornblende. Locally are present some flakes or little amorphic chambres of pyrrhotite. The structure is massive and a texture is blastoporphyric and blastoophitic.

52,90 - 53,20 The strongly chloritic and hornblende greenschist, with some little schliers of quartz feldspatic matrix locally only. Some little schliers or little chambres are created by

pyrrhotite, but more scarce by chalcopyrite locally only too. Some rodlike crushed porphyroblasts of hornblende are present too. The structure is pell-mell and phacoidal or phacoidal-schistose.

53,20 - 57,10 The keratophyric, little bit chloritic and sericitic and weakly biotitic gneiss with many very small grains of garnet together. The structure is fluidal schistose and this rock is very detail folded by the diagonal folds of a cm and mm amplitude. The average gradient of this foliation is 80° around, but locally 0° - 10° around too.

57,10 - 60,90 The strongly chloritic and locally hornblende greenschist and gneissic-greenschist too, with some little rodlike and acicular porphyroblasts of hornblende and with some schliers pellets, lenticles or chambres of a quartz or a quartz-feldspatic matrix. Some little flakes or little irregular chambres of pyrrhotite and some allotriomorphic grains of pyrite are present, but locally only. The structure is phacoidal-schistose and rape or fluidial too. This rock is strongly and very detail folded locally by the diagonal folds of a cm and mm amplitude.

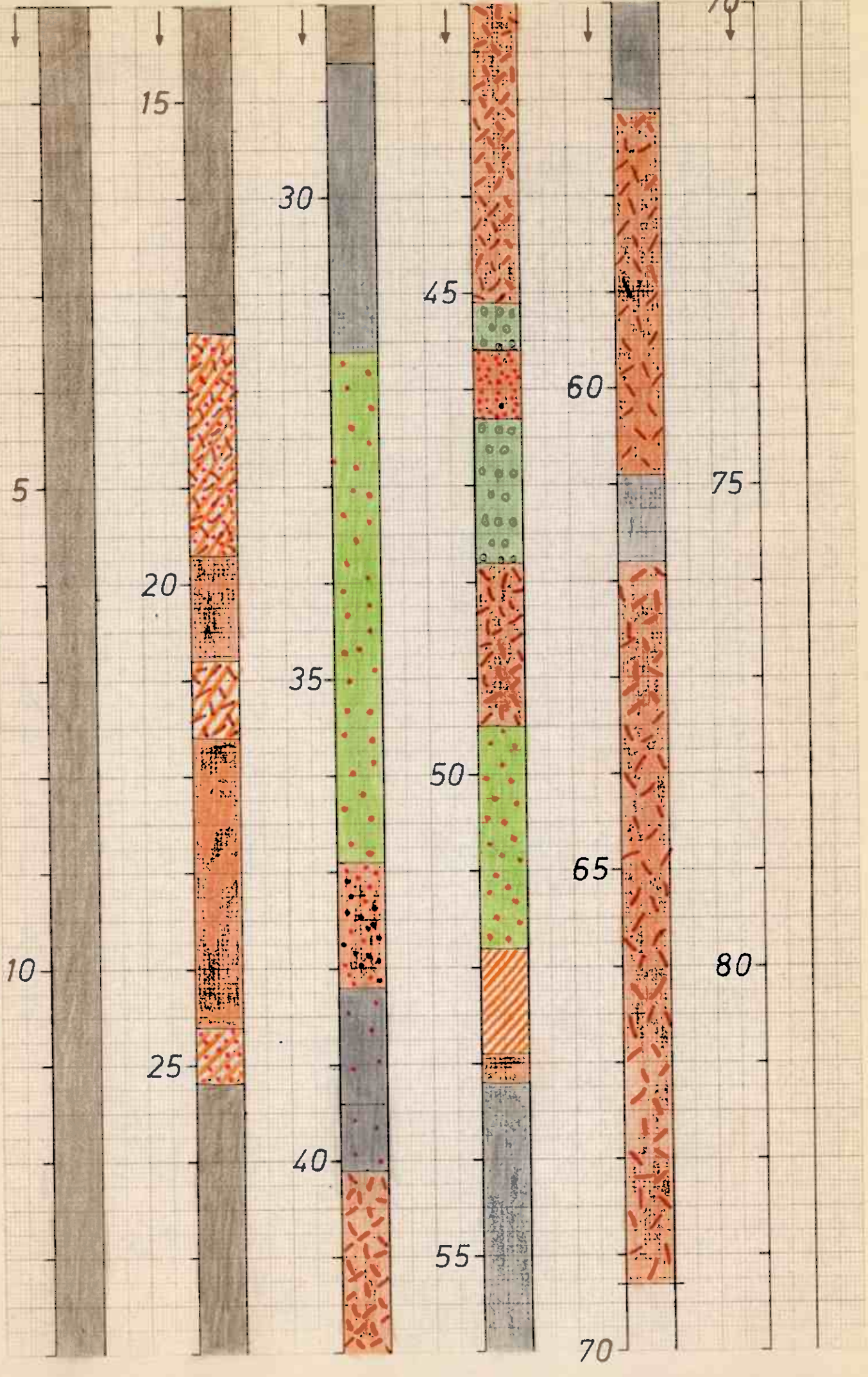
60,90 - 61,80 The hornblende and zoisite-epidotic and little bit chloritic gneiss, with some little flakes of biotite and sericite too. The hornblende created a lot of little and small crushed porphyroblasts. Locally only are present some flakes or amorphic forms of pyrrhotite or some little allotriomorphic grains of pyrite or idiomorphic grains. The structure is massive and sheeting, locally too. Some a total grain elongation is little bit clear too allong the hornblende porphyroblasts.

61,80 - 69,30 The strongly chloritic and locally hornblende greenschist as well as in 57,10 - 60,90 m. The average gradient of this foliation is 50°-60° around.

This borehole no. 175 was stopped at 69,30 m on Juni 21st 1970 at 10.30 a.m.

(M. Motys).

The petrografical profile of the borehole nr. 175, Skarvåsen.



THE BOREHOLE NR. 176, Skarvaasen. 1030 x - 265 Y

The brief petrographical description.

0,00 - 10,60 The tiny-grained chloritic and feldspatic greenstone with some irregular grains or spots of carbonates (dolomite a kerite) too. The feldspatic and a quartz-feldspatic matrix creat a lot of spots, pellets, schliers lenticles and chambres. Locally only are present some irregular allotriomorphic grains of pyrite. The structure is maculose-schistose or fluidal schistose. The averag gradient of this foliation is 50° about. Between 7,80 - 7,95 m is present a position of a white secretion quartz with some irregular inclucions of carbonates (dolomite-ancerite).

10,60 - 12,55 The chloritic and amphibolitic feldspatic greenschist with much little acicular porphyroblasts of hornblende. The quartz-feldspatic matrix creats a lot of very thin little schliers which are paralel with the total schistosity. The average gradient of this foliation is 50° about.

12,55 - 14,60 The chloritic, amphibolitic and garnet keratophyre. The hornblende creats a lot of acicular and rodlike porphyroblasts which havent some a total grain clongation. The structure is massive and the texture is blastoporphyric.

14,60 - 14,95 The medium grained and little bit coarse-grained amphibolitic feldspatic and chloritic greenstone, strongly infiltrated by a quartz-feldspatic matrix. The structure is massive and the texture is blastophitic and porphyric.

14,95 - 15,20 The amphibolitic and garnet keratophyre as well as in 12,55 - 14,60 m.

15,20 - 24,25 The strongly chloritic amphibolitic greenschist as well as in 10,60 - 12,55 m but locally with some detail folds of a mm and cm amplitude. Locally this rock hasn't so much schliers or pellets of a quartz-feldspatic matrix. The average gradient of this foliation is 50° about.

24,25 - 27,00 The hornblende and garnet keratophyre as well as in 12,55 - 14,60 m.

27.00 - 34,50 The strongly chloritic amphibolitic greenschist as well as in 10,60 - 12,55 m but locally with some flakes or irregular grains of FeS_2. The average gradient of this foliation is 50° about. Between 28,55 - 28,80 m, 29,10 - 29,30 m and between 31,30 - 31,40 m are present the positions of a white barren secretion quartz.

34,50 - 37,65 The tiny-grained chloritic and feldspatic amphibolitic greenstone as well as in 0,00 - 10,60 m. The average gradient of this foliation is 50° about.

37,65 - 38,35 The tiny-grained and little bit medium-grained amphibolitic greenstone feldspatic with some chrushed small rodlike porphyroblasts of hornblende In this rock are present much littl lenticles chambres or flakes of pyrrhotite, pyrite and more scharcely of chalcopyrite too. The structure is massive and pell-mell and the texture is blastophitic oftenly. The result of the chemical analyse from this position between 37,65 - 38,35 m is:

1) Cu = %
Zn = %
S = %

38,35 - 56 30 The motley serie of a strongly chloritic, amphibolitic greenschist with a lot of little schliers, pellets, chambres and spots of a quartz-feldspatic matrix and locally only with some small and little flakes, chambres or irregular spots of pyrite and of pyrrhotite too. The structure is fluidal and phacoidal-schistose. This rock is folded oftenly by the diagonal folds of a mm and cm and dm amplitude. The average gradient of this foliation is 30° about, but locally 40° - 50° around too. Between 49,10 - 49,25 m, 49,60 - 49,85 m and between 51,80 - 51,95 m are present a positions of a white barren secretion quartz.

56,30 - 58,20 The very strongly chloritic amphibolitic greenschis with a lot of little schliers, chambres and pellets of a quartz and of a quartz-feldspatic matrix and with much flakes of biotite. Locally are present some poor impregnation of pyrrhotite and pyrite with chalcopyrite more scarce too. These sulphides creat some flakes, littlehambres or irregular little lenticles. The structure is phacoidal-schistose and fluidal mostly. The average gradient of this foliation is 20° - 30° around.
The result of the chemical analyse from this position between 56,30 - 58,20 m is :

2) Cu = %
Zn = %
S = %

58,20 - 58,70 The chloritic and little bit biotitic and amphibolitic quartzite with some poor impregnation of pyrite and pyrrhotite mostly only. The structure is massive. The result of the chemical analyse from this position between 58,20 - 58,70 m is:

3) Cu = %
Zn = %
S = %

58,70 - 61,10 The strongly chloritic, amphibolitic greenschist with some poor impregnation as well as in 56,30 - 58,20 m. The average gradient of this foliation is 50° around.
Between 59,00 - 59,10 m is present a position of a white barren secretion quartz. The result of the chemical analyse from this position between 58,70 - 61,10 m is:

4) Cu = %
Zn = %
S = %

61,10 - 62,60 The serie of a chloritic quartzy myllonitic and little bit weakly amphibolitic greenschist (myllonit) with a poor impregnation of pyrite, pyrrhotite and more scarce of chalcopyrite or sphalerite. These sulphides creat some irregular little chambres or lenticles or flakes. The str cture is pell-mell or myllonitic mostly. The result of the chemical analyse from this position is:
5) Cu = %
Zn = %
S = %

62,60 - 72,30 The hornblende and chloritic gneiss. The hornblende creats a lot of little and small rodlike and acicular porphyroblasts of hornblende which have locally some clear a total grain clongation. The structure is massive and sheeting. The average gradient of this foliation is 50° around.

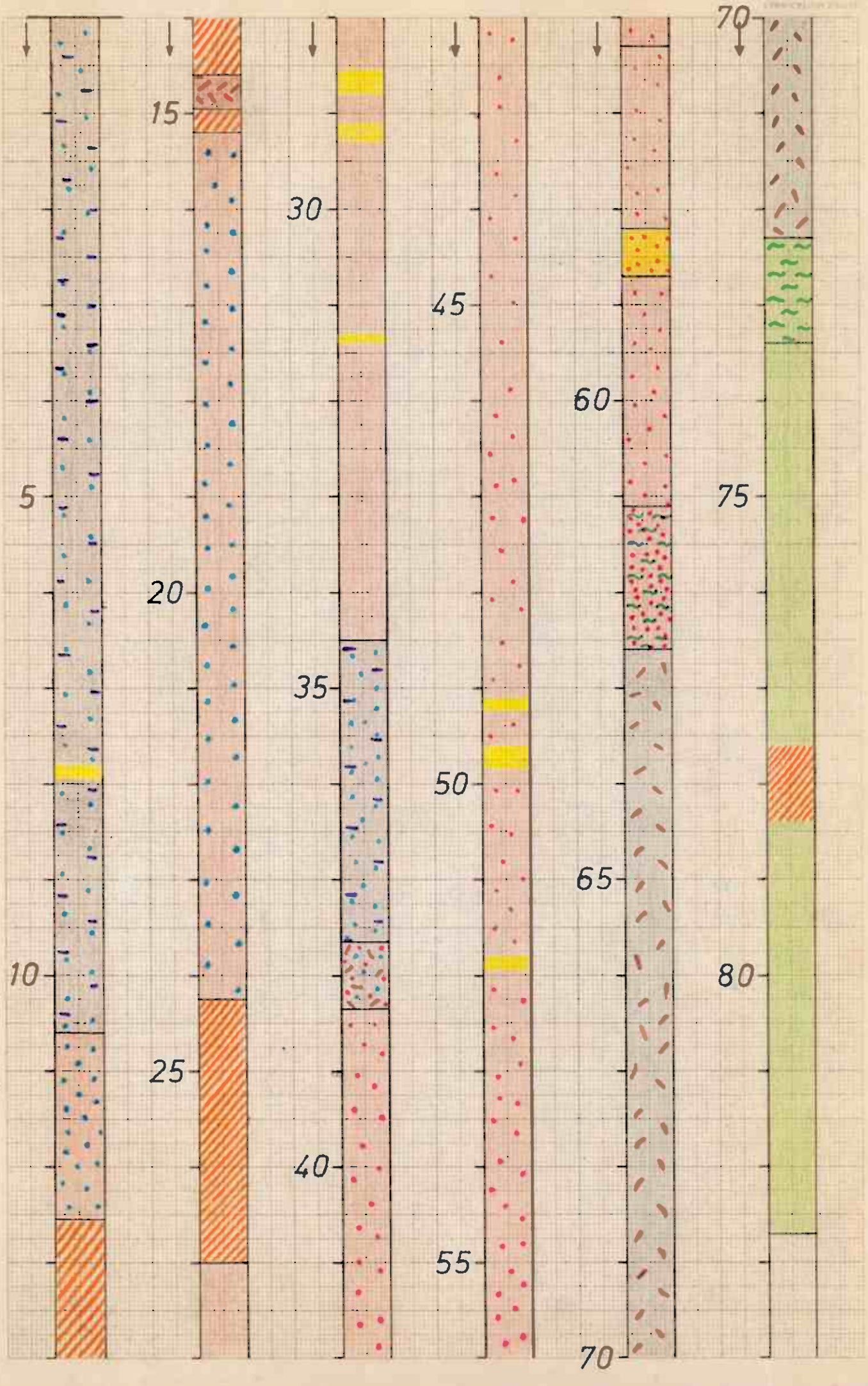
72,30 - 73,40 The chloritic and strongly biotitic, myllonitic gneissic greenschist, locally with some schliers pellets and lenticles of a white secretion quartz which has locally some irregular little inclusions of zoisite-epidote matrix. The structure is pell-mell and myllonitic. Some or sulphides are present very scarce only.

73,40 - 82,70 The chloritic and biotitic gneissic greenschist, locally with some schliers, pell ts and lenticles of a white secretion barren quartz. The structure is schistose sheeting and phacoidal-schistose. Locally is this rock folded by the diagonal folds of a cm and dm amplitude. Some ore sulphides are present scarce only. The average gradient of this foliation is 40° about.
Between 77 60 - 78,40 m is present a position of a hornblende-garnet keratophyre like as in 12,55 - 14,60 m but with clear a total grain clongation of the little acicular and rodlike porphyroblasts of hornblende. The structure is sheeting. The average gradient of this foliation is 55° around.

This borehole was stopped at 82,70 m.

July 18th 1970
Milosh Motys.

The petrografical profile of the borehole nr. 176, Skarvåsen.



Bh 176 Skarvåsen

FOLLDAL VERK A/S

DRIFTSANALYSER

Tatt 19

Skift:	% Cu	% Zn	% S	% Fe				% H_2O	Sikt	Anmerkning
Rågods, tørt	0.03	–	1.50		Fra	57.65	–	58.35	~	
Cu-konsentrat	0.01	0.05	1.65		"	56.30	–	58.20	"	
Cu-avgang	0.04	0.05	2 –		"	58.20	–	58.70	"	
Zn-konsentrat	0.02	–	1.10		"	58.70	–	61.10	"	
Zn-avgang	–	–	1. –		"	61.10	–	62.60	"	
S-konsentrat										
S-avgang										
Cu-retur										
Zn-retur										
Cu-tørke										
Zn-tørke										
S-tørke I										
S-tørke II										

Folldal Verk 12/8 1970

[illegible signature]

SÆTHER, HAMAR

THE BOREHOLE NR. 177, Skarvaasen. 1550 x - 515 Y

The brief petrografical description.

0,00 - 6,10 The chloritic amphibolitic and feldspatic tiny-grained greenstone with a maculose and maculose-schistose structure. Sofa-lime feldspars creat a lot of spots or little chambres. The average gradient of this foliation is 40° - 45° about. Between 2,70-2,80 m, 3,40-3,50 m and between 4,60 - 4,75 m are present the positions of a white barren secretion quartz.

6,10 - 17,80 The strongly chloritic amphibolitic and biotitic (present some small and little flakes of biotite) greenschist with a schistose and phacoidal schistose structure, with very much irregular little positions and pellets or chambres of white barren secretion quartz, which have locally some grains or inclusions of dolomite or ancerite. This rock is mostly strongly folded by the folds (diagonal) of a mm cm and dm amplitude. The average gradient of this foliation is 40° - 50°, but locally 0° - 10° and locally 80° around too.

17,80 - 18,50 The chloritic and biotitic and quartzy gneiss with a pell mell and phacoidal structure and with some poor impregnation of pyrite, and pyrrhotite mostly. This rock is folded by the flat folds of a dm amplitude. The average gradient of this foliation is 30° - 40° about. The result of the chemical analyse from this position between 17,80 - 18,50 m is:

1) Cu = %
Zn = %
S = %

18,50 - 21,50 The strongly chloritic, biotitic and amphibolitic greenschist with a lot of schliers, pellets of a quartz or quartz-feldspatic matrix, with some spots or pellets of a carbonate (dolomite, ancerite) locally too and with some poor impregnation of pyrrhotite mostly, pyrite and chalcopyrite or sphalerit scarcely too. These sulphides creat some little amorphic forms (chambres) mostly. The structure of this rock is phacoidal-schistose or myllonitic-schistose. The average gradient of this foliation is 40° - 45° about.
The result of the chemical analyse from this position between 18,50 - 21,50 m is:

2) Cu = %
Zn = %
S = %

21,50 - 30,00 The strongly chloritic biotitic and amphibolitic greenschist, with a lot of little schliers or pellets of a quartz or of a quartz-feldspatic matrix. Some spots of soda-lime feldspars or of carbonates (dolomite-ancerite) are locally present too. Some little chambres or irregular lenticles (little) of pyrrhotite are present too but locally and scar-

cely only. The structure is schistose and phacoidal-schistose and locally is this rock strongly folded by the folds of a cm and dm amplitude.
The results of the chemical analyses from this position between 21,50 - 30,00 m are:
3) between 21,50 - 24,50 m = Cu = %
Zn = %
S = %
4) between 24,50 - 30,00 m = Cu = %
Zn = %
S = %

30,00 - 32,50 The chloritic amphibolitic and feldspatic greenstone as well as in 0,00 - 6,10 m, but with some spots of carbonates (dolomite-ancerite) too and locally with some poor impregnation of pyrrhotite mostly. The average gradient of this foliation is 40° - 50° about, but 20° - 30° locally too.
The result of the chemical analyse from this position between 30,00 - 32,50 m is:
5) Cu = %
Zn = %
S = %

32,50 - 34,10 The strongly chloritic biotitic and amphibolitic greenschist as well as in 18,50 - 21,50 m. The average gradient of this foliation is 45° - 50° about.
The result of the chemical analyse from this position between 32,50 - 34,10 m is:
6) Cu = %
Zn = %
S = %

34,10 - 37,60 The graphitic, biotitic and sericitic phyllitic mica schist with a lot of grains of garnet and with very much little schliers and pellets of a quartz and of a quartz-feldspatic matrix. The structure is phacoidal-schistose and myllonitic schistose and this rock is folded too by the diagonal folds of a mm,cm and dm amplitude. The average gradient of this foliation is 30° around.
The result of the chemical analyse from this position between 34,10 - 37,60 m is:
7) Cu = %
Zn = %
S = %

37,60 - 38,20 The strongly biotitic and chloritic and zoisit-epidotic gneissic mica schist with a fluidal-schistose and phacoidal-schistose structure. The average gradient of this foliation is 35° - 40° around.

38,20 - 43,00 The chloritic, amphibolitic and biotitic gneissic schist with a lot of small and little rodlike and acicular porphyroblasts of hornblende and with some spots of carbonates too. The structure is sheeting and phacoidal-schistose. The average gradient of this foliation is 45° - 50° around.

43,00 - 44,50 The amphibolitic, biotitic and carbonatic gneiss with a phacoidal and pell-mell structure. Horn-

blende creats a lot of rodlike and acicular chrushed porphyroblasts and carbonates (dolomite-ancerite) creat very much grains and spots. Some sulphides (pyrrhotite or pyrite) are present scarce only.
Between 44,10 - 44,40 m is present a position of a white barren s cretion quartz.

44,50 - 66,40 The motley serie of a biotitic and of a very strongly biotitic and garnet gneissic schist and gn issic mica schist. The structure is phacoidal-schistose, fluidal-schistose and locally myllonitic-schistose too. Some little schliers or chambres of chloritic matrix are locally present too. This rock is locally folded too. Secretion quartz creats a lot of schliers, lenticles and chambres, in example between 52,70 - 52,85 m, 55,00 - 55,15 m, 57,40 - 57,60 m and between 64,50 - 64,70 m are present a position of this white barren secretion quartz. Between 65,70 - 66,30 m is present a barren quartz tectonic breccic with some irregular inclusions (chambres) of biotitic flakes or of the basement rock around, and with some schliers of a graphitic myllonitic matrix. Some amorphic little chambres of FeS_2 are present scarce only. The average gradient of this foliation is 30^{o} - 40^{o} around.

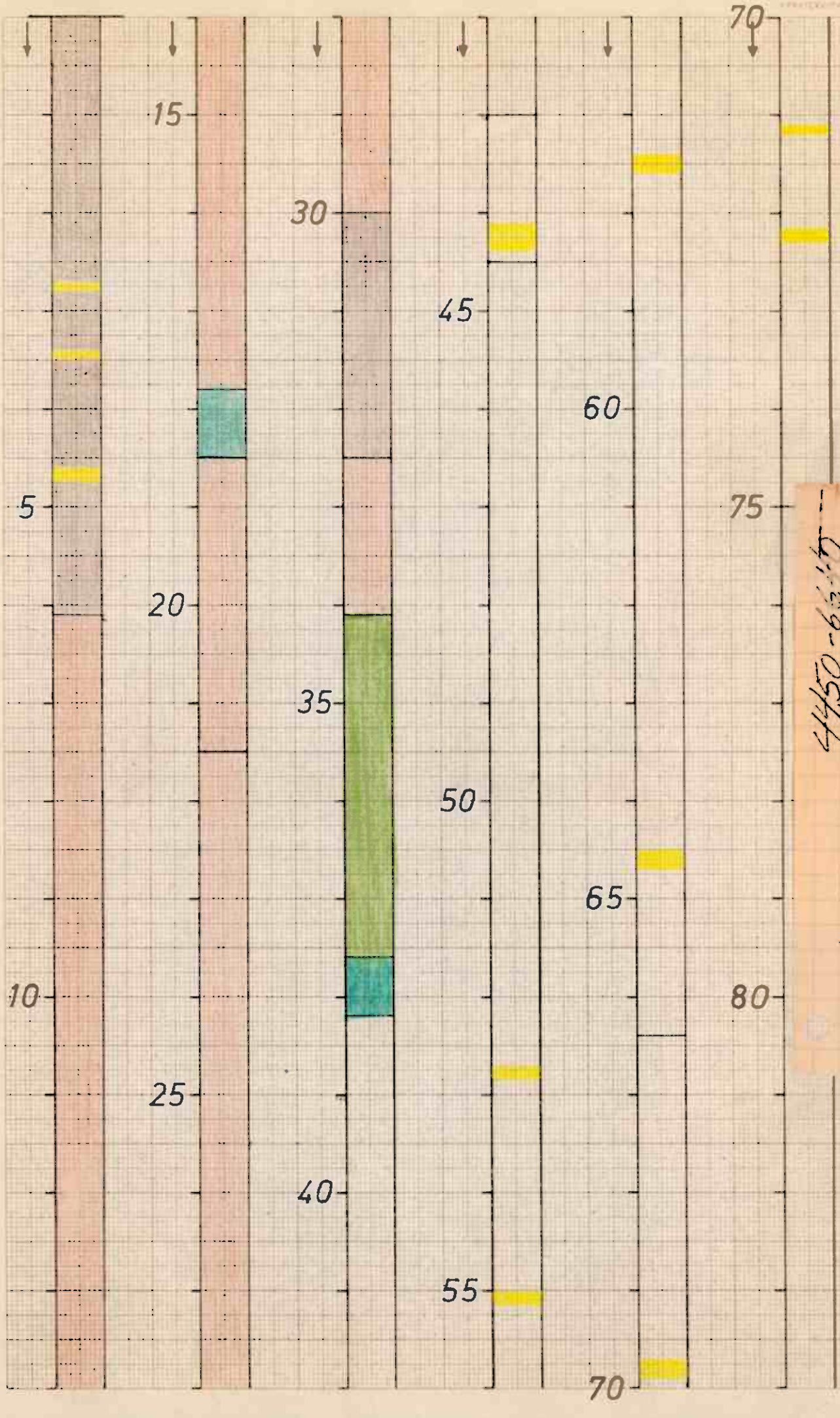
66,40 - 75,00 The biotitic and chloritic and graphitic gneissic mica schist with much little grains of garnet too. This rock has myllonitic and phacoidal-schistose structure and is v ry strongly folded by the folds of a mm and cm and dm amplitude. Some little chambres or flakes of FeS or FeS_2 are present scarce only. The average gradient of this foliation is 20^{o} - 30^{o} around but from 74,00 m 0^{o} around.
Between 69,70 - 69,90 m, 71,10 - 71,20 m and between 72,15 - 72,30 m are present the positions of a white barren secretion quartz.

This borehole was stopped at 75,00 m.

July 10th 1970.

Milosh Motys.

The petrografical profile of the borehole nr. 2



Bk. 175 Spansåsen

LLDAL VERK A/S

DRIFTSANALYSER

Tatt ____ 19

Skift:	% Cu	% Zn	% S	% Fe				% H_2O	Sikt	Anmerkning
gods, tørt	—	—	1.-		Fm	40.10	—	45.10	m	
-konsentrat	—	0.05	1.20		"	45.10	—	45.60	"	
-avgang	0.02	—	1.50		"	46.10	—	47.80	"	
-konsentrat	—	—	0.75		"	52.9%	—	53.20	"	
-avgang										
konsentrat										
avgang										
-retur										
-retur										
-tørke										
tørke										
tørke I										
tørke II										

lldal Verk 12/8 1970

J. Jensen

ÆTHER, HAMAR

OLLDAL VERK A/S

Bk 177 Skanråsen

DRIFTSANALYSER

Tatt 19

Skift:	% Cu	% Zn	% S	% Fe				% H_2O	Sikt	Anmerkning
ågods, tørt	0.01	—	1.—		Fra	17.50	—	18.50	—	
u-konsentrat	0.02	—	1.45		"	18.50	—	21.50	"	
u-avgang	0.02	—	1.50		"	21.50	—	24.50	"	
n-konsentrat	6.03	0.05	2.—		"	24.50	—	30.—	"	
n-avgang	0.05	0.05	2.40		"	30.—	—	32.50	"	
-konsentrat	0.02	—	1.75		"	32.50	—	34.10	"	
-avgang	—	—	1.—		"	34.10	—	37.60	"	
u-retur										
n-retur										
u-tørke										
n-tørke										
-tørke I										
-tørke II										

olldal Verk 12/8 19 78

J. Jensen

S.ETHER, HAMAR

THE BOREHOLE NR. 178, Skarvassen. 4310 x - 1320 Y

The petrographical description.

0,00 - 4,00 The medium-grained amphibolite, strongly infiltrated by a quartz-feldspatic and by a feldspatic (soda-lime feldspars) matrix, with some small grains of garnet too. The structure is massive and sheeting or fluidial locally too. The average gradient of this not so clear foliation is 55° - 60° around.

4,00 - 5,10 The medium-grained feldspatic amphibolit with a clear grain elongation (little acicular and rodlike porphyroblasts of hornblende and with a clear sheeting structure. The average gradient of this foliation is 50° about.

5,10 - 6,20 The amphibolitic chloritic and biotitic gneiss or gneissic schist, with very clear schistose - sheeting structure. The average gradient of this foliation is 40° - 45° around.

6,20 - 13,70 The motley serie of the biotitic chloritic and locally graphitic (some little schliers with a graphitic substance locally only) gneissic schist. The schistose structure and schistose sheeting structure is very clear. Some little folds of a cm amplitude are present too but locally only. The average gradient of this foliation is 50° about.

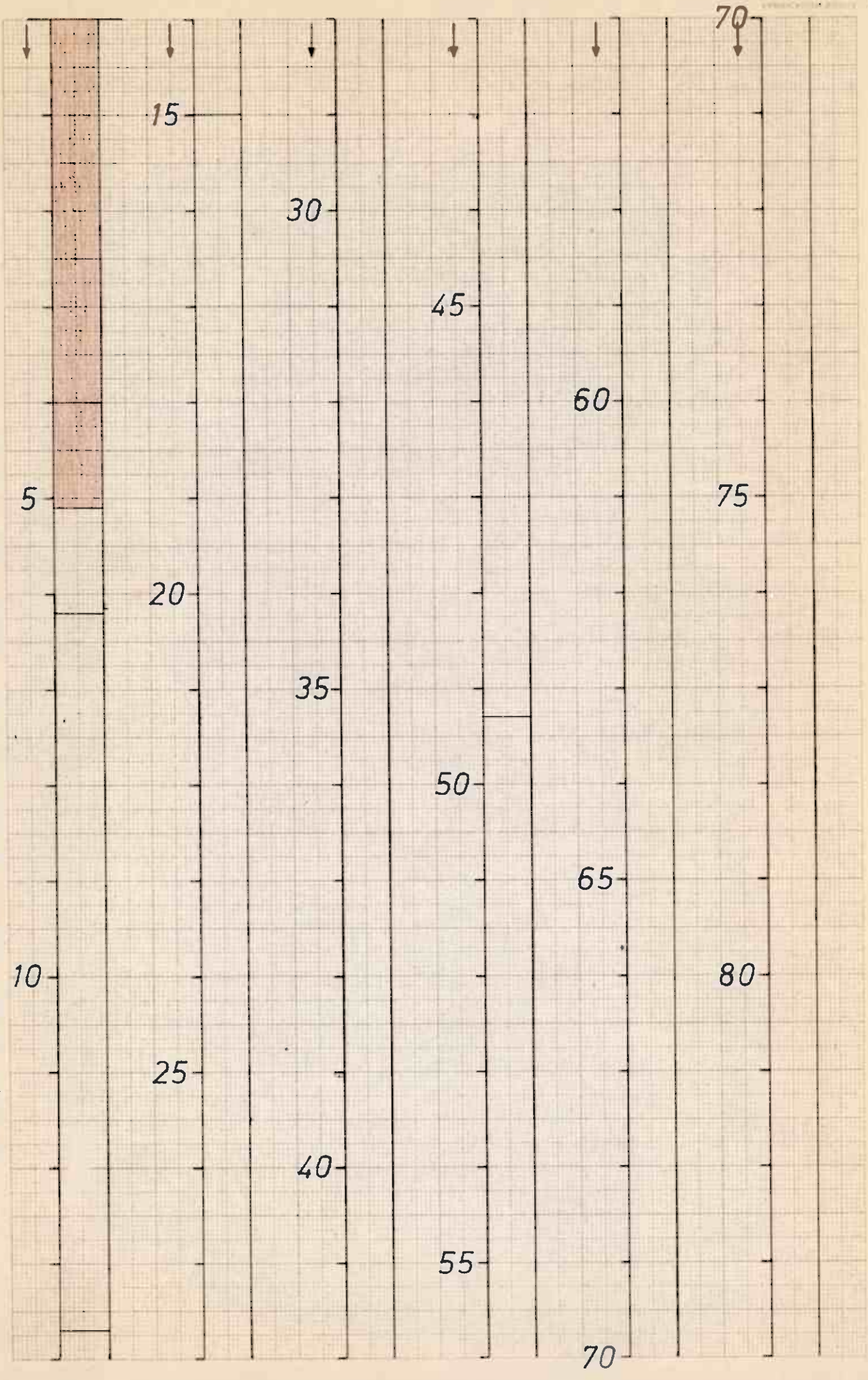
13,70 - 15,00 The chloritic and biotitic more strongly quartzy gneiss or gneissic schist, with clear schistose structure. This rock is folded by the folds of a mm and dm amplitude. The average gradient of this foliation is 40° - 50° around.

15,00 - 49,30 The motley serie of a strongly biotitic gneiss and gneissic schist, weakly chloritic and locally carbonatic too. Some rodlike, chrushed porphyroblasts of hornblende are present locally only too. The structure is sheeting and schistose. This rock is locally folded too by the flat or diagonal folds of a dm, cm and mm amplitude. The average gradient of this foliation is to 30,00 m ca 50° - 60° around and over 30,00 m ca 65° - 70° around. Between 18,70 - 19,05 m, 20,30 - 20,50 m, 24,40 - 24,60 m, 24,80 - 25,30 m and between 36,00 - 36,15m are present positions with a graphitic substance and with a lot of little schliers and little intercalations of a graphitic schists matrix. In these positions are present very poor impregnation of pyrrhotite (very little flakes), scarcely pyrite and magnetite (little hypidiomorphic grains), locally are present some schliers or chambres of a chloritic matrix, some little irregular chambres and schliers of a zoisit-epidotic matrix and with grains of garnet or with rodlike porphyroblasts of hornblende locally too.

Between 21,00 - 22,50 m is present position of a chloritic, biotitic gneiss with impregnation of very much hypidiomorphic and idiomorphic grains of magnetite, with some rodlik and chrushed porphyroblasts of hornblende. Between 20,00 - 20,20m is present positions of a white barren secretion quartz. Between 30,60 - 30,80 m, 33,50 - 34,10 m and between 35,30 - 35,70 m are prese t positions of a crystalline limestone with some little chambres and little flakes of phyrrotite locally only and with fuchsite, biotite and flogopite.
Between 35,90 - 36,00 m and between 40,90 - 41,60m are present positions of a crystalline limestone or marble with some flakes of biotite or flagopite too, and scarce with some little schliers of a graphitic matrix. Pyrite or pyrrhotite (like some little flakes or very little chambres) are present very scarce only.

This borehole nr. 178, Skarvaasen was stopped at 49,30 m.

Milosh Motys.


The petrografical profile of the borehole nr.
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BOREHOLE NO. 179, SVARTÅSEN

17005 - 50 G

The brief petrografical description.

0,00 - 10,40	The sericitic, little bit chloritic, strongly quartzy mica schist more sericitic quartzite with some little flakes of biotite or with some little chambres with biotitic flakes locally only and scarcely more, but with a lot of very little idiomorphic and hypidiomorphic grains of pyrite. The structure is phacoidal and phacoidal schistose and fluidial. The average gradient of this foliation is 55^{o}-60^{o} around.
10,40 - 10,80	The chloritic and weakly sericitic phyllitic schist with a lot of schliers of a quartz matrix and with some flakes of biotite too. The structure is phacoidal schistose and phacoidal. The average gradient of this foliation is 40^{o}-45^{o} around.
10,80 - 43,40	The motley serie of a sericitic and little bit chloritic quartzite or of a sericitic, weakly chloritic, strongly quartzite schist. The structure is phacoidal schistose and fluidial. The average gradient of this foliation is 40^{o}-45^{o} but locally 50^{o}. This rock is folded locally too. Oftenly are present very much little idiomorphic and hypidiomorphic grains of pyrite. Between 15,00 - 15,15 m is present a poor impregnation of pyrite (idiomorphic and hypidiomorphic grains) together with some little irregular chambres or irregular amorphic form of chalcopyrite. Sphalerite and pyrrhotite are present more scarcely too. Between 20,00 - 20,20 m is present a position of strongly graphitic fyllitic schist with not much little schliers of a quartz matrix and with some little flakes of pyrrhotite together with some hypidiomorphic or allotriomorphic grains of pyrite.
43,40 - 43,70	The strongly chloritic and sericitic and biotitic, phyllitic green mica-schist with a lot of chambres and flakes of biotite. The structure is fluidial and phacoidal schistose. The average gradient of this foliation is 50^{o}-55^{o} around.
43,70 - 45,00	The strongly graphitic, weakly chloritic and aericitic, phyllitic schist with a lot of little schliers and pellets of a quartz matrix. Very often are present some little flakes of pyrrhotite and some little irregular grains of pyrite. The structure is fluidial and phacoidal schistose. The average gradient of this foliation is 55^{o}-60^{o} around.

45,00 - 46,80 The strongly graphitic phyllitic schist as well as in 43,70 - 45,00 m, but with much more hypidiomorphic and idiomorphic grains of pyrite. Some little flakes of pyrrhotite are present not so oftenly. The average gradient of this foliation is 55° about. The result of the chemical analyse from this position between 45,00 - 46,80 m is: Cu 0.04 %, Zn 0,09% , S [illegible] Ag. Co 200 ppm. Pb 111 ppm Ni 316 ppm

46,80 - 53,00 The chloritic, quartzy phyllitic schist and phyllitic gneissic schist with a lot of schliers and pellets of quartz and of a quartz-feldspatic (scarcely) matrix. Some little hypidiomorphic idiomorphic grains or flakes of pyrite are locally present too. The structure is phacoidal and phacoidal schistose, but fluidial too. The average gradient of this foliation is 45° about. Between 47,90 - 48,50 m is present a position of barren white secretion quartz.

53,00 - 57,55 The strongly sericitic, chloritic, phyllitic mica schist with some flakes of biotite locally too and with a lot of schliers and pellets of a quartz matrix. Some little idiomorphic and hypidiomorphic grains of pyrite are present too, but locally only. The structure is phacoidal schistose and fluidial. The average gradient of this foliation is 40° about.

57,55 - 57,70 Weakly sericitic and very weakly chloritic quartzite with massive and phacoidal-schistose structure.

57,70 - 58,05 Quartzite as well as in 57,55 - 57,70 m but with a very poor impregnation of pyrrite, chalcopyrite, sphalerite and pyrrhotite locally only in some schliers mostly. The result of the chemical analyse from this position between 57,70 - 58,05 m is: Cu 2.20 , Zn 0.30 , S 7.40 Co 85 ppm, Pb 1199 ppm (0.12 %) Ni = 94 ppm

36 ppm Ag

58,05 - 58,40 The very strong impregnation of sulphides (pyrite, pyrrhotite, sphalerite and chalcopyrite) in a quartzite. Chalcopyrite creats some irregular chambres and another little amorphic forms. Sphalerite is present very strongly locally (in some schliers). The structure is massive and phacoidal. The result of the chemical analyse from this position between 58,05 - 58,40 m is: Cu 4.40 , Zn 4.00 , S 28,50 Co 87 ppm, Pb 0.27 % Ni = 87 ppm

57,70 - 58,55

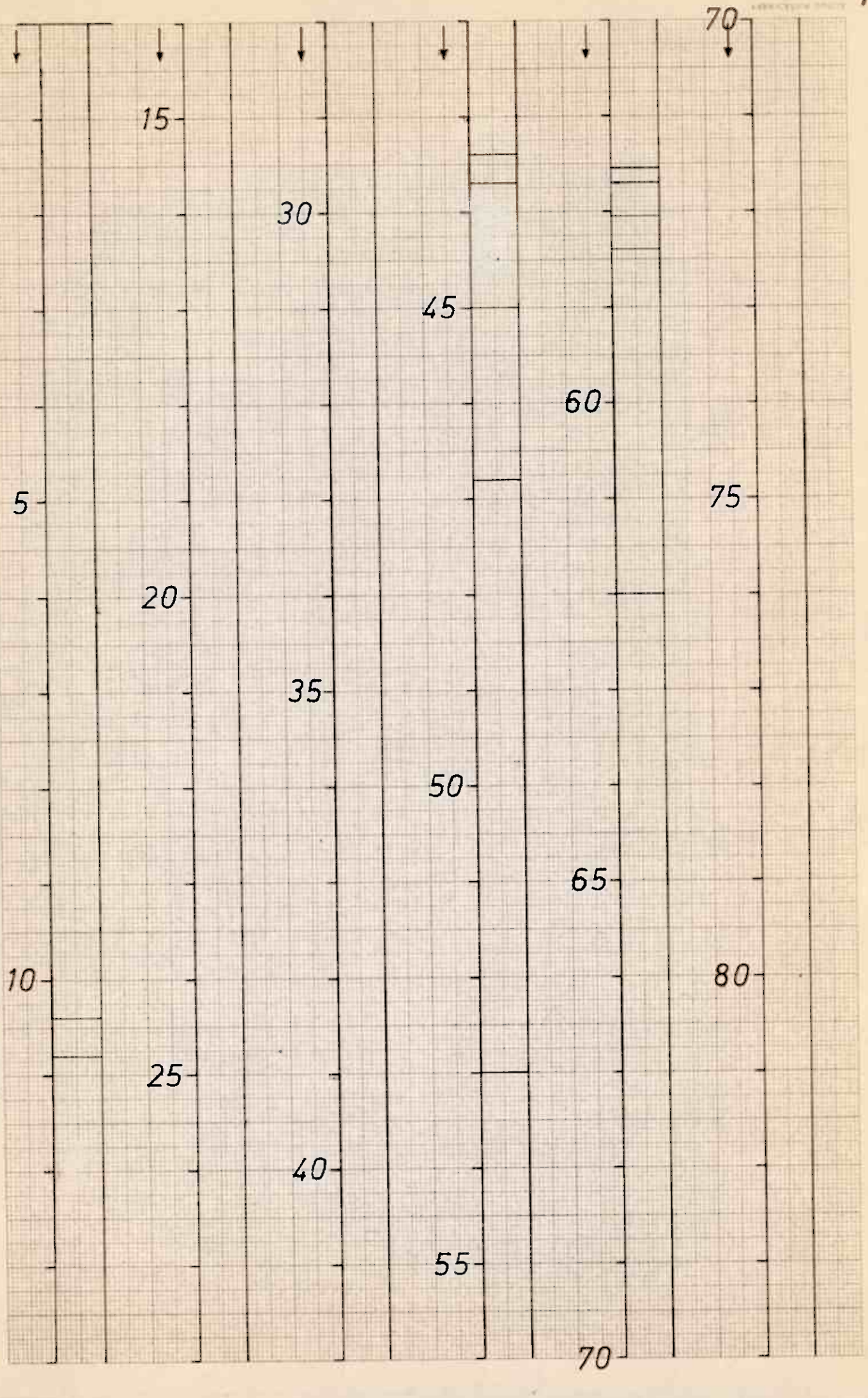
70 ppm Ag

58,40 - 62,00 The motley serie of a sericitic and weakly chloritic quartzite or quartzite schist like in 10,80 - 43,40 m. The average gradient of this foliation is 55° and 60° about. Between 58,40 - 58,55 m is present some poor impregnation of pyrite, sphalerite and chalcopyrite with pyrrhotite too. Between 61,40 - 62,00 m are

present much more intercalations of a chloritic and sericitic matrix. The result of the chemical analyse from the position between 58,40 - 58,55 m is: Cu 0,54 , Zn 1,20 , S 5,65 .
Co 81 ppm, Pb 352 ppm, Ni = 138 ppm
15 ppm Ag.

This borehole was stoppes at 62,00 m on August 11th 1970 at 11 a.m.

(Milos Motys).


The petrografical profile of the borehole nr.
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The Borehole no. 191, Svartåsen.

1700 S - 178 Ø

The brief petrografical description.

0,00 - 7.15	The motley serie of a sericitic and very weakly chloritic quartzite or quartzite-mica schist with a phacoidal schistose structure. In foliations plates are present some little flakes of biotite but not much. Some little grains (hypidiomorphic and idiomorphic too) of pyrite are present too but locally only. The average gradient of this foliation is 45° about. Between 1,20 - 1,40 m and between 5,00 - 5,25 m are present some position of a weakly graphitic phyllitic and biotitic-sericitic quartzy schist.
7,15 - 13,70	The strongly chloritic phyllitic greenschist with a lot of schliers, spots and pellets of a quartz matrix. The structure is phacoidal - schistose, phacoidal and maculose schistose. The average gradient of this foliation is 50°-55° about.
13,70 - 14,50	The chloritic quartzy phyllitic schist with a poor graphitic substance and with a lot of schliers or pellets of a quartz matrix. The structure is phacoidal schistose and fluidial. The average gradient of this foliation is 50° about.
14,50 - 20,90	The strongly chloritic phyllitic greenschist as well as in 7,15 - 13,70 m, but with much more flakes of biotite. The average gradient of this foliation is 60° about.
20,90 - 23,00	The myllonitic and tectonic zone of a chloritic and weakly biotitic phyllitic green-mica schist with a lot of chambres, pellets or spots of a quartz matrix. The texture is maculose, phacoidal and myllonitic mostly.
23,00 - 26,10	The strongly chloritic and weakly biotitic phyllitic greenschist with a lot of schliers or pellets and lenticles of a quartz matrix. Little biotite flakes are present on foliations plates mostly only. The structure is schistose and phacoidal schistose. The average gradient of this foliation is 65° about.
26,10 - 28,00	The weakly sericitic and very weakly chloritic quartzite or quartzite schist with a sheeting or phacoidal schistose structure. The average gradient of this foliation is 65° about.

28,00 - 30,00	The biotitic and chloritic gneissic mica schist with a lot of schliers and pellets of a quartz and of a quartz-feldspatic matrix. The structure is schistose and phacoidal-schistose. The average gradient of this foliation is 40^{o}-45^{o} about.
30,00 - 31,50	The strongly chloritic and weakly biotitic phyllitic schist as well as in 7,15 - 13,70 m. The average gradient of this foliation is 50^{o}-55^{o} about.
31,50 - 32,80	The white barren secretion quartz, with some little chambres of a chloritic matrix locally only.
32,80 - 35,30	The weakly sericitic and very weakly chloritic quartzite or quartzite schist, with some little flakes of biotite locally only and with some little idiomorphic and hypidiomorphic grains of pyrite locally too. The structure is sheeting and phacoidal schistose. The average gradient of this foliation is 60^{o} about.

This borehole no. 191 was stopped at 35,30 m on August 15th 1970 at 17 p.m.

(Milos Motys).

The petrografical profile of the borehole nr. 191, Svartåsen.