Bergvesenet
Postboks 3021, N-7441 Trondheim

Rapportarkivet
Innlegging av nye rapporter ved: Stein Erik

Bergvesenet rapport nr	Intern Journal nr	Internt arkiv nr	Rapport lokalisering	Gradering
6037				
Kommer fra ..arkiv	**Ekstern rapport nr**	**Oversendt fra**	**Fortrolig pga**	**Fortrolig fra dato:**
Folldal Verk AS		Folldal Verk a.s.		

Tittel

Borhullslogger for diamantborhull Tverrfjellet Gruve 1969 - 1971

Forfatter	Dato	Bedrift (oppdragsgiver og/eller oppdragstaker)
Motys, Milosh H.	1971	Folldal Verk AS

Kommune	Fylke	Bergdistrikt	1: 50 000 kartblad	1: 250 000 kartblad
Dovre	Oppland		15193	Røros

Fagområde	Dokument type	Forekomster (forekomst, gruvefelt, undersøkelsesfelt)
Geologi Boring		Tverrfjellforekomsten
Råstoffgruppe	**Råstofftype**	
Malm/metall	Cu, Zn, S	

Sammendrag, innholdsfortegnelse eller innholdsbeskrivelse

Borhullslogger for diamantborhull Tverrfjellet Gruve

Hullnr. 1G, 28G, 29G, 30G, 41G, 42G, 43G, 48G, 49G, 50G, 52, 52G, 53, 53G, 54G, 55G, 60G, 61G, 62G, 63G, 64G, 65G, 66G, 67G, 68G, 69G, 71G, 72G, 72aG, 73G, 74G, 75G, 76G, 77G, 78G, 79G, 81G, 82G, 83G, 85G, 89G, 94G, 106G, 108G, 109G, 110G, 111G, 113G, 114G, 115G, 116G, 117G, 118G, 119G, 120G, 121G, 122G, 123G, 124G, 125G, 126G

THE BOREHOLE NR. I. G., Tverrfjellet-gruva
on the lavel III., zone IV.

61/FV

TH E BOREHOLE nr. I. in the lavel 3. (36mm)

The petrografical description.

0,00 - 0,70 The chloritic,biotitic mica schist,locally with some small rodlike or acicular porphyroblasts of hornblende. The phacoidal schistose structure is clear. The average gradient of this foliation is 85° about.

0,70 - 2,30 The bright gray quartzite(metaquartzite)locally with some quartz-feldspar's matter schliers and little pellets and with very weak impregnation of FeS_2 mostly,scarcely too. The chlorite and sericite are present too. The total structure is phacoidal,the average gradient of this foliation is 55° - 60° about.

2,30 - 2,60 The gray and bright gray quartzite,locally with very poor and weak impregnation of FeS_2 mostly only. The structure is compact and banking.

2,60 - 3,80 The chloritic,strongly quartzy schist,locally with some small rodlike and acicular porphyroblasts of hornblende and with a lot of very little acicular porphyroblasts of actinolite. The schistose structure not so clear. The average gradient of this foliation is 75° - 80° about.

3,80 - 3,85 The bright gray quartzite with some little bit more strongly impregnation of FeS_2 mostly.

3,85 - 6,50 The strongly chloritic,little bit sericitic,and biotitic mica schist with a lot of little schliers of quartz and quartzite matterial. Some impregnation of FeS_2 is present very scarce only. The total structure of this rock is phacoidal schistose oftenly. The average gradient of this foliation is 70° about.

6,50 - 6,75 The gray and white gray and white quartzite,with not much chloritic and sericitic substance in and locally only with some little grains of FeS_2,hypidiomorphic or allotriomorphic mostly.

6,75 - 7,35 The strongly chloritic,little bit sericitic,and biotitic mica schist as well as in 3,85 - 6,50m. The average gradient of this foliation is 70° about.

7,35 - 7,50 The little bit chloritic quartzite or strongly quartzy schist with some little bit more strongly impregnation of FeS_2 mostly only,but very poor totally only. The schistosity isn't so clear.

7,50 - 7,70 The white hydrothermal barren quartz.

7,70 - 9,90 The chloritic and little bit biotitic,quartzy mica schist with a lot of schliers,irregular intercalations of quartz. Scarce only are present some hypidiomorphic or automorphic grains of FeS_2. In quartz's schliers are locally only present some small spots or pellets of carbonates. The total structure is phacoidal schistose mostly. The average gradient of this foliation is 55° round.

9,90 - 28,65 The strongly chloritic-hornblende green schist or green mica schist, with a lot of small and little acicular and rodlike porphyroblasts of hornblende and aktinolite too and with very much small grains of carbonates (ancerite - dolomite ?). Locally are present some schliers and spots of quartz and of quartzite matter too. In this rock are locally present some small and little idiomorphic and hypidiomorphic grains of FeS_2 and scarcely some little scales of FeS.
Between 11,20m , 11,40m , 11,90m ,12,40m , 12,50m, 13,50m , 14,30m , 14,80-14,85m , 18,20-18,25m , 22,75-22,85m , 23,35m , 23,80-23,85m and in 25,25m and between 25,40-25,50m, 27,20m , 27,50-27,60m , 28,25 - -28,30m and between 28,50-28,65m are present some position of bright

gray and gray quartzite with some little bit strongly impregnation of FeS_2 mostly.
In 16,00-16,10m , 16,50-16,60m , 16,90-17,00m and in 17,20-17,35m are present some positions of the bright gray quartzite with some schliers of quartz with some very weak impregnation of FeS_2 mostly. In 22,20 - 22,50m and in 24,65 - 25,15m are present some positions of the gray and bright gray quartzite with very stron impregnation of FeS_2 mostly only. The result of the chemical analyse of the impregnated positon between 22,20 - 22,50m is : Cu = 0,09% , Zn = 0,65% , S = 28,88%. The result of the chemical analyse of the impregnated position between 24,65 - 25,15m is : Cu = 0,09% , Zn = 0,45% and S = 30,25%. Both of these positions are the representant of the ore zone IV.

28,65 - 30,85 The strongly chloritic-green schist and chloritic-hornblende green schist as well as in 9,90 - 28,65m, The average gradient of this foliation is 55°- 60°round.

30,85 - 31,57 The strongly chloritic-hornblende green schist as well as in 9,90 - - 28,65m,but with much more acicular and rodlike porphyroblasts of the hornblende.
Between 31,52 - 31,57m is present some position of quartzite with poor impregnation of FeS_2,round boundaries more.

31,57 - 31,70 The strongly chloritic hornblende green schist as well as in 9,90 - 28,65m,but with more acicular and rodlike porphyroblasts of hornblende. The average gradient of this foliation is 60° - 65° round.

31,70 - 31,83 The gray or white gray quartzite with little bit chlorite locally too and with little bit strongly impregnation of FeS_2 mostly only.

31,83 - 35,10 The strongly carbonatic,chloritic,tiny-grained or medium-grained amphibolitic greenstone with a lot of grains of carbonates (dolomite - ancerite ?),with much schliers or pellets of the quartz and of quartz-feldspar matter too and locally with some little chloritic schliers. The structure is blastoofitic or blastoporphyric. locally, scarcely only are present some little grains of FeS_2(hypidiomorphic or idiomorphic too. The average gradient of this total foliation(more along schliers or grain elongation) is 60° about.
Between 34,15 - 34,35m and between 34,50 - 35,00m are present some positions of the white barren hydrothermal quartz.

35,10 - 35,40 The white barren hydrothermal quartz.

35,40 - 40,40 The strongly chloritic-hornblende green schist or greenstone schist, as well as in 9,90 - 28,65m. The average gradient of this foliation is 60° round(?).

Between 36,20 - 36,50m is present some position of the quartz brecie,barren only.

Between 36,90 - 39,10m is present the position of the gray or bright gray quartzite with very poor and weak impregnation of FeS_2 mostly.
In 39,09 - 39,10m is present the position with much more stongly impregnation of FeS_2 mostly too.
Between 39,70 - 39,80m is present the same quartzite as well as in 36,90 - 39,10m.

40,40 - 40,60 The strongly quartzy,hornblende keratophyre rock with the blastoophitic or blastoporphyric structure in totally. Locally much more scarcely only is present some very poor and weak impregnation of FeS_2 mostly.

40,60 - 41,90 The tiny-grained and medium-grained amphibolitic greenstone with some little spots or grains of carbonates(Dolomite-ankerite?) and locally with not so clear infiltration of quartz-feldspar matter. The total structure of this rock is blastoophitic mostly.

41,90 - 42,05 The white gray and gray quartzite with some schliers or pellets of the carbonates,with some chloritic substance and with not much little acicular porphyroblasts of hornblende or actinolite. Some FeS_2 impregnation is very poor and weak only.

42,05 - 45,90 The very strongly carbonatic and strongly chloritic greenstone schist or green schist as wellas in 9,90 - 28,65m,but with much more grains of carbonates and withot so clear total foliation.

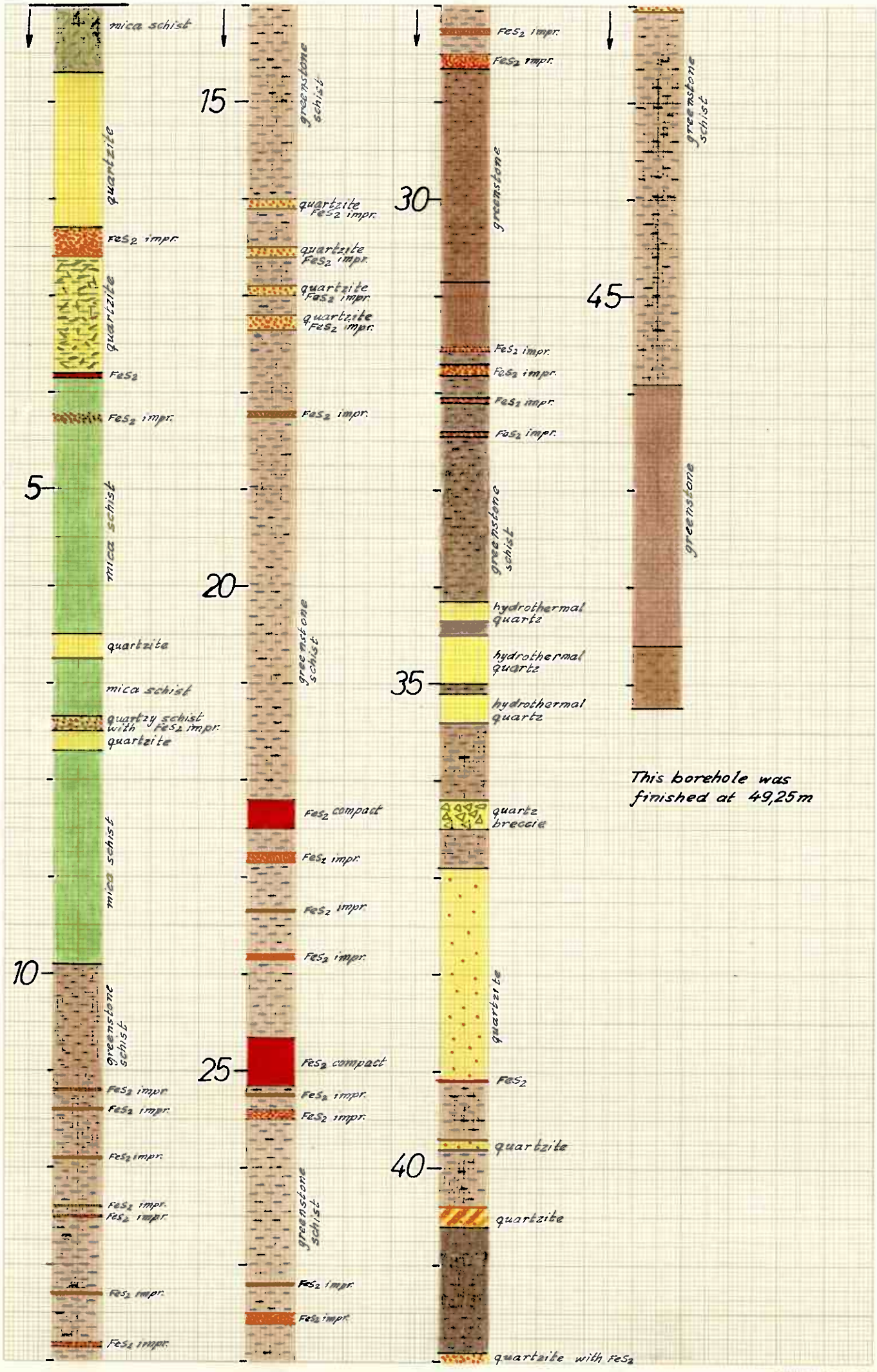
45,90 - 48,60 The medium-grained amphibolitic greenstone,little bit infiltrated by quartz and quartz-feldspar matter,with the blastoophitic structure oftenly mostly.

48,60 - 49,25 The little bit chloritic,strongly carbonatic(dolomite-ancerite?) amphibolitic greenstone or greenstone schist,with a lot of small grains of carbonates and with very much little acicular and rodlike porphyroblasts of hornblende. Some little grains of FeS_2,hypidiomorphic and idiomorphic are present locally too,but scarce only. The total structure is blastoporphyric mostly.

This borehole was finished at 49,25m.
The angle of dip of this borehole is 0° to North.
The profile of the core of this borehole is 36mm.

15.1o.1969 M.Motys

The borehole nr. 1.G. from the lavel III., zone IV., horisontal. (1:50)



OLLDAL VERK A/S

DRIFTSANALYSER

Tatt 20/10 19 69

Skift:	% Cu	% Zn	% S	% Fe				% H_2O	Sikt	Anmerkning
Rågods, tørt	0.09	0.65	28.88		Kl. 1	G. Vakt	3	22.20	Ty	22.50 cm
Cu–konsentrat	0.09	0.45	30.25		" 16	"	3	24.65	"	25.15 "
Cu–avgang										
Zn–konsentrat										
Zn–avgang										
S–konsentrat										
S–avgang										
Cu–retur										
Zn-retur										
Cu–tørke										
Zn–tørke										
S–tørke I										
S–tørke II										

Folldal Verk 19

P. Stai

A. SÆTHER, HAMAR

BH 28 C Transpilli, vom Anschlag der Nivå V

0,00 – 10,30 Bei ersten an den Biotit und dem dieselbe führenden Quarzit – Gneis
Farbe von C 30 cm

Hornblendeporphyroblasten meist in subparall. Aussrichtung im Schiefergefüge oft aber auch übergreifend
Farbe: mittel – dunkelgrün bis 1,2 cm lang

Biotit kommt meist unmittelbar angrenzend an den Hornblenden vor
Quarz erscheint leicht „gemästet" – Feldspatgehalt scheint in gewissen Bereichen zu schwanken

ab 10,30 ist das Gestein stark durchbewegt. Der d- der SF ist hier wechselnd stark und liegt v. 17,50 – 18,20° voll. Parallelität mit dem Hang.

Bei ganz dünnen u. grossen Quarzschlieren durchsetzt schräg auch die graduelle Farbzonen wahrnehmlich nicht verändert, trotz allmählichem Kornwachstum der Hornblenden ein (oder auch der Feldspäte)
Neben Biotit tritt auch Chlorit auf.
Bis 12 m also wechsel v. Quarzschlieren und HB Bi. q.
ab 12,00 bis 12,75 sind helle Bi u. HB führende Lagen Mittelkorn Quarzit und allmählich ab 12,75 grobkörniger
dasselbe v. Quarzschlieren durchsetzt
12,75 – 13,30 Einalong der Korngröße, die HB-Porph → 2 cm lang und sind in dem Grundgewebe linear eingeregelt

– 13,30 Quarzschlier mit idiomorphen (viereckigen Pyrit xx)
Rand beiderseits der Schlier ist das Gestein sehr feinkörnig und feingebändert.

Bis 13,60 setzt nun der grobe charakt. fort

ab 14,60 * Einalong der Glimmer, gut 11 Tafeln, bei anhaltend vorhandenen groben HB – Porphyroblasten
Gestein ist zwar hier an sich mehr als Quarzit zu bezeichnen, Feldspatgehalt überwiegt den Quarzgehalt offenbar.

P. 28 C 16,40

16,40

Schlieren mit Feldspat treten auf

* neben Biotit auch nennenswerte Chlorit u. Chloritoid.

Grenseglimmerskifer

- Bei 20 m ... under kornvergröbring. Gestein er hellgrønn med fører inn til 1,5 cm store grønne hornblendeporfyroblaster som er orientert med ca 40° til SE og ca 40° hellende Granat.
Bergartene er sterkt serisitisert. (Alle bergartene er også med finkornet HB-blodfels)
Resten av Gesteinet består av porfyroblastene og grunnmassen som er en fin glimmerskifer.

28 G | 22,00

Bei 25,50 sterk kvartsittisk innslag med kornvergröbring av bergarten

28 G | 26 Kvartsitt

ac 26,20 ... under kvartsittisk glimmerskifer med noen få HB-porfyroblaster (men ikke så mye som tidligere)

ac 27,50 ... dårlig grønn (Felsitt) glimmerskifer med porfyroblaster av HB, på alle bergart/fjellet, spalter og noen steder finkornet → omvandlet kvartsitt 28 G | 27,60
... vekslende med grønne porfyroblastiske hornblende med mer glimmerskifer.

ac 28,30 ... skaller seg grove HB-porfyroblaster med gråbrune karbonatkorner (Dolomitt?) og det gesteinet går over i en finkornet grønnskifer.

28 G | 29,10 Denne grønnskifer inneholder mye grove vekslende porfyroblaster.
ac kjerne 4

ac 30,35 ... under mørkere bergarter grønne HB-P. (ikke Granat) med serisitt og/eller ST og noen vekslende Biotitt. (som 34,50 30 cm ned er SE gående)
- 36,25 vekslende med idiomorfe Pyritt. Ved 35,92 innslag av kvartsittisk flekker med noen få knapt merkbare porfyroblaster.

ab 36,25 ... enorme innslag av Kvartsittlinser. Det grønne bergarten av denne skifer er med Pyritt, karbonat (Dolomitt) og Feltspatt-blastene

- 38,35 fast dominert. Grønn med mer sjeldne hvite innslag. Ved skifrigheten med Pyritt.
Ved grensen til skifrene ved 38,35 er det over ca 5 cm mørkere farge med store porfyroblastene glimmerskifer.

28 G 38,35

ac 38,35 ... under grønnglimmerskifer, med enkelte litt mørkere grønn, noen grove - 2,5 cm HB-P, ellers fin. Bi.

28-G 38,50

ab 39,03 wieder Quarzschlieren, ca 25 cm „Reaktionsraum" ⇒ es findet ein allmählicher Übergang in neuen Quarz statt.
Der Glimmergneis bekommt eine bläulich dunkle Farbe und eine feine Pyritimprägnation. Gelegentlich ist ein Zunehmen an Epidotmineralien zu beobachten.
Der direkte Kontakt zur Quarzschliere ist durch grobe Feldspäte und Pyrite markiert.
Der Quarz selbst ist reinweiß und ohne weitere silikatische Gemengteile.

(Kernlauf 5)

ab 39,35 wieder grüner Glimmerschiefer mit silikatisch auf den ST und einzelnen Hornblendeporphyroblasten.

a 42,00 Quarzschliere – 43 einzelne Pyritkörnchen.

danach wieder Gneis mit zuerst bis 44,70
→ hellgrünen HB-P-führ. silikatisch - Glimmerschiefer.

28 G 43,70

ab 44,70 beginnend lokal gröbere Textur und Zunahme des Biotitgehaltes
HB-P kommen nicht mehr vor. HB-Schiefer in Grundgesteine.

28 G 46,55

vermutlich Kontaktbereich Chloritgehalt.

ab 48,70 Bänderung v. Quarz-Feldspatschlieren mit einzelnen Pyritkörnern, Spuren v. Bewegungen – Torsion-Rotation.

Kernlauf 6

ab 49,00 Biotit und auch silikatisch/führender Gneis eingebettete Schiefer – Glimmerschiefer – Grünschiefer und kalkspatlamellen und Bewegungsflächen

in einzelnen Lagen finden sich noch größere Hornblende-porphyroblasten.
Kern oft 11 cm > ST.
~~Kontakt~~ Quarzschliere bei 55,00
danach Wechsel des Gesteinscharakters / Quarzschiefer öffnet den Zutritt für Verwitterung.

der „Kernfahrt"

ab 54,00 Grünschiefer, „amphibolitisch" Gestein besteht aus feinen bläulich Hornblendenädelchen. Bei ST Richtung zerfällt dann. Kern auf Schalen, die beim Bruch eines Gesteins entstehen.
Dort, wo dünn Feldspat-Quarz-Schieferungen mächtiger werden (5 cm) sind HB-schiefer gepreßt.

28 G 58,20

ab 59,00 zeitweise Grünstein - Grünschiefer mit wesentlichen im Hornblendegestein, gel. v. Quarz - Feldspat - stärkeren unterbrochen und gemischt v. Pyrit durchsetzt.

62,25 – 63,10 } Quarzgang mit breitem (ca 25cm) hinterlegt in den Grünsteinen

hinterlegt Gestein aus einem hellgrünlich-glänzenden Pyrit u. Biotit führenden Carbonatschiefer. extrem stark verfältelt.

63,20 – 66,00 } Grünstein - / Einlagerung (wie oben)

66,24 – 66,75 } Quarz; in Linsen mit ca 25 cm hinterlegt

Grünstein mit Quarzzufuhr

im Hangenden geht der Quarz nach einer 5 cm mächtigen v. Imprägnierten Bereichen lage in einen klaren Quarzit über, (Hangendquarzit) der auch Imprägnationspuren zeigt.

ab 67,15 folgt ein grobes HB-P-Gestein – 67,53

ab da ein mehr feinkörniges Gestein ähnlicher mineral. Zusammensetzung.

28 G. 63,00

bis 8

bis 72,70 dunkler feinkörniger HB-P führend. Simmer geht in ein mehr glimmerschieferartiges Gestein über → grün mit feinkörnig, mit stellenweise stark glänzenden Partien → Blättchenstruktur

Zunt. Pyritimprägnationen → zunehmend

28 G 69,00

Ein Quarz zwischen 73 u. 74 hat bis 35 cm breit "Reaktionsränder" allgemein starkere Imprägnation "Reaktionsr." liegen bei 2 cm großen HB-P. vermutlich mehr späteren Bildung.

75,97 das Ende wird markiert durch ein langes schwarzes Hornblendestängel ca 5 cm danach folgt kompaktes "Gut".

bis 149 | sei 20cm mächtige Einschaltungen von Chlorit, Biotit und Hornblende führenden Schiefern.

im Folgenden werden Mächtigkeiten

Probe v. 165 m als Beispiel für alle diese Zonen

163 m kompaktes Erz als Beispiel

allgemein zu bemerken ist, daß die "Randbereiche" meist 1 m von dem Beginn beziehen.

bis 165,70 | reicht das kompakte Erz

es folgt 1,17 m mächtige Lage eines stark verschieferten Biotit führenden Hornblendegesteins ist evtl. auch Hornfelsen noch als "Schiefer" anzusprechen

163,87
165,70
1,17

dann eine weiteren Einschaltung v. ca 2,30 m Erz folgt wieder HB-P führender Gneis.

Der Gneiszug Erz - Gestein sind charakterisiert durch die cm mächtige Lagen von Quarz und schwarzen Hornblenden.

v. 171,19 | Das auf dem hiesigen Erzgang folgende Gestein ist ein mittelkörniger HB-P führender verschieferter Gneis? einzelne Glimmerzonen sind erkennbar Bruchspaltflächen zeigen starken Glanz (Chlorit)

- 173,40

ab 173,40 | ist das Gest ein grober dunkelgrauer verschieferter HB-P führender Gneis dem spezielle mineralogische Texturelle Unterschiede von Erzeinschaltungen sind - gutierten durchsetzt.

Probe 174

- 176,15 | Vergröberung der Hornblenden bis zu 1,5 cm Pr. 175,70

v. 176,15 | Grün Gestf führende Schiefer mit gel. porphyroblastischen gesprossten Feldspäten

es schalten sich ± Quarzitische Schiefern ein sandlich zu den Schiefern gross HB-P.

Einige Zwischenschieferproben = 181,93

auffällig sind die vielen Erzanreicherungen

BH 28 — Trockenfeld (V. 15) — (6)

– 185,20 — Quarzit mit dünnen Schieferlagen, wechselnd einen grünen Glimmer. Farbe hellgrün.

bei 185,20 nach 2 cm plötzlicher Imprägnationswechsel

ab 185,20 — stark in sich verfalteter grünschwarzer Glimmerschiefer mit einzelnen Hornblenden, rund Biotit als Glimmer. Verbandlinien teilweise gut als punktförmige Porphyroblasten. Kann auch als Glimmer führender Quarzit (Grauwacke?) bezeichnet werden.

139,42 — von hier ab schalten sich wieder Hornblende-porphyroblastenlagen ein. Die Gesteine hat aber noch durchaus Quarzitcharakter bis ca 192 (Bruch!) Probe 191,20

ab 191 — starke Zunahme der Hornblenden → Amphibolit

bis 201,45 — Gestein, durch die Pr 194 entspr. Pr 1194

: grobe rund feinkörnige Partien eines amphibolitischen Gesteins. Kein Glimmer

viele Hornblenden dieses Teils oder Gesamt HB → homogenisierendes Gesamtbild

ab 199 offenbar weniger dicht HB-Textur, quarzitische Schichten?

49 BH

Turb

Tonalitgneis

63,30 – 73,90

73,90 – 86,20

hellgrüner dichter Hornblendegneis und z. T. noch idiomorphe Anteile zurücktretender Feldspäte. → vermut zähl. sauerer Tonalit

Hell Schlieren vorhanden aber weniger häufig. (Begleitgneis)

(49 / 73,20) Gestein zeigt gut Wechsellagerung

vereinzelt Pyritxx oder Aggregate.

Schieferung häufig. Chlorit / weiter Biotit nach SO 0° in gl. Sinn. + etwas quarzitischen Lagen. mit 2°. Imprägnation. Abfall der Imprägnation durch Lagerungen v. Biotit schwankend.

mächtigere v. den idiomorphen Feldspäten ist das Gest. von hellen Schlieren durchsetzt die im Gegensatz zu dem dichten Gestein der Feldspat weiß sind.

86,20 – 89,92

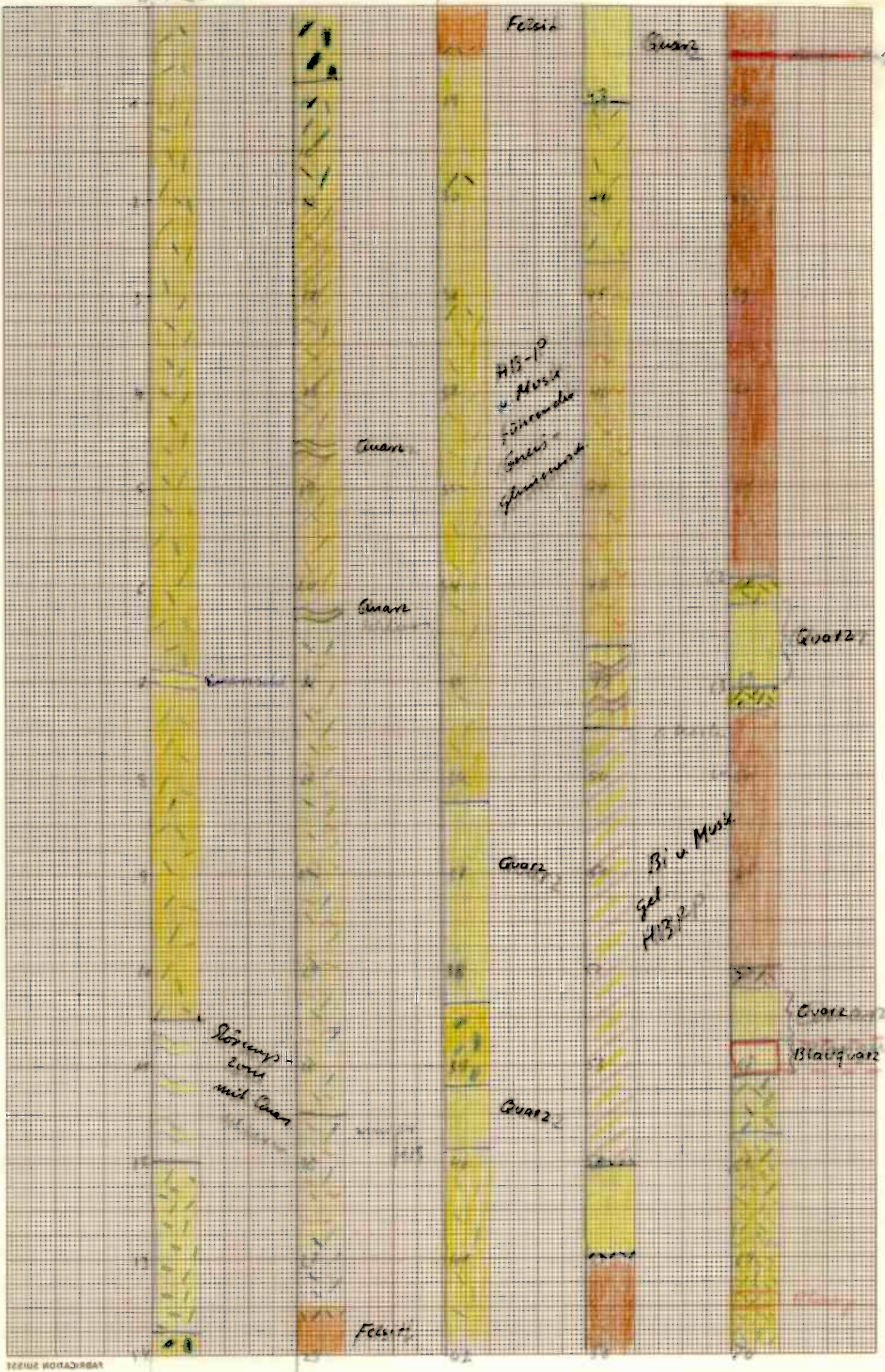
Starke Pyritimprägnation im Porphyrotidgneis/Begrenzung der stärkimprägnierten Bänder gegen den „taub" Gestein immer mit einem mächtigen scharfen Quarz-Fsp. / Rand. im Bereich der Imp. ist meist auch Biotit vorhanden.

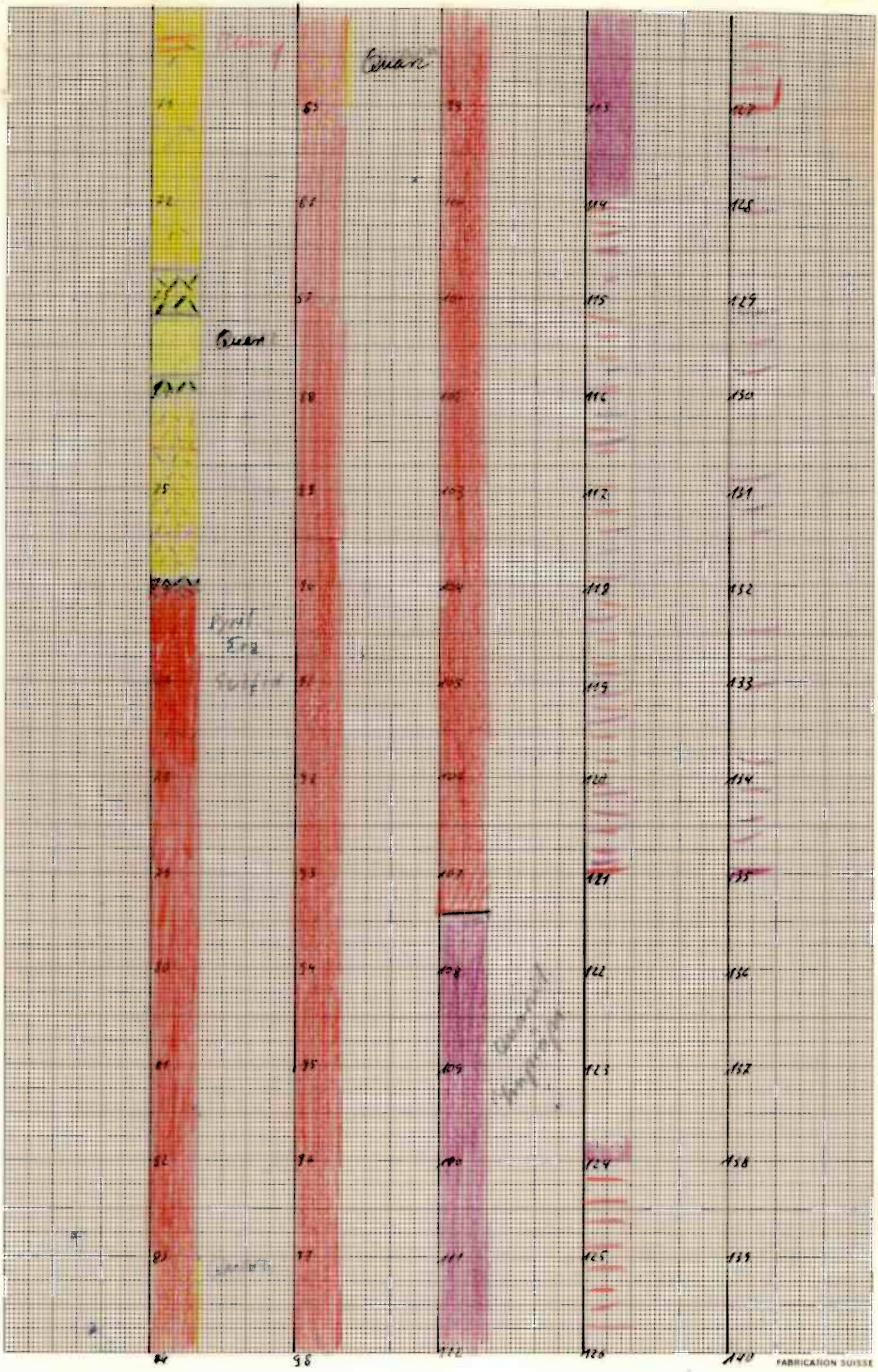
taube Schichten innerhalb der Imp. scheinen fehlen. stärker Chloritgehalt. Die Feldspatporphyroclasten sind vom. zerbrochen und zu längs Schlieren angezogen.

89,92

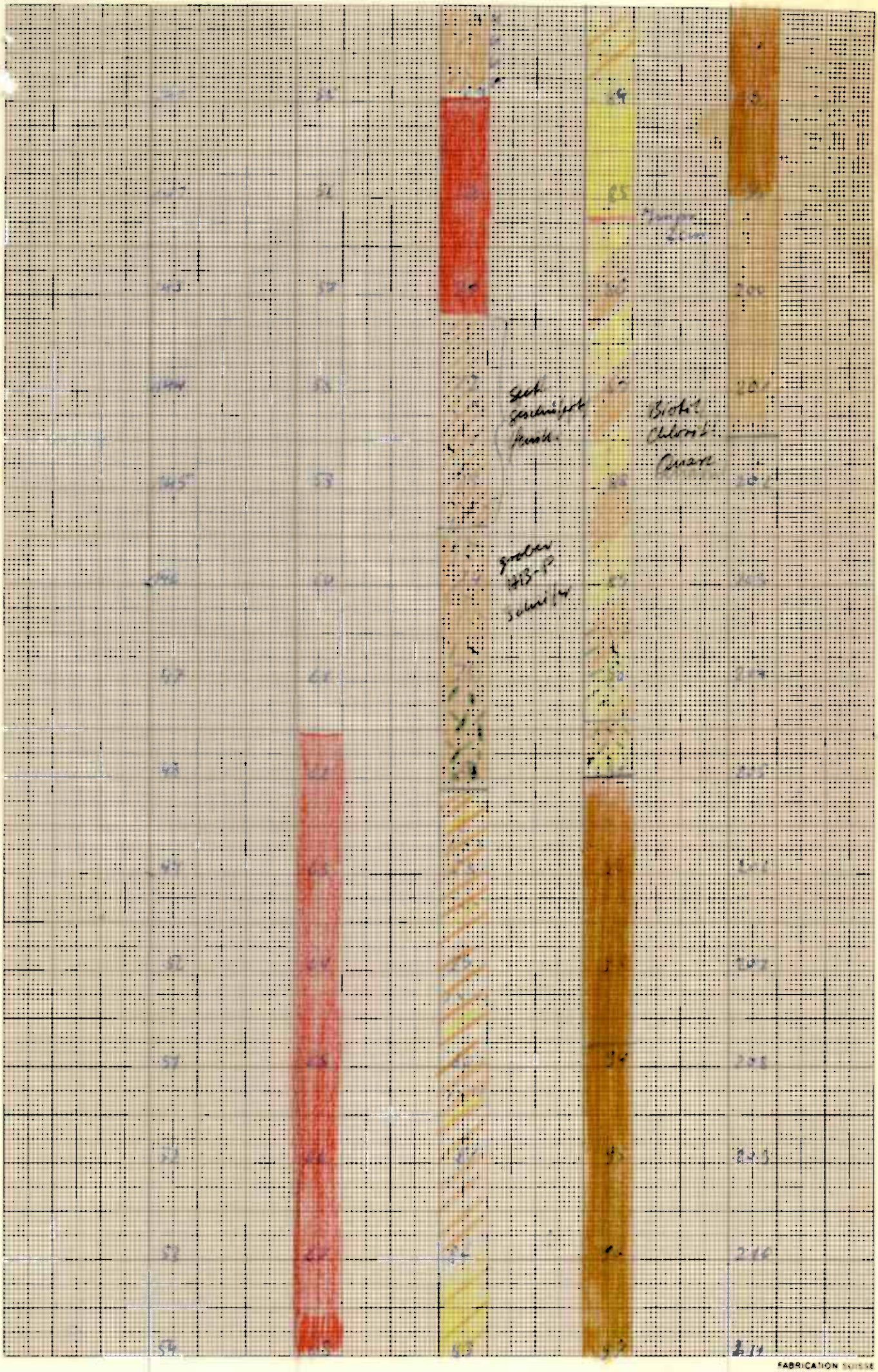
Pyritlagen mit Quarz sind durchsetzt.

die folgenden Imprägnationszonen sind quarzitisch dolomitisch oder magnetitführende Quarzite wechsellagert, wobei jedoch die dolomitischen zu überwiegen scheint.


Feldsp
Quarz
Grap
Quarz
Hbl-Bi
Quarz
Quarz
Bi u. Musk.
Quarz
Quarz
Quarz
Blaugquarz
Quarz
Feldsp



FABRICATION SUISSE



FABRICATION SUISSE

BH 29 G Tuff/pelit.

ab 1 Grobt/führender Quarzit + Granat.
oder quarzitischer HB-P und granat/staurolithführender Glimmerschiefer.
von Quarzadern und -trümmern durchzogen

v. 5,30 – 7,34 Einschaltung v. hyl.² Quarzit² schiefrigen feldspathyl-führ. Formen.

ab 13,10 zum Teil verquarzt HB-P. Gestein stumpf grünlich Bicht (gut durch Granat-) führender Glimmerschiefer – Quarzit
[br. 20,50]

Gut lagenweise und fast gebändert, wechselnd Glimmerreich und Quarz Bicht.

v. 13,60 – 14,30 hoher Feldspatgehalt → Bicht-Quarzschiefer.

ab 27,30 dichter grüner fein Hornblendeschiefer (Amphibolit) stark Carbonat führend bis 28 cm SE.
mit Schlieren v. Feldspat

ab – 30,60 dicht werden Quarz. einz. → grobe grüne HB-Porphyre – blasten mit Calcit und Quarz allmählicher Übergang der dichten Hornblende bis 33,30

ab 33,30 "Amphibolit" (überwiegend) bis 33,89
→ hornblendischer Hornblendeschiefer

ab 33,89 } bis 34,10 Glimmerreicher Quarzit

v – 34,10 } – 37,15 überwiegend Amphibolit / hornblendischer Hornblendeschiefer

ab 37,15 } 39,56 Glimmerreicher Quarzit mit einzelnen HB-Porphyroblasten.

ab 39,56 grobe HB-P-Schiefer

bis 40,10 bis 30 cm Quarzit (Gneis) Einschaltung
ab [illegible] dann wieder bis 41,70
grobe HB-P-Schiefer

ab 41,70 kompakter bis
bis 48,82 ab 48,82 Bicht. HB-führender Glimmerquarzit
– einzelner Amphibolit.

53,62 } – 55,57 kompakter Erz

BH 29 G

Trempiller-

56,57
– 59,37 } Amphibolit randlich am Salbend grob ausgeschiefert und von Quarz, Feldsp. u. Karbonat injiziert.

a 53,37 kompaktes Erz

– ~~102,80~~ } von der Imprägnation + Magnetit-
97,50
– 102,80

ab 102,80 bis

– 107,49 ab der Amphibolit → HBF- und Nagelkopfporphyrit.

107,22
105,37 } mit dünnen 30° zur gr. Quarzit + Imp.

und dann wieder Amphibolit
nochmals mit klein Imp. v. 110,50 → TM 29
darin/ folg ein Amphibolit und Nagelkopf-
porphyrit 1–2 mm Ø mit Sanssurit.

BH 29 G

Tverrfilit.

120 - 130 ± grüner Hornblendporphyroblast führender Schiefer mit lokalen Biotitanhäufungen und diffuser Vererzung des in mm quarzitischen Partien.

ab 130 ± amphibolitischer Charakter des Gesteins mit Quarz + karbonatreichen Lagen verpröbernng der HB-XX und Pyritimprägnation.

141,30 bei 141,50 10 cm mächtige Quarz - Feldspat - Karbonat-lage mit verrundeten schwarzen Hornblenden

danach folgt wieder einheitlicher grüner Schiefer, der von größeren bis 1 cm langen Hornblenden durchsetzt ist.

v. 143,30 - 143,50 } diffuse Pyritimprägnation
143,58 - 143,85 }

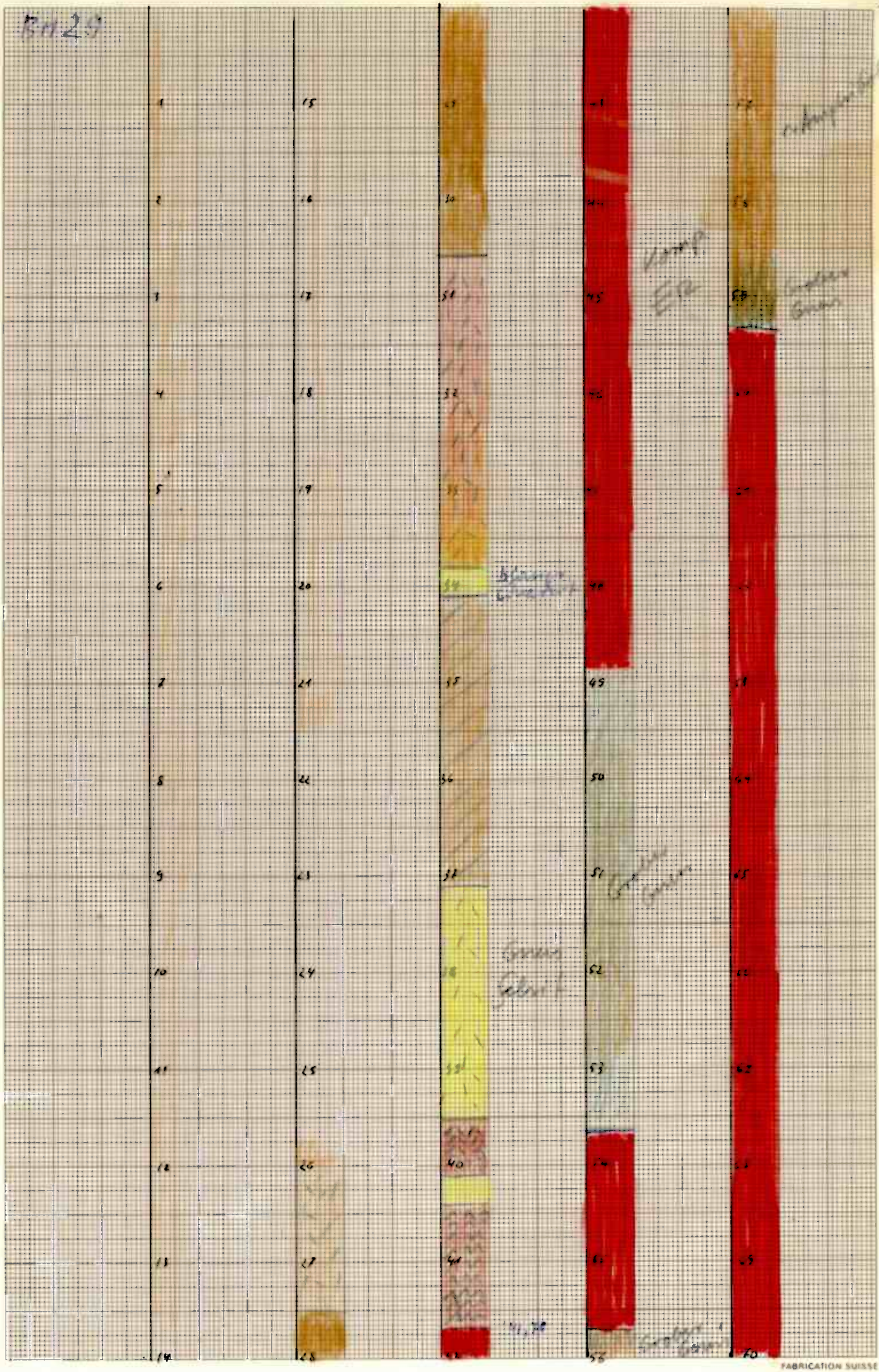
Gestein erscheint wechselhaft verwoben in der Lagerung und von salischen alterierten schiefrigem Typ durchsetzt.

ab ca 150 m wieder starke amphibolitische Einschiebung

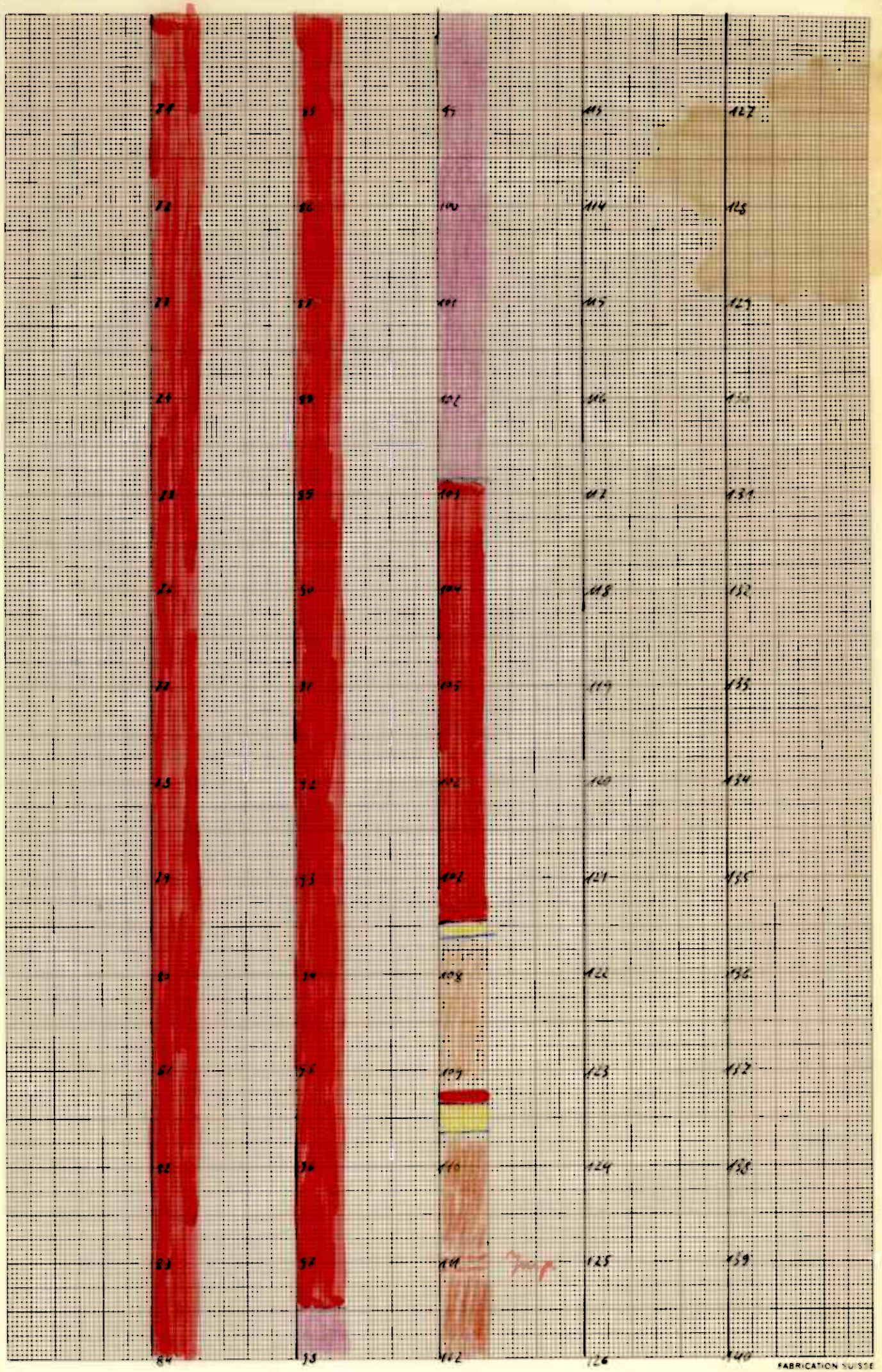
- 152,50 ab 152,50 hellgrüner Schiefer mit 2 - 4 mm großen (0,8 cm) grünen HB - Porphyroblasten.

158,50 wieder deutlich amphibolitische Ausbildung des Gesteins

-160,50



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BH 30 C | von Tremschlag auf Nivi 5 60° → N

0 – 11 | Hornblende und Biotit führender Quarzit

11 – 12,80 | HB → dunkelgrün, um so größer je mehr Quarzanteil
stark durchbewegtes Gestein sp. auf St.
HB-P haben meist linsenform und schwimmen in Gs u.
von grusartigem Aussehen
bei 10,80 – 11,10 nur wenig Hornblenden in einem
feinjelagerten Quarz-Fsp-Gestein.

a 12,80 | wieder HB-P-Quarzit zu zuvor nur etwas glimmerreicher

– 17,39 | 17,39 – 17,85 Quarzschlieren mit wenig HB

17,85 – 18,90 | HB-P-Quarzit

18,90 – 19,20 | Quarz-Karbonat-Schiefer

19,20 | HB-P-Bi führ. Quarzit

– 22,00 – 28,72 | Glimmerschiefer mit großen grünen HB-P.
schiefrig, durchbewegt, dicht, feinkörnige Strukturen

– 29,93 | reiner Quarz, nach den Grenzen zu, in dem ansteh. Schiefern
injizierte Hornblende

ab 29,23 | muskovit führender Glimmerschiefer mit bis zu 3cm
langen Hornblende (grün) porphyroblasten

– 34,06 – 34,66 | reiner Quarz, ganz feinkörnig Pyrit imprägn. am Rand zum
"Nebengestein".

von 34,66 | wieder ein HB-P führendem Muskovit-Glimmerschiefer

38,16 – 38,33 | quarzitischer Schiefer (20 cm mächtig) i. Pyrit und HB-P
durchsetzt

v. 38,33 – 38,55 | reiner Quarz

38,55 – 38,64 | quarzitischer Schiefer wie zuvor

bis 47,38 | dann → Glimmerschiefer mit Granat
und kleinen HB-P

d ca 50 | Grün dunkle Schiefer die mit kleinen HB-Lag durchsetzt sind
zwischen quarzitische geringmächtige Bänder eingelagert, → kontakt-
saltionsschieferung
Gestein nicht = amphibolitisch aus (Probe) 55,70

– 54,30

ab 47,35 Verschwinden der Granate und Abnahme des Glimmergehaltes fein // Texturen des Gesteins im mm-Bereich
Gesteinsart ± noch hornblendereicher Glimmerschiefer (Pr.
45,40 Kornvergröberung und kleiner Materialwechsel:
Glimmer beten völlig zurück
in Quarz-feldspat-karbonatischem Grundgewebe meist 2-3 mm grosse HB-Porphyrobl.

49,00 bei 49,00 Übergang in Hornblendereiche Varietät des gleichen Gesteins
50,23 - 50,30 → reiner Quarz mit 10 cm breiter „Zerrkl." von groben HB xx auf beiden Seiten
danach ist das Gestein feinkl. amphibolitisch **P. 57.50**

53,30 zum Hangenden Durchbewegung (Pr. 54,55)
grobe dunkle HB-P ± ungeregelt diversgentstreifig in schlierigem Grundgewebe v. Quarz Feldspat und Karbonat
Feldspat in einem Korn mittl. bis stark getrübt.

ab 54,30 gering dicke Schiefer, die mit kleinen HB-xx eng durchsetzt sind fein // texturiert im mm-Bereich, meist mit Quarzitischen Bändern P. 55,70

ab 52,30 nimmt der Biotitgehalt merklich zu
52,50 - 53 → Imprägnation von

ab 60,80 zunehmend Durchbewegung helle Schlieren in Quarz-, Feldsp. und Karbonat durchsetzen das Gestein
zT. auch Kalkimprägnation
HB in allen größen (0,5 cm) Probe 63,65

Spril v. 63,75 - 63,82
Amph 63,82 - 64,02

ab 66,44 bis kompakt. — Übergang durch grobe schwarze HB und Karbonat xx.

– 67,80 } grober Biotit und Chlorit? führender
– 68,97 } Hornblendeporphyro Blastschiefer
mesoskopisch Übergänge ohne Spuren v. lateraler Einfaltung

68,97 danach wieder kompakter bis.

bis 82,95 ab 81,55 Einschaltungen v. 5-10 cm mittl. bis grober Biotit führender Hornblendeporphyroblast-schiefer.

ab 82,95 folgt ein grober amphibolit (Gestein) führender Chloritglimmerschiefer mit Hornblendeporphyroblasten (grün)
P. 84.50

– 84,90

folgt ein dichteres Gestein ohne Albitporphyroblasten mit Biotit Chlorit und grösseren Hornblendeporphyroblasten.

84,90	Eingeschaltet ist eine Imprägnation v. 85,12 – 85,44 Gesteinstyp Pr. 86,20
	es folgen ± feinkörnige (mittelkörnige) von hellen quarzitischen Schlieren durchsetzte Schiefer mit dgrünen HB-Porphyroblast. Pr. 90,80
ca 93,50 – 95,80	heller Gneisschiefer (banded schists?) mit Albitporph. und wenigen auf den SF meist ausgewalzten HB XX. Probe 94,50
– 100,80	von hellen Schlieren durchsetzter Biotit-Chl und grüne HB-P führender Schiefer helle Schlieren machen ca 45 % dieser 5m aus es handelt sich dabei um reine Quarzschlieren, die gel mit bis 2cm rundl. Körnern sind. Körner zum Schiefer sind scharf, in einzelnen Fällen jedoch auch diffus.
ca 100,80	wieder heller Gneisschiefer Pr. 104,45 Albitporphyroblasten – Hornblenden
	v. 104,87 – 105,12 HB-P + Chlorit/Biot führ. Schiefer (rel. prot) mit Imprägnation
bis 108,21	Gestein meist quarzitischer Charakter → Quarz (rein) mit Albitporph. Biotit und auch Hornblenden (Chlorit)
	v. 108,21 (2 cm Impr.)
bis 113,90	Grober HB-P-Schiefer bis Gneis, aber von CuFeS-Schlieren durchsetzt ist (auch Quarzschlieren) – 111,96 Probe
ca 113,90	feink. Amphibolit
	v 114,43 – 114,95 rein Quarzschlieren + Schlieren v. Quarz + Karbonat Probe 116,56
– 118,07	Chloritschiefer mit groben HB-P
bis ca 119,00	
v. 119,00 – 121,20	mittelkörniger ± quarzitischer Karbonat v. 2-3 cm großen Hornblenden führender Gneis
v. 121,20 – 122,15	} feinkörniger Amphibolit 122,00

ab 122,15 Leicht mittelkörnige zunehmend quarzitisch werdende Schiefer mit Biotit und Hornblenden 124,50
stark 124,50 wieder feinkörniger
ab 126,20 starker quarzitischer Schiefer (rel. kompakt) mit großen HB-P
Pr. 133,26 mit Pyritimprägnationen
– 135,90 dieser quarzit Schiefer nimmt an Breite zu
den Charakter eines Quarzits an

v. 135,90 – 139,13 } stark durchbewegter quarzitischer Glimmerschiefer mit gel. Zonen HB-P

139,13 – 141,23 } Muskovitit (Serizitführender Glimmerschiefer mit HB-Porphyroblasten Probe 140,40

Von 141,23 – 143,15 heller quarzitischer Gneis Pr. 141,45 mit Quarzschlieren

ab 143,15 grober quarzitischer Gneis mit großen in oder GM schwimmenden HB-P, Biotit.
große HB-Kad. verschwinden allm.
Bemerkenswert sind quarzitische Lagen mit Kiesimprägnation.

v 147,49 – 147,90 } dunkler Quarzit – (Quarz?)

v 147,90 – 151,00 } chlorit, Biotit und HB-P führender Gneis
HB-P → unterschied. Größe v mm – cm.

v. 151,00 – 151,47 } heller Quarzit (hornsteinartiger Quarz?)

v 151,47 – 153,11 } Zone größerer Durchbewegung HB-P verbogen u. gestreckt besonders grob ausgebildet.

a 153,11 starke Imprägnation v. $CuFeS_2$ und Magnetit
Magnetit in feinen (mm – cm) Schiefern.

– 155,61

ab 155,61 kein Magnetitschiefer mehr Gneis

162,46 – 163,15 ab da Imprägnation bis 163,15 in dunklem Biotit-schiefer und blauem Quarzit.

a 163,15 – 163,95 } Gneis

163,95 Bei 163,95 endet das Erz. das Liegende Gestein ist ein dichtes, fälbender Glimmerschiefer mit einem merklich höheren hellgrünem Glimmer (Talk?) Anteil Probe Pr. 164,05

164,25 ändert sich der Gesteinstyp. es folgen mittlere - stark grüne Schiefer die HB-P verschiedener Ausprägung und Größe enthalten. teilweise auch mit Imprägnation

als Probenbeispiel: 170

ab 125,60 feinen dichten Amphibolit, ca 1,5 m vor Kluftbeginn ist Gestein stark durchbewegt, behält aber den amphibolitischen Charakter.

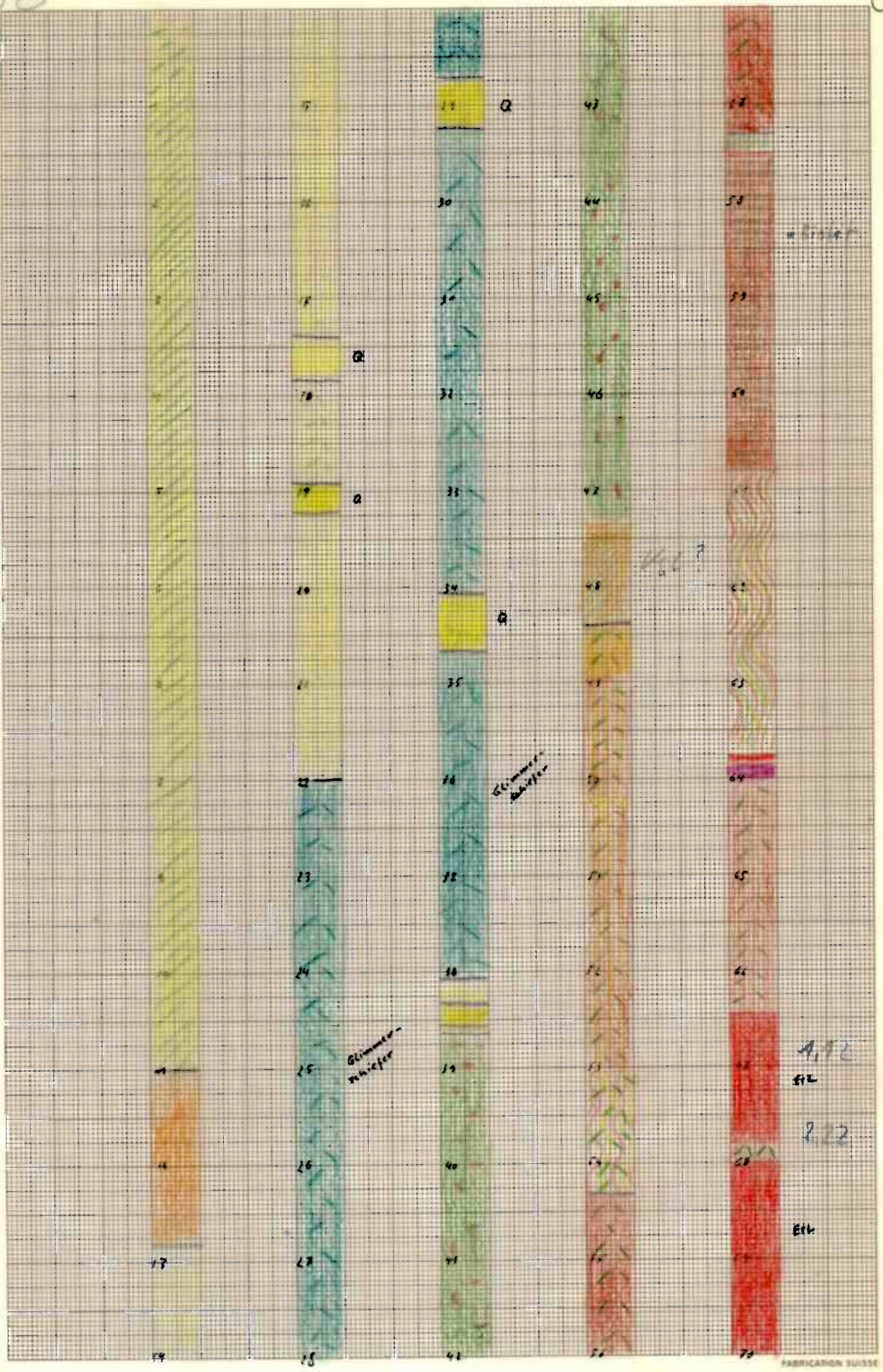
— 186,20 ab 186,20 Kluft kompakt bis 187,95

187,95 danach wieder grüne Schiefer mit HB-P Chlorit und Imprägnationsschlieren.

Pr. 196.

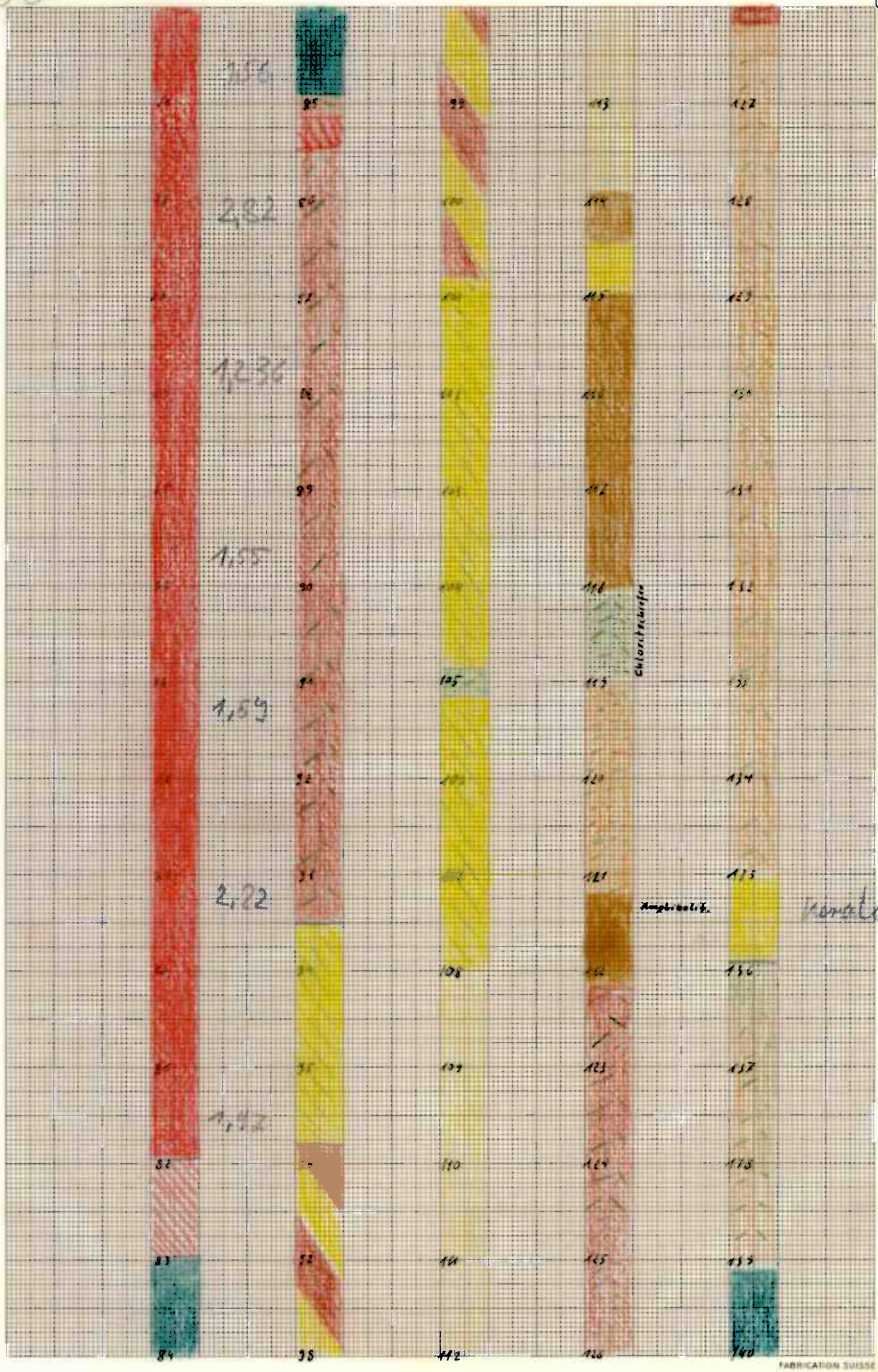
BH 306

BH 30 6


Q
Q
Q
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Glimmer-schiefer
Glimmer-schiefer
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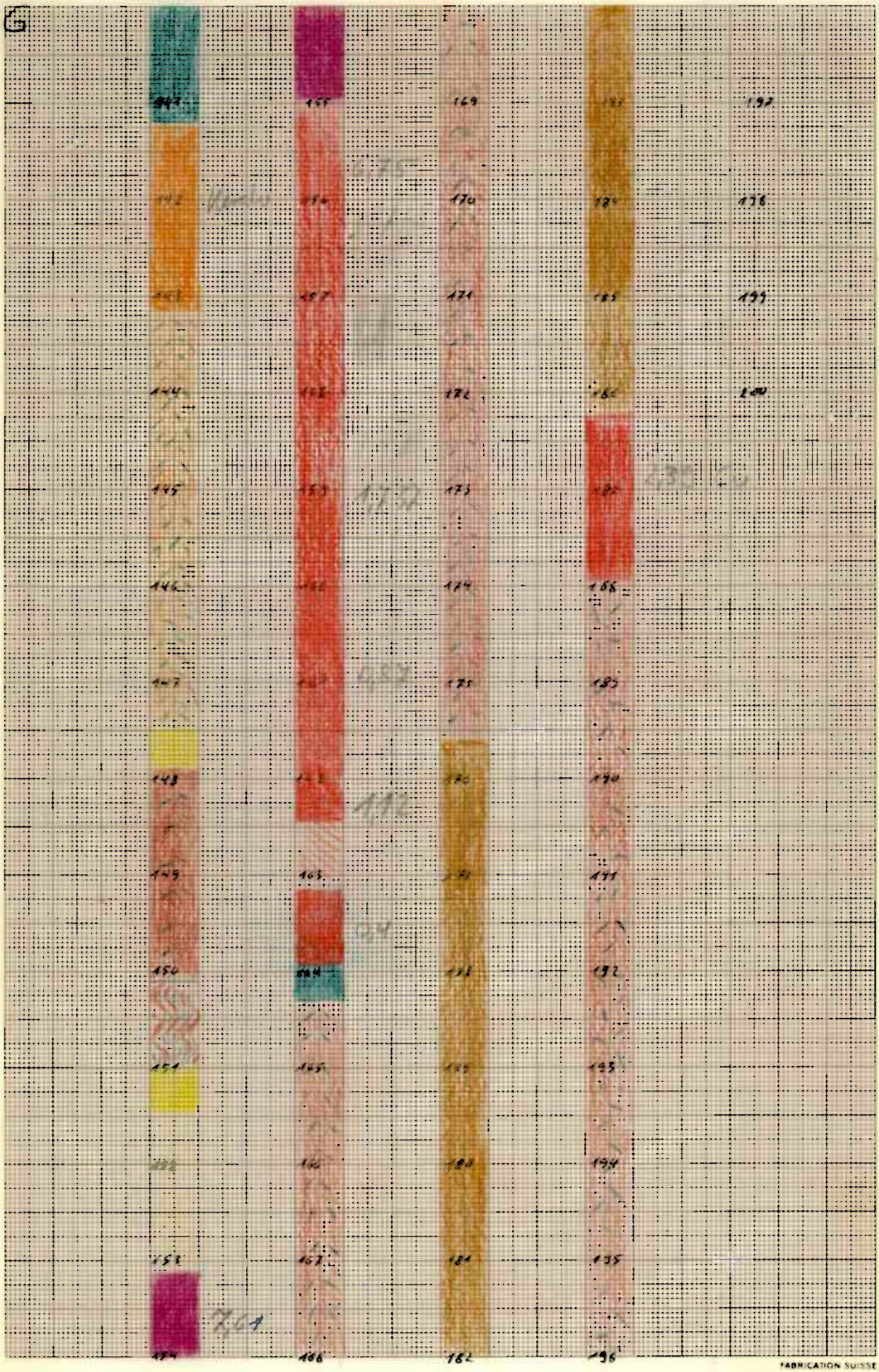
BH 30 G

BH 30 G (2)



BH 30 G

(3)



FABRICATION SUISSE

THE BOREHOLE NR. 41 G.
Tverrfjellet mine, level 6 th

THE BOREHOLE NR. 41.G. (Tverrfjellet, the lavel 6th).
X = - 91,3 , Y = + 89,7 , (- 55°).

The brief petrografical description.

0,00 - 3,70 — The biotitic and chloritic greenschist with quartz mostly in basement matter, with some acicular crystales of aktinolite and hornblende too. Some intercalations creat epidotic tiny-grained amphibolitic greenstone with biotite. The schistose structure is clear. The quartz mostly creat some little veins, little intercalations or little pellets ate. The total mineralisation of sulphides is scare only. The average gradient of this foliation is 45° round.

3,70 - 19,30 — The motley serie of spotted biotitic tiny-grained amphibolitic greenstone. The much spots are created by carbonates mostly, but by quartz or by the porphyroblasts of feldspar fewly too. The quartz or carbonates creats some pellets schliers or irregular lenticles. The some impregnation of FeS_2 mostly is very poor or scare only altogether. The average gradient of this foliation is 15° - 20° around, but 30° round too.

19,30 - 28,90 — The tiny-grained amphibolitic greenstone with some, but not much little parallel veins or little intercalations of quartz with the anreols which are created by carbonates. The parallel schistose structure is very clear. The total impregnation of sulphides is scare only. The average gradient of this foliation is 20° - 25° round.

28,90 - 32,10 — The motley serie of a spotted biotitic tiny-grained amphibolitic greenstone the same as in 3,70 - 19,30 m but with more little intercalations of quartzite and quartz. The part round 29,00 - 31,00 m is very strong folding. The total mineralisation is poor only, but more clear than in 3,70 - 19,30 m. More strongly mineralisation is present is quartzite intercalations.

32,10 - 33,40 — The strongly folding chloritic and biotitic gneissic-greenschist or greenschist with quartz and quartz-feldspar mostly in basement matter. The total mineralisation of sulphides is scare only, but in quartz and quartz-feldspar matter are present a lot of small grains of Fe_3O_4. This rock commamorate some tectonic-folding zone.

33,40 - 39,50 — The motley serie of strongly quarty chloritic greenschist with mostly quartz in basement matter (type of quartzite-chloritic) with some pellets or schliers of quartz or carbonates, with apots or grains of carbonates too. Some weak intercalations, mostly irregular are crea-

ted by coarse grained biotitic amphibolitic greenstone, by chloritic and biotitic greenschist or by spotted greenstone as well as in 3,70 - 19,30 m. The total mineralisation of sulphides is scarce only. Some small grains creat Fe_3O_4, but these are present not so much too. Quartz creat also some parallel positions or veins (1 - 2 cm thickness maximally), but also not much.

39,50 - 41,75 — The motley serie, which are created by tiny-grained amphibolitic greenstone, more medium-grained apotted amphibolitic, epidotic greenstone and more by coarse-frained epidotic am hiboli-tic greenstone with a lot of redlike or aci-cular grains, pellets or schliers. The biotite and chlorite are present too and locally more. The total mineralisation of sulphides is scare and very poor only. The average gradient of this foliation is 30° - 35° round.

41,75 - 45,80 — The motley serie of spotted tiny-grained amphi-bolitic greenstone as well as in 28,90 - 32,10 m. Locally is present some folding zone. The aver-age gradient of this foliation is 40° - 45° round.

45,80 - 48,60 — The tiny-grained and tender-grained amphibolitic greenstone with homagenetic structure with a lot of joints or parallel little veins or little intercalatios, which are fulfiled by quartz mostly, but by carbonates little bit too. The total mineralisation of sulphides is scarce only. Some thin intercalations of spotted greenstone (the same as in 3,70 - 19,30 m) are present between 46,40 - 46,55 m and 48,50 - 48,65 m.
In 46,20 - 46,25 m, in 46,45 - 46,60 m, in 47,50 - 47,65 m, in 47,75 - 47,80 m and in 47,85 - 47,90 m are present some intercalations of white quartz with some inclusions of carbon-ates, but without som mineralisation of sul-phides.

48,60 - 49,70 — The motley serie of spotted tiny-grained amphi-bolitic greenstone as well as in 3,70 - 19,30 m In 49,10 - 49,15 m is present some intercalation of gray quartzite with poor mineralisation of FeS_2 which is more strongly in boundarys of this position.

49,70 - 51,10 — The white-gray quartzite with little bit more strongly impregnation or FeS and FeS_2, but poor altogether.

51,10 - 52,20 — The spotted medium-grained and coarse-grained (little bit only) amphibolitic greenstone, with a lot of mostly acicular crystales of hornblende and actinolite, with a lot of spots or grains of quartz, carbonates or feldspar and with quartz, quartz-feldspar epidotic basement matter mostly. The total impregnation of sulphides is very poor, scarce only. Locally are present

some veins and little intercalations of quartz. The structure is irregular porphyroblastic.

52,20 - 53,10 The motley serie of spotted tiny-grained amphibolitic greenstone as well as in 3,70 - 19,30 m.

53,10 - 59,70 The tiny-grained and tender-grained mostly homogenetic amphibolitic greenstone the same as in 45,80 - 48,60 m, with little bit more clear, but also very poor impregnation of FeS and FeS_2.

59,70 - 60,60 The spotted medium-grained amphibolitic greenstone as well as in 51,10 - 52,20 m, but with more chlorite. Tound 60,20 - 60,40 m is present some tectonic zone.

60,60 - 66,30 The tender-grained homogenetic amphibolitic greenstone for the other the same as in 45,80 - 48,60 m, but with more clear impregnation of sulphides, in totally poor only. From 61,50 m is this rock just the same as in 45,80 - 48,60 m The average gradient of this foliation is 30^0 - 35^0 round.

66,30 - 68,70 The mylonitic, tectonic zone with tiny-grained amphibolitic greenstone, with medium-grained amphibolitic greenstone, with a lot of schliers or pellets of a black mylonitic matter, with some pellets, schliers, irregular intercalations of quartz. The total impregnation of sulphides is very poor, scarce only.

68,70 - 71,30 The medium-grained amphibolitic greenstone as well as 51,10 - 52,20 m. The impregnation of FeS_2 mosly is little bit clear, but very poor only. To 69,50 m are present some of mylonitic-tectonic zone.

71,30 - 88,30 The tiny-grained and tender-grained amphibolitic greenstone as well as in 45,80 - 48,60 m, with some weak irregular intercalations of tiny-grained and medium-grained spotted amphibolitic greenstone like as in 51,10 - 52,20 m. These intercalations are in 73,80 - 74,10 m and in 75,90 - 76,20 m and in 77,30 - 77,65m. The average gradient of this foliation is 25^0 round.

88,30 - 89,60 The tectonic-breccie of tiny-grained and tender-grained amphibolitic greenstone and the cement matter creat quartz mostly and fewly carbonates too. The total mineralisation of sulphides is very poor and scare only.

89,60 - 90,30 The medium-grained and tiny-grained, strongly quartzy amphibolitic greenstone, with a lot of parallel little veins of little intercalations of quartz, with some very small or rodlike or acicular ~~porphyroblaste~~ krystales of hornblende. Some impregnation of FeS_2 mostly is little bit clear, but is very poor altogether. The average grad-

	ient of this foliation is 60° - 65° round.
90,30 - 91,40	The tiny-grained and mostly medium-grained amphibolitic greenstone with some veins or little intercalations of quartz and locally with biotite, but not so much. Hornblende creat small rodlike and acicular chrystales. The total impregnation of sulphides is present but scare only. More strongly impregnation of FeS_2 mostly only is present in some little intercalations of gray quartzite, in example round 91,30 m (4 cm). The average gradient of this foliation is 40° - 60° round.
91,40 - 92,30	The medium-grained and coarse-grained epidotic, zoisite-epidotic and chloritic amphibolitic greenstone, with acicular or rodlike chrystales of hornblende and with some micas of biotite. The total mineralisation of sulphides is present but poor only. More strongly is this mineralisation of FeS_2 mostly present in more quartzy intercalations or in quartzite intercalations, in example in 92,60 - 92,65 m. The average gradient of this foliation is 45° round (?).
92,30 - 92,70	The strong mylonitic and tectonic zone with a lot of irregular schliers, pellets or lenticles of black mylonitic matter, with some schliers pellets ate of quartz mostly. The total mineralisation of sulphides is scare only. This basement rock is created by tiny-grained greenstone mostly.
92,70 - 93,90	The tiny-grained amphibolitic greenstone, as well as in 45,80 - 48,60 m.
93,90 - 100,70	The coarse-grained, epidotic, zoisite-epidotic amphibolitic greenstone with a lot of rodlike or acicular chrystales of hornblende, with much biotite locally in some weak schliers which are in the foliations plates. Quartz or quartzite creat much veins or little intercalations, parallel with the total foliation. The structure is porphyroblastic or schistose-porphyroblastic. Some more strong impregnation of FeS_2 mostly is present in more quartzy rock or in some intercalations of quartzite in example round 94,70 - 94,85 m. The total impregnation of sulphides in this rock is very poor or scarce only. The average gradient of this foliation is 40° - 45° round.
100,70 - 102,20	The tiny-grained, homogenetic amphibolitic greenstone, with some very poor impregnation of FeS_2, with not much little veins, little intercalations of quartz. In 101,65 - 101,75 m and in 101,85 - 101,95 m are positions of white quartz without some impregnation of sulphides. Between 101,95 - 102,20 m creat this rock the basement matter of tectonic breccic with quartz veins, pellets atc.

102,20 - 103,20	The medium-grained amphibolitic greenstone with small rodlike and acicular chrystales of hornblende, with quartz and quartz-feldspar mostly in the basement matter, with not much episote and chlorite and with some spots, little grains of carbonates. The structure is porphyroblastophitic. The total impregnation of sulphides is very poor, but is present (grains of FeS_2 and not much of $CuFeS_2$). The average gradient of thsi foliation is 50^0 - 55^0 round. Between 102,30 - 102,70 m is present the position of white quartz with some little bit strong but poor mineralisation of FeS_2 mostly with few $CuFeS_2$.
103,20 - 103,40	The tectonic and myllonitic breccic with quartz and the myllonitic matter and locally with very strong impregnation of FeS_2 mostly in some irregular lenticles, schliers and pellets.
103,40 - 104,10	The medium-grained amphibolitic greenstone as well as in 102,20 - 103,20 m, but with little bit more grains of FeS_2 and $CuFeS_2$, but this impregnation of sulphides is very poor altogether too.
104,10 - 104,25	The impregnated ore of FeS_2 in some gray quartz or quartzite.
104,25 - 104,35	The chloritic and biotitic quartzite with very poor impregnation of FeS_2 and with some very small rodlike crystales of amphibole.
104,35 - 104,45	The impregnated ore of FeS_2 as well as in 104,10 104,25 m.
104,45 - 104,85	The coarse-grained and medium-grained amphibolitic greenstone the same as in 93,90 - 100,70 m.
104,85 - 113,85	The impregnated ore of FeS_2 mostly in gray or blue-gray quartzite. The magnetite impregnation in FeS_2 ore beginning from 108,80 m but scare only. Some intercalations or homogenetic positions of Fe_3O_4 are present between 109,60 - 110,95 m. This FeS_2 ore is more rich of $CuFeS_2$ ca from 108,60 m and more between 112,00 - 113,85 m. Some the other positions with strong impregnation of Fe_3O_4 or with some little intercalations of Fe_3O_4 are present in 111,35 - 11,40 m, in 112,80 - 112,90 m and in 113,00 - 113,05 m.
113,85 - 114,35	The chloitic greenschist, which are very strong broken by some tectonic movements, with some little bit strong impregnation of $CuFeS_2$ mostly and with a lot of small grains of Fe_3O_4. FeS_2 is present too, but not much. From the others minerals are present hornblende, actinolite, little bit epidote and klinozoisite. Quartz creat mostly some irregular veins, pellets or schliers.
114,35 - 114.70	The impregnated ore of $CuFeS_2$ and FeS_2 with some

strong impregnation of Fe_3O_4 in 114,55 - 114,70m This strong ore impregnation is in some quartzite (gray).

114,70 - 114,90 The chloritic greenschist as well as in 113,85 - 114,35 m.

114,90 - 115,10 The impregnated ore as well as in 114,35 - 114,70 m, but without some impregnation of Fe_3O_4.

115,10 - 117,60 The chloritic greenschist as well as in 113,85 - 114,35 m, but with some rodlike and acicular crystales of hornblende and with some more matter of tiny-grained and medium-grained amphibolitic greenstone. Between the others ore minerals are present more FeS.

117,60 - 117,85 The kerato hyre rock, which is created by quartz and feldspar mostly and with some small acicular and rodlike crystales of hornblende. The impregnation of sulphides minerals isn't present.

117,85 - 118,30 The medium-grained amphibolitic greenstone with very strong quartz or quartz-feldspar infiltration, with not much chlorite and apidote and with a lot of small rodlike or acicular crystales of hornblende. The some little bit strong impregnation of $CuFeS_2$ mostly and FeS_2 and FeS is present. This impregnation , mostly of $CuFeS_2$ is very strong between 118,05 - 118,25 m with homogenetic position of $CuFeS_2$ mostly in 118,10 - 118,14 m, all this impregnation of $CuFeS_2$ mostly is in some more quartzy rock or in some quartzite intercalation.

118,30 - 119,50 The medium-grained amphibolitic greenstone with some quartz or quartz-feldspar infiltration, which is locally more strongly. From accesoric minerals are present present chlorite, epidote, klino-zoisite. The total mineralisation of sulphides is scare only. Quartz and quartzite creat a lot of weak intercalations (maximally thickness 2 - 3 cm). The intercalations of quartzite have often some poor impregnation of FeS_2 mostly.

119,50 - 121,75 The biotitic and strongly chloritic greenschist and amphibolitic chloritic and biotitic greenschist with a lot of weak little veins , little intercalations ate of quartz, parallel with the foliation of this rock, which is very clear. The impregnation of sulphides is very poor or scare only. The average gradient of this foliation is 40° round.

121,75 - 123,15 The gray, white-gray, white and blue-gray quartz and quartzite with very strong impregnation of FeS_2 between 121,75 - 122,20 m with positions of homogenetic FeS_2 in 121,95 - 122,10 m, with strong im regnation of FeS_2 (homogenetic position) between 122,30 - 122,45 m, with poor impregnation of FeS_2 between 122,55 - 122,90 m,

with very strong impregnation of FeS_2 with much ZnS (brown-red colour) between 122,90 - 123,00 m and with very strong impregnation of FeS_2 between 123,05 - 123,15 m.

123,15 - 124,45 The biotitic and chloritic greenschist and amphibolitic biotitic greenschist as well as in 119,50 - 121,75 m with some positions of white and white-gray quartz, without some impregnation of sulphides minerals in 123,30 - 123,40 m, in 123,60 - 123,75 m, in 123,80 - 123,85 m and in 124,35 - 124,40 m (there is some accumulation of micas of biotite in some pellets in the boundary of quartz position). The average gradient of this foliation is 40° round.

124,45 - 127,35 The strongly quartzy rock or quartzite with the infiltration of albite and with a lot of small rodlike crystales of hornblende, and like accesorik minerales with chlorite, epidote. Sericite is present too enought. The some mineralisation of sulphides isn't present mostly. but in 127,30 m (2 cm) is present some intercalation of quartzite with little bit strong impregnation of FeS_2. The schistosity is little bit clear. The average gradient of this foliation is 40° round.

127,35 - 127,90 The strongly quartzy tiny-grained and locally only tender-grained amphibolitic greenstone with a lot of little veins, little intercalations ote., which are palallel with foliation of quartz, quartzite and quartz-feldspar matter, little bit too. The total mineralisation of sulphides is very scare only. The average gradient of this foliation is 40° round.

127,90 - 132,70 The medium-grained epidotic or chloritic amphibolitic greenstone which cross to greenschist with small or little bigger rodlike or acicular crystales of hornblende. Albite little present locally too. Quartz creat some little schliers or little pellets or little intercalations, but not much. The structure is porphyroblastophitic mostly with little bit clear schistosity. The total impregnation of sulphides isn't present or is very scare only. The average gradient of this foliation is 55° - 65° round.

132,70 - 133,75 The chloritic greenschist just the same as in 127,90 - 132,70, but very strongly quartzy, with a lot of little intercalations, schliers, pellets atc. of quartz, which are parallel with foliation. The average gradient of this foliation is 55° - 60° round, but 70° round too.

133,75 - 146,40 The strongly chloritic and sericitic mica schist with a lot of small micas of biotite and with much big grains (2 - 3 mm in average) of garnet (pink colour). Quartz creat basement matter of this rock and a lot of little parallel little veins, little intercalations and schliers. The

impregnation of sulphides is scarce only, but in more quartzy positions is present some very poor impregnation of FeS only.(creat some small and very thin scales). The average gradient of this foliation is 70° - 75° round. This rock is very strongly folding in the folds with a cm amplitude.

146,40 - 146,90 The same rock as in 133,75 - 146,40 m but strongly broken by some tectonic movements with a mylonitic matter in some schliers and pellets and with some pellets or irregular lenticles of quartz, without some impregnation of sulphides.

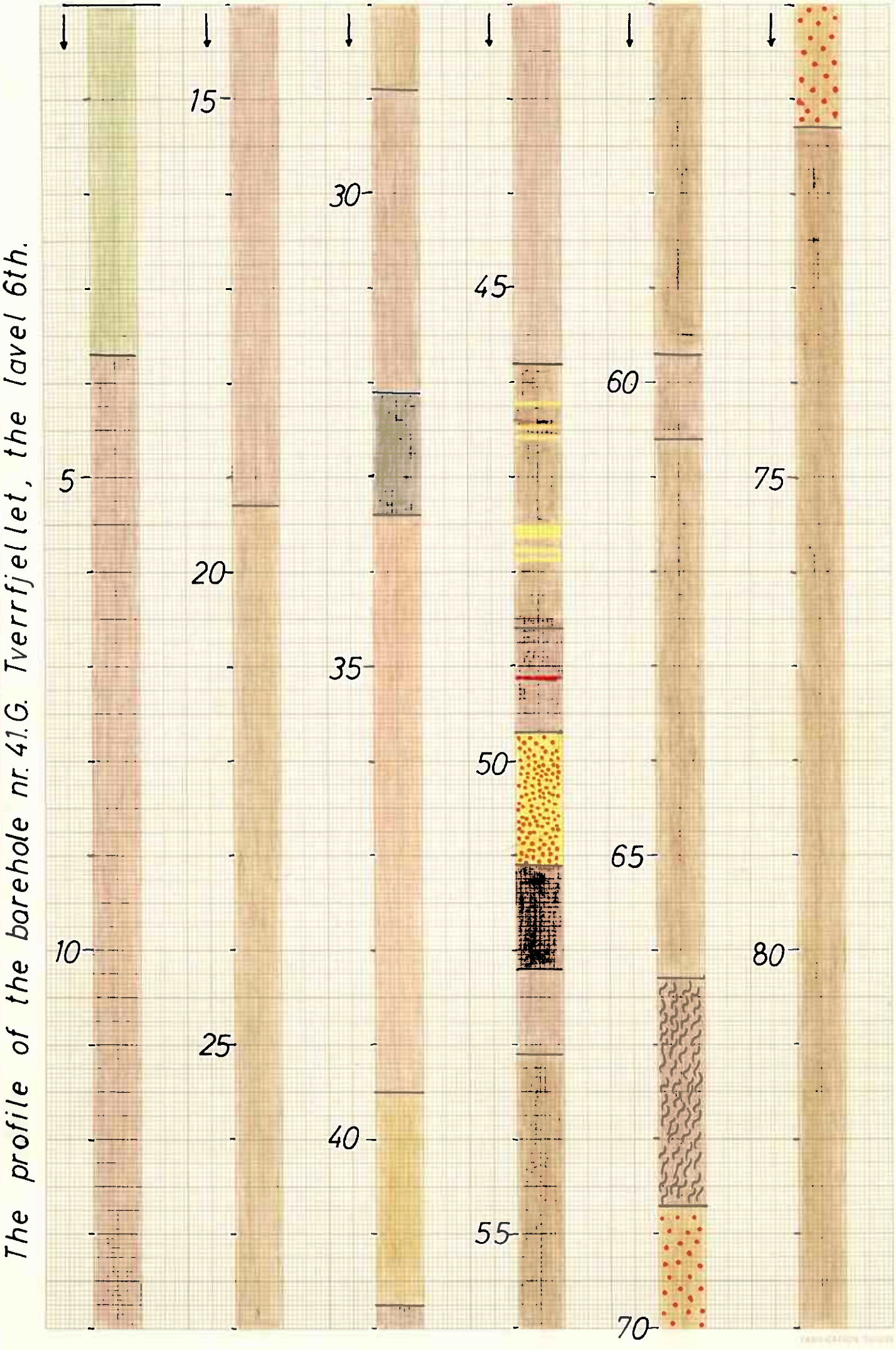
146,90 - 151,70 The strongly quartzy, biotitic mica schist with sericite, very few chlorite and zoisit-epidote. The basement matter creat quartz mostly. Scarce are present some very small acicular and rodlike crystales of hornblende. The impregnation of sulphides is scarce only (some very small scales of FeS). Garnet is present also scarce and creat some very small grains only.

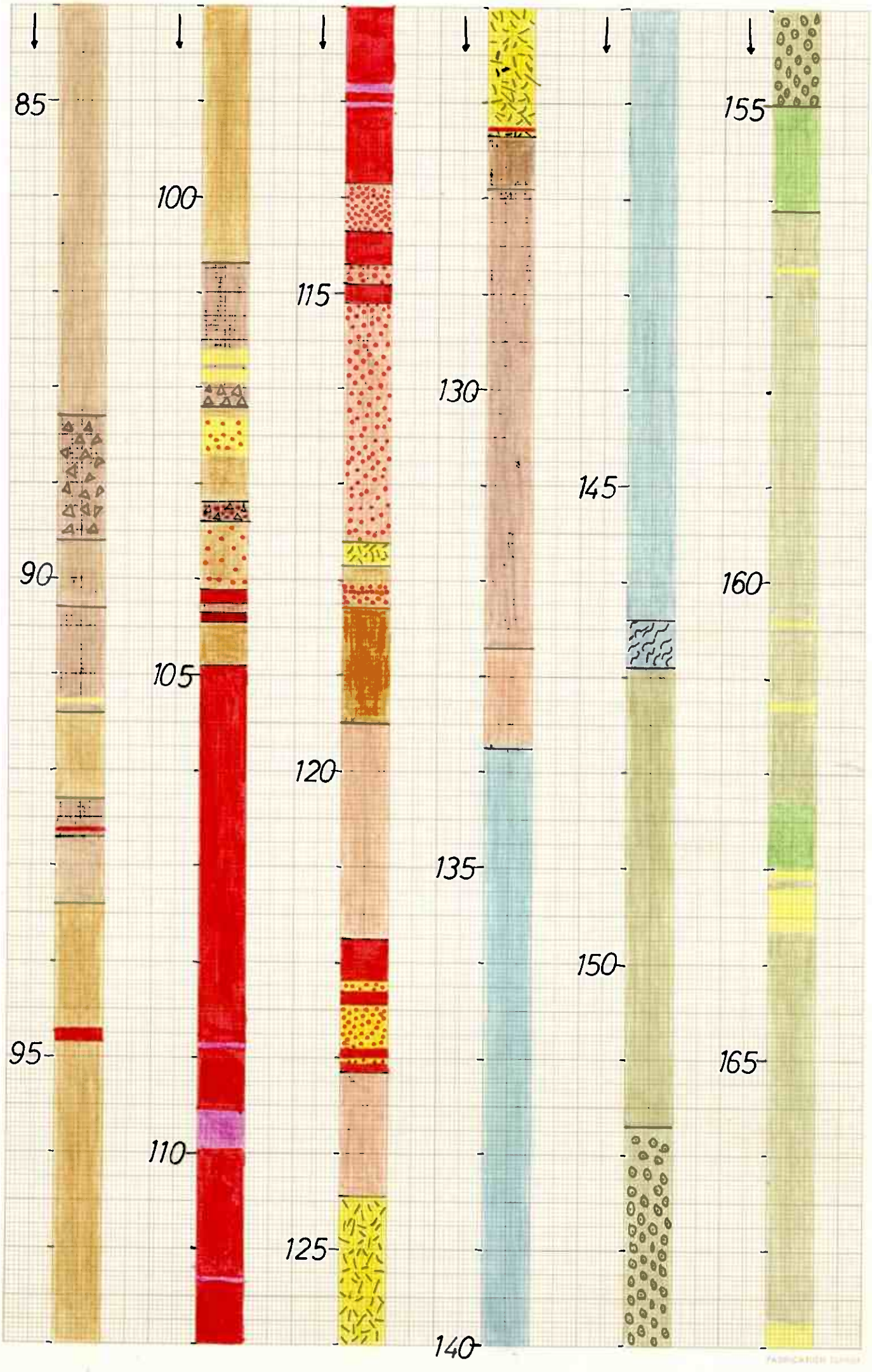
151,70 - 155,00 The strongly quartzy biotitic mica schist as well as in 146,90 - 151,70, but with little bit more grains of garnet and with more and bigger acicular or rodlike crystales of hornblende (1 cm maximally).

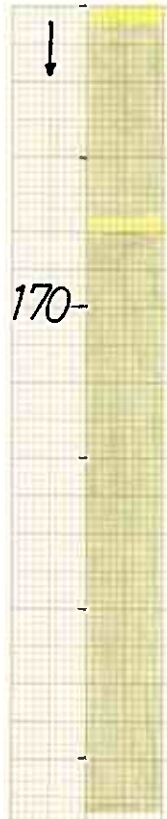
155,00 - 156,10 The strongly quartzy rock with rodlike and acicular crystales of hornblende, with some not much chlorite and epidote, with very small and not much grains of pink garnet and with some small spots or little schliers and pellets of carbonates. The impregnation of sulphides is very scarce only. The average gradient of this foliation is 70° - 75° round.

156,10 - 173,36 The strongly quartzy biotitic mica schist as well as in 151,70 - 155,00 m, but with more quartzite matter and with more some intercalations or positions of white quartz without some mineralisation in example in 156,70 - 156,75 m, 160,40 - 160,45 m, 161,25 - 161,35 m, 163,00 - 163,10 m, 163,20 - 163,65m, 167,75 - 168,10 m, and in 169,40 - 169,50 m. Between 162,30 - 163,00 m is position of the same rock as in 155,00 - 156,10 m. The average gradient of this foliation is 75° round (?).

This borehole nr. 41.G., was finished at 173,36 m.


The profile of the borehole nr. 41.G. Tverrfjellet, the lavel 6th.
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THE BOREHOLE NR. 42 G.
Tverrfjellet mine, level 6 th.

THE BOREHOLE NR. 42 G Tverrfjellet the lavel 6th.
X = - 104,6 , Y = + 83,0 (- 30°)

The petrographical description.

0,00 - 30,20 The tiny-grained and medium-grained amphibolitic greenstone with a lot of mostly parelel weak little veins or positions or intercalstions of quartz, quartz-feldspar basement matter with some grains, schliers or pellets of carbonates. Some mineralisation of FeS and few FeS_2 is present, but poor - scarce altogether. This type of rock has some not thick intercalstions of coarse-grained and medium-grained greenstone (keratophyric-greenstone) with acicular and rodlike crystales of hornblende and with quartz-feldspatic basement matter. Some weak intercalstions creat tiny-grained amphibolitic greenstone with clear parelel schistosity. The average gradient of this foliation is 40° round.

30,20 - 59,10 The tiny-grained and tender-grained amphibolitic greenstone with some weak intercalstions of the same type of rick, but with more chlorite and epidote and with a lot of biotite too. The impregnation of FeS or FeS_2 is present, bur very poor altogether. Quartz or carbonates creat very weak little mostly parelel veins or intercalstions. In 33,75 m is present white quartz position (5 cm thickness) The coarse-grained epidotic greenstone with big rodlike and acicular crystales of hornblende is present in intercalations between 42,50 - 42,85 m and 45,90 - 46,50 m with little bit strongly impregnation of FeS more and FeS_2 too. Between 46,65 m and 48,40 m is present the strongly calcareons tiny-grained or medium-grained greenstone. The same type of rock as in 0,00 - 30,20 m is present between 48,40 - 52,60 m. The average gradient of this foliation is 40° round.

59,10 - 63,30 The tiny-grained and medium-grained amphibolitic greenstone as well as in 0,00 - 30,20 m.

63,30 - 77,50 The tiny-grained and tender-grained amphibolitic greenstone very homogenetic but on some places has some weak intercalations of epidote medium or coarse-grained greenstone and with a lot of weak, little parelel veins or intercalations of quartz and carbonates and some intercalstions with mostly quartz-feldspar basement material and with impregnation of FeS_2 (in 68,40 - 1 cm, in 68,40 - 68,60 m, in 70,40 m - 1 cm, in 72,05 - 72,10 m, in 72,20 m - 1 cm, and in 75,50 m 1 cm). In 70,00 m and 72,40 m is present white quartz (a 5 cm). The average gradient of this foliation is 40° round.

77,50 - 97,20 The epidotic amphibolitic greenstone with a lot of rodlike or acicular crystales of hornblende with a lot of weak little veins or parelel weak intercalations of quartz mostly. The impregnation of sulphides is present but poor altogether (in 88,50 - 88,60 m little bit more strongly. Between 91,40 - 94,70 m is in this rock present more quartz and feldspar too in basement matter. Locally is present more little bit strong impregnation of FeS_2 mostly - in example round 92,65 - 92,75 m. The average gradient of this foliation is 60° - 70° round.

97,20 - 100,50 The coarse-grained amphibolitic greenstone with a lot of rodlike or acicular crystales of hornblende in a quartz-feldspar basement matter, with biotite but not so much and with a lot of irregular pellets, schliers etc. of carbonates too. The white or gray-white and gray quartz or quartzite creat some positions, mostly with little bit strong impregnation of FeS_2 mostly (in 98,90 - 99,05 m, 99,20 - 99,50 m).

100,50 - 112,30 The motley serie of tiny-grained and tender-grained and medium-grained amphibolitic greenstone as well as in 0,00 - 30,20 m. The more thickness positions of quartz or quartzite are present in 100,50 - 100,65 m, in 101,20 m (5 cm), in 102,20 m (7 cm), in 101,50 m - 101,60 m, in 104,25 m (2 cm) and in 109,30 - 109,40 m. The quartz or quartzite with little bit more strong impregnation of FeS_2 mostly are present in 102,90 - 103,00 m, 109,40 - 109,65 m but with some weak intercalations of tiny-grained amphibolitic greenstone in 110,40 - 110,50 m, in 110,70 - 110,75 m, in 111,50 - 111,55 m. The total mineralisation of sulphides in this rock is very poor only. The average gradient of this foliation is 45° - 50°, but 25° and 70° too.

112,30 - 117,10 The coarse-grained epidotic greenstone with a lot of big rodlike or acicular crystales of hornblende and with some very weak or little bit thick positions intercalations or little veins of quartz and quartzite (keratophyre too). The quartz positions with little bit strong impregnation of FeS_2 mostly are present in 114,80 - 115,05 m and in 114,60 - 114,65 m. The average gradient of this foliation is 60° - 65° round.

117,10 - 117,65 The medium-grained or little bit tiny-grained amphibolitic greenstone with some chlorite and some biotite micas and with some little bit strong impregnation of FeS_2 mostly. Between 117,50 - 117,65 m are present more and more quartz with feldspar in basement matter. The average gradient of this foliation is

117,65 - 119,35 The strong impregnation of FeS_2 mostly in white-gray or gray quartz. Between 118,35 - 119,00 m, 119,05 - 119,25 m are some intercalations of biotite-quartz gneissicschist with very poor and very weak impregnation of FeS_2 only.

119,35 - 122,65 The medium-grained and coarse-grained amphibolitic greenstone as well as m with some weak intercalations of gray quartz or quartzite (maximally 5 cm thickness) but without some impregnation of sulphides. Between 121,90 - 121,95 m is position of grey quartz with strong impregnation of FeS_2.

122,65 - 123,50 The strong impregnation of FeS_2 as well as in 117,65 - 119,35 m.

123,50 - 124,25 The same intercalation of amphibolitic greenstone as well as in 119,35 - 122,65 m.

124,25 - 125,70 The very strong impregnation of FeS_2 as well as in 117,65 - 119,35 m.

125,70 - 125,95 The same intercalation of amphibolitic greenstone with some veins of quartz as well as in 119,35 - 122,65 m.

125,95 - 130,10 The very strong impregnation of FeS_2 as well as in 117,65 - 119,35 m.

130,10 - 130,35 The same intercalation of amphibolitic greenstone as well as in 119,35 - 122,65 m.

130,35 - 155,50 The very strong impregnation of FeS_2 mostly, in quartz or gray quartzite, locally total homogenetic. Between 131,65 - 131,70 m is present the same intercalation of greenstone as well as in 119,35 - 122,65 m. From 144,50 m beginning more $CuFeS_2$ in ore xxxxxxxxxxxxx and impregnation is more homogenetic.
From 146,50 m beginning position with Fe_2O_4 ore with some weak intercalations or little veins of quartz and with mineralisation of $CuFeS_2$ more and FeS FeS_2 is very scarce present only. This position of Fe_2O_4 mineralisation finish in 152,10 m. Between 152,10 - 155,50 m is presnet the same mineralisation as well as between 130,35 - 144,50 m, but with more $CuFeS_2$.

155,50 - 156,25 The amphibolitic greenstone as well as 119,35 - 122,65 m, with a lot of veins of white quartz, but with strong mineralisation of $CuFeS_2$ FeS_2 and a few of FeS too.

156,25 - 158,60 The epidotic, quartzy greenschist with biotite and some small rodlike or acicular crystales of hornblende with a lot of weak little veins or interkalations of quartz. Some impregnation of sulphides is scarce only. The average gradient of this foliation is 50° - 55° round.

158,60 - 160,90 White-grey or gray quartzite with very scarce impregnation of FeS_2 only between 159,20 - 159,35 m is impregnation of FeS_2 little bit strongly.

160,90 - 161,50 The medium-grained or tiny-grained amphibolitic and biotitic greenschist with quartz and feldspar in basement matter too. The some mineralisation of sulphides is scarce only.

161,50 - 161,95 The epidotic greenschist with some acicular crystales of hornblende, few micas of biotite and some mineralisation of FeS_2 but poor altogether.

161,95 - 163,70 The white-grey or gray quartzitewith scarce mineralisation altogether but between 162,00 - 162,30 m, 162,50 - 162,65 m (homogenetic ore position with some inclusions of coarse-grained greenstone) ore position of strong impregnation of FeS_2 mostly.

163,70 - 165,50 The strong impregnation of FeS_2 mostly in gray or white-gray quartz or quartzite but mineralisation of $CuFeS_2$ is present not so much too. The mineralisation of ZnS (brown-red colour) is very strongly both a mineralisation of FeS_2 present too.

165,50 - 188,50 The motley serie of tiny-grained amphibolitic greenstone with a lot of weak little paralel veins or interkalations of quartz. Between 171,00 - 172,20 m is position of biotitic and epidotic chloritic greenschist. In 167,30 - 167,50 m, 173,10 - 173,15 m, 173,90 - 174,00 m, 174,10 - 174,15 m, 174,20 - 174,25 m, 174,30 - 174,40 m, 176,20 - 176,30 m, 176,40 - 176,50 m, 179,40 - 179,65 m, 179,70 - 179,75 m, and 181,60 - 181,65 m and 182,70 - 182,75 m are position of quartz with poor impregnation of FeS_2 mostly. Between 181,65 - 182,65 m is present position of white-gray quartzite with scarce mineralisation of FeS_2 only.

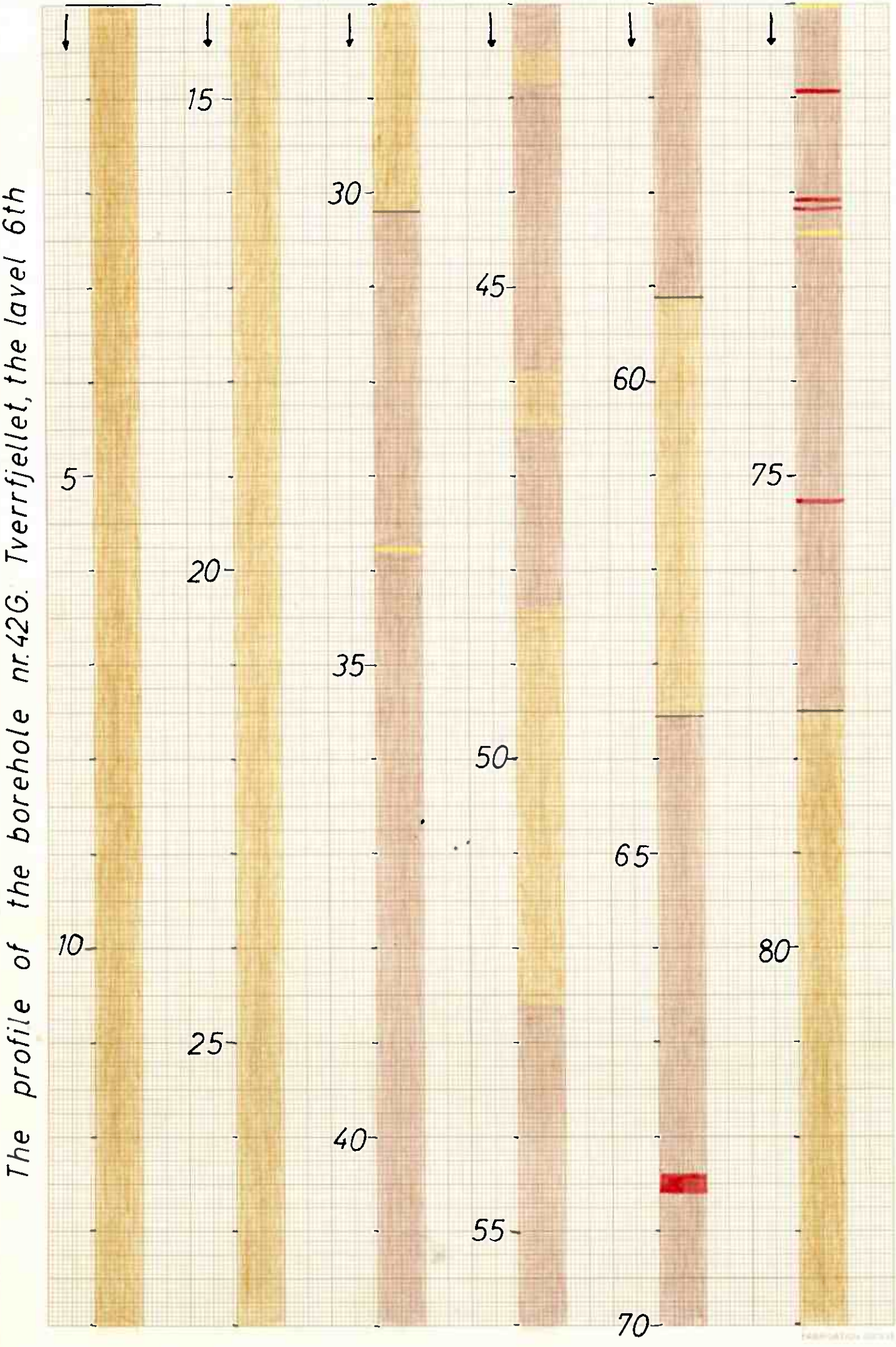
188,50 - 188,70 The coarse-grained epidotic, amphibolitic greenstone with some big grains of pink garnet.

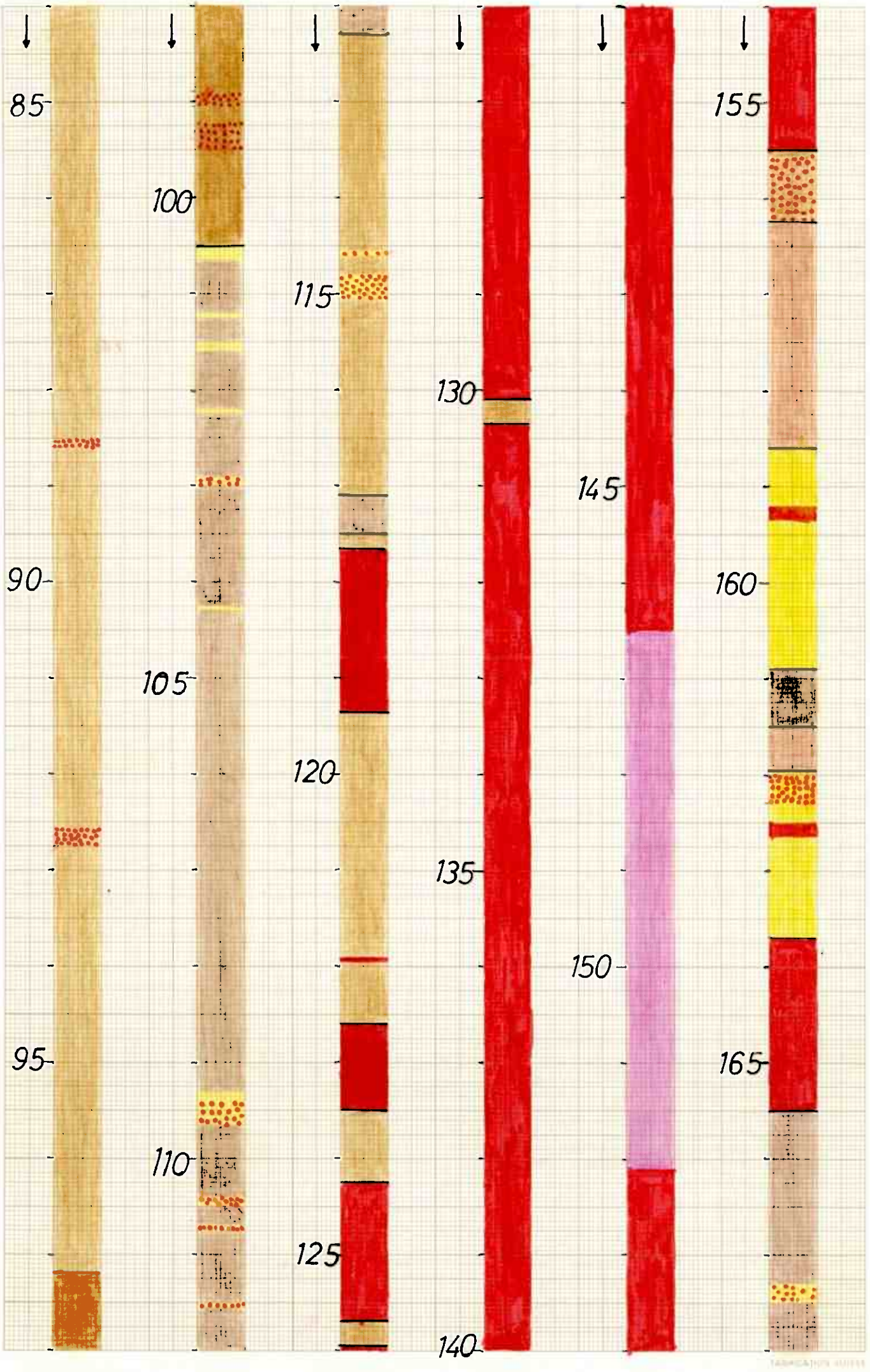
188,70 - 195,30 The sericitic and biotitic mica schist with a lot of big grains of pink garnet and with much paralel little veins or interkalations of quartz. The mineralisation of sulphides is scarce only. The average gradient of this foliation is 55° - 60° round.

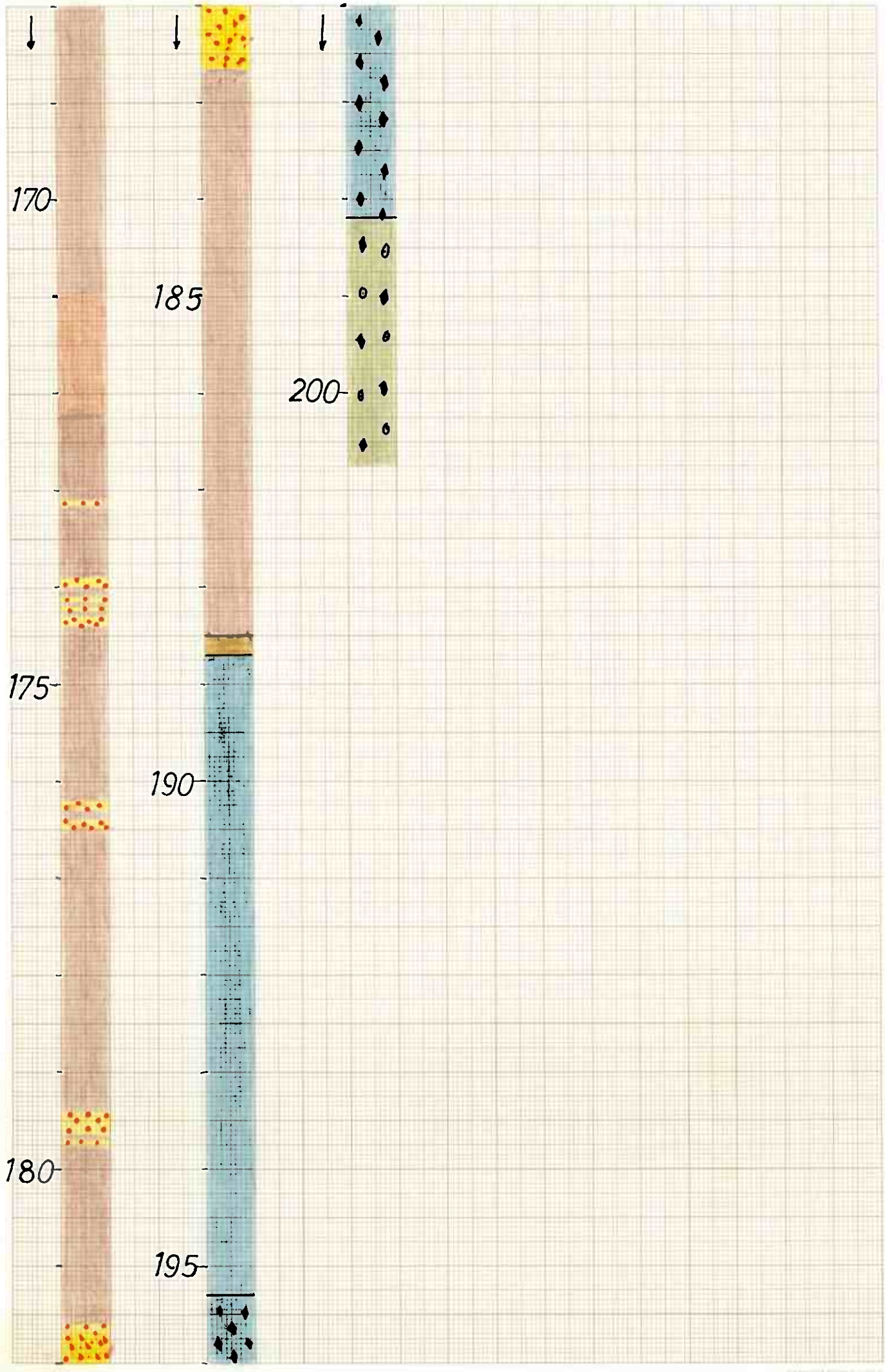
195,30 - 198,20 The sericitic and biotitic mica schist with some small grains of Fe_3O_4, garnet is present (scarce only big) but not so much. The average gradient of this foliation is 60° round.

198,20 - 200,77 The quartzy sericitic and biotitic mica schist with much grains of pink garnet, with a lot of avivular or rodlike crystales of hornblende and with some small grains of Fe_3O_4, but not so much. The average gradient of this foliation is 55° round.

This Borehole nr. 426 was finished at 200,77 m.


The profile of the borehole nr.42G. Tverrfjellet, the lavel 6th
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THE BOREHOLE NR. 43 G,
Tverrfjellet mine, the level 6 th.

The borehole no. 43 G, Tverrfjellet, the level 6th

X = - 104,6, Y = + 83,0 (-60°)

The brief petrographical description.

0,00 - 7,60 The medium-grained and little corase-grained amphibolitic greenstone. Locally more quartz and feldspar in basement matter present, locally more zoisit-epidote with quartz. Hornblende creat a lot of acicular and rodlike crystales, biotite is present too, but not so much. Carbonates creat some irregular little veins, pellets, schliers or grains too. Some mineralisation of sulphides (FeS_2 mostly) is present, but scarce only. Between 5,00 - 6,60 m the coarse-grained amphibolitic greenstone is present with big rodlike or acicular crystales of hornblende, with more zoisit-epidote and chlorite in basement matter. Quartz and carbonates creat some little paralell or anthitetic veins, intercalations, pellets or schliers. Garnet's big grains are present in the type of big coarse-grained greenstone, but not so much. 30° round.

7,60 - 31,20 The motley serie of medium-grained and tiny-grained amphibolitic greenstone which has quartz with some albite locally more zoisit-epidote with some chlorite or biotite too. This second type cross fluently too chloritic, amphibolitic greenschist with some biotite too etc.. The types between greenstone and greenschist with more chlorite and some biotite creat some weak intercalations. Carbonates mostly and quartz too creat some little paralell veins, weak intercalations, pellets, schliers etc. The total mineralisation of sulphides (FeS_2 mostly) is very poor only. In 10,30 m (5 cm) is present white quartz. Between 17,30 - 17,55 m is present position of limestone (crystalic) with some paralell weak intercalations of amphibolitic greenstone or greenschist. 40° round, but 30° or 35° too.

31,20 - 31,50 The gray quartzite with some very thin intercalations of amphibolitic greenstone with some scarce impregnation of FeS_2 mostly and with some thin paralell little veins of carbonates.

31,50 - 32,20 The coarse-grained and lessly medium-grained amphibolitic greenstone, which has more quartz and feldspar in basement rock and which has some thin positions of compact coarse-grained hornblende greenstone with big rodlike and acicular crystales of amphibole and with some impregnation of FeS_2 mostly, but poor altogether.

32,20 - 37,50 The medium-grained mostly, but tiny-grained too amphibolitic greenstone with more quartz and feldspar locally, but with a lot of grains of garnet (mostly garnet present round 32,00 - 33,00 m),

which after decrease fluently. 30°-35° . Carbonates and quartz too creat a lot of thin paralell little veins, intercalations, schliers etc..

37,50 - 39,00 The medium-grained amphibolitic greenstone with quartz-albitic basement matter mostly with some small grains of pink garnet and with some impregnation of FeS_2 mostly, but poor altogether only.

39,00 - 40,60 The gray metaquartzite with some feldspar, with not so much very small grains of hornblende, with some very small grains of garnet, with some impregnation of FeS_2 mostly but very poor altogether and with not very much, very small grains, but mostly little crystales of Fe_3O_4. Carbonates creat a lot of thin paralell veins, schliers, pellets etc.

40,60 - 40,80 Some tectonic zone with amphibolitic greenstone tiny-grained but coarse-grained too and with some footprint after a breccietic-mylonitic structure.

40,80 - 56,80 The tiny-grained amphibolitic greenstone mostly with some very thin intercalations with more chlorite and with some biotite (more comemorate greenschist, but something the other more greenstone), with a lot of weak little paralell veins, intercalations, pellets, schliers or grains of carbonates, and with the same veins or intercalations of quartz (in 51,15 m white-quartz, 5 cm thickness, in 54,60 m white-quartz, 5 cm thickness) The mineralisation of sulphides is very poor or scarce altogether. 40° round.

56,80 - 57,30 The medium-grained and tiny-grained amphibolitic greenstone with a lot of irregular little veins intercalations, pellets, schliers of quartz mostly, with chlorite, epidote and some biotite and with more quartz and some feldspar in basement matter. This rock has many footprint after strong stress or tectonic movements (pell-mell or breccietic structure). The same mineralisation of sulphides is scarce only.

57,30 - 59,40 The medium-grained greenstone as well as in 0,00 - 7,60 m, but with some strong footprint after some foulding, which cross fluently to some type of amphibolitic, biotitic gneissicschist round 57,70 m and round 58,50 m cross back to the beginning rock of this position. The impregnation of FeS_2 mostly is present but is poor altogether.

59,40 - 74,60 The motley serie of the tiny-grained amphibolitic greenstone with some more strongly impregnation of FeS mostly but with some FeS_2 too, with a lot of not thick intercalations of compact coarse-grained amphibolitic greenstone, with intercalations of quartzite, mostly together with little bit strong impregnation of FeS and FeS_2, with some weak little veins or intercalations of quartz without mineralisation and with some intercalations of the same

greenstone as in 0,00 - 7,60 m. Locally the schistosity clear, but more not. Some interesting positions of quartz or quartzite with little bit strong impregnation are in 66,20 - 66,50m, 69,50 - 69,60 m ans 71,20 - 71,25 m. This rock's comples has some footprint after some foulding. Exchange 0°-50°-70° max..

74,60 - 77,00 The tiny-grained or tender-grained amphibolitic greenstone with some impregnation of FeS mostly, but poor only altogether. This rock has strong footprint after some tectonic pressing and folding. The structure is breccitic or mylonitic locally, locally pell-mell, with a lot of pellets schliers etc. og quartz mostly, but of carbonates not much too.

77.00 - 86,60 The tiny-grained or tender-grained amphibolitic greenstone with a lot of weak and thin mostly little veins or intercalations, pellets, schliers etc. of quartz mostly, but of carbonates little bit too. The impregnation of FeS mostly is more strong, but poor only altogether. 40°-50° round. In 80,30 - 80,35 m, in 83,30 - 83,35 m and in 84,35 - 84,40 m are positions of quartz or quartzite with little bit more strong impregnation of FeS, FeS_2 more or mostly.

89,60 - 89,15 The medium-grained amphibolitic greenstone as well as in 0,00 - 7.60 m.

89,15 - 89,70 The gray metaquartzite, with some thin intercalations of tiny or tender-grained amphibolitic greenstone with some more strongly impregnation of FeS_2 mostly round 89.20 m and between 89,50 - 89.65 m (same four positions maximally 1 cm. thickness).

89,70 - 92,10 The tiny or tender-grained amphibolitic greenstone as well as in 77.00 = 86,60 m. 40° round.

92,10 - 102,10 The very strong tectonic zone with breccietic or myllonitic structure mostly. The basement rock is tiny or tender-grained amphibolitic greenstone. Much more clear is myllonitic zone between 97,50 - 98,60 m:

102,10 - 106,80 The strongly biotitic greenschist with chlorite, some epidote and with some rodlike, crystales of hornblende and aktinolite. Quartz is more present in basement matter of rock and creat some little veins or intercalations. The impregnation of FeS mostly is poor altogether. This one is more strong between 100,25 - 100,60 m and 102,90 - 103,00 m, where is present also FeS2 more strongly, as well as in 106,20 - 106,35 m. 25°-35° round.

106.80 - 143,50 The tiny-grained or tender-grained amphibolitic with a lot of weak, thin little veins, little intercalations, schliers, pellets or positions of quartz mostly, but somewhere of quartzite.

These positions are mostly without some ore impregnation, but some positions have little bit more strong impregnation of FeS_2 mostly in example in 109,00 (3 cm), in 140,50 m and 140,60 m (á 1-2 cm thickness). Some more thick quartz positions are in 110,00 m (5 cm), in 129,30 m (5 cm); in 129,80 - 129,90 m and in 132,90 m (3 cm). Some weak (thin) intercalations of biotitic and chloritic greenschist (10-20 cm thickness maximally) are between 119,50 - 121,00 m. 30°-35° round, but 60° round too. Between 122,30 - 122,60 m is position of greenstone with a lot of quartz-feldspar and carbonates in basement matter as well as in 0,00 - 7,60 m.

143,50 - 150,90 — The corase grained and medium-grained mostly amphibolitic greenstone with rodlike or acicular crystales of hornblende and with more quartz, some zoisit-epidote in basement matter. The structure is porphyroblastic. Some lot of paralell or oblique little veins or intercalations and schliers creat quartz mostly. The same imregnation of sulphides is scarce only, but is present locally.

150,90 - 152,00 — The tiny-grained and tender-grained amphibolitic greenstone as well as in 106,80 - 143,50 m. 70°-80° round.

152,00 - 167,20 — The medium-grained and coarse-grained amphibolitic greenstone as well as in 143,50 - 150,90 m, but with some intercalations of greenschist (maximally thickness 10 cm) with some strongly mineralisation of FeS more and FeS_2, in example in 155,65 - 155,7[illegible] m, in 155,10 - 155,20, in 156,10 - 156,20 m, 156,95 - 157,10 m, in 157,50 - 157,60 m, 158,50 158,60 m. Between 158,00 m and 161,00 m is some tectonic and mylonitic zone with some mylonitic material any brecciatic-myllonitic, pell-mell structure. 55°-60° round, but 70° too. The other tectonic zone like between 158,00 - 161,00 m is in 165,00 - 165,30 m.

167,20 - 176,60 — The strongly quartzy sericitic and chloritic mica-schist, but more comemorate this rock sericitic and chloritic quartzite with some weak veins, intercalations or pellets and schliers of quartz mortly and carbonates too. In basement matter is little present fedlspar too. The same mineralisation of sulphides is poor only altogether, but in some position of gray quartz is strong impregnation of FeS_2 mostly in 174,20 m (5 cm thickness).

176,60 - 176,90 — The medium-grained and coarse-grained amphibolitic greenstone as well as in 143,50 - 150,90 m.

176,90 - 181,20 — The tiny-grained and tender-grained amphibolitic as well as in 106,80 - 143,50 m. 65°-70° round, but 0° or 2o° too.

181,20 - 182,30 The medium-grained and coarse-grained amphibolitic greenstone as well as in 143,50 - 150,90 m and in 176,60 - 176,90 m. 70° round.

182,30 - 186,80 The tiny-grained or tender-grained amphibolitic greenstone with a good paralell schistose structur with a lot of paralell little veins, intercalation and schliers, which are created by quartz mostly or carbonates or quartz-feldspar matter fewly too. The same impregnation of sulphides in this rock is very poor only and some this one is present more round or in some little intercalations of quartz. 5° - 15° round. In 183,30 - 183,75 m is present position of white-gray quartzite with some poor impregnation of FeS_2 mostly. 10° round.

186,80 - 200,10 The medium-grained and locally coarse-grained amphibolitic greenstone with a lot of rodlike or acicular crystales of hornblende with quartz and some fedlspar and more epidote and zoisit-epidote in basement matter of this rock. Quartz or quartzite creat a lot of mostly paralell little veins, little intercalations or schliers with some strongly impregnation of FeS_2 mostly, locally, in example in 191,10 m (2 cm), in 195,85m - 195,90 m and in 196,30 m round (the two weak positions á 1 cm thickness). The total mineralisation of sulphides in this rock is very poor-scarce only. 25°-30° round, but 50° round too.

200,10 - 201,25 The medium-grained and tiny-grained amphibolitic greenstone, with a lot of small acicular and rodlike grains of hornblende or aktinolite too and with quartz, zoisit-epidote and not much albite in the basement matter of this rock and with a lot of small grains of garnet (pink colour) Biotite and chlorite are present too, but more scarcely. Carbonate creat some little veins or pellets, schliers and grains but not much, mostly quartz creat some little veins or intercalations and schliers. The mineralisation of sulphides is scarce only altogether. 30° round.

201,25 - 201,55 The medium-grained and locally coarse-grained amphibolitic greenschist with much rodlike and acicular crystales of hornblende, with a lot of small grains of garnet (pink colour) and with quartz with feldspar in basement matter mostly. Biotite is present little bit locally too. Chlorite and epidote are present mostly like accessoric minerales.

201,55 - 202,75 The medium-grained and tiny-grained amphibolitic greenstone as well as in 200,10 - 201,15 m.

202,75 - 203,60 The medium-grained and locally coarse-grained amphibolitic greenstone as well as in 201,25 - 201,55 m.

203,60 - 206,50 The medium-grained and locally coarse-grained amphibolitic greenstone with quartz and some

feldspar in basement matter of rock mostly as well as in 201,25 - 201,55 m but without garnet. In 205,20 - 205,30 m is position of white-gray quartz without impregnation of sulphides.

206,50 - 218,20 The tiny grained and tender-grained amphibolitic greenstone with a lot of weak, thin little paralell veins, intercalations, schliers or pellets of quartz mostly but fewly of carbonates too. The impregnation of sulphides (FeS_2 mostly) is very poor, scarce only altogether. 50° round. Locally the acicular and rodlike crystales (medium or coarse-grained) are present too.

218,20 - 221,00 The medium-grained and coarse-grained amphibolitic greenstone as well as in 143,50 - 150,90 m. Some weak positions of strongly impregnation of FeS_2 mostly are in 220,30 m (0,5 - 1 cm); in 220,50 m 81 cm) and in 220,85 m (0,5 cm).

221,00 - 222,10 The tiny-grained and tender-grained amphibolitic greenstone as well as in 206,50 - 218,20 m. 50°-60° round.

222,10 - 222,75 The coarse-grained amphibolitic greenstone for the others like in 143,50 - 150,90 m.

222,75 - 223,80 The strongly quartzy edpidotic greenschist, mostly with quartz in basement matter, with epidote, biotite and some weak, very poor impregnation of FeS_2 mostly. The crystales of hornblende or aktinolite are present scarcely only. Chlorite is only accessoric mineral. 50°-55° round.

223,80 - 244,00 The biotitic and sericitic micaschist with a lot of grains of garnet (minimally 2 mm, maximally 6 mm size in average) and with quartz like basement mineral of basement matter. Epidote, klinozoisite or some rodlike and acicular crystales of hornblende are accessoric minerales. The impregnation of some sulphides isn't or is scarce only. Locally has this rock very detail folding by mm or cm amplitude. The average gradient of the foliation of this rock is 50°-55° round. The quartz, mostly and little bit carbonates creat some little veins or little intercalations, pellets, lenticles or schliers, but not so much.

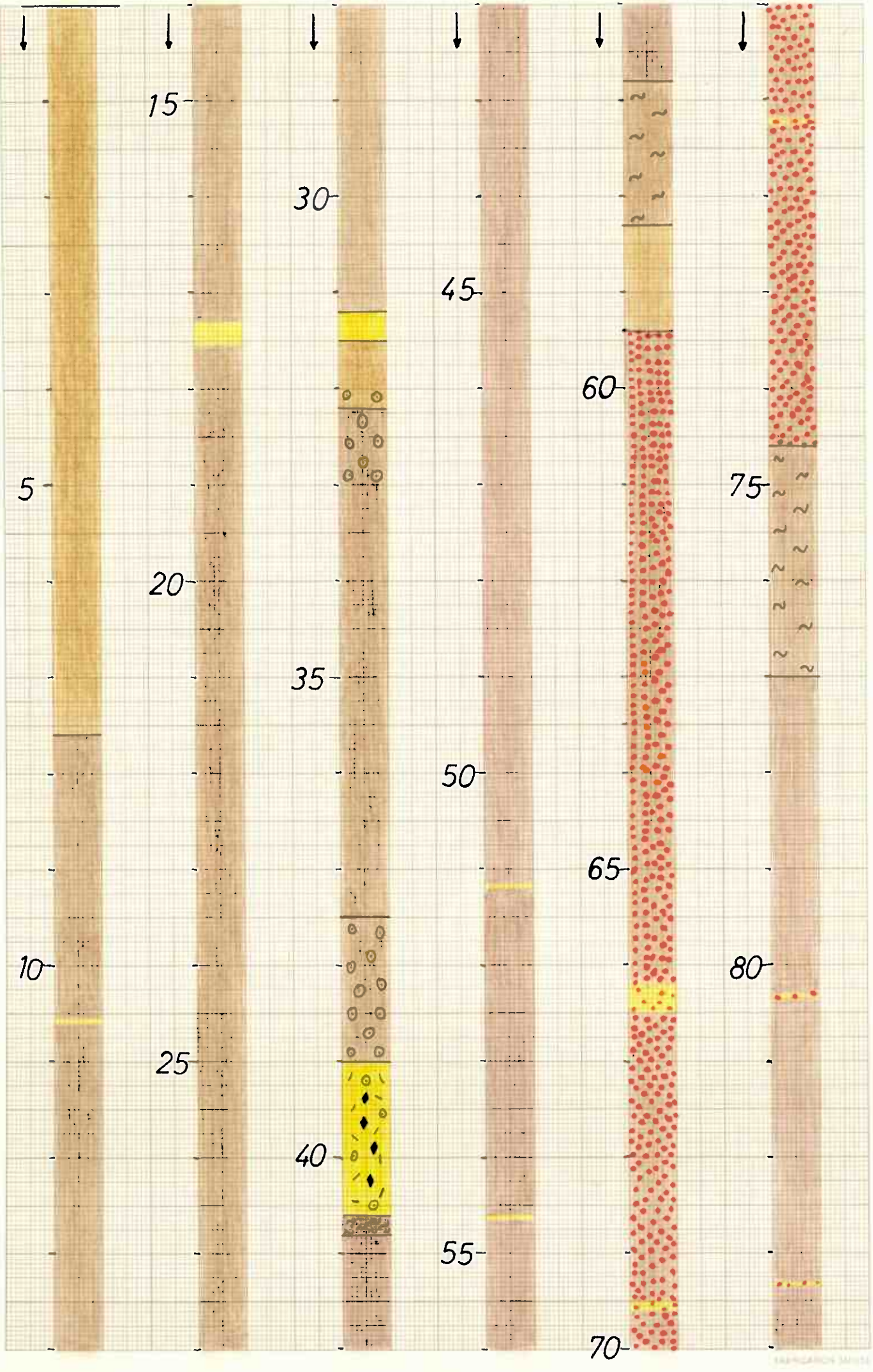
244,00 - 253,07 The sericitic micaschist, with a lot of grains of garnet and with a lot of acicular or rodlike crystales of hornblende, which are partly transformated by epidote. The biotite's micas are present too. Quartz creat mostly basement matter of this rock. The mineralisation of sulphides is very scarce only or isn't present. Between 246,95 - 247,05 m, 247,90 - 248,05 m, 248,50 - 248,55 m, 248,90 - 249,00 m, and 249,40 - 249,45 m are present some intercalations of sericitic quartzite with some big crystales (rodlike or acicular) of hornblende which are trans-

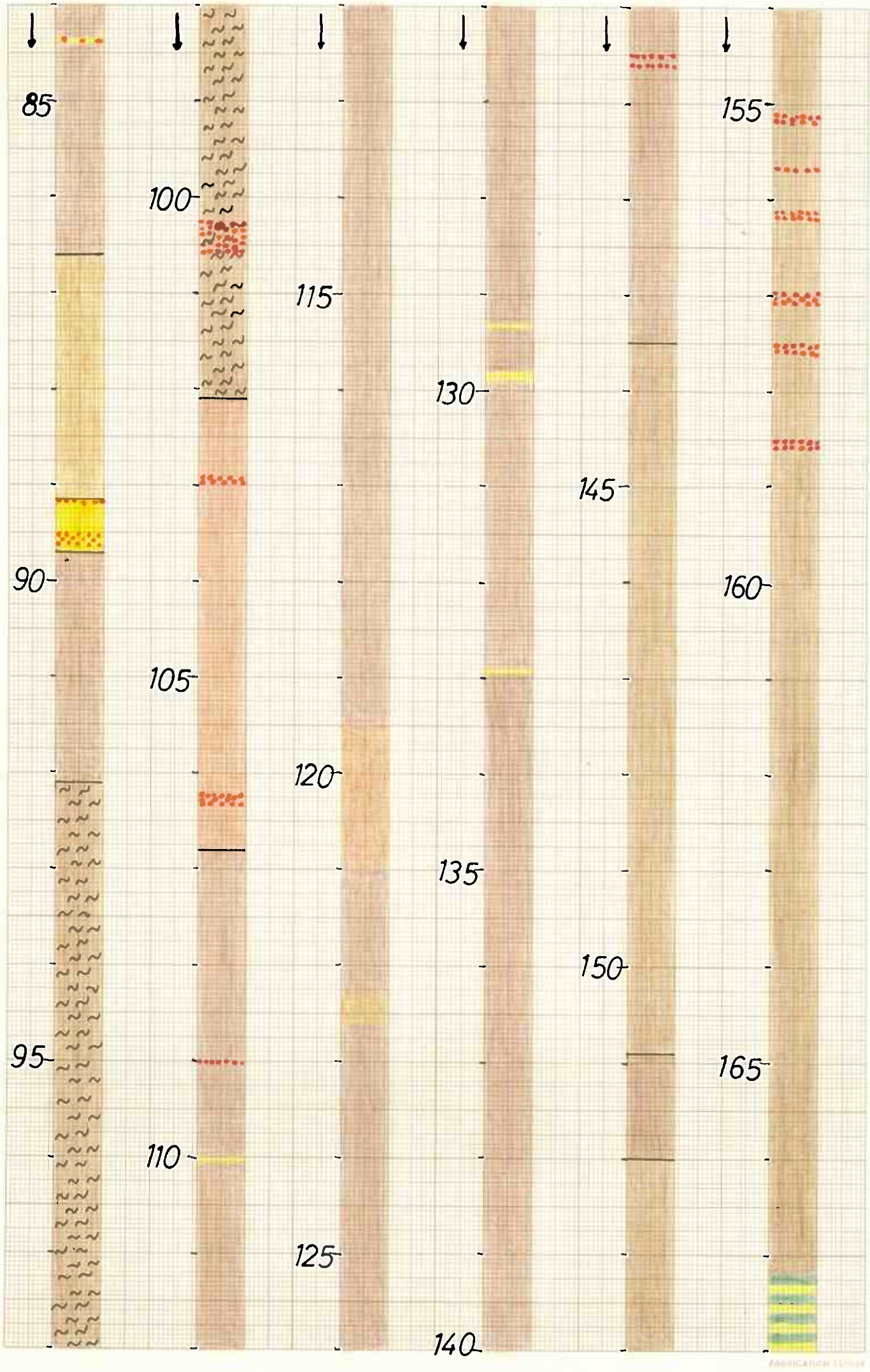
formated partly to epidote. Biotite is present too, but garnet isn't present. 50° round.

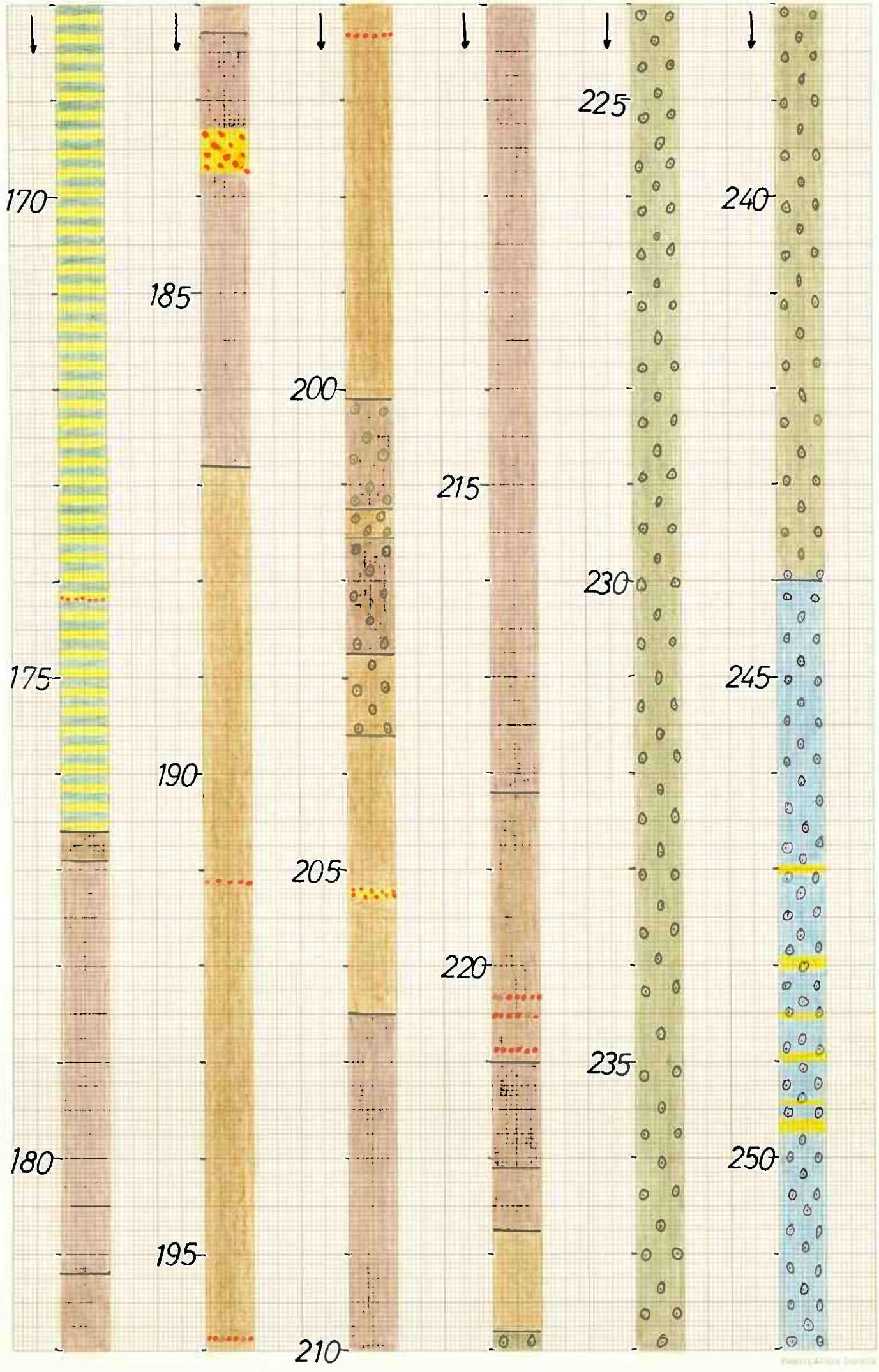
This borehole no. 43 was finished at 253,07 m.

(M. Motys).

The profile of the borehole nr. 43G. Tverrfjellet, the lavel 6th




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THE BOREHOLE NR. 48 G,
Tverrfjellet mine.

The borehole no. 48 G, Tverrfjellet.

The brief petrografical description.

0,00 - 0,20 — The strongly calcareous, motley greenstone, with a lot of epidote and with much acicular or rod-like crystales of hornblende (small 2-5 mm long in average maximally). Carbonates creat a lot of small grains, weak irregular intercalations, veins pellets, schliers etc.. Quartz is present in basement rock and creat some weak intercalations or irregular lenticles too. Biotite calcitic silicate chlorite etc. are present too, but lessly only. Th mineralisation of FeS_2 only is present but poor only. The pell-mell and porphyroblastic structure is present mostly but schistosity is little bit clear. The entire colour of this rock is green-gray or bright green-gray. The average gradient of foliation is 65° round.

0,20 - 1,65 — The tender-grained or tiny-grained amphibolitic greenstone with some very weak mostly irregular veins or intercalations of carbonates, with some irregular mettling of carbonates. The feldspathoid is present little and scarcely only. Chlrote, epidote and biotite are very scarce, but on some places is more epidote present in basement matter of this rock. Some mineralisation of FeS_2 is very, very weak. The schistosity is very little clear. The total colour of this rock is green-gray or little bit dark green-gray. The average gradient of foliation is 65° round.

1,65 - 2,40 — The strongly calcareous biotitic and chloritic greenschist with a lot of grains irregular weak pellets, schliers etc. of carbonates, with much quartz in the basement matter of this rock, epidote and some the other calcitic minerales are present too, but lessly only. Some mineralisation of sulphides, FeS_2 mostly is very scarce. The porphyroblastic pell-mell structure, with very few clear schistosity is present. The total colour of this rock is green-gray or dark green-gray. The average gradient of a foliation is 65° round.

2,40 - 5,20 — The strongly calcareous motley greenstone, the same as in 0,00 - 0,20 m, but from 3,30 m beginning more and more to be present weak intercalations or positions of keratophyre and quartz. Round the more little strongly impregnation of FeS_2 is present. In example between 3,30 - 3,45 m, 3,70 - 3,75 m, 4,55 - 4,70 m are positions of keratophyre. Round 3,40 - 3,45 m is little bit strong impregnation of FeS_2. The average gradient of foliation is 65° round. In 4,15 - 4,35 m is position of strongly chloritic greenschist.

5,20 - 5,60	The strongly amphibolitic keratophyre, with a lot of big (1 cm in average long) acicular crystales of hornblende, with some not much schliers and pellets of carbonates, with some biotite and sericite, but few only. The mineralisation of sulphides isn't present mostly. The structure is porphyroblastic. The total colour of this rock is green gray.
5,60 - 5,95	The strongly sericitic rock with a lot of small rodlike or acicular crystales of hornblende, with quartz mostly and with some irregular grains, pellets or schliers of carbonates, but few only. Chlorite and biotite are present very scarcely only. Epidote etc. are present also very scarcely only. The mineralisation of sulphides isn't present. The structure is irregular porphyroblastic, without a clear some foliation. The total colour of this rock is gray. This rock commemorate keratophyre matter, because is present some fedlspar.
5,95 - 10,20	The white-gray or gray and bright gray quartz with very strong mineralisation of FeS_2 mostly locally only and with poor impregnation of FeS_2 altogether in average. Some micas of biotite and chlorite (very small) are present, but very scarce only and creat very small irregular schliers or lenticles etc., locally only. More sericite is present, but not so much too. The positions of very strong mineralisation of FeS_2 mostly are in 5,95 - 5,98 m, in 6,90 - 7,10 m, in 7,25 - 7,40 m, in 9,60 - 9,70 m and in 10,00 - 10,05 m. The positions with strong concentration of biotite, some rodlike crystales of hornblende, with some small grains of carbonates and with impregnation of FeS_2 mostly, but not so strong are in 6,40 - 6,42 m and in 6,85 - 6,90 m. Between 7,50 - 8,15 m is present some micro-impregnation of Fe_3O_4 in this quartz (blue-quartz), but this impregnation isn' so strong.
10,20 - 10,65	The strongly sericitic rock as well as in 5,60 - 5,95 m which has more less crystales of hornblende in overlying stratum and in a subjaccent. This rock is some mineralisation of sulphides-free.
10,65 - 11,45	The white-gray quartz with a strong impregnation of FeS_2 mostly.
11,45 - 11,80	The quartz-sericitic micaschist with feldspar, with not so much biotite and chlorite, with some grains and irregular pellets, schliers etc. of carbonates and without some mineralisation of sulphides. This rock is little bit commemorate, the rock which is present in 5,60 - 5,95 m, but without hornblende. The schistose structure is very little clear only. The total colour of this rock is gray and bright gray too. The average gradient of a foliation is 55°-60° round.

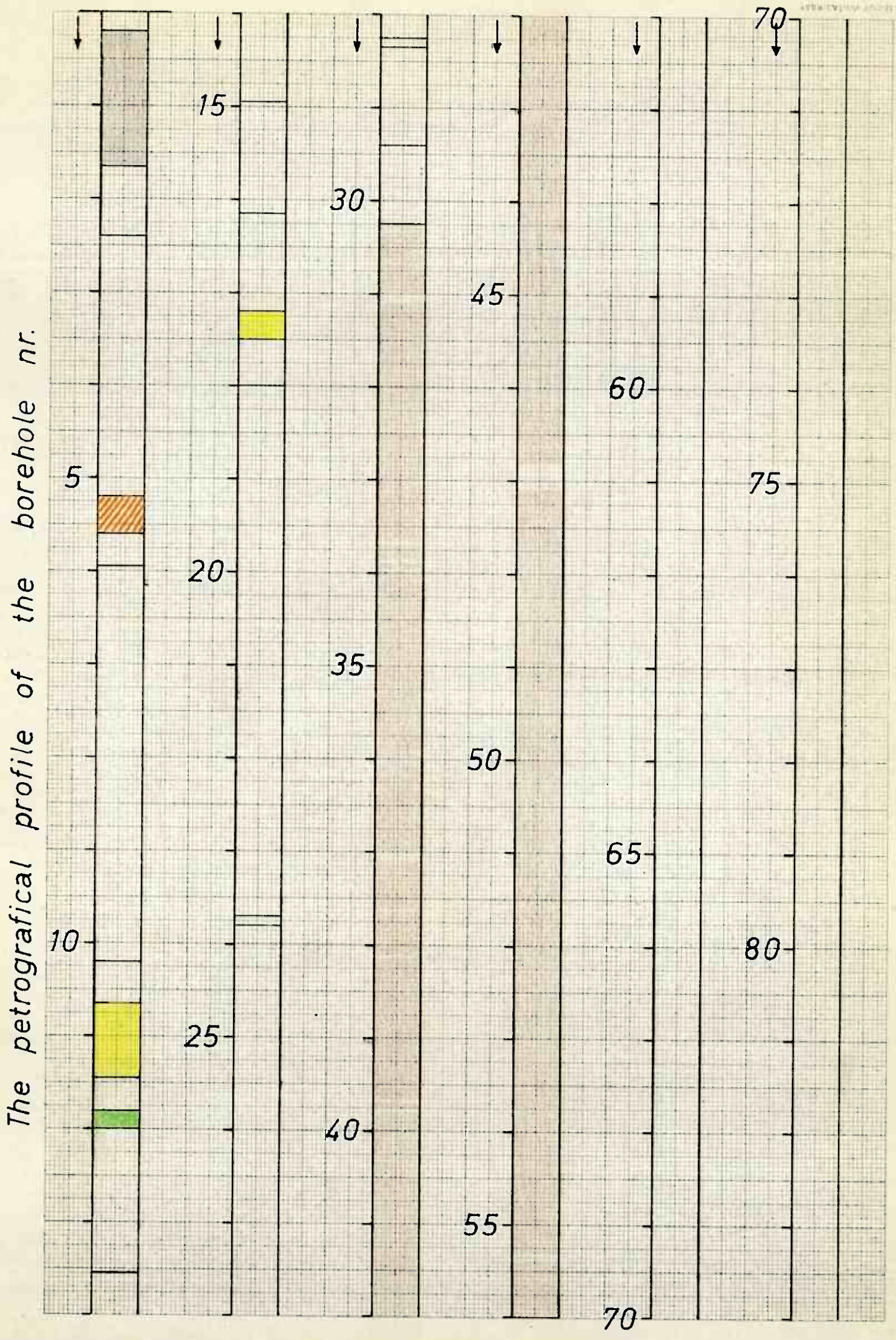
11,80 - 12,00	The mylonitic zone, which is created by the sericitic and biotitic micaschist with the basementic mylonitic cement, without some mineralisation of sulphides.
12,00 - 13,55	The keratophyre with very small micas of biotite and with zoisite, but mostly present quartz and feldspar. The some mineralisation of sulphides isn't present or is very scarce only. The structure is massive and a schistosity isn't clear. The total colour of this rock is bright gray and white-gray. Between 13,50 - 13,85 m are present not much small grains of Fe_3O_4 (maximally 1 mm in average).
13,55 - 14,95	The quartz-sericitic micaschist as well as in 11,45 - 11,80 m, but with more chlorite and with some epidote locally only. The average gradient of a foliation is 70° - 75° round - not so clear this schistosity.
14,95 - 16,15	The keratophyre with quartz and feldspar mostly and with sericite and with very small grains of garnet and micas of biotite, but few only. Some little bit bigger grains of Fe_3O_4 are in 14,95 - 15,05 m (1,0 mm in average big). This type of keratophyre is just the same on the others as in 12,00 - 13,55 m. The total colour of this rock is white and white-gray.
16,15 - 17,20	The quartz-sericitic micaschist as well as in 11,45 - 11,80 m.
17,20 - 17,50	White-quartz with same very poor impregnation of FeS_2.
17,50 - 18,00	The keratophyre, which is created by quartz mostly, with a lot of micas of biotite, with some rodlike and acicular crystales of hornblende and with very few chlorite. Feldspar is present but not so much. Carbonates creat some irregular grains, schliers and pellets but not so much too. Fe_3O_4 grains are present locally too but scarcely only altogether. The total colour of this rock is white-gray. The mineralisation of sulphides isn't present.
18,00 - 23,70	The quarts-sericitic micaschist with the few chlorite and micas of biotite, with not so much grains of Fe_3O_4, but without some impregnation of sulphides. Carbonates creat some small grains and irregular schliers, pellets etc. The structure of this rock is phacoidal and pell-mell and schistosity is clear very little only. The total colour of this rock is bright grey, little bit bright greengray too. The average gradient of a foliation is 70° round, but 65° too.
23,70 - 23,80	The quartz-sericitic micaschist as well as in 18,00 - 23,70 m cross fluently to keratophyre and both have some impregnation of FeS_2 mostly, but very poor altogether. The colour of these rocks is white-gray.

23,80 - 28,25 4,45 m	The very strong impregnation of FeS_2 mostly in quartz, but more homigenitic impregnated ore with $CuFeS_2$ (5-10 %).
28,25 - 28,35	The gray quartz or mostly gray sericitic quartzite with some micas of biotite and with some crystales (acicular or rodlike) of hornblende and with very poor impregnation of FeS_2 mostly.
28,35 - 29,40	The tiny-grained and medium-grained amphibolitic greenstone with some, big rodlike or acicular crystales of hornblende with a lot of thin paralell little veins or little intercalations of quartz. Carbonates creat some small schliers, pellets or grains. The structure is porphyroblastic with little bit clear schistosity. The total mineralisation of sulphides is scarce only. The total colour of this rock is gray-green. The average gradient of a foliation is 70°-75° round.
29,40 - 30,25	The epidotic spotted greenstone with some very small acicular crystales of aktinolite more and hornblende too, with some cencentration of micas of biotite in some small lenticles, pellets or irregular small schliers. Much spots creat quartz with albite. Some impregnation of FeS_2 mostly is present (some grains). but is very poor altogether The same schistosity isn't clear. Quartz mostly creat too some little intercalations. The total colour of this rock is green or gray-green.
30,25 - 56,00	The very motley serie of medium-grained amphibolitic greenstone, with a lot of small acicular and rodlike crystales of hornblende and with quartz-fedlspatic basement matter with not so much zoisit-epidote matter and with some chlorite and biotite like accessoric minerales. Quartz mostly but carbonates locally too creat some little paralell veins, little intercalations or schliers, pellets and spots. The tiny-grained or tender-grained amphibolitic greenstone with a lot of paralell little veins or little intercalations of quartz mostly and some epidotic tiny-grained green stone with some micas of biotite and some epidotic coarse-grained amphibolitic greenstone creat some not so thick (maximally 1-2 m but mostly 3-4 dm only) intercalations in medium-grained amphibolitic greenstone. The total mineralisation of FeS_2 mostly in this serie of the other types of greenstone is present but very poor, locally scarce only. The total colour of this serie of rocks is green-gray, bright green-gray or gray-green and green locally too. The average gradient of foliation is 65°-70° round. Some intercalations (little bit more thick) of quartz or quartzite are present in 37,00 - 37,10 m, 39,65 - 39,70 m. 39,75 - 39,80 m and in 55,30 - 55,40 m. Some

Little bit more strong impregnation of FeS_2 mostly in more quartzy parts of rock's is in 31,00 - 31,10 m, in 33,65 - 33,70 m, in 33,85 - 33,90 m, in 33,95 - 34,00 m, in 36,00 - 36,05 m, in 37,60 - 37,65 m, in 38,10 - 38,15 m. Between 46,80 - 47,10 m is present position of biotitic gneissicschist.

This borehole no. 48 G was finished at 56,00 m.

(M. Motys).


The petrografical profile of the borehole nr.
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THE BOREHOLE NR. 49 G.
Tverrfjellet mine, level 6 th.

THE BOREHOLE NR. 49 G, Tverrfjellet, the lavel 6th.
X = - 102,7 , Y = + 84,0 (- 45°).

The petrographical description.

0,00 - 6,30 The coarse-grained amphibolitic greenstone with the quartz-feldspar basement matter. Between 1,60 - 1,75 m and 1,85 - 2,10 m are present positions of calcareous quartzite with some intercalations of greenstone. The sulphides mineralisation is scarce.

6,30 - 13,40 The tiny-grained amphibolitic greenstone with the clear paralel schistosity with a lot of paralel little veins or intercalations of quartz more few of carbonates, which creat also some schliers and grains too. The mineralisation of sulphides is scarce only. The average gradient of this foliation is 45° round.

13,40 - 18,55 The coarse-graiend amphibolitic greenstone as well as in 0,00 - 6,30 m but with some more intercalations (paralel) of quartz and tiny-grained amphibolitic greenstone with some more biotite too. The sulphides mineralisation is very scarce only.

18,55 - 24,60 The tiny-grained amphibolitic greenstone as well as in 6,30 - 13,40 m. The mineralisation of sulphides is very scarce only. The average gradient of this foliation is 40° round.

24,60 - 26,90 The coarse-grained amphibolitic greenstone as well as in 0,00 - 6,30 m but with more intercalations of quartzite and tiny-grained or medium-grained amphibolitic greenstone.

26,90 - 34,10 The strongly quartzy amphibolitic greenstone with very clear paralel schistosity with very poor mineralisation of FeS_2 mostly (scarcely) In 29,80 - 29,90 m the white quartz. The avera e gradient of this foliation is 40° round.

34,10 - 46,40 The hornblende greenschist with quartz and feldspar in basement matter, but with a lot of small grains of pink garnet. Locally more the quartz-feldspar basement matter, locally some not thick intercalations of the biotitic and chloritic greenschist round 41,20 - 41,50 m and 41,80 - 42,10 m. The average gradient of this foliation is 35° round.

46,40 - 46,90 The mylonitic zine (this core is breaken).

46,90 - 64,30 The motley serie of tiny-grained and tender-grained amphibolitic greenstone with a lot of very weak little veins of quartz, fewly of carbonates and on some places with more grains, pellets schliers etc. of carbonates. Locally some not thick intercalations of biotitic and chloritic greenschist. The paralel schistose structure is very clear. The average gradient of this foliation is 35° round. On some places more micas of biotite present. The mineralisation of sulphides is very poor altogether. Between 63,50 - 63,80 m the intercalation of biotitic and amphibolitic (acicular crystales of actinolite too) keratophyre rock.

64,30 - 64,50 The gray quartz with very poor mineralisation of FeS_2 only.

64,50 - 67,10 The motley serie of some variation types of amphibolitic keratophyre intercalations of greenschist (chloritic, biotitic and amphibolitic) and coarse-grained or edium-grained greenstone. The mineralisation of sulphides is scarce only. The average gradient of this foliation is 35° round.

67,10 - 75,10 The keratophyre with a lot of little veins, schliers pellets or

grains of carbonates, with chlorite, with FeS_2 locally only, but with some very small grains of Fe_2O_3. On some places more intercalations of chloritic, epidotic or biotitic greenschist are present, but very thin only.

75,10 - 143,90 The complex of tiny-grained and tender-grained amphibolitic greenstone with a lot of little veins, schliers, pellets or irregular intercalations of quartz and carbonates, but weak only, very thin (maximally 1 cm in average thickness). Schistosity isn't clear. Between 89,60-90,80 m this basement matter of this rock has more quartz and feldspar and schistosity is more clear. Some mineralisation of FeS is present but poor altogether. FeS creat mostly some very small lenticles or scales. The average gradient of this foliation is 35°, 45° and 30° round. The white quartz without mineralisation is in 81,30 - 81,40 m, 83,00 m (5cm), 84,20 m (5cm), and in 94,50 m (5 cm). The gray quartz with little bit strong mineralisation is in 82,50 m (2 cm). Between 104,10 - 107,00 m, 111,20 - 111,40 m and 116,50 - 119,00 m.are tectonic mylonitic zones (the core is broken). From 119,70 begin the same mylonitic and tectonic zone to 129,30 m.

143,90 - 144,50 Grey quartzite with some sericite and few chlorite only, without some mineralisation of sulphides.

144,50 - 155,00 The motley serie of the tiny- and tender-grained amphibolitic greenstone with a lot of schliers, pellets, grains, irregular lenticles, irregular veins or irregular intercalations of quartz and little of carbonates too. The structure is pell-mell and phacoidal. The schistosity isn't much clear. This rock bring the strong footprint of some tectonic movements altogether, with some clear mylonitic zones locally. The mineralisation of FeS mostly is present (creat some small scales mostly), but poor altogether. The average gradient of this foliation exchange from 25° - 55° round.

155,00 - 161,90 The coarse-grained epidotic greenstone, with some weak intercalations of quartz mostly. The mineralisationof sulphides is scarce altogether, but round 161,40 m is the position of strong impregnation of FeS_2. The structure is porphyroblastic without some clear schistosity.

161,90 - 162,50 The same motley serie of tiny-grained greenstone with few biotite and chlorite too as well as in 144,50 - 155,00 m.

162,50 - 162,65 The strong impregnation of FeS_2 in white-gray quartz.

162,65 - 163,00 The same rock as in 144,50 - 155,00 m.

163,00 - 163,15 The strong mineralisation of FeS_2 in white-gray quartz round some inclusions of coarse-grained amphibolitic greenstone.

163,15 - 163,50 White-gray quartz with very poor impregnation of FeS_2 only.

163,50 - 163,65 The very strong impregnation of FeS_2 in white quartz with some small inclusions of coarse-grained greenstone.

163,65 - 165,00 The strongly quartzy amphibolitic greenstone and greenschist (motley serie) with big acicular and rodlike crystales of hornblende with much biotite epidote and with some chlorite.

165,00 - 165,15 The very strong impregnation of FeS_2 in white and white-gray quartz.

165,15 - 167,90 The coarse-grained amphibolitic greenstone with the intercalations of biotitic amphibolitic and chloritic greenschist with some mineralisation of sulphides (FeS and FeS_2 too).

167,90 - 168,40 The white quartz with two positions (15 cm and 10 cm) of horogenetic FeS_2 mineralisation in 167,90 - 168,05 m and in 168,10 - 168,20 m.

168,40 - 170,00 The coarse-grained amphibolitic greenstone as well as 165,15 - 167,90 m. In 168,60 - 168,65 m is very strong impregnation of FeS_2 in quartz.

170,00 - 174,15 The tiny-grained amphibolitic greenstone with some weak intercalations of chloritic and biotitic greenschist. Some mineralisation of FeS mostly is present too, but poor altogether only. Some weak and irregular intercalations, veins, pellets, schliers etc. of quartz and carbonates are present strongly enough.

174,15 - 181,00 The very strong mineralisation of FeS_2 in white and white-gray quartz. The some intercalations of quartzy coarse-grained and medium-grained amphibolitic greenstone with FeS_2 impregnation too, but weak only.

181,00 - 184,30 The tiny-grained amphibolitic greenstone with a lot of weak intercalations of quartz, which are between 181,50 - 181,65 m and 181,95 - 182,10 m present like homogenetic positions with poor impregnation of FeS_2 mostly.

184,30 - 184,90 The FeS_2 strong impregnation as well as in 174,15 - 181,00 m.

184,90 - 186,60 The chloritic, epidotic greenschist with acicular and rodlike crystales of hornblende and with a lot of weak parallel veins or intercalations of quartz mostly and with some not so poor mineralisation of FeS_2 with some not much $CuFeS_2$.

186,60 - 192,80 The very strong impregnation of FeS_2 as well as in 174,15 - 181,00 m.

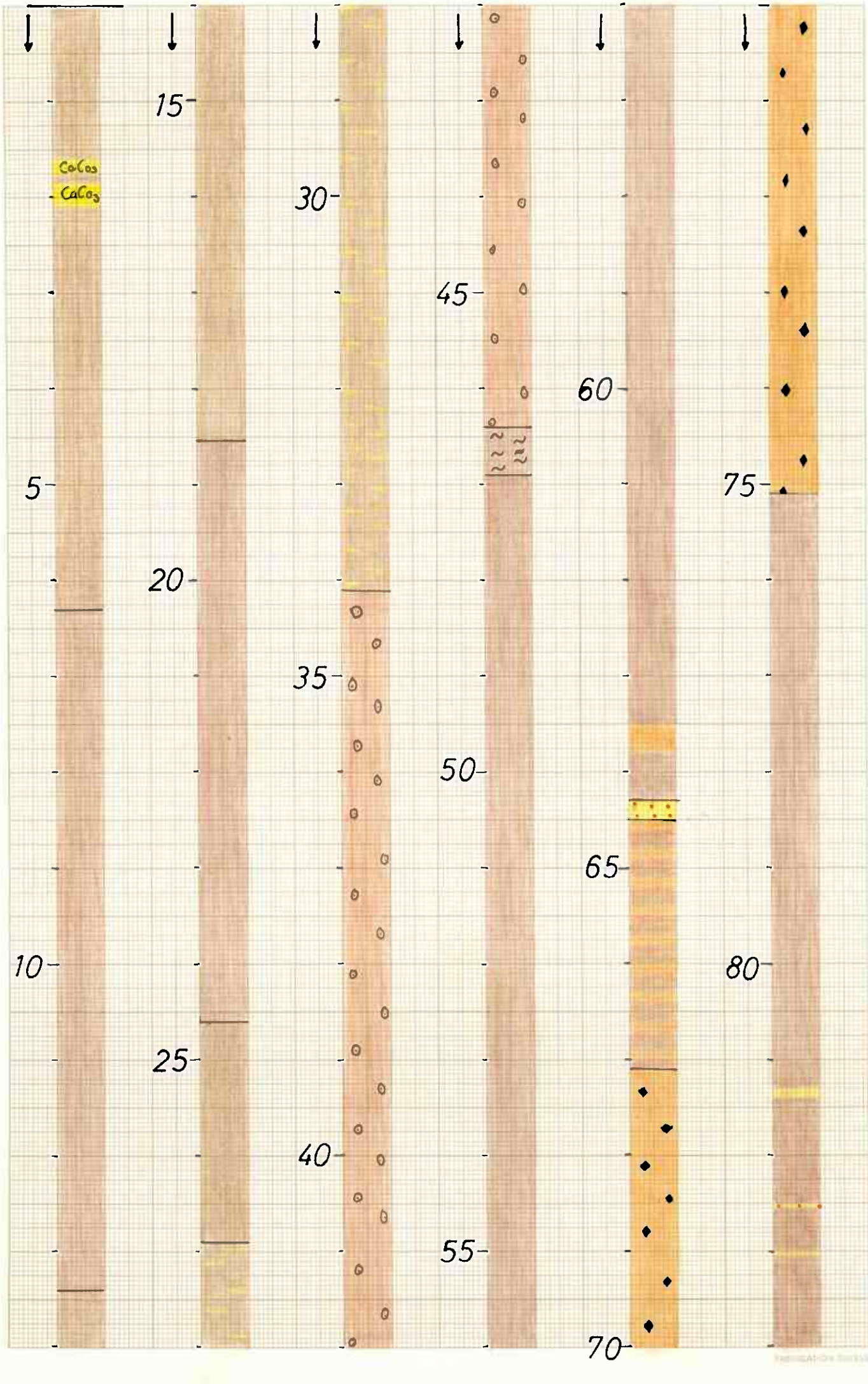
192,80 - 194,60 The tiny-grained amphibolitic greenstone as well as in 144,50 - 155,00 m with some footprint of mylonite, tectonic zone and with white quartz positions with some weak mineralisation of FeS_2 in 193,20 - 193,50 m, 192,80 - 192,95 m, and 194,00 - 194,50 m.

194,60 - 195,50 The very strong impregnation of FeS_2 as well as in 174,15 - 181,00 m.

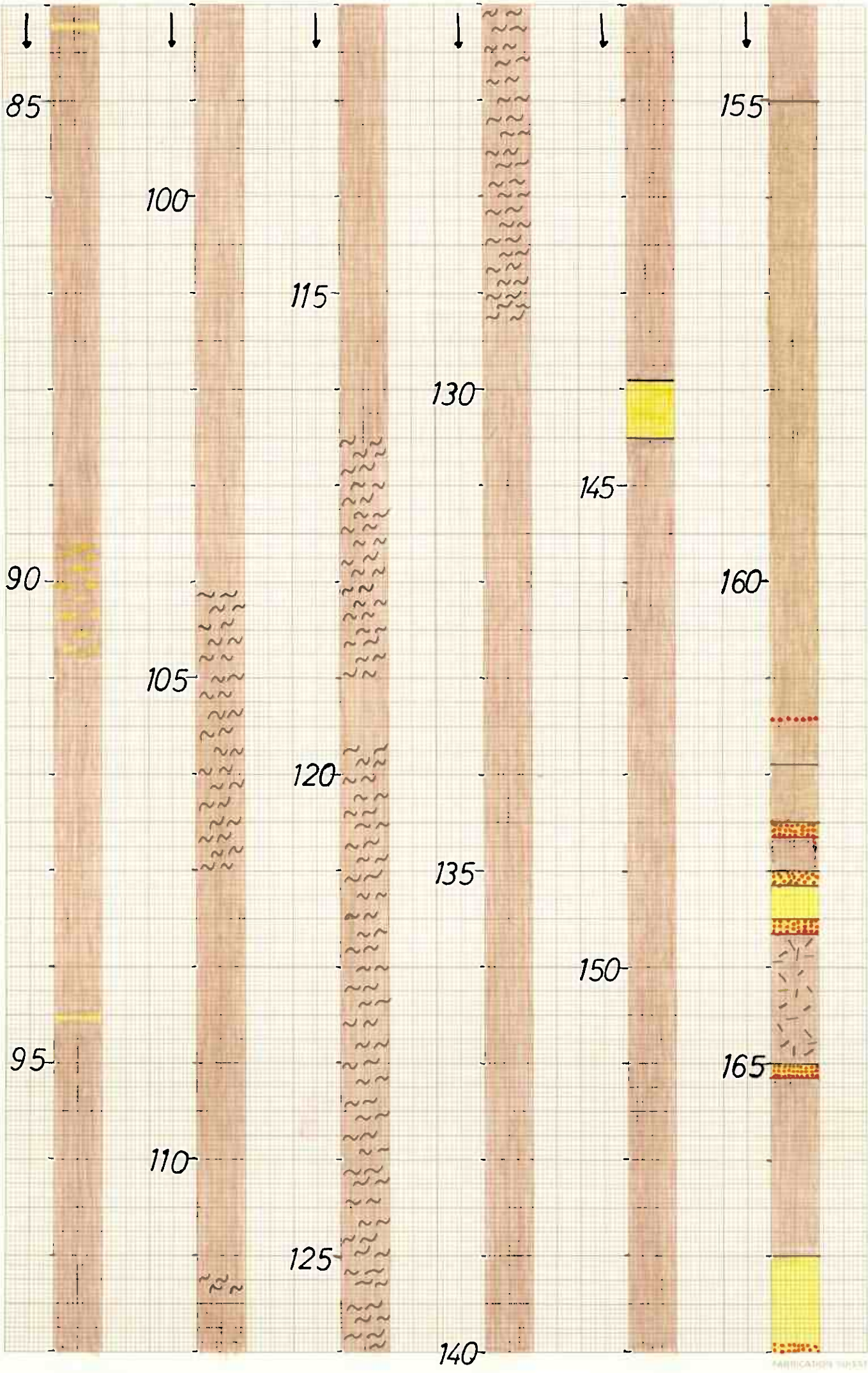
195,50 - 202,50 The tiny-grained amphibolitic greenstone as well as in 181,00 - 184,30 m.

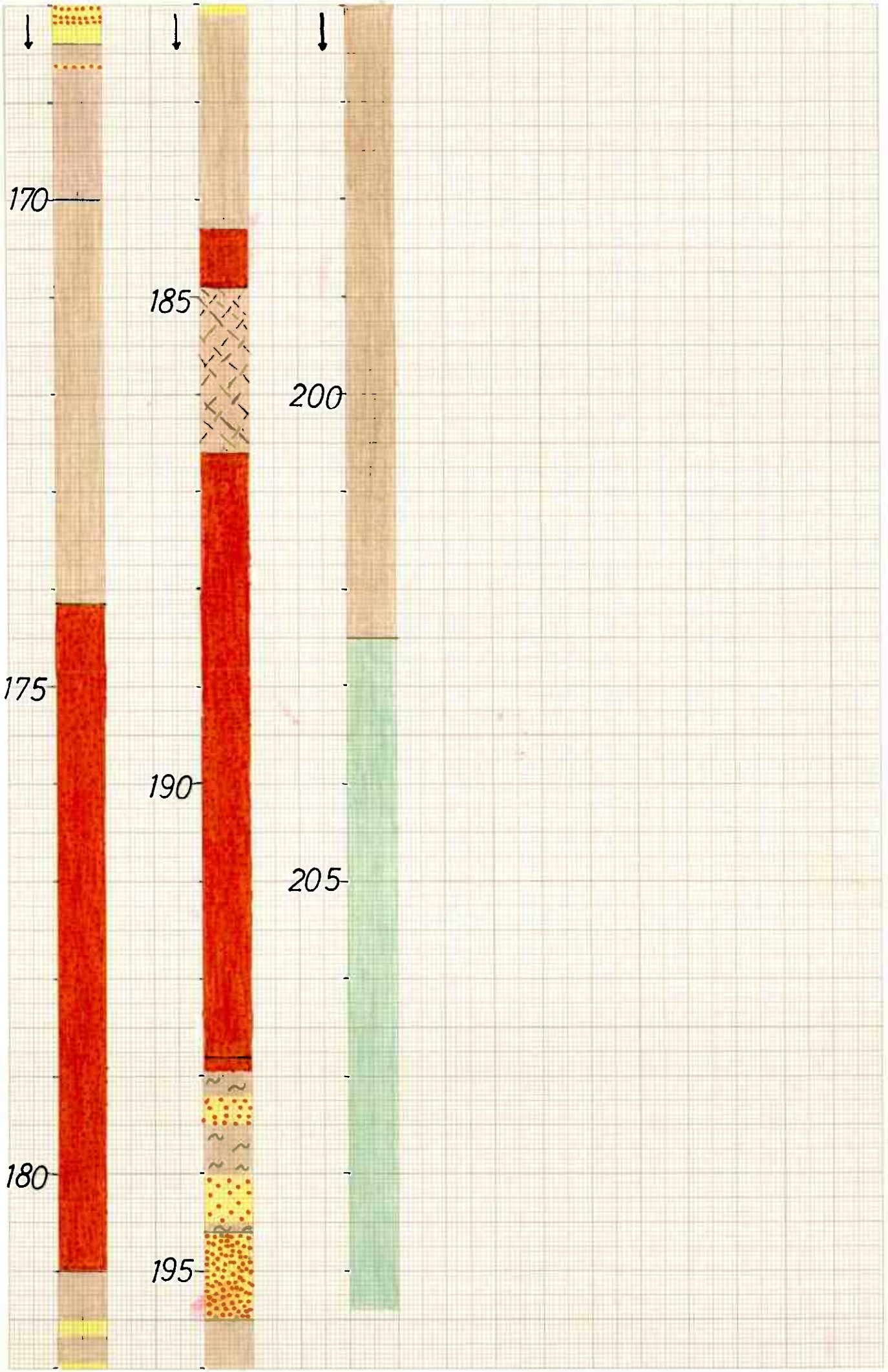
202,50 - 209,40 The sericitic and chloritic mica schist with few biotite with quartz mostly in the basement matter, without some mineralisation of sulphides. The average gradient of this foliation is 40^0 - 45^0 round, but locally 20^0 in the some folding place round.

This Borehole nr. 49. was finished at 209,40 m.



The profile of the borehole nr.490. Tverrfjellet, the lavel 6th


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THE BOREHOLE NR. 50 G,
Tverrfjellet mine, the level 6th.

Borehole no. 50 G, Tverrfjellet, the level 6th.

The brief petrografical description.

0,00 - 6,70	The coarse-grained amphibolitic greenstone with a lot of positions, little veins and little intercalations of quartz mostly. Quartz albitic matter creat basement matter mostly. Structure porphyroblastic. Hornblende creat big rodlike or acicular crystales. The average gradient of foliation is 50°.
6,70 - 10,90	The tiny-grained or tender-grained amphibolitic greenstone with a lot of positions, weak intercalations and little veins of quartz mostly, but of carbonates too. The total impregnation of FeS and FeS_2 is scarce only. The average gradient of foliation is 45°.
10,90 - 14,40	The coarse-grained amphibolitic greenstone with a quartz-fedlspatic basement matter mostly with the little intercalations of biotitic gneissic schist, epidotic and amphibolitic greenschist and with a lot of little veins, little pellets, little veins etc. of quartz mostly and carbonates fewly only. Hornblende creat acicular or rodlike crystales, but from ca. 13,00 m are grains more small, medium grained. The total impregnation of sulphides is scarce only. The average gradient of foliation is 40°.
14,40 - 15,80	Gray quartzite with a lot of grains of Fe_3O_4, which are concentrated in some schliers or pellets locally.
15,80 - 16,20	The coarse-grained, locally medium-grained amphibolitic greenstone as well as in 10,90 - 14,40 m.
16,20 - 16,60	The gray-quartzite as well as in 14,40 - 15,80 m with some grains of Fe_3O_4, but not so much.
16,60 - 18,70	The coarse-grained amphibolitic greenstone as well as in 10,90 - 14,40 m.
18,70 - 20,50	The tiny-grained and tender-grained amphibolitic as well as in 6,70 - 10,90 m.
20,50 - 22,60	The medium-grained amphibolitic greenstone more, but also coarse-grained greenstone as well as in 10,90 - 14,40 m altogether.
22,60 - 26,10	The tiny-grained and tender-grained amphibolitic greenstone with not so much little intercalations of biotitic amphibolitic greenschist. Some small grains of garnet are present but also not so much. The total mineralisation of some sulphides is scarce only. In 23,40 - 23,50 m is position of white quartz.

26,10 - 47,60	The motley serie of tiny-grained and tender-grained amphibolitic greenstone, biotitic and amphibolitic greenschist, quartz-fedlspar medium-grained amphibolitic greenstone, strongly quartzy greenstone and greenschist, which creat some intercalations, which exchange. There is a lot of little veins or little paralell intercalations creat quartz. Some little schliers or pellets creak carbonates, but not much. Between 26,10 - 31,00 m the grains of garnet are present (pink colour, max. size of garnet's grains is 2 mm in average). In 32,90 - 33,05 m is present position of white-gray quartzite. The average gradient of foliation is 40°-45°.
47,60 - 58,60	The motley serie of tiny-grained and tender-grained amphibolitic greenstone, but more of medium-grained amphibolitic greenstone with some very little intercalations of amphibolitic, biotitic greenschist, with some strongly quartzy greenstone or greenschist. Quartz creat a lot of little paralell veins etc. The schistosity is very clear mostly. Between 40.20 - 50,00 m is present some mylonitic zone. The total mineralisation of sulphides is very poor and scarce. The average gradient of foliation is 35°-40°.
58,60 - 62,40	The tiny-grained amphibolitic greenstone as well as in 6,70 - 10,90 m. In 60,40 - 60,50 m and in 60,85 - 61,00 m are positions of white-gray quartzite without some impregnation of sulphides.
62,40 - 65,90	The motley serie of greenstone and greenschist as well as in 47,60 - 58,60 m, but locally is more biotite.
65,90 - 66,80	The quartzy keratophyre with a lot of rodlike and acicular crystales of hornblende (2-5 mm but 1 cm too are average size of hornblende crystales).
66,80 - 68,70	The very various motley serie of coarse-grained amphibolitic greenstone with some a lot of rodlike and acicular crystales of hornblende, with a lot of not thick intercalations of biotitic and biotitic-chloritic, amphibolitic and epidotic greenschist. Quartz and quartz-feldspar together creat much weak intercalations, schliers and pellets. Carbonates creat also some little mostly paralell veins, little intercalations, little schliers or pellets etc., but not so much. Locally is present more strong impregnation of FeS_2 mostly, but with FeS too. This impregnation of sulphides is very poor altogether. In 68,30 - 68,70 m is present hornblende-keratophyre.
68,70 - 69,00	The white-gray or gray quartzite without some impregnation of ore minerales.
69,00 - 69,50	The position of biotitic gneissic-schist with quartz-feldspar mostly on basement matter and with not so much carbonates spots or little pellets and little schliers. The average gradient of foliation is 40°- 45° round.

69,50 - 72,70	The motley serie of coarse-grained amphibolitic greenstone and greenschist as well as in 66,80 - 68,70 m.
72,70 - 76,00	The tiny-grained and little bit medium-grained very homogenitic amphibolitic greenstone with not so much fedlspar and quartz in basement matter. The very poor impregnation of FeS and FeS_2 is present too.
76,00 - 77,40	The biotitic gneissicschist with quartz-feldspar mostly in basement matter and with a lot of intercalations (1-2 cm thickness) of coarse-grained amphibolitic greenstone, which have round mostly a strongly impregnation of FeS_2 and FeS, in 76,30 m (mostly FeS) and in 76,90 m and between 76,10 - 76,15 m.
77,40 - 79,40	The medium-grained amphibolitic greenstone with a lot of little, weak veins and intercalations of quartz, with quartz-feldspar matter too and of carbonates, but not so much. The total impregnation of sulphides is very weak only.
79,40 - 87,50	The tiny-grained and tender-grained amphibolitic greenstone with some mostly paralell vein,schliers of quartz and not so much of carbonates. Some mineralisation of sulphides is very poor altogether The average gradient of foliation is 30°-35° round
87,50 - 91,40	The medium-grained amphibolitic greenstone as well as in 77,40 - 79,40 m.
91,40 - 94,90	The tiny-grained amphibolitic greenstone as well as in 79,40 - 87,50 m. In 94,10 - 94,20 m is position of white quartz without mineralisation.
94,90 - 95,50	The coarse-grained amphibolitic greenstone as well as in 66,80 - 67,80 m. The strongly impregnation of FeS (more) and FeS_2 is in 95,10 m (1 cm) 95,30 m (2 cm) and 95,35 m (2,5 cm).
95,50 - 97,40	The strongly quartzy amphibolitic greenstone with quartz albite matter mostly in basement matter Some impregnation of sulphides is very poor only altogether.
97,40 - 97,80	The biotitic gneissic-schist as well as in 76,00 - 77,40 m, with position of quartzite in 97,60 - 97,70 m and with some scales or little pellets of FeS (thickness 0,5 cm), mostly round 97,65 m, with not so much schliers and pellets of carbonates also round 97,65 m.
97,80 - 109,00	The tiny-grained amphibolitic greenstone with some, mostly paralell little veins or little intercalations of quartz and with some intercalations of quartzite, some intercalations of coarse-grained and medium-grained amphibolitic greenstone with some very poor and weak impregnation of FeS and FeS_2.

109,00 - 111,40 The gneissic-schist the same as in 76,00 - 77,40 m

111,40 - 156,75 The tiny-grained amphibolitic greenstone the same as in 97,80 - 109.00 m. In 117,70 m - 117,90 m, in 118.60 (5 cm), in 123.00 m (5 cm), in 123,40 m (5 cm), in 124,40 m (5 cm), in 124.70 m (5 cm), in 124.90 m (5 cm) and in 117,00 m round are present some positions of quartz or quartzite with some strongly impregnation of FeS_2. In 142,30 - 142,60 m and in 144,40 - 144,60 m are some intercalations of epidotic greenstone with the big aciculars of hornblende. In 144,90 - 145,20 m, in 145,30 - 145,50m, in 145,70 - 145,90 m, in 151,90-151,95 m, ins 152,60 - 152,70 m and in 153,50 - 153,65 m are positions of white and gray-white quartz. Between 154,70 - 155,20 m is some myloni-tic and tectonic zone.

156,75 - 157,25 (0,50 m) The very strong impregnation of FeS_2 mostly in a white-gray quartzite.

157,25 - 175,60 The medium-grained amphibolitic greenstone with quartz-feldspar mostly in basement matter and with a lot of little paralell veins or little, weak intercalations of quartz and of not much some carbonates too. The same mineralisation of sulphides is very poor only altogether. Some weak intercalations creat chloritic and biotitic greenschist. The average gradient of foliation is 50°-55° round.

175,60 - 185,60 The chloritic and biotitic greenschist with epidote amphibole and aktinolite in basement matter. Some little paralell veins or little intercalations are created by quartz mostly, but some by carbonat-es too. The total mineralisation of sulphides is very poor only. More strong is this mineralisation of FeS and FeS_2 in 177,25 m, in 180,30 m and in 180,50 m round.

185,60 - 191.15 The coarse-grained and medium-grained amphibolitic greenstone with a lot of little intercalations of quartz or quartzite with some strong impregnation of FeS_2 mostly in example in 185,60 - 185,65 m, in 185,85 - 185,95 m, in 186,05 - 186,10 m, in 186,30 - 186,35 m, in 187,20 - 187,50 m. in 188,80 - 188,90 m, in 189,15 - 189,25 m and in 189,40 - 189,55 m and in 188,90 - 189,15 m is position of quartzite with very poor impregnation of FeS_2

191,15 - 194,10 The tiny-grained and tender-grained amphibolitic greenstone as well as in 97,80 - 109,00 m with very scarce impregnation of sulphides altogether only.

This borehole no. 50 G was finished at 194,10 m.

(M. Motys).

THE BOREHOLE NR. 52,
Hjerkinn.

Borehole no. 52, HJERKINN.

(Petrogracical description)

0,00 - 5,40	Chloritic, biotite mica-schist with epidote and klinozoizite too that exchange carbonatic or carbonate-dolomite positions with some chlorite (thickness of positions of both types of rocks is 2-5 mm and max. 1 cm in average). This rock has phacoidal and schistose structure. Mineralisation or impregnation isn't present in. The total colour of this rock is gray and dark gray. The average gradient of schistosity is 30°-40° round.
5,40 - 23,30	Chloritic and biotitic mica schist with a lot of very thin schliers and lenticles of carbonates or carbonate-dolomite. The structure of rock is schistosic or phacoidal-schistose. The mineralisation (impregnation) of FeS is present but very weak only. The total colour of this rock is gray-green. In 14,00 - 14,10 m is a compact position og chloritic-sericitic carbonates, gray-white colour, with some epidote and zoizite little bit too somewhere. This one is without some mineralisation. The average gradient of foliation is 30°-35° about.
23,30 - 24,85	Just the same chloritic and biotitic mica schist like before but with little bit more stromg impregnation of FeS. The grains of FeS are protact along schistosity. The average gradient of foliation is 40°-45° about. In 24,70 m is some joints with the angle of dip 0°-15° about.
24,85 - 29,60	Just the same rock as in metrages 5,40 - 23,30 m and 23,30 - 24,85 m but with a lot of grains of garnet (andradite ?), 1-2 mm in average somewhere and with some weak mineralisation of FeS, like in 23,30 - 24,85 m. The average gradient of schistosity is 45° about.
29,60 - 30,80	The complex of chloritic mica schist, without garnet, which exchange feldspatic-quartz matter and carbonates that clear schliers, pellets etc. This rock has pell-mell structure and somewhere slaty structure only. The mineralisation (impregnation) of FeS and little bit FeS2 too is in this rock and creats some pellets, schliers, lenticles etc. The schistose isn't clear everywhere. The total colour of this one foliation is gray and so dark gray.
30,80 - 40,60	The chloritic and sericitic mica schist with quarts and biotite too and without garnet. The carbonates and carbonatic-dolomite creat some a lot of schliers and protactial lenticles or pellets. The schistosity is very clear. The total colour of this rock is gray, bright green-gray and green-gray In 33,65 - 33,90 m is a weak impregnation of FeS and a zone weak mineralisated positions like as in

	29,60 - 30,80 m. In 37,30 - 37,35 m is not parallel position of white quartz without mineralisation. In 34,50 m is not very clear joint with an angle of dip 10°-15° about. The angle of dip of schistosity of this rock is 40°-45° round.
40,60 - 41,70	It is just the same complex, which is situated in 29,60 - 30,80 m with just the same type of mineralisation.
41,70 - 44,90	The chloritic and sericitic mica schist with very small biotite, with quartz and without garnet. The mineralisation (impregnation) of FeS mostly is very, very weak only. This rock is for the other facts just the same as in 30,80 - 40,60 m. The total colour of this rock is gray and bright green-gray. In 42,10 - 42,20 m is weak impregnation, mostly of FeS only.
44,90 - 49,50	The very poor impregnated ore of FeS and FeS_2 too in some carbonatic, dolomitic and quartz-feldspatic rocks.
49,50 - 50,60	The sericitic mica schist with chlorite, quartz and small biotite and without garnet and mineralisation The much carbonates and carbonate-dolomitic schlier pellets or lenticles are in too and every are pratracted along schistosity. This rock has schistose structure very clear. The total colour of this rock is gray or bright gray. The average schistosity of foliation is 50° about.
50,60 - 51,55	The just the same sericitic mica schist as in 49,50 - 50,60 m but with a lot of biotitic transversal micas (0,5 mm in average). The average gradient of foliation is 50° about. The total colour of rock is gray.
51,55 - 52,20	This is the same sericitic mica schist as in 49,50 - 50,60 m. The average gradient of foliation is 55° round. In 51,55 m is the dipping fault against the schistosity with filling of carbonates and limonite and with the angle of dip 30° about. The same antithetic fault is in 52,10 m with the same filling and with the angle of dip 40° about.
52,20 - 52,75	It is the same rock as in 50,60 - 51,55 m.
52,75 - 54,40	It is just the same type of rock as in 49,50 - 50,60 m and 51,50 - 52,20 m. Some, but not much transversal biotitic micas are round 53,60 - 54,00 m. The weak positions of mineralisation of FeS and FeS_2 too (1 cm) is 54,30 m. The average gradient of foliation is 55° or 60° round.
54,40 - 56,25	The chloritic mica schist or greenschist with biotite, garnet and quartz too. The plagioklase (albite) is little present too. This rock is also very rich of carbonatic and dolomitic weak positioons, schliers, pellets, lenticles etc. which follow schistosity of rock. The total colour of this rock is dark green and dark gray-green.

In 55,70 - 55,90 m is some transversal biotitic micas (max. 1 mm). This rock slowly present to the other next type. The average gradient of schistosity or foliation is 55° about. The mineralisation of FeS only is very weak, this one going little bit up on the finish of this position.

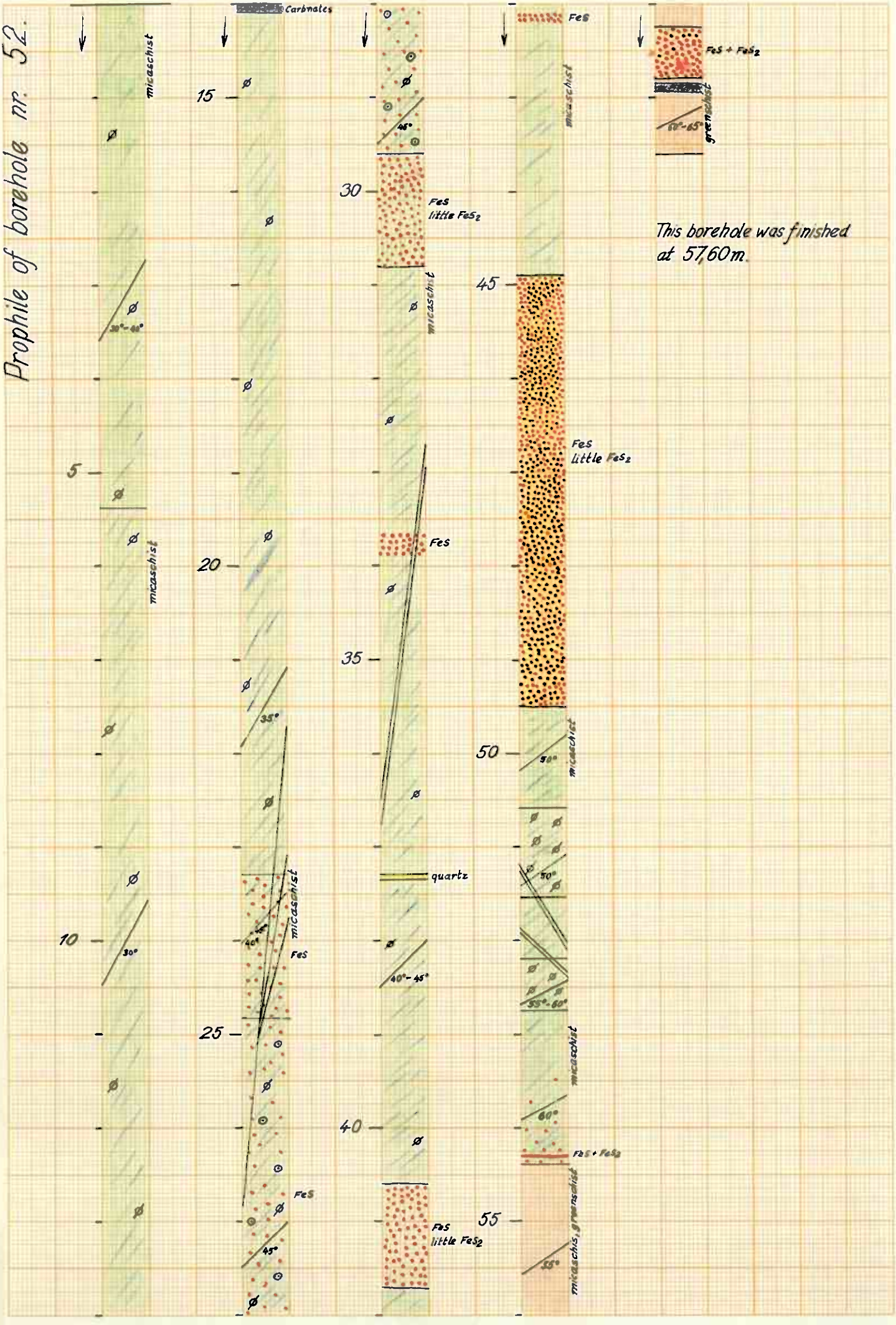
56,25 - 56,80 The mineralisation of FeS and FeS_2 too is very weak only and creats some schliers, pellets and not thick, compact positions (max. 1 - 2 cm in average). The mineralisation is in complex, carbonates or carbonate-dolomite and feldspatic-quartz which exchange among themselves. The average gradient of foliation is 55° round:

56,80 - 57,60 The tiny-grained and medium-grained chloritic and amphibole-chloritic greenschist and round 57,60 m prevents to greenstone maybe. The main minerals are chlorite, amphibolite, biotite, feldspar and carbonates. Klinozoizite and epidote is present too somewhere. The carbonates or dolomitic-carbonate creat a lot of weak positions schliers, pellets and grains, which protact along or follow schistosity of this rock. The mineralisation (impregnation) of FeS is very poor and weak. The total colour of this rock is dark green, green, dark-gray-green. The average gradient of foliation is 60°-65° about. In 56,85 - 56,95 m is position some dolomitic or carbonate-dolomitic rock with weak mineralisation of FeS and FeS_2 too. This position has the total gray colour.

This borehole was finished at 57,60 m.

(M. Motys).

Prophile of borehole nr. 52.



This borehole was finished at 57,60 m.

THE BOREHOLE NR. 52 G,
Tverrfjellet mine, level 6 th.

The borehole no. 52 G, Tverrfjellet level 6th

X = - 38,2, Y = + 239,2 (horizontal)

The petrographical description.

0,00 - 0,70	The medium-grained amphibolitic greenstone, strongly calcarcous, with a lot of small rodlike or acicular crystalles of hornblende which are in quartz-carbonates basement matter, with some feldspathoid but not so much. Epidote, chlorite, aktinolite are present but like accesoric minerales only. Some mineralisation of FeS_2 mostly is present but few only. Carbonates and quartz too creat some little veins, irregular intercalations etc.. Carbonates creat some grains, schliers, pellets and irregular lenticles too. The structure is tiny-porphyroblastic (blastoophitic) with not so much clear schistosity. The total colour of this rock is green-gray, little bit dark green-gray too. The average gradient of foliation is 35°-40° round.
0,70 - 1,20	The position of white quartz, without some sulphidic impregnation, but only some inclusions of chlorite, which creat some small scales or irregular small pellets, schliers etc.
1,20 - 11,70	The medium-grained amphibolitic greenstone the same as in 0,00 - 0,70 m, but locally is present more coarse-grained greenstone, with rodlike and acicular cyrstales of hornblende, more epidote and the others calkiticsilicates are also on some places. The mineralisation of FeS_2 mostly, but FeS little too is also more strong and exactly round 8,80 m is present some strong mineralisation of FeS_2 (average thickness 2-3 cm maximally). The structure is more pell-mell and schistosity is lessly clear. The total colour of this type of rock is dark gray-green. The average gradient of foliation is 40° round.
11,70 - 13,10	The strongly calcarcous coarse-grained and medium-grained amphibolitic greenstone with big rodlike crystales of hornblende, but acicular little bit present too, with some epidote and the others calcitic silicates, with biotite, which is concentrate to little irregular schliers or lenticles and pellets too. Carbonates creat some grains, irregular weak schliers, pellets etc.. The basement matter is created by quartz and little bit feldspar too. The structure is porphyroblastic and pell-mell without some schistosity. The total colour of this rock is green gray. The mineralisation of FeS_2 but, with FeS too is present, but poor only altogether, locally is more strong, but maximally with the average thickness 0,5 - 1 cm.

13,10 - 15,30 The tender-grained or locally medium-grained epidotic and strongly calcarcous greenstone with not so much little rodlike crystales of hornblende, with not much chlorite, with some very small micas of biotite, with a lot of grains of carbonates. The basement matter has much quartz and little fedispar is present too. This type of rock commemorate some different and a crossing type keratophyre and calcarcous greenstone. The white quartz creat a lot of paralell or little bit oblique veins or very weak intercalations (maximally 0,5 - 1 cm i average). The structure is tiny-porphyroblastic, pell-mell, without the clear schistosity. The total colour of this rock is gray. The average gradient of foliation is 45° round. Impregnation of sulphides is very poor or scarce only.

15,30 - 16,15 The medium grained amphibolitic greenstone as well as in 0,00 - 0,70 m. The average gradient of foliation is 45° round.

16,15 - 16,75 The white or white-gray hydrothermal quartz with a vertical network of little joints. Some small inclusions of the basement amphibolitic greenstone are present, with some weak acreole of epidote and biotite round and with some mineralisation of FeS_2 and $CuFeS_2$. $CuFeS_2$ creat some irregular grains 1-3 mm or bigger in average in example at 16,55 m round. Magnetite is present scarcely too in the basement quartz and creat small grains (0,5 and maximally 1 mm big in average).

16,75 - 17,50 The strongly chloritic and biotitic greenschist with epidote, with rodlike and acicular small crystals of hornblende and aktinolite, with the others calcitic silicates and with quartz. Some pellets and schliers of carbonates are present scarcely only. The mineralisation of FeS_2 and FeS little bit too is present but poor altogether only. The structure is porphyroblastic with clear schistosity. The total colour of this rock is dark green-gray or dark gray-green. The average gradient of a foliation is 40° round.

17,50 - 40,30 The impregnated homogenitic ore of FeS_2. $CuFeS_2$ is present too, but very small. FeS is present scarce only. The colectore rock of this ore is white or white-gray quartz. In 36,10 m (2 cm) and in 37,95 m (1 cm) are present some positions of carbonates, white colour. In 39,65 (5 cm) and in 39,95 m (1 cm) are some positions of white quartz with much chloritic and biotitic inclusions and with some grains, schliers, pellets etc. of carbonates, without some mineralisation of sulphides, but some crystales of hornblende are present too.

40,30 - 41,10 The medium-grained and coarse-grained amphibolitic greenstone, with a lot of rodlike and acicular crystales of hornblende, aktinolite, epidote and

chlorite and with quartz too, but not so much. Carbonates are present also more few. The impregnation of FeS_2 and $CuFeS_2$ is strong but poor altogether. In 40,40 - 40,50 m is a homogenitic position of FeS2 mostly as well as in 17,50 - 40,30 m.

41,10 - 41,30 — The impregnated homogenitic ore as well as in 17,50 - 40,30 m.

41,30 - 43,00 — The sericitic, biotitic micaschist with chlorite. The basement matter of this rock creat mostly quartz. Epidote, amphibole, aktinolite are present like aceesoric minerales. Biotite creat small micas which creat mostly the covers of foliations, plates like sericite. The mineralisation of sulphides is scarce only (mostly small grains of FeS_2 only). The schistose structure is little bit clear. The total colour of this rock is gray and bright gray, little bit green. The average gradient of foliation is 40° and 45° round. Quartz creat some paralell, or little bit oblique weak, mostly irregular veins, intercalations (2-5 mm thickness maximally). Some weak intercalations, veins, schliers or pellets of carbonates are scarce only.

43,00 - 43,20 — The position of white quartz, with some irregular small schliers or scales of chlorite (inclusions). The same impregnation of sulphides is scarce only, but locally is present some little scales of FeS.

43,20 - 46,00 — The sericitic and biotitic micaschist the same as in 41,30 - 43,00 m, but with little bit more impregnation of FeS_2 mostly. The average gradient of foliation is 40°-45° round.

46,00 - 46,25 — The white quartz as well as in 43,00 - 43,20 m.

46,25 - 50,90 — The biotitic greenschist with chlorite, epidote and with the others calcitic silicates, with some small acicular or rodlike crystales of hornblende. The basement matter is created by quartz. Carbonates creat some small grains, pellets or schliers. Some mineralisation of sulphides is scarce only. The structure is porphyroblastic with not much clear schistosity. The total colour of this rock is green gray. The average gradient of foliation is 50° round. In 49,75 - 50,00 m are some paralell veins of white-gray quartz (1 cm thickness), which exchange with intercalations of coarse-grained amphibolitic greenstone and medium-grained amphibolitic greenstone. The strong impregnation of FeS_2 mostly are present on the boundary of these positions (1-15, cm thickness maximally) or in quartz positions.

50,90 - 55,15 The strongly chloritic greenschist with micas of biotite, with much epidote and with very small acicular crystales of hornblende and aktinolite, but few only. This positions of greenschist exchange with tiny or tender-grained amphibolitic greenstones. The both types of rock cross to the other very gradually. The structure is ophitic-compacte without much clear schistosity. Carbonates and quartz creat very weak positions and veins, paralell mostly, but not so much. The mineralisation of sulphides is scarce only. The total colour of this rock is grey-green. The average gradient of the foliation is 50° round. In 52,50 - 52,55 m, in 53,30 - 53,35 m, in 53,80 - 53,85 m, in 54,60 - 54,65 m and in 54,90 - 54,95 m are some positions of white-gray and gray quartz with some very scarce impregnation of FeS_2 mostly.

55,15 - 56,05 The strongly biotitic and chloritic greenschist with epidote and with not much small acicular or rodlike crystales of hornblende. The other calcitic silicates are present too. Carbonates creat some grains, weak schliers, pellets, lenticles etc.. Quartz creat a basement matter of rock and also some weak veins, pellets etc.. The mineralisation of sulphides is scarce only. The schistosity isn't so much clear. The total colour of this rock is green-gray or gray-green. The average gradient of a foliation is 45° round.

56,05 - 61,70 The tender-grained or tiny-grained amphibolitic greenstone, with epidote in the basement matter, with not so much micas of biotite (transversal too) and with very weak little paralell veins of carbonates mostly (the thickness 0,5 - 1 mm maximally). The structure is tender-porphyroblastic with little bit clear paralell schistosity. The mineralisation of FeS_2 mostly is scarce only. The total colour of this rock is green-gray or gray-green. The average gradient of a foliation is 65°-70° round.

61,70 - 61,95 The strongly calcareous tiny-grained or medium-grained amphibolitic greenstone, with a lot of small acicular or rodlike krystales of hornblende. The basement matter of this rock creat quartz, with epidote and with the others calcitic silicates. Carbonates creat some small grains schliers or pellets and the filling of much weak anthithetic joints. The mineralisation of sulphides is very scarce or isn't present more. The structure is blastoophitic with not clear schistosity. The total colour of this rock is green-gray.

61,95 - 62,40 The motley serie of biotitic and chloritic greenschist and tender, tiny and coarse-grained amphibolitic greenstone, with big crystales (rodlike and acicular) of hornblende and with much intercalations of quartz in altogether. Carbonates

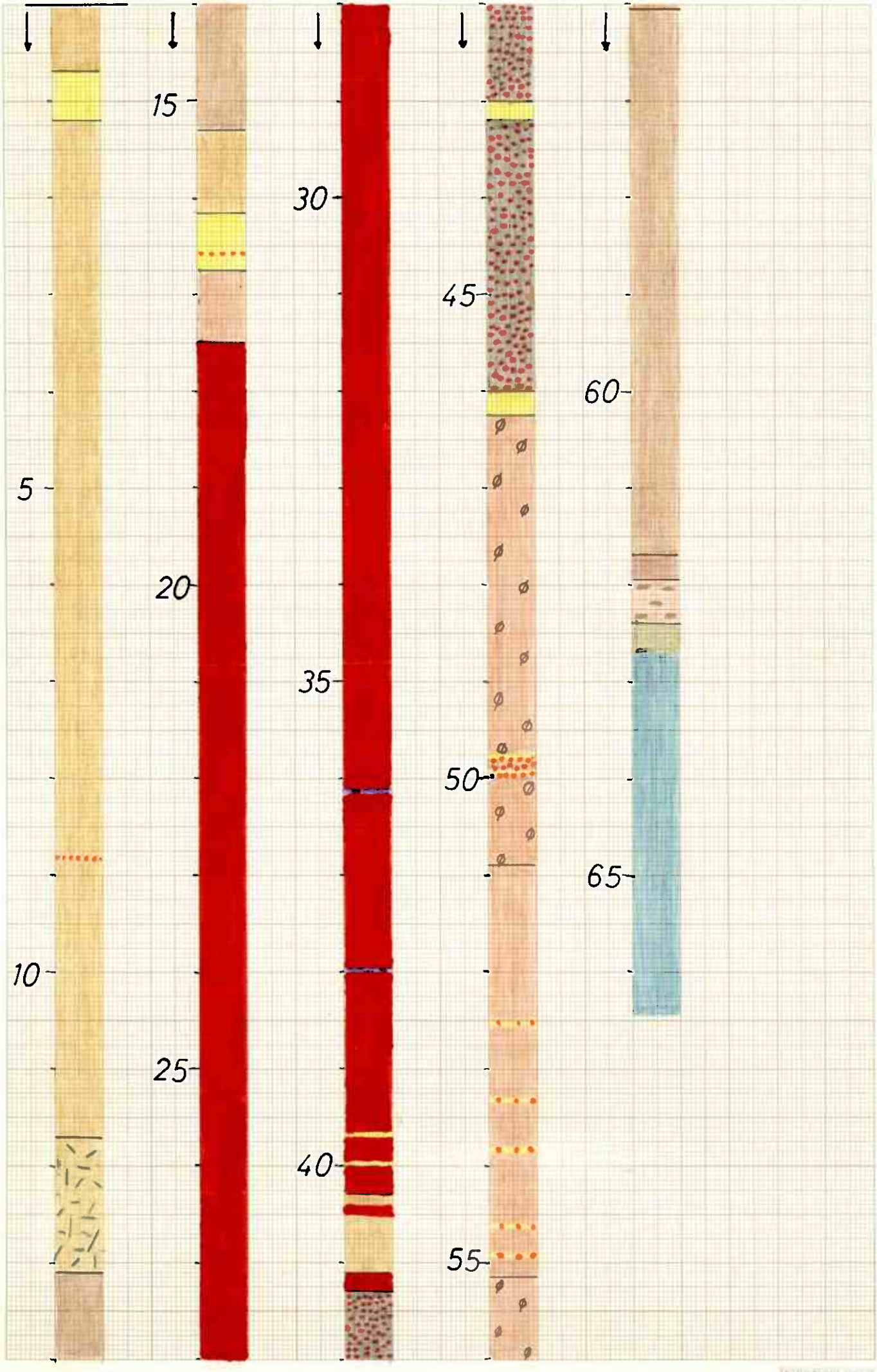
creat also some irregular schliers, pellets and grains, but not so much. The structure is phacoidal, blastoophitic, with not clear schistosity mostly. The mineralisation of some sulphides is very scarce only (FeS_2). The total colour of this rock's complex is green-gray or dark green-gray.

62,40 - 66,45 The sericitic micaschist with chlorite and biotite and with quartz and epidote (little) in basement matter of this rock. Garnet creat a lot of grains (2-3 mm, but 5 mm and more big too in average). Between 62,40 - 62,70 m are present big acicular and rodlike cyrstales of hornblende. Carbonates and quartz mostly creat some weak intercalations, schliers, pellets etc. The structure is phacoidal and little bit phacoidal schistose. The total colour of this rock is bright green-gray. The mineralisation of sulphides is very scarce only or isn't present. The average gradient of foliation is 45° round.

This borehole no. 52 was finished at 66,45 m.

(M. Motys).

The profile of the borehole nr. 52G. Tverrfjellet, the lavél 6th



FOLLDAL VERK A/S

DRIFTSANALYSER

Tatt 19

Skift:	% Cu	% Zn	% S	% Fe				% H_2O	Sikt	Anmerkning
~~Rågods, tørt~~	C.53	1.50	40.5		B.1	.52	C.	16.-	40.40	m = 24.40.
~~Cu-konsentrat~~	C.55	C.50	22.20		"	.53	"	26.65	34.65	" = 8.- "
~~Cu-avgang~~	1.28	1.10	42.60		"	.53	"	34.65	102.25	" = 67.6 "
~~Zn-konsentrat~~	C.61	1.20	39.30		"	.54	"	33.7	36.8	m = 3.1 "
~~Zn-avgang~~	C.44	1.65	40.70		"	.54	"	36.8	51.35	" = 14.55 "
~~S-konsentrat~~	1.22	2.10	44.-		"	.55	"	67.-	127.20	" = 60.2 "
S-avgang										
Fe-konsentrat										
Fe-avgang										
Cu-tørke										
Zn-tørke										
S-tørke I										
S-tørke II										

Folldal Verk 23 - 10 1963

K. Lindeberg

THE BOREHOLE NR. 53,

Hjerkinn.

Borhull nr. 53, HJERKINN.

(Petrografical description).

0,00 - 7,40	The very strong calcarcous biotitic mica schist with quartz, sericitic and very, very weak impregnation of FeS_2 and FeS locallity only. The carbonatic and dolomite-carbonatic minerals creat a lot of protractic schliers, pellets, lenticles etc. (0,5 max. 1 cm thickness in average). The structure of this rock is a phacoidal or phacoidal-schistose. The total colour of this rock is bright gray. The average gradient of foliation is 30° round The positions 1-5 cm of average thickness of tiny-grained chloritic mica schist with biotite and with very weak impregnation of FeS_2 and FeS too creat some intercalations in 6,20 m and 7,00 - 7,20 m round. The total colour of these intercalations is bright green-gray.
7,40 - 8,40	The chloritic and sericitic mica schist with very tiny-grains, with biotite, often the transversal biotitic micas (max. 1 mm in average). Quartz is present too and some very weak positions or schliers of carbonates we can also find. The impregnation of FeS and FeS2 isn't present or is very weak. The total colour of this rock is bright green-gray. The average schistosity gradient is 30° round.
8,40 - 9,50	It is just the same strong-calcarcous biotitic mica schist, with a lot of positions schliers, lenticles etc. of carbonates as in 0,00 - 7,40 m.
9,50 - 30,25	It is just the same type of chloritic and sericitic mica schist like in intercalations in 6,20 m, 7,00 - 7,20 m and in position 7,40 - 8,40 m. In this type of mica schist are intercalations of carbonatic mica schists type lik in 0,00 - 7,40 m and 8,40 - 9,50 m. These positions (intercalations) are 5-10 cm and max. 30 mm thick in average in 18,10 - 18,40 m, 15,40 m, 20,25 m and 23,90 - 24,25 m. The impregnation of FeS or FeS_2 or is very, very weak only. In 13,10 m round is some transversal fault with some carbonates and limonite on the fault place and with the angle of dip 10° about.
30,25 - 49,80	It is complex of just the same type of biotitic-sericitic mica schist with a lot of schlier, positions or small and big lenticulars of carbonates or dolomitic-carbonates as in 0,00 - 7,40 m and 8,40 - 9,50 m. In this type of carbonatic mica schist are intercalations or positions of chloritic mica sshist like the same type as in 7,40 - 8,40 m etc. In 47,50 m and 49,20 m are positions of compact chloritic-dolomitic carbonate, of gray-white colour. The average gradient of foliation is 40° round. The impregnation of FeS and FeS_2 or is very, very weak only.

49,80 - 61,30	The same type of carbonatic mica schist with transversal biotite as in 9,50 - 30,25 m, without impregnation FeS or FeS_2 or with very very weak somewhere only. Int this type of mica schist intercalations of the same type of mica schist as in 30,25 - 49,80 m. The average gradient of foliation is 50° round.
61,30 - 71,60	Just the same type of carbonatic-biotitic mica schist with typical phacoidal, structure and with big micas (1-2 mm in average) og biotite (transversal biotite too) ispecialy 70,00 m round, without mineralisation. Some systems of joints are filling by carbonates. The intercalations of the other chloritic mica schists type (10-25 cm thick in average) are present too. The average gradient of foliation is 50°-55° round.
71,60 - 98,10	The chloritic and biotitic mica schist with some bu not so much (1-2 cm thick) positions of chloritic carbonates or dolomitic-carbonates. The biotite's micas are transversal somewhere. The quartz and albite are present too. Garnet by microscopic not exist. The total colour of this rock is dark gray green or dark green-gray. The average schistosity's angle of dip is 55°-60° round. In 87,40 - 87,60 m is the same type of carbonatic-biotitic mica-schist as in 0.00 - 7,40 m etc. Just the same rock but with more much biotite (transversal too) is in intercalations in 83,90 m about. The average gradient of foliation is 50°-55° about. In 89,35 m round is the transversal fault with the angle of dip 5° round.
98,10 - 115,90	The carbonatic chloritic and biotitic mica schist just the same type as in 0,00 - 7,40 m etc. In 103,15 - 103,30 m and 105,80 - 106,00 m are some more strong mineralisation of FeS in some pellets, schliers etc. which follow schistosity. In 111,90 - 112,10 m is some little bit strong impregnation FeS and FeS_2 too. The strong impregnation is in 113,10 - 113,85 m, there are three compact positio with ore mineralisation of FeS and little FeS_2 (exactly in 113,12 - 113,17 m, 113,33 - 113,40 m and 113,68 - 113,80 m). In 114,10 - 114,80 m is weak mineralisation of FeS by grains and some pellets. The average gradient of foliation is 65°-70° round.
115,90 - 120,75	The chloritic mica schist with biotite and with weak mineralisation (impr.) of FeS. A lot of weak positions and schlier or pellets, which are parallel with foliation creat carbonates or dolomitic-carbonates. Somewhere rock is without ore impregnation. The total colour of this rock is gray-green. The average gradient of foliation is 65° round.
120,75 - 125,25	The tiny- og tender-grained greenschist or greenstone with chloritic, amphibole very few only, carbonates etc. The very, very poor (weak) impregnation mostly of FeS is present too. The weak

positions (max. 1 cm) of carbonates are somewhere too. The total colour of rock is green or gray-green. The average gradient of foliation is 70° round.

125,25 - 129,70 It is the complex of carbonates and chloritic carbonate, biotitic mica schist with quartz, carbonates and chlorite too, chloritic schist, mica schist without garnet etc., which exchange between them. I carbonate or dolomitic-carbonate partes is present some mineralisation of FeS and FeS_2 too. This one is very poor. Exactly exist in 125,25 - 125,50 m and 126,60 - 126,80 m. The average gradient of foliation is 70° round.

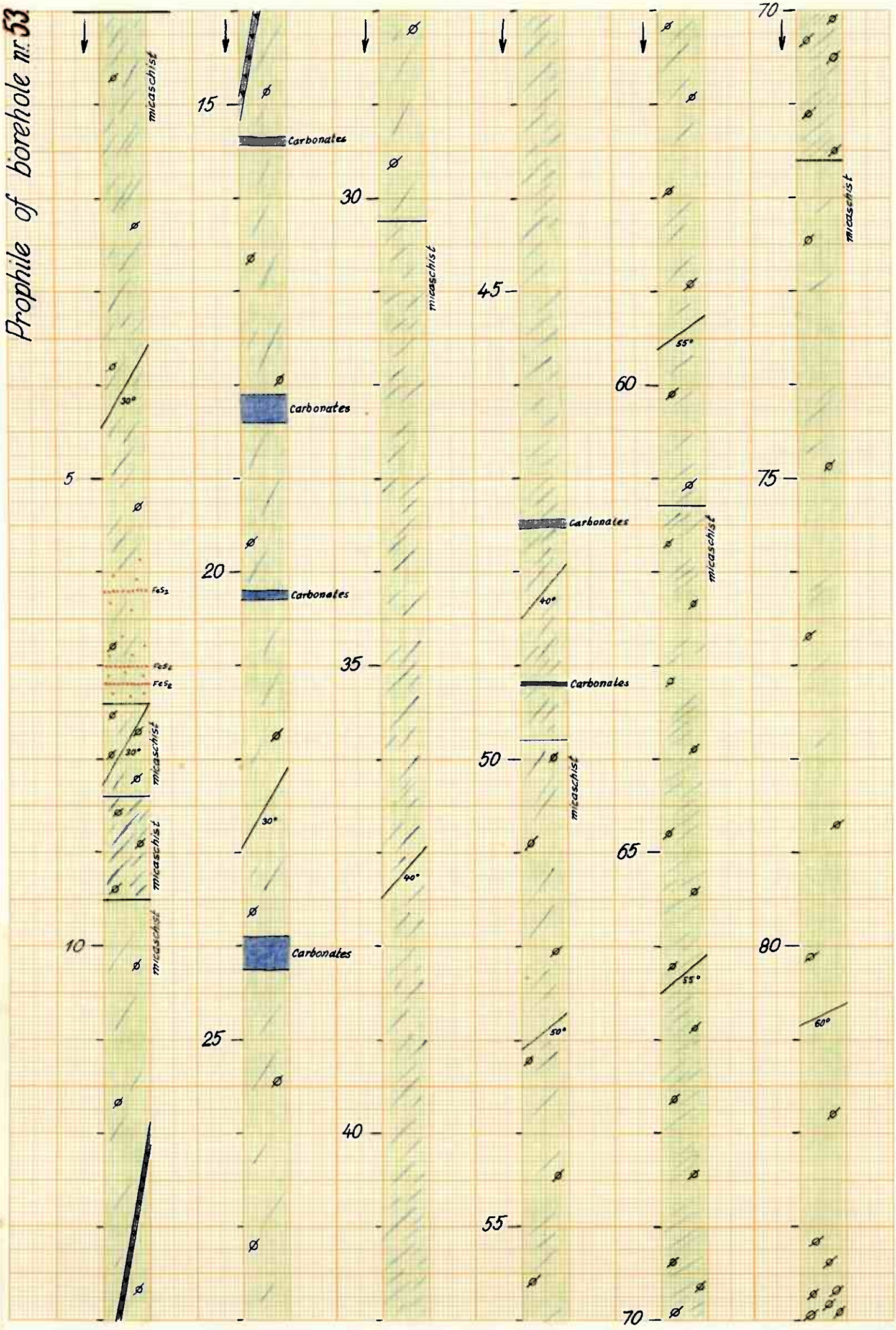
129,70 - 132,45 The chloritic and biotitic greenschist or mica-schist with a lot of pellets, schliers, lenticles etc. of carbonates. The mineralisation of FeS is very poor only. The mineralisation of FeS is very poor only. The total colour of this rock is gray-green or green. The average gradient of foliation is 65° round.

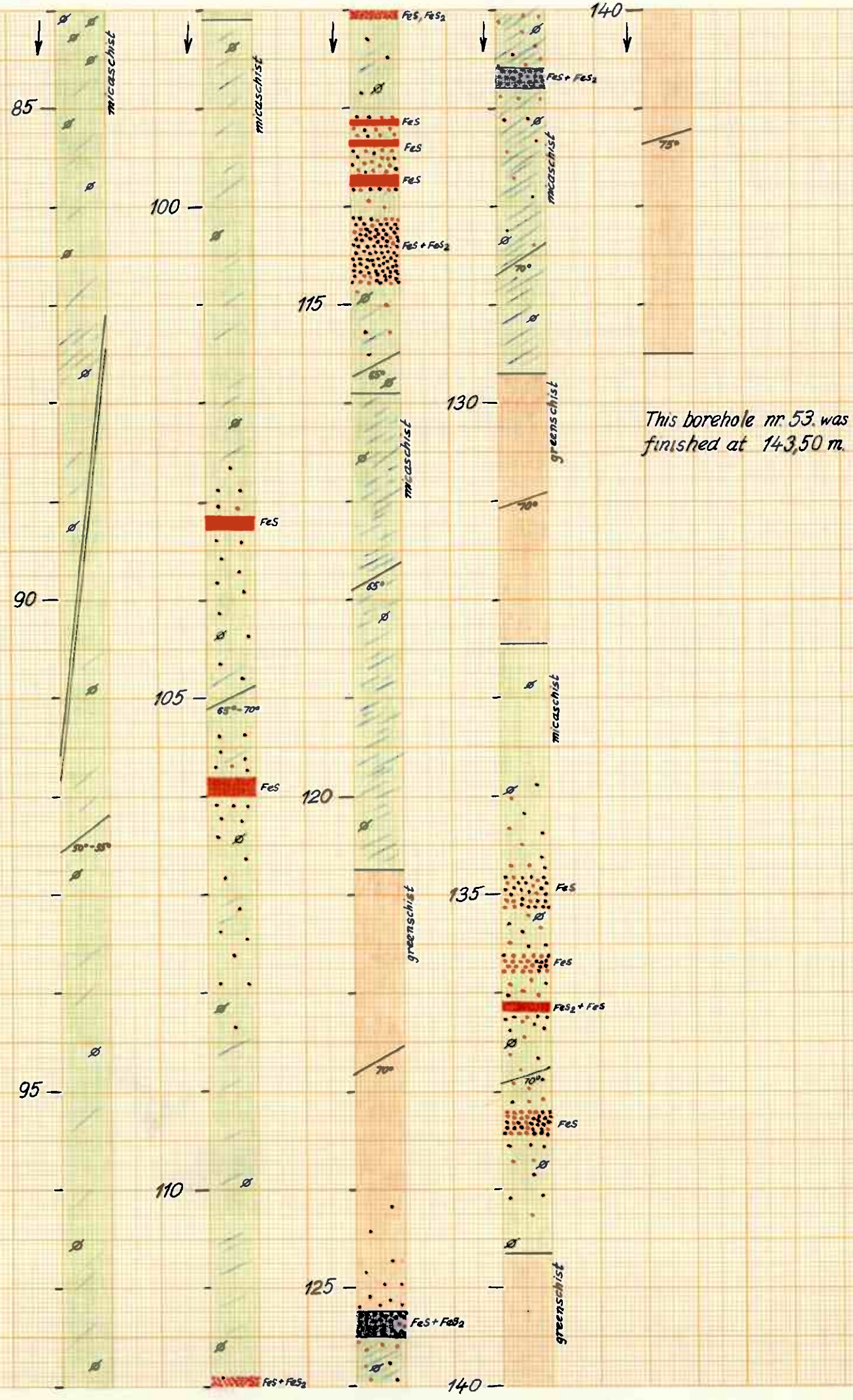
132,45 - 138,65 The very relation complex of rocks that are exchanging among them, as in 125,25 - 129,70 m. In 136,10 - 136,20 m is more strong and very strong mineralisation of FeS_2 with some $CuFeS_2$ and FeS too. On the other some places is mineralisation of FeS mostly very poor only - in example in 134,80 - 135,15 m, in 135,65 - 135,80 m, in 137,20 - 137,45 m. The average gradient of foliation is 70° about.

138,65 - 143,50 The chloritic greenschist or mica-schist with biotite and transversal biotite too. Quartz is present too. The rock has a lot of very weak paralel positions or schliers and pellets, which creat carbonates. The total colour of this rock is gray-green or dark gray-green. The average gradient of foliation is 75° round.

The borehole was finished at 143,50 m.

(M. Motys).


Prophile of borehole nr. 53
micaschist
Carbonates
FeS2
30°
40°
50°
55°
60°
5
10
15
20
25
30
35
40
45
50
55
60
65
70
75
80



This borehole nr. 53 was finished at 143,50 m.

THE BOREHOLE NR. 53 G

Tverrfjellet mine, level 6 th

THE BOREHOLE NO. 53, Tverrfjellet mine , level VI
X = - 38,0 , Y = + 239,3.

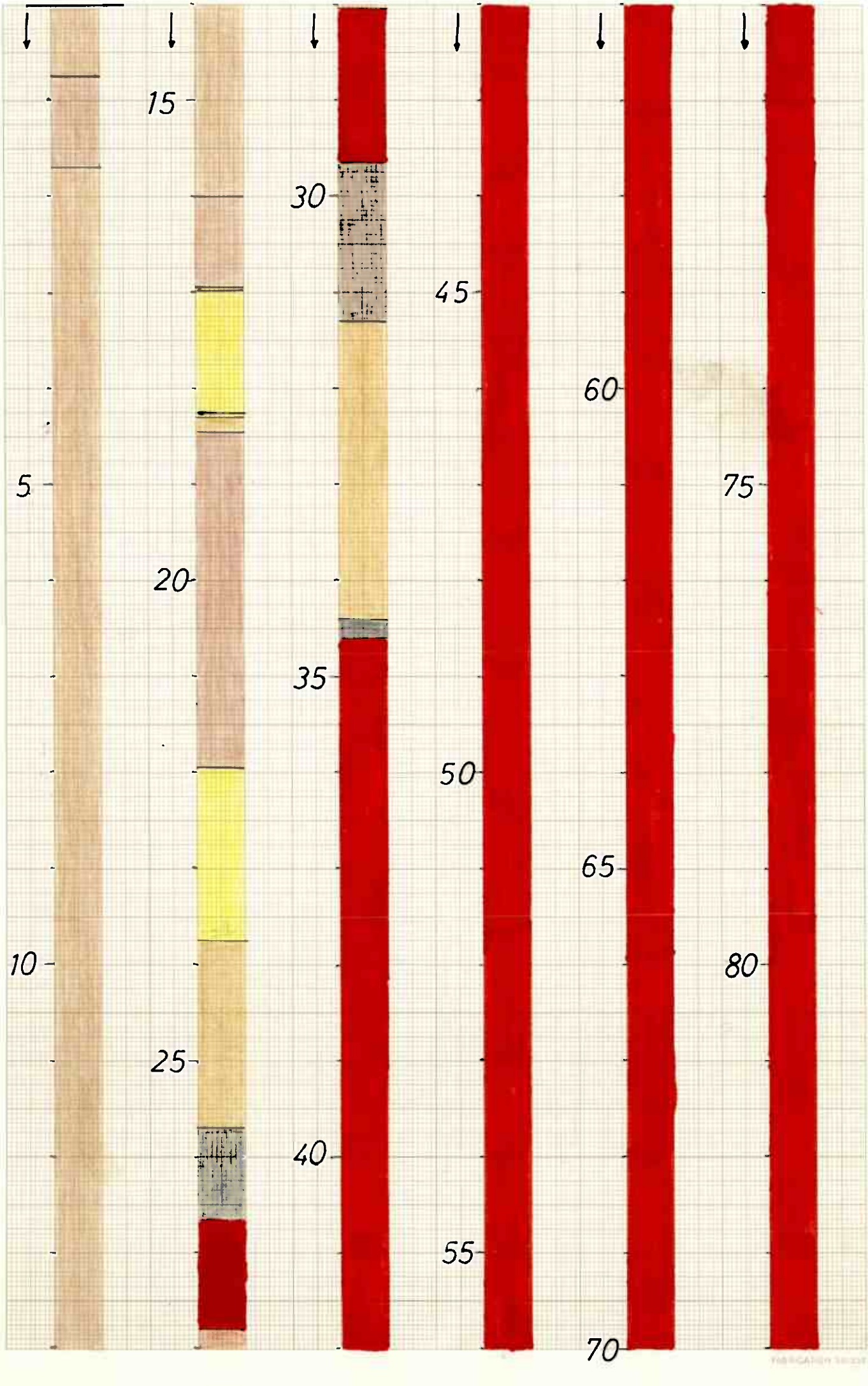
(The beginning of a gradient of this borehole is - 65°).

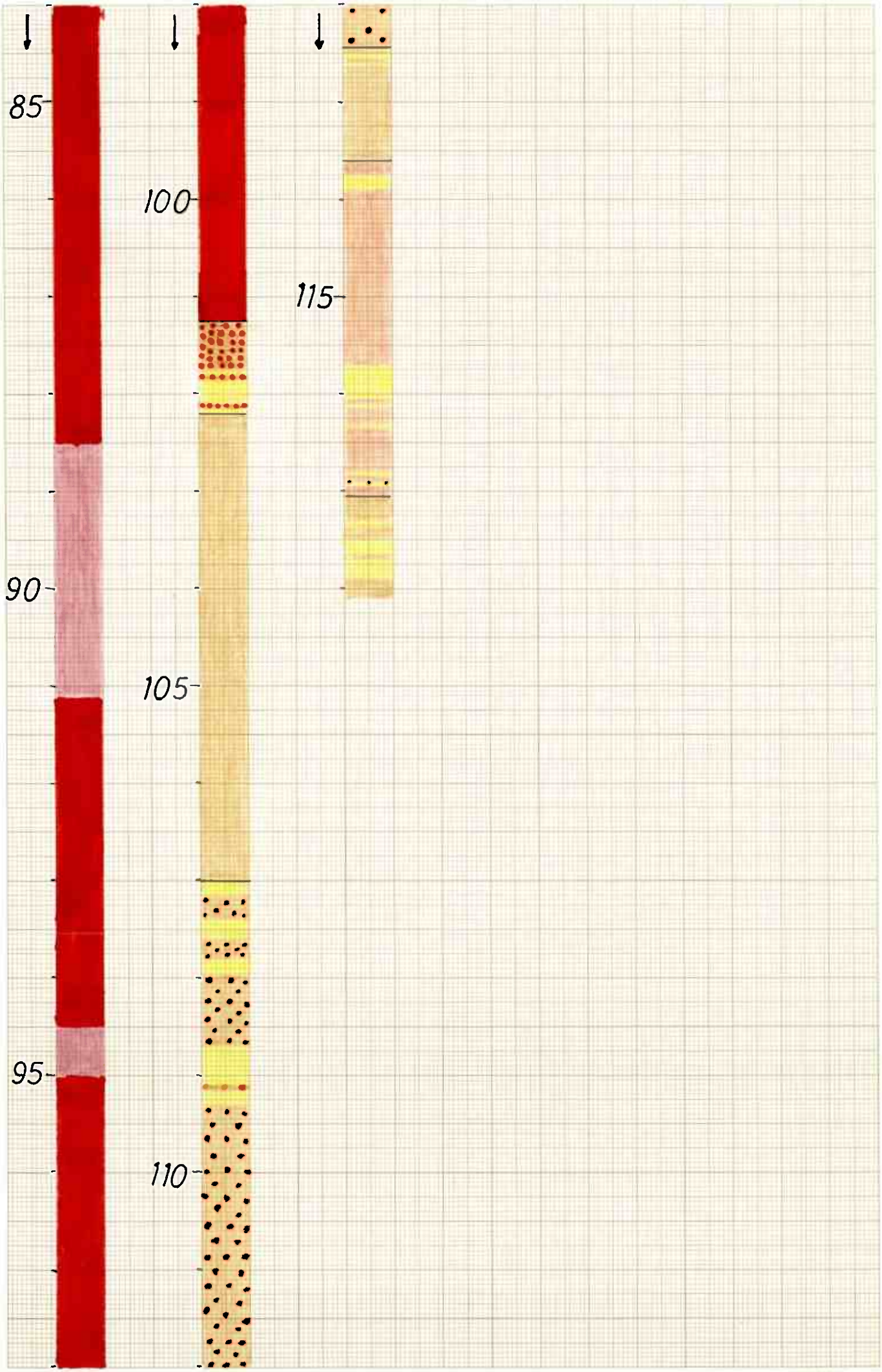
The brief petrografical description.

0,00 - 0,75	The amphibolitic greenstone.
0,75 - 1,70	The same amphibolitic greenstone with a lot of paralel positions of quartz with impregnation of FeS_2.
1,70 - 16,00	The amphibolitic greenstone as well as in 0,00 - 0,75 m.
16,00 - 16,95	The amphibolitic greenstone as well as in 1,70 - 16,00 m but with some positions of coarse-grained amphibolitic greenstone with some irregular weins or positions of quartz with impregnation of FeS_2 mostly with pellets, schliers and grains of carbon.
16,95 - 16,98	The white quartz.
16,98 - 18,25	The blue-gray quartzite without impregnation of sulphides.
18,25 - 18,30	The white quartz.
18,30 - 18,45	The coarse-grained amphibolitic greenstone.
18,45 - 21,95	The amphibolitic greenstone as well as in 1,70 - 16,00 m.
21,95 - 23,75	The white or white-gray quartz with poor impregnation of FeS_2 with some schliers of carbonates and with some weak intercalations of epidotic greenstone and greenschiest with chlorite and small hornblende crystals. Some more strongly impregnationof FeS_2 in 22,60 22,90 m.
23,75 - 25,70	The medium-grained amphibolitic greenstone. The average gradient of this foliation is 35° - 40° around.
25,70 - 26,63	
26,63 - 27,80	The strong impregnation of FeS_2.
27,80 - 28,05	The biotitic mica schist with poor impregnation of FeS_2 with some hornblende and chlorite.
28,05 - 29,63	The strong impregnation of FeS_2.
29,63 - 31,30	The gneissic schist, strongly biotitic with chloritic without impregnation of FeS_2.
31,30 - 34,40	The coarse-grained amphibolitic greenstone with poor impregnation of FeS_2 mostly only.

34,40 - 34,60	The same as in 29,63 - 31,30 m with some poor impregnation of FeS_2.
36,60 - 101,25	The strong impregnation of FeS_2. Between 88,50 - 91,10 m and 94,50 - 95,00 m is present strong impregnation of Fe_3O_4 creat also intercalations.
101,25 - 102,20	The medium-grained and coarse-grained amphibolitic greenstonewith impregnation of $CuFeS_2$ and with FeS_2 with thick positionsof white quartz with impregnationof FeS_2 mostly. In 101,75 - 101,80 m, 101,85 - 102,10 m and in 102,15 - 102,20 m are present positions of the white quartz.
102,20 - 107,00	The medium-grained and tiny-grained amphibolitic greenstone with weak weins of quartz. Very, very weak impregnation of sulphides or without.
107,00 - 112,45	The medium-grained and more coarse-grained amphibolitic greenstone on some places with more strongly impregnation of FeS_2 mostly. In 107,00 - 107,15 m, 107,40 - 107,60 m, 107,80-107,95 m, 108,70 - 109,10 m and in 109,15 - 109,30 m is present positions of white or white-gray quartz with poor impregnation of FeS_2 and gray quartzite without impregnation.
112,45 - 113,60	The amphibolitic greenstone as well as in 102,20-107,00 m with more quartzite intercalat. In 112,20 - 112,50 m and in 112,55 m are 3-5 cm thickness position of quartz without impregnation of FeS_2.
113,60 - 117,05	The motley serie of the biotitic and biotitic-chloritic greenschist medium-and coarse (little) grained greenstone with some positions of quartz (1 - 5 cm thickness maximal). In 114,75 - 114,90 m is present biotitic and seritic mica schist with amphibolitic rodlike and acicular crystals. In 115,70 - 116,05 m is present biotitic and chloritic mica schist. In 116,10 and 116,30 m (5 and 3 cm) is present quartz. In 116,80 m is present quartz and foulding quartz with FeS_2 impregnation and coarse-grained amphibolitic greenstone.
117,05 - 118,10	The medium-grained and tiny-grained amphibolitic greenstone. In 117,30 - 117,35 m, 117,50 - 117,65 m and in 117,70 - 117,90 m is present the gray and white-gray quartz without minerals.

The profile of the borehole nr.53. Tverrfjellet, the lavel 6th




85
90
95
100
105
110
115

THE BOREHOLE NR. 54,
Tverrfjellet mine, level 6 th.

THE BOREHOLE NO. 54, Tverrfjellet mine, level VI
X = - 56,6 , Y = + 159,2.

(The beginning of a gradient of this borehole is + 0°).

The brief petrografical description.

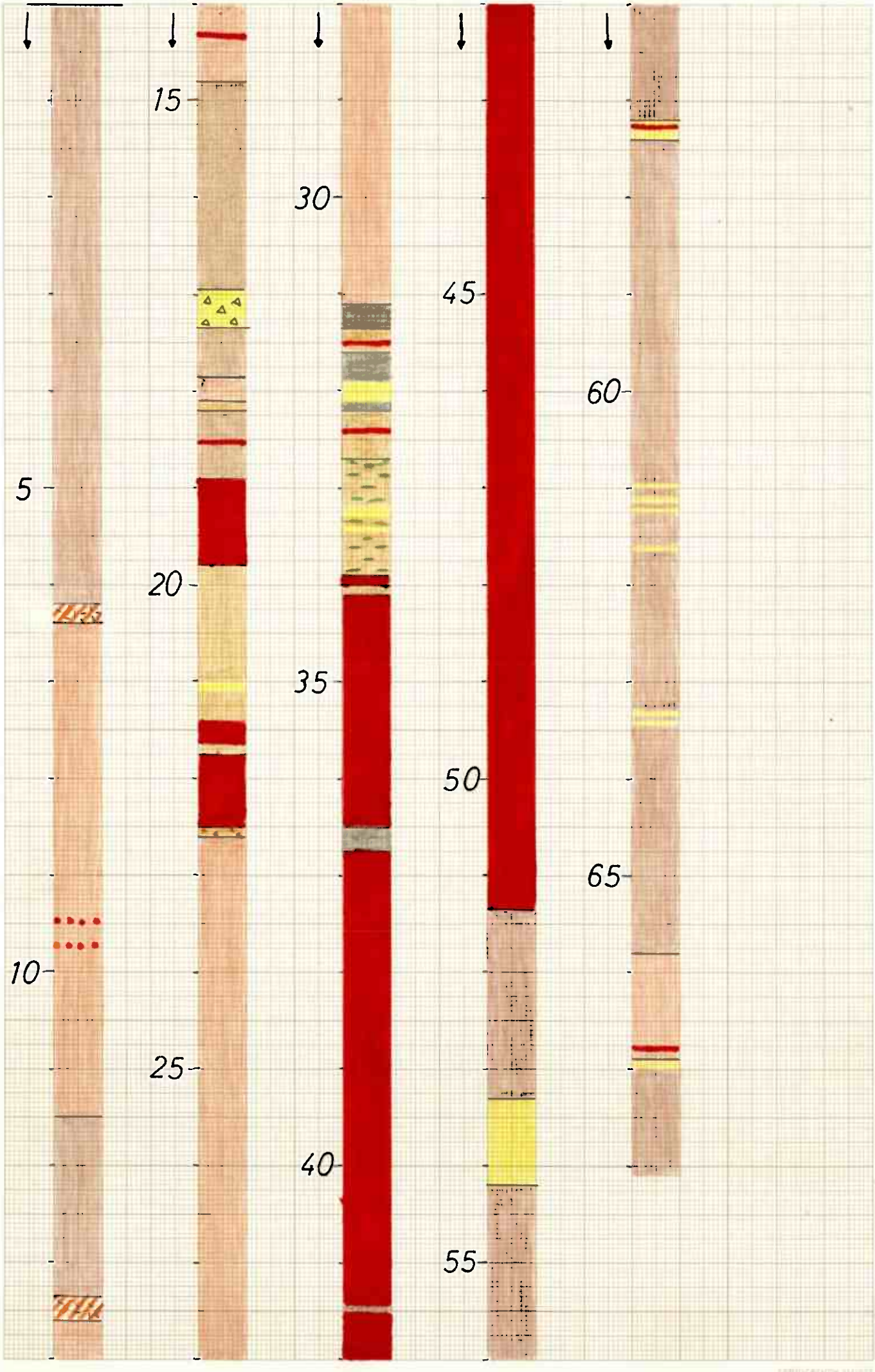
0,00 - 6,20	The tiny-grained and tender-grained amphibolitic greenstone with weak intercalat on of greenschist with schliers , grains of carbonates (weak only much). In 2,40 m and 4,00 m is 5 cm quartz weins.
6,20 - 6,40	Keratophyre with a lot of smallrodlike crystales of hornblende, biotite.
6,40 - 11,50	Greenschist amphibolitic, crystales, carbonates quarts, veins, foulding, FeS_2 impregnation 9,45 m, 9,70 m but poor only. Biotite creat schliers, lenticles etc. On some places foulding 9,50 - 9,60 m.
11,50 - 13,35	As well as in 0,00 - 6,20 m.
13,35 - 13,60	As well as in 6,20 - 6,40 m.
13,60 - 14,80	The motley serie of the greenschist with much biotite with amphibolitic crystales folding on some places. A lot of weak intercalations, schliers ate of carbonates + quartz too with quartz sosit. some impregnation of FeS_2. In 14,35 m with coarse-grained greenstone position 2 - 3 cm thickness.
14,80 - 16,95	The greenstone with 5 - 7 cm position of greenschist with acicular amphibolitic crystales (1 cm). Some very poor impregnation of FeS_2 ispresent only.
16,95 - 17,35	The quartz (breccie) with inclusions of basement rock (greenstone, greenschist).
17,35 - 17,85	As well as 14,80 - 16,95 m. Some impregnation of FeS_2 is present very poor only.
17,85 - 18,10	The biotitic greenschist with weins of carbonates or quartz.
18,10 - 18,20	The coarse-grained amphibolitic greenstone with some impregnation of FeS_2 mostly.
18,20 - 18,90	The quartzy amphibolitic greenstone. In 18,50 m is present impregnation of FeS_2 with a lot of weak weins of quartzand carbon.
18,90 - 19,80	The position of FeS_2 or strong impregnation in quartz.

19,80 - 21,75	Motley serie coarse-grained greenstones with a lot of biotite, hornblende with some intercalations of maculose chloritic greenschist carbonates creat grains veins, quartz-weak positions, quartzite too. Some weak intercalations of types of greenstone commemorate amphibolitic-keratophyre. Between 21,oo - 21,10 m quartz, alltogether impr. of FeS_2 poor only. (Quartzite with amphibolitic with impr. of FeS_2 little bit strong)
21,75 - 22,50	FeS_2 ore - strong impregnation in quartz.
22,50 - 22,60	Carlcarcous and quartzy amphibolitic greenstone - keratophyre with impregnation FeS and FeS_2.
22,60 - 31,10	Motley serie greenschist (biotitic hornblende with some posit of greenstone.
31,10 - 31,35	Sericitic and chloritic strongly biotitic micaschist - greenschist with a lot of carbonates grains schliers.
31,35 - 31,60	Medium-grained or little bit corase-grained greenstone with a lot of irregular schliers, veins, pellets of carbonates and quartz together. In 31,50 m (2 cm) strong impregnation FeS with $CuFeS_2$.
31,60 - 32.20	Biotitic gneissic schist with a lot of lenticles schliers of carbonates, quartz with some chloritic and a lot of grains of carbonates. Impregnation of sulphides poor only. 31,90 - 32,10 m - quartz.
32,20 - 32,70	Motley serie, exchange corase - greenstone, tiny-grained greenstone and posit quartz with impregnation of FeS_2 mostly. Round 32,40 m (3 cm) strongly impregnation of FeS with $CuFeS_2$.
32,70 - 33,90	Coarse-grained amphibolitic greenstone with a lot of epidote in basement matter (big acicular crystals of hornblende) impregnation poor, very scarce. 33,20 - 33,30 m - quartz 33,40 - (3 cm) - quartz.
33,90 - 34,00	FeS_2 ore.
34,00 - 34,10	Coarse-grained greenstone with FeS_2 impregnation.
34,10 - 36,50	FeS_2 ore.
36,50 - 36,75	Chloritic-structure biotite micaschist without impregnation of sulphure in 41,45 m (2 cm) position the same rock.

36,75 - 51,35	FeS_2 ore.
51,35 - 53,30	The tender and tiny-grained amphibolitic greenstone with a lot very weak veins of carbonates and quartz impregnation of sulphides very poor.
53,30 - 54,20	Quartztie-gray or white-gray, blue-gray too impregnation present scarce.
54,20 - 57,20	Tiny-grained and tender-grained greenstone with some weak intercalations of greenschist (biotite) impregnation FeS_2 very poor.
57,20 - 57,40	Secretion quartz-white, in 57,30 m and 57.35 m is 0,5 cm and 1 cm thickness irregular lenticles of FeS_2.
57,40 - 65,80	Tiny-grained amphibolitic greenstone with a lot of very weak little paralell veins or intercalations of carbonates and quartz. Secretion quartz in: 58,95 - 58,90 m, 60,95 (2 cm), 61,20 (2 cm), 61,10 (2 cm), 61,60 (3 m), 63,30 (5 cm), 63,40 (4 cm).
65,80 - 66,90	Motley serie biotite greenschist with epidote chlorite and some intercalations of tiny-grained greenstone and epidote. In 66,75 m some impregnation of FeS_2 in 66,40 m folding zone. 66,50 m) 65,70 m) faults' zone breaking of the core
66,90 - 68,10	Tiny-grained amphibolitic greenstone as well as in 57,40 - 65,80 m. In 66,90 - 67,00 quartzite.

(M. Motys.)

The profile of the borehole nr. 54, Tverrfjellet, the lavel 6th



THE BOREHOLE NR. 55
Tverrfjellet mine, level 6 th

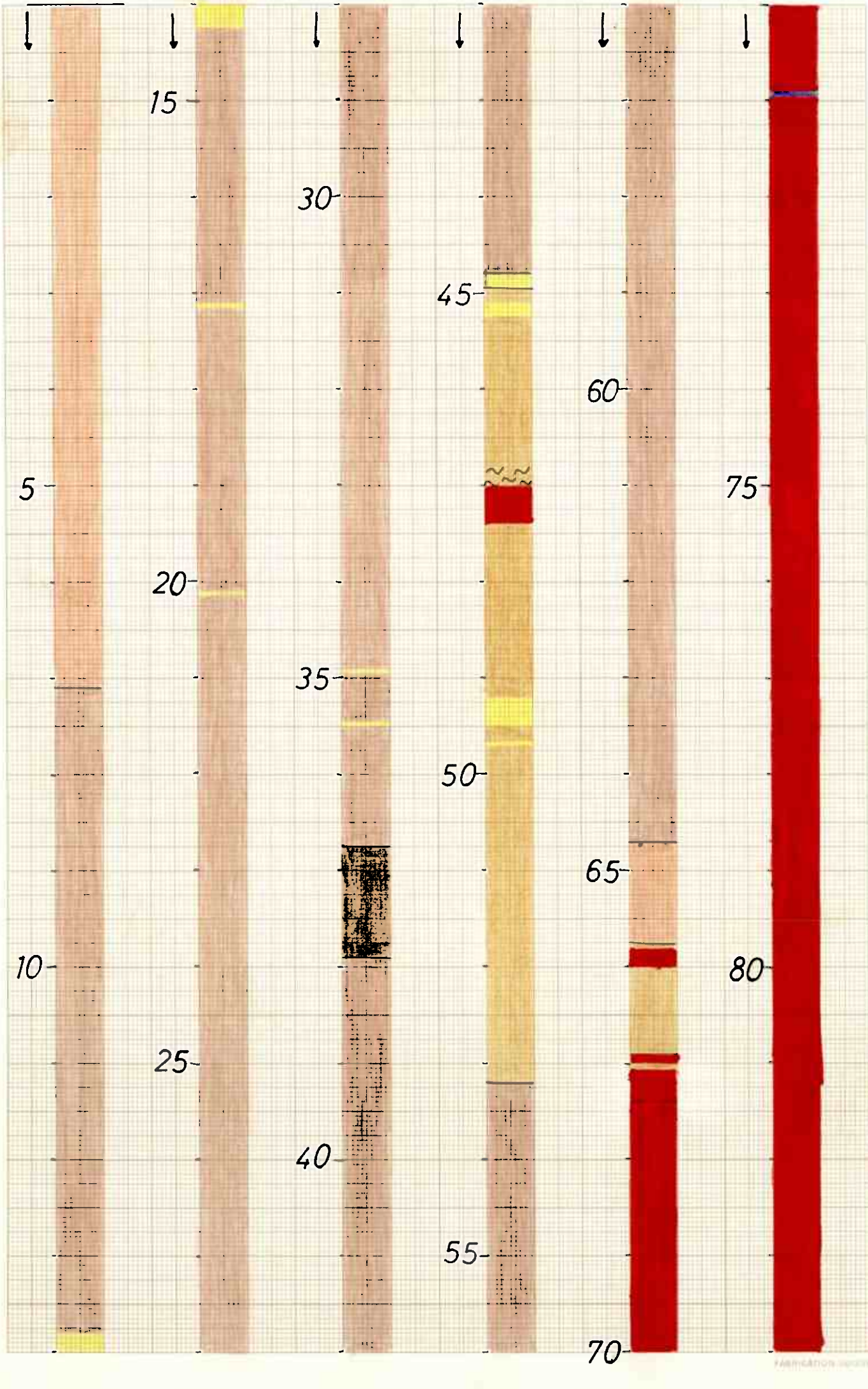
THE BOREHOLE NO. 55, Tverrfjellet mine, level VI
X = - 56,6 , Y = + 159,2

(The beginning of a gradient of this borehole is - 60°).

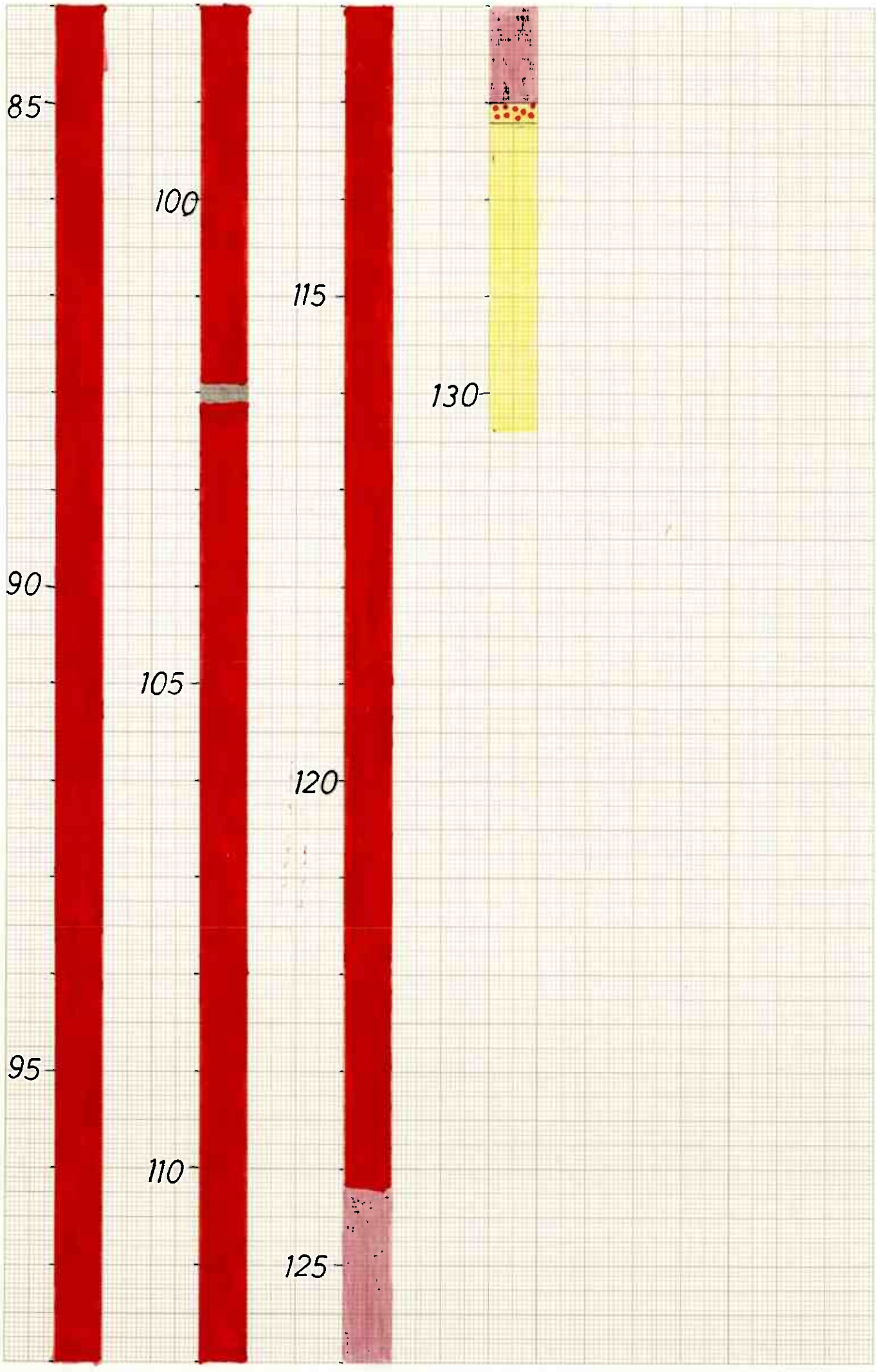
The brief petrografical description.

0,00 - 7,10	The motley serie of the amphibolitic greenschist and amphibolitic greenstone with intercalations of quartz with poor impregnation of FeS (scales) mostly.
7,10 - 36,75	The tiny and medium grained amphibolitic greenstone with poor impregnation of FeS_2 and FeS. Between 13,80 - 14,25 m is present a position of the white quartz whithout minerals. In 12,40m(5cm), between 17,10 - 17,15 m, in 20,10 m (5cm), between 34,90 - 34,95 m and between 35,45 - 35,50 m are present some positions of the white quartz.
36,75 - 37,90	The tiny and tender-grained amphibolitic greenstone.
37,90 - 44,80	The same rock as in 7,10 - 36,70 m.
44,80 - 44,95	The position of the white quartz without impregnation.
44,95 - 53,20	The coarse-grained amphibolitic greenstone. The average gradient of this foliation is 30° - 35° around. Between 45,10 - 45,25 m is present some positions of the white-gray quartz with some impregnation of FeS_2 (in 45,15 m 2cm thick kompact positionof FeS_2). In 47,00 - 47,40 m,and in 49,20 - 49,50 m are present positions of the white quartz. In 49,65 - 49,70 m is present a position of the white quartz without minerals. In 46,80 - 47,00 m is present a mylonitic sone.
53,20 - 64,70	The same rock as in 37,90 - 44,80 m. In 60,00 - 60,20 m is present a mylonitic sone.
64,70 - 65,75	The motley serie of greenschist and greenstone with a lot of irregular intercalations ate of quartz (hornblende, biotite, epidote, chlorite) with some poor impregnation of FeS_2 scarcely with FeS.
65,75 - 66,90	The medium and coarse-grained amphibolitic greenstone with poor impregnation of FeS_2. In 65,80 - 66,00 m is present a very strong impregnation of FeS_2.

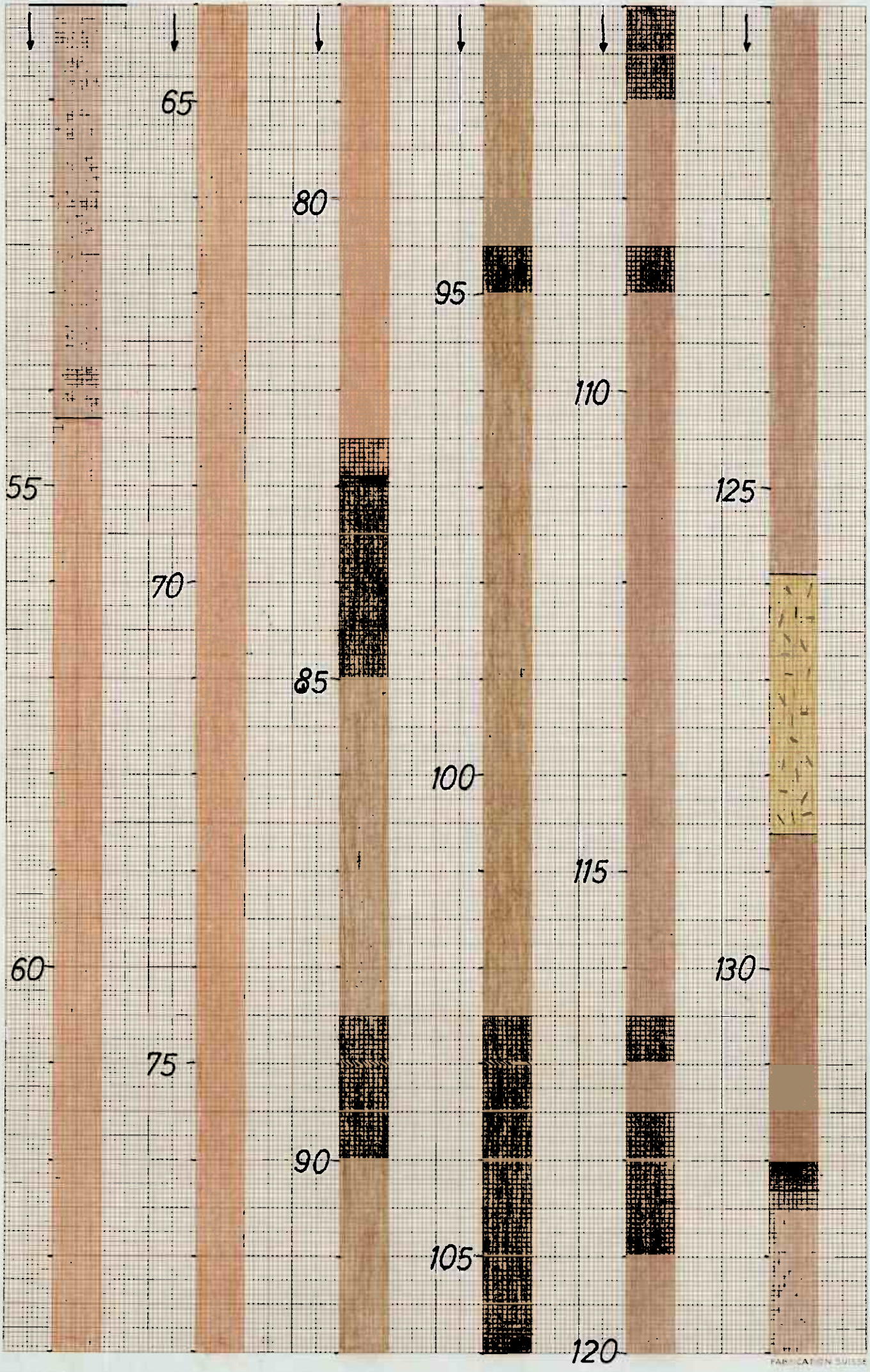
66,90 - 127,00	The strong impregnation of FeS_2. In 67,00 m around is present some inclusion of the coarse-grained amphibolitic greenstone. In 70,95 m (5 cm) is present the white carbonates. In 101,90 - 102,10 m is present the biotitic gneissic schist without impregnation. Between 124,20 - 127,00 m is present Fe_3O_4 creat weak parallel positions (from 125,70 m is more Fe_3O_4 strong.
127,00 - 127,20	The gray and dark gray quartzite with impregnation of FeS_2 mostly and without Fe_3O_4.
127,20 - 130,40	The gray and dark gray quartzite. The average gradient of this foliation is 35° - 40° around. Some very, very poor impregnation of FeS_2 is present.

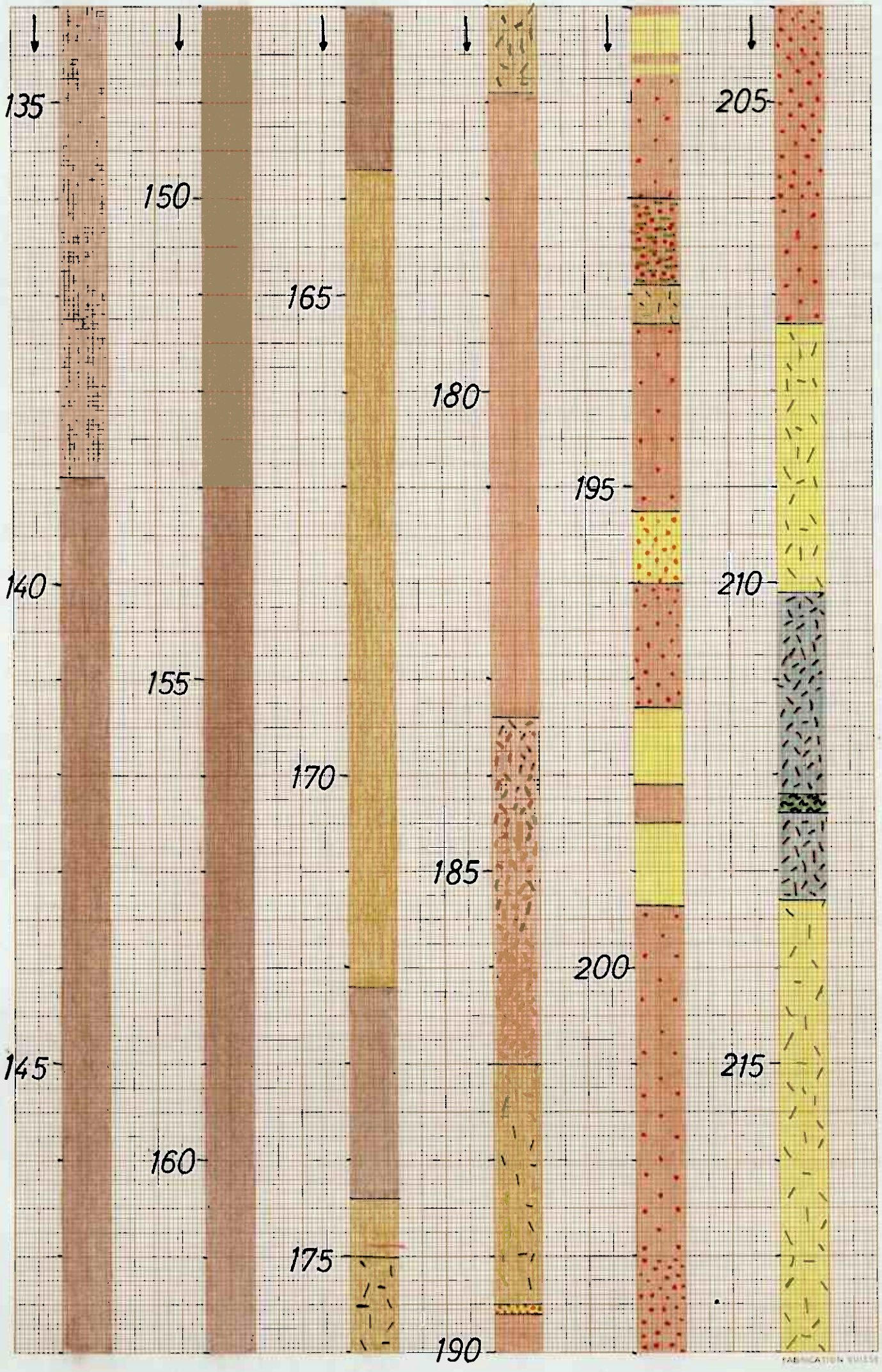


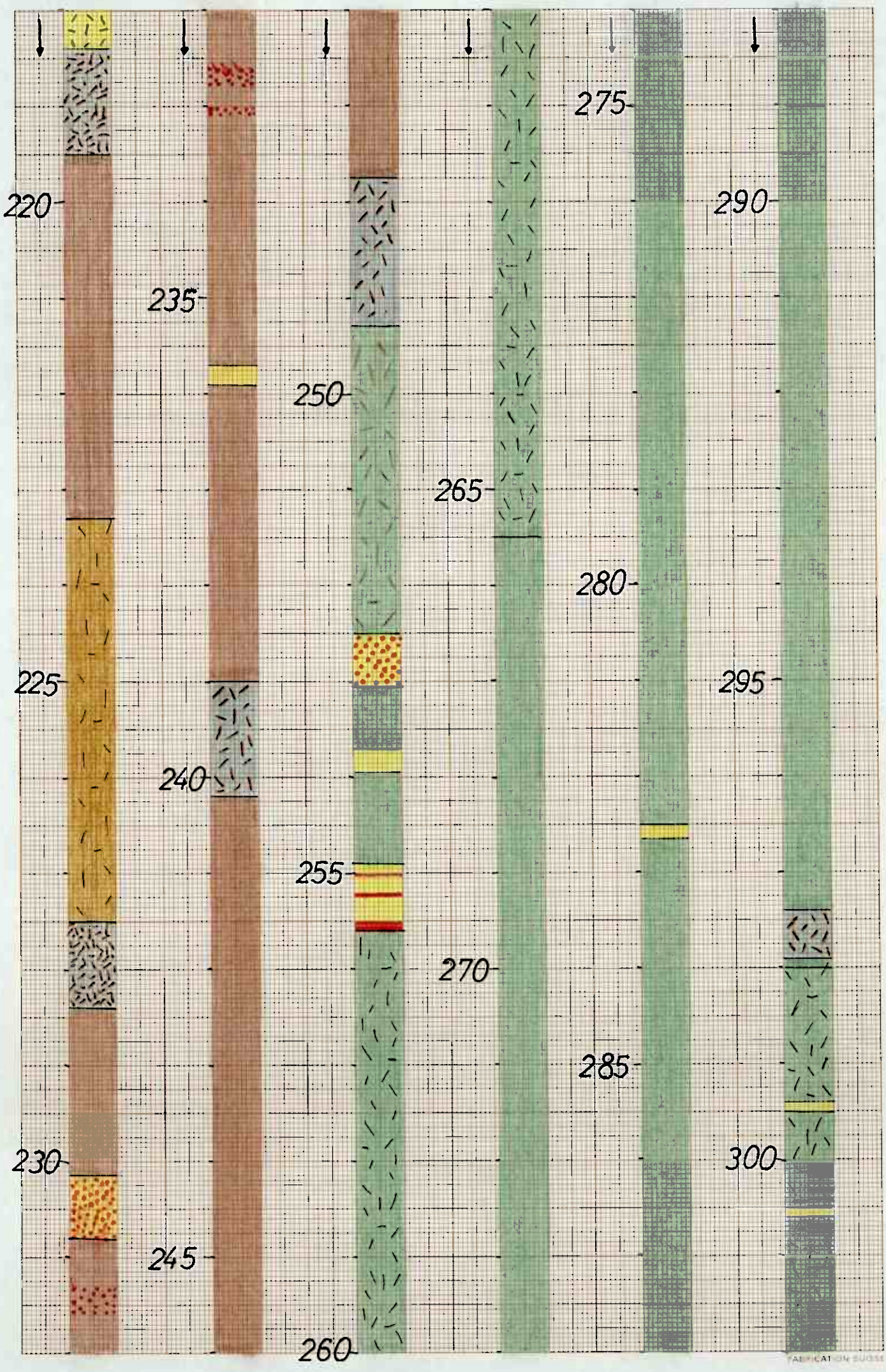
The profile of the borehole nr. 55. Tverrfjellet, the lavel 6th

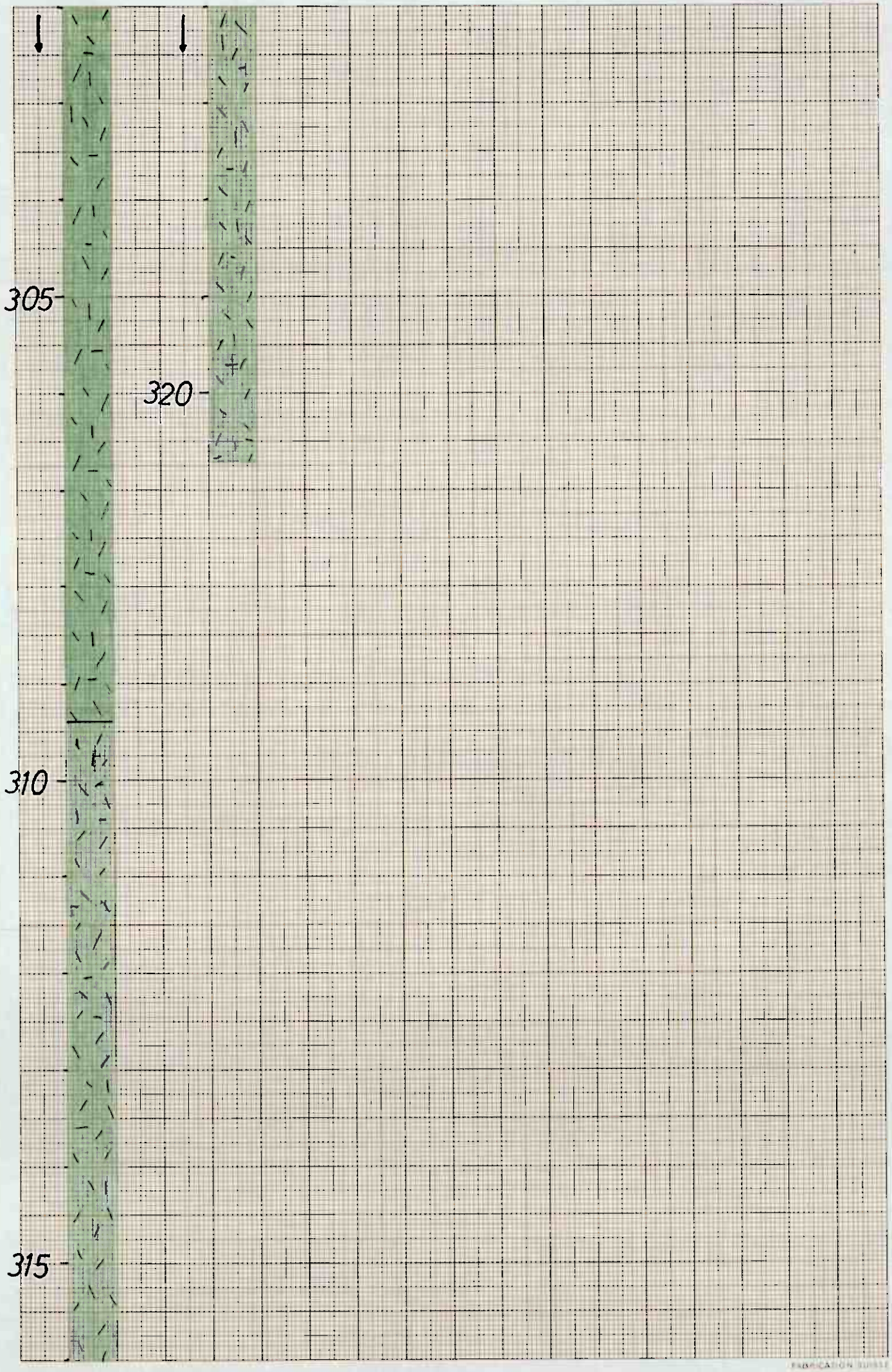

85
100
115
130
90
105
120
95
110
125

THE BOREHOLE NR. 60 G,
Tverrfjellet mine, the level 6th.

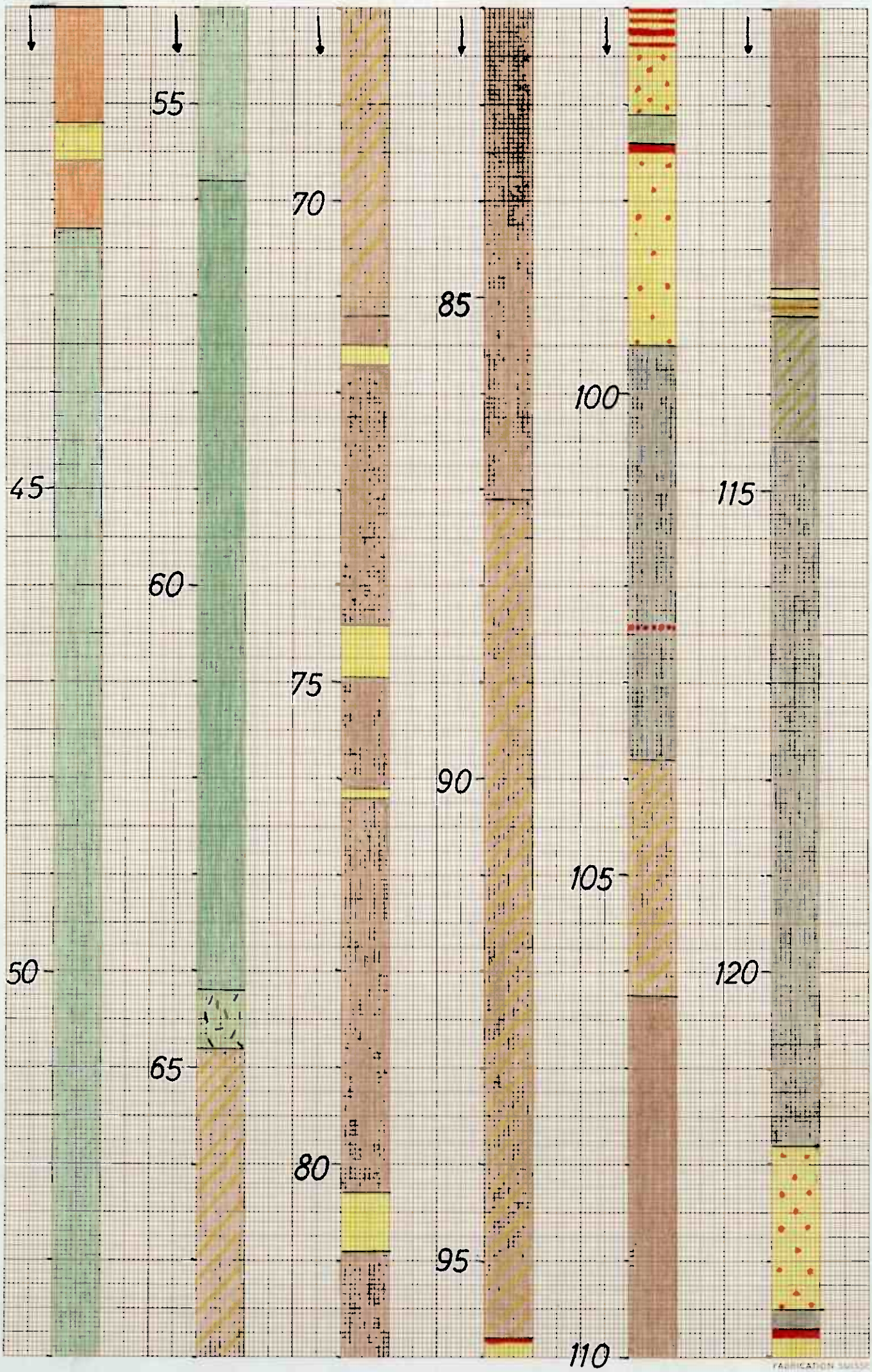

The profile of the borehole nr. 60G. Tverrfjellet, the level 6th
55
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65
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75
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120
125
130

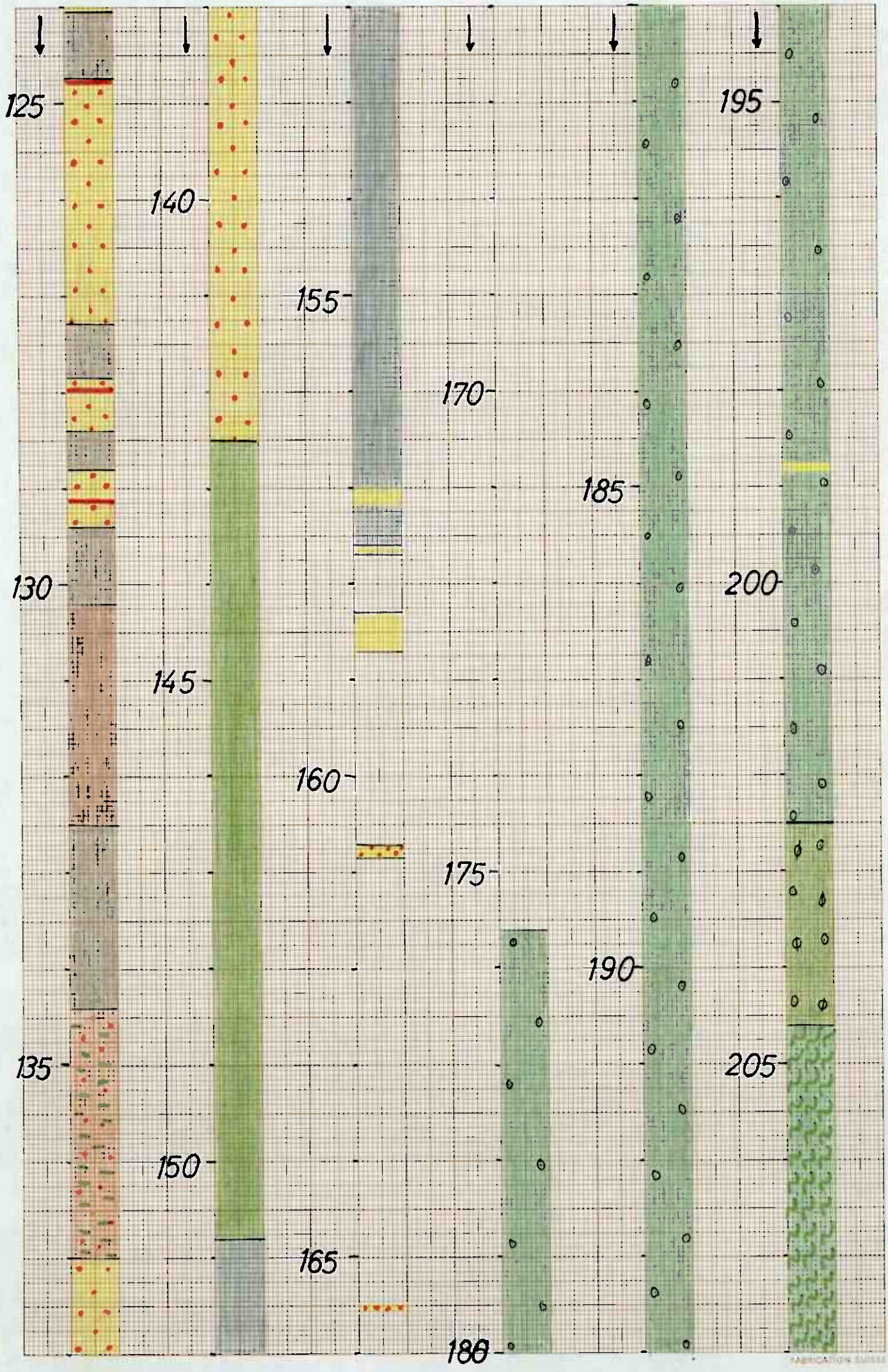

135
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145
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165
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210
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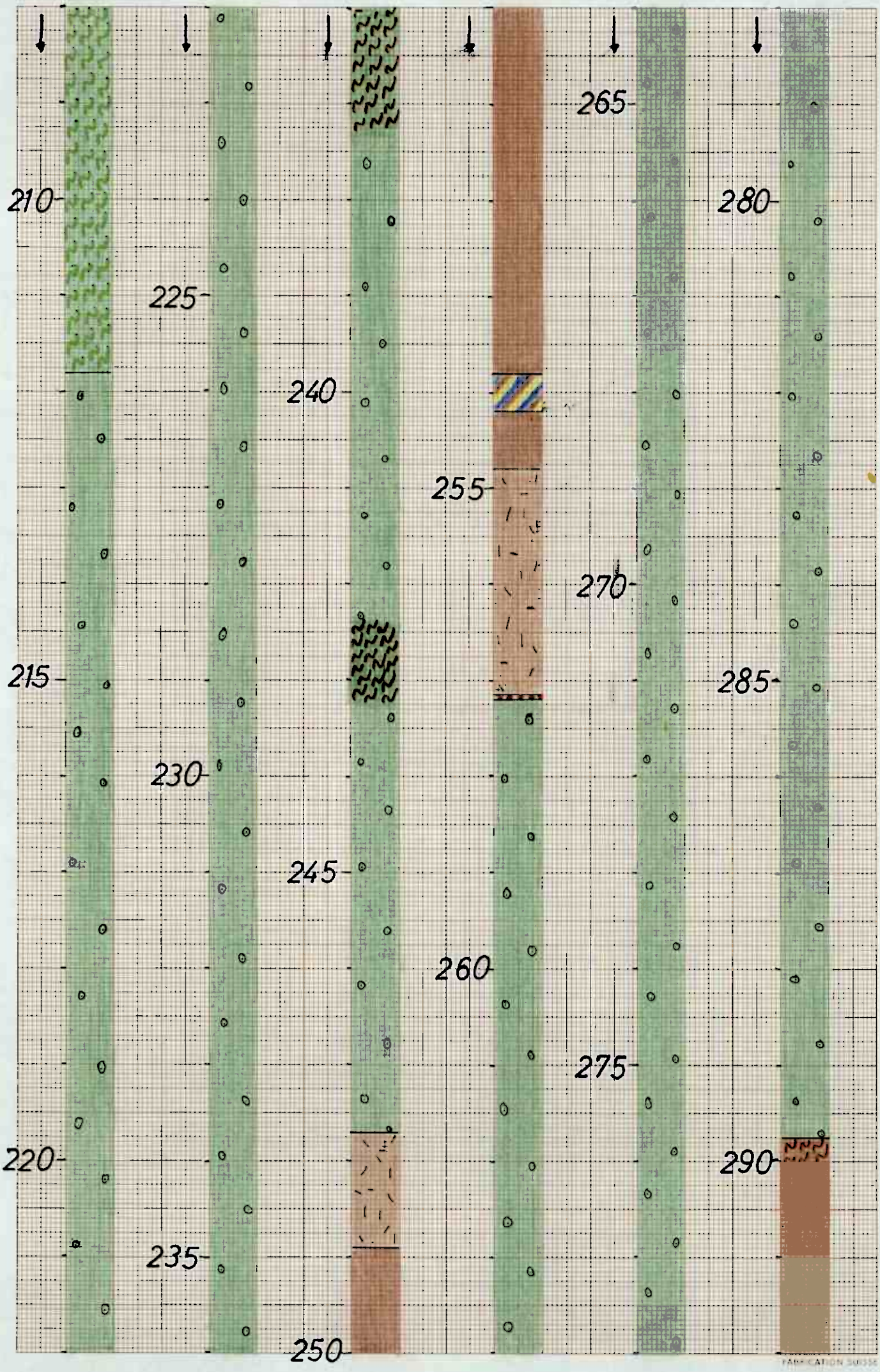

220
225
230
235
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245
250
255
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265
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275
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285
290
295
300

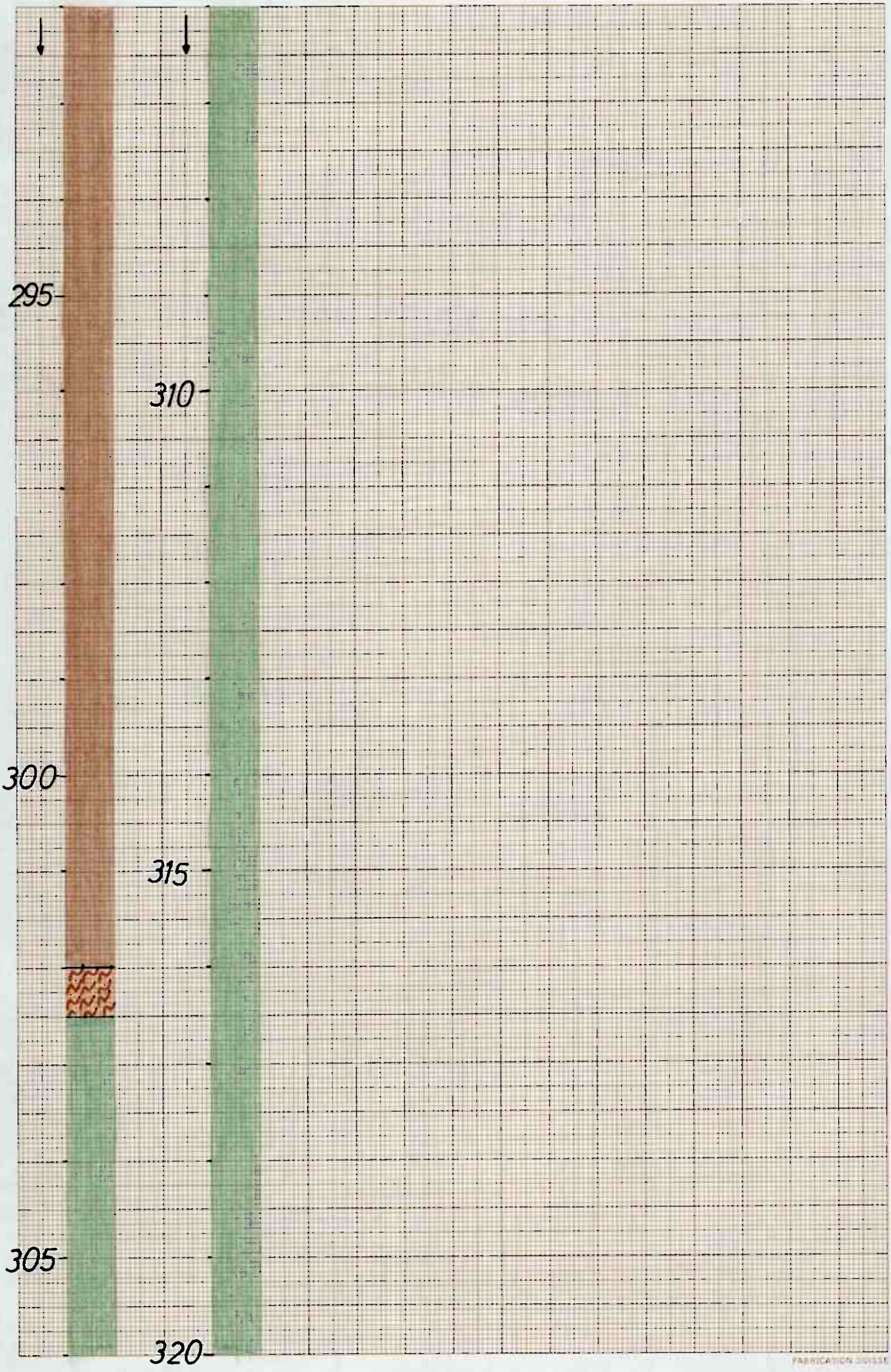

305
320
310
315

THE BOREHOLE NR. 61 G
Tverrfjellet mine the level 6th.

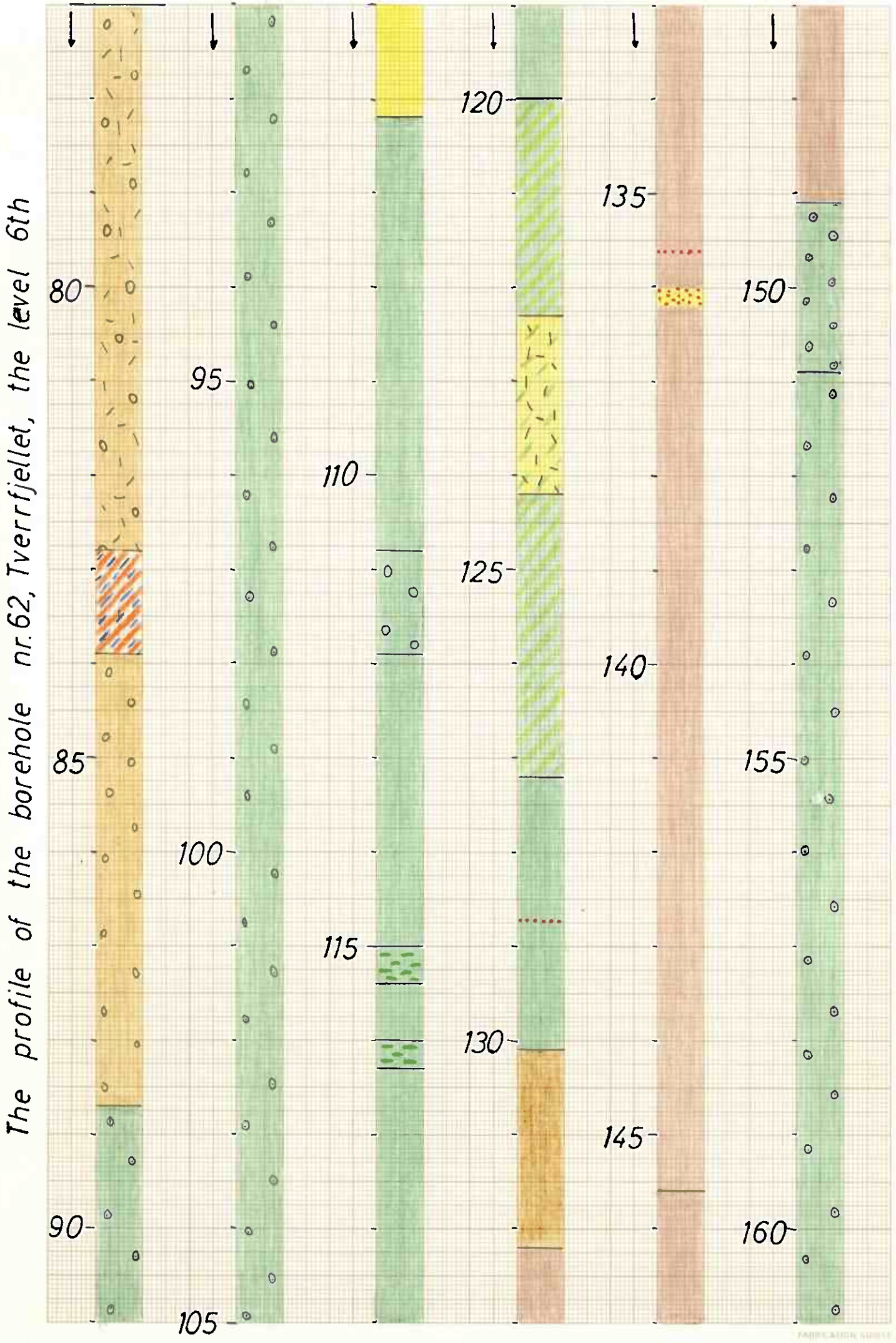

The profile of the borehole nr.61G. Tverrfjellet, the lavel 6th
45
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75
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110
115
120

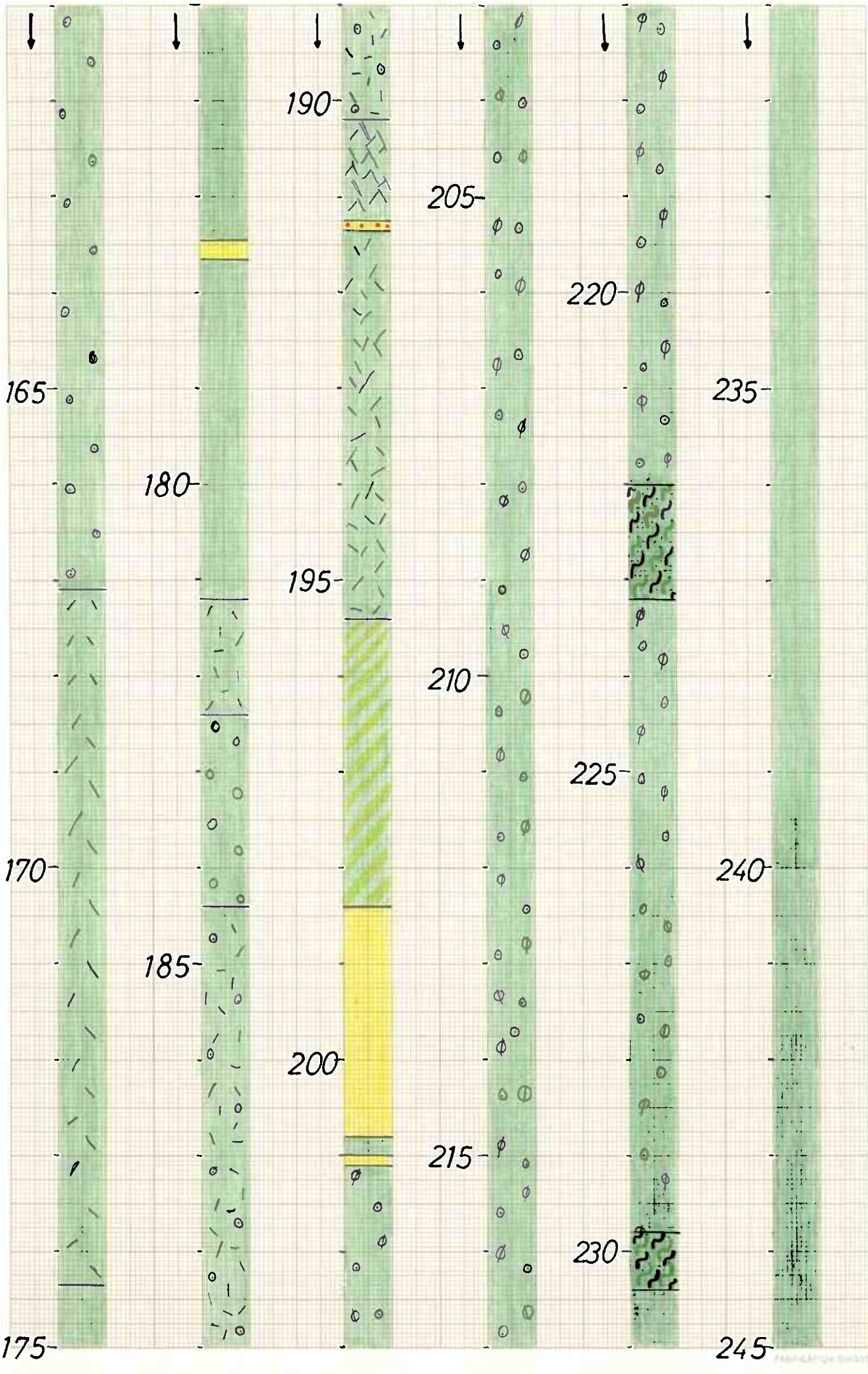

125
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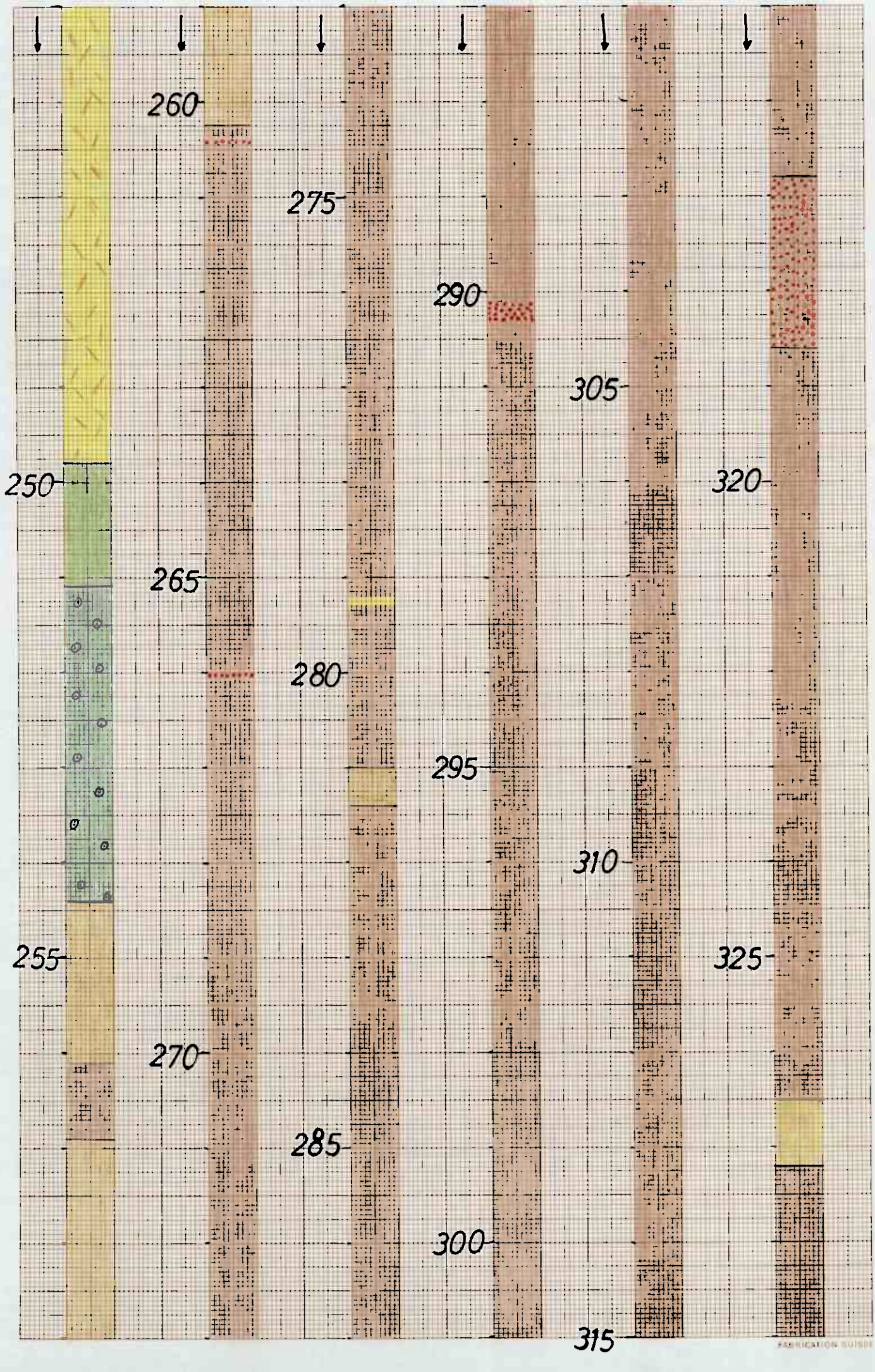

210
215
220
225
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235
240
245
250
255
260
265
270
275
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285
290

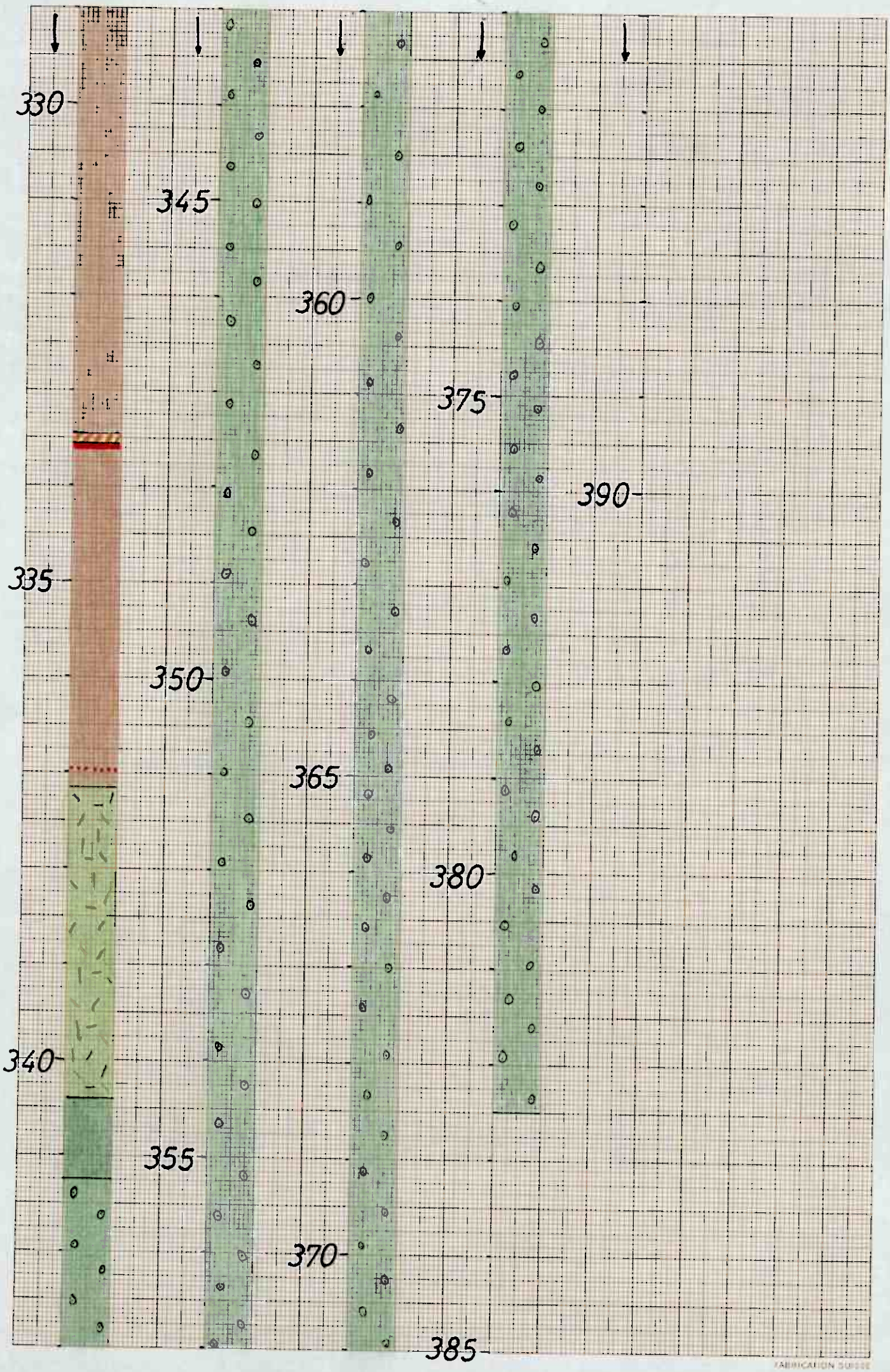

295
310
300
315
305
320

THE BOREHOLE NR. 62 G.
Tverrfjellet mine, the level 6th.


The profile of the borehole nr.62, Tverrfjellet, the level 6th
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
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160


165
170
175
180
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225
230
235
240
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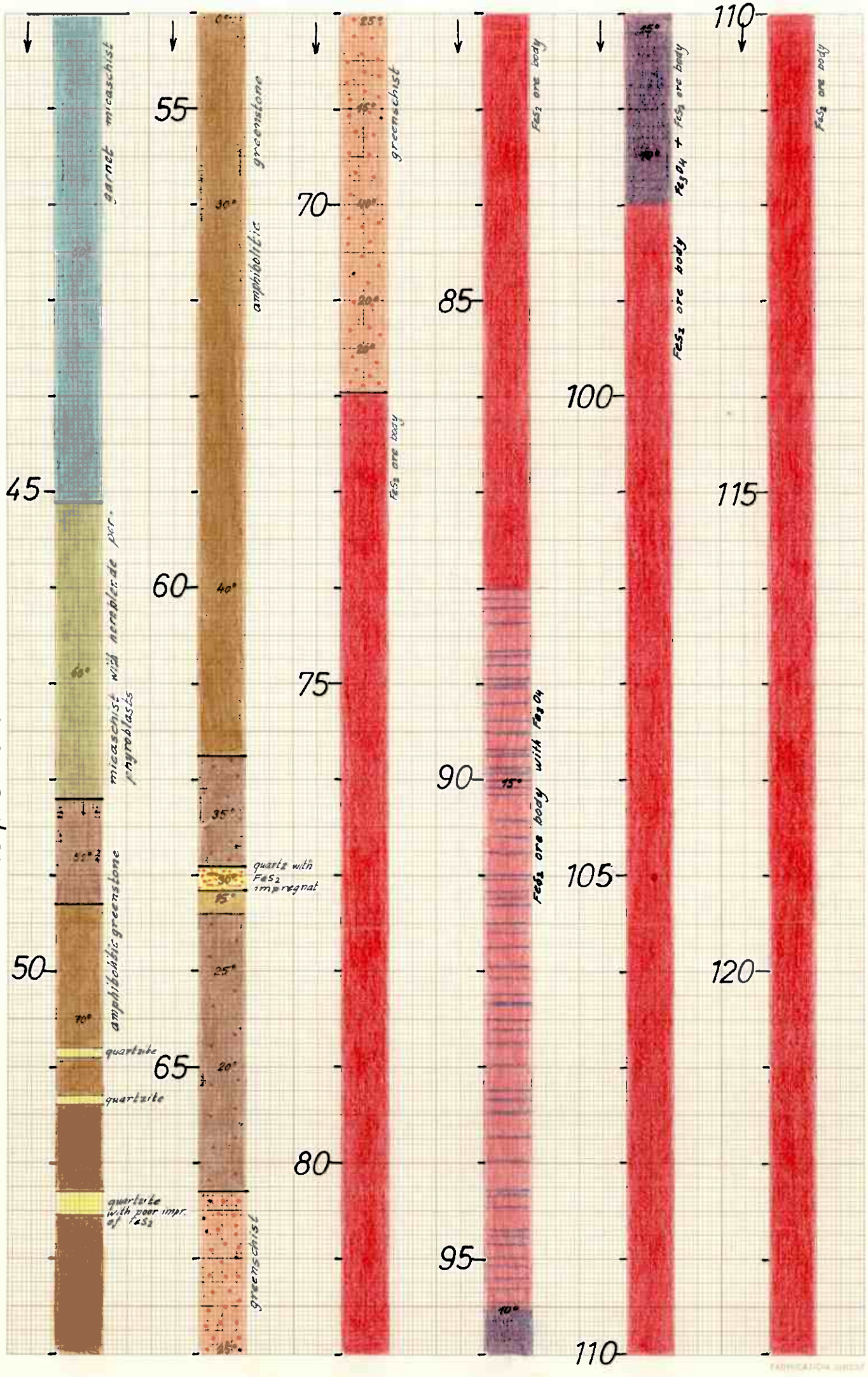

250
255
260
265
270
275
280
285
290
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325


330
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390
335
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365
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340
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370
385

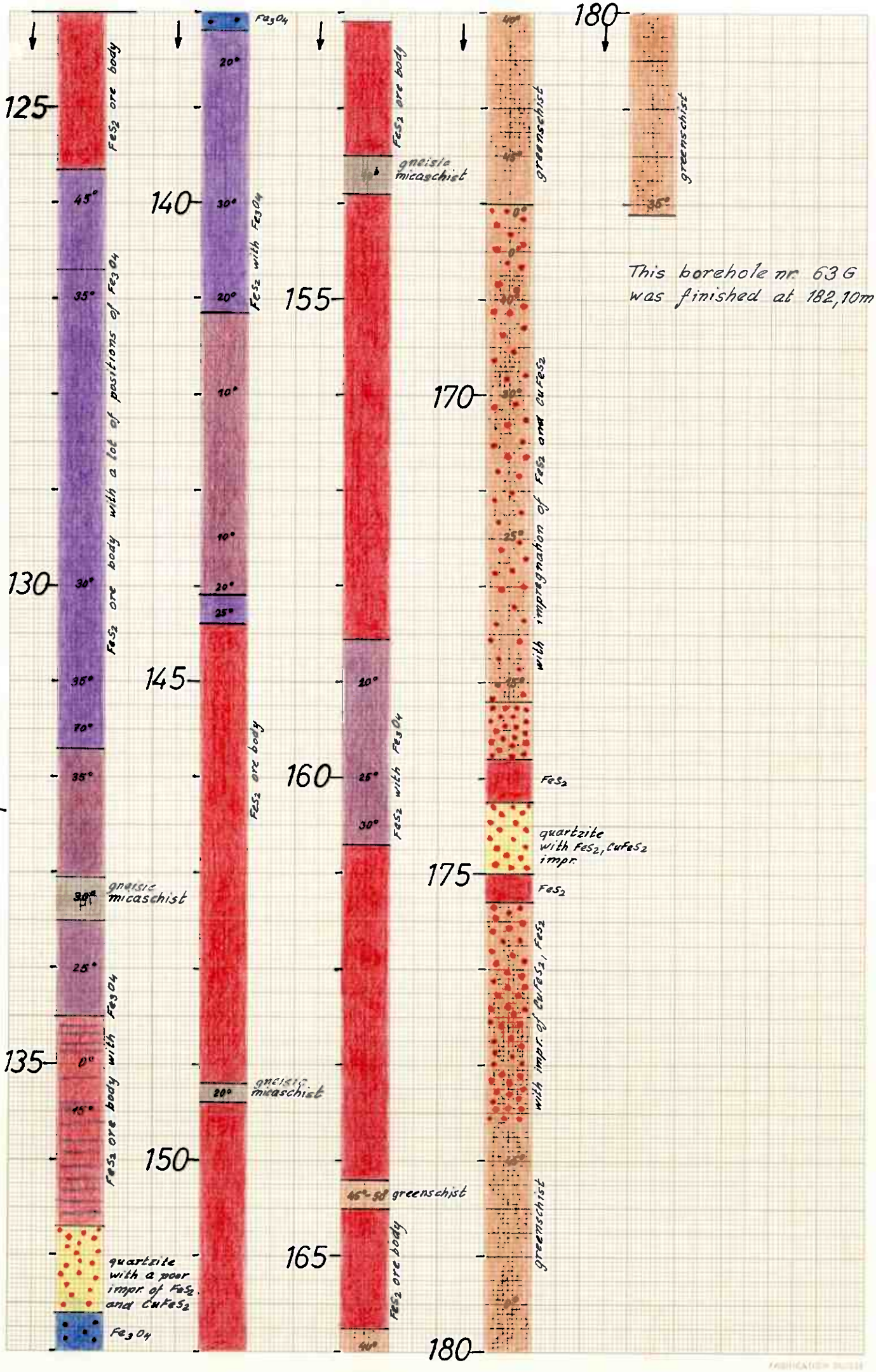
THE BOREHOLE NR. 63 G

Tverrfjelletgruva
level VI. crosscut to S.

The profile of the borehole nr. 63 G



The profile of the borehole nr. 63 G



This borehole nr. 63 G was finished at 182,10m

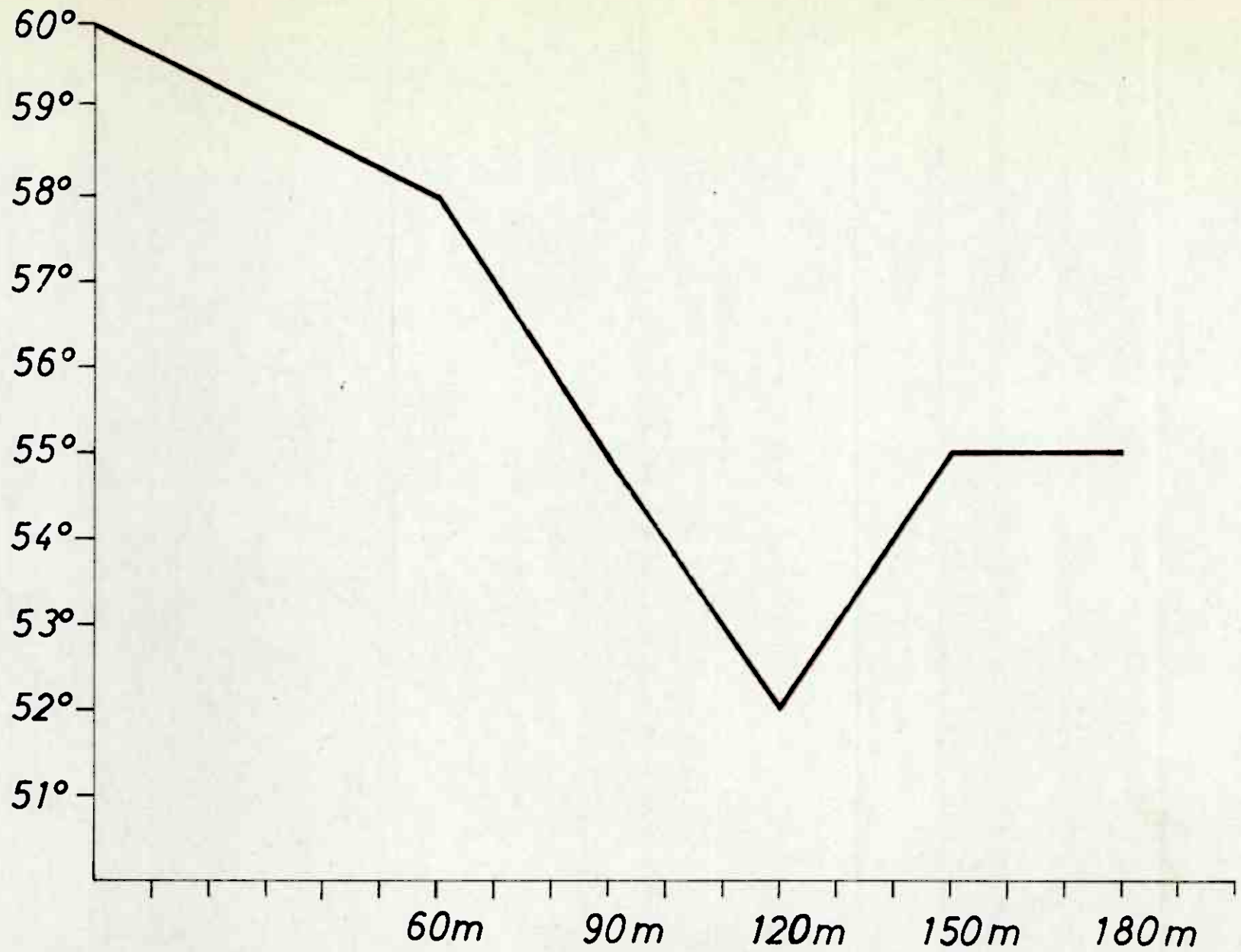
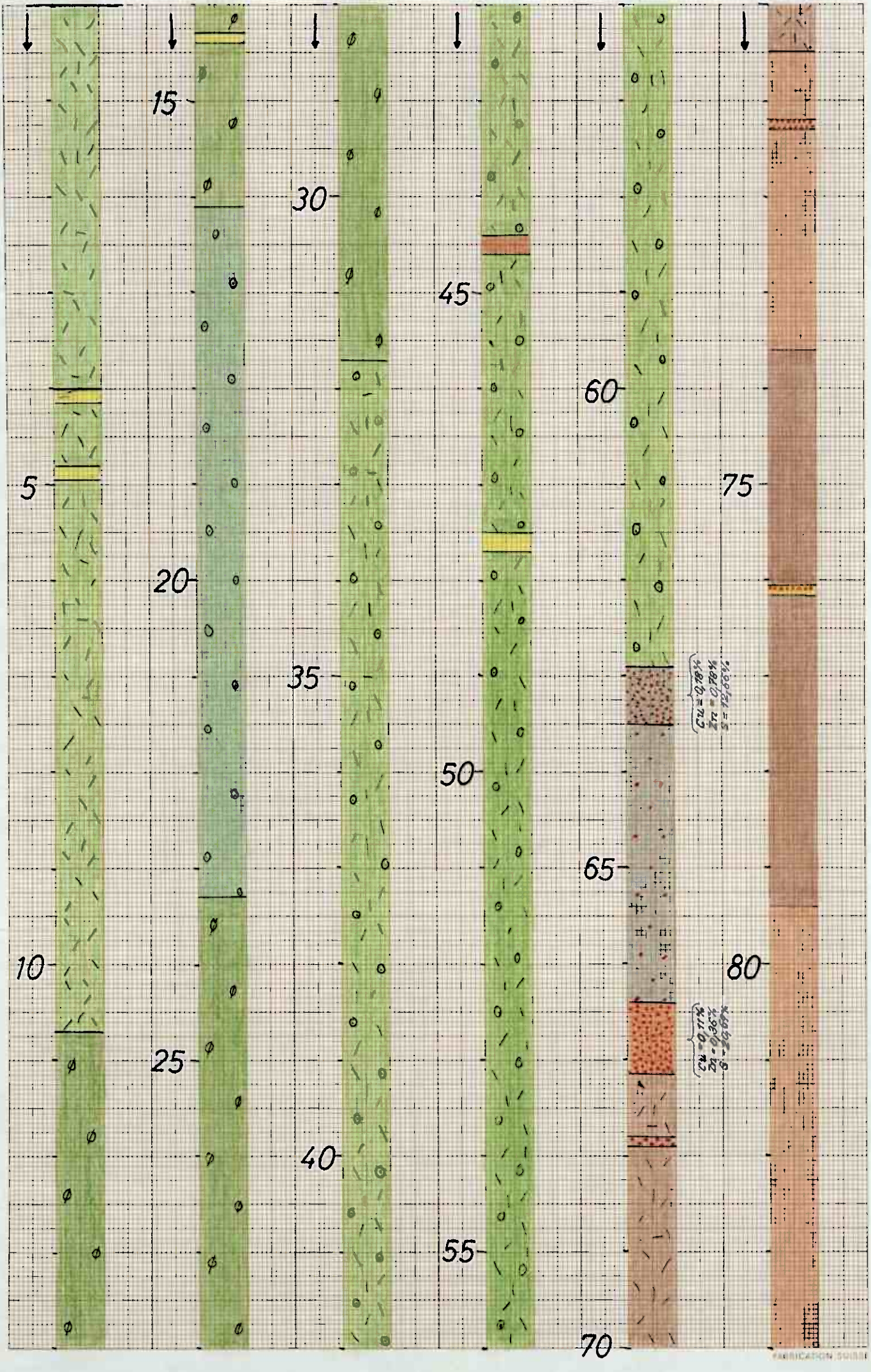
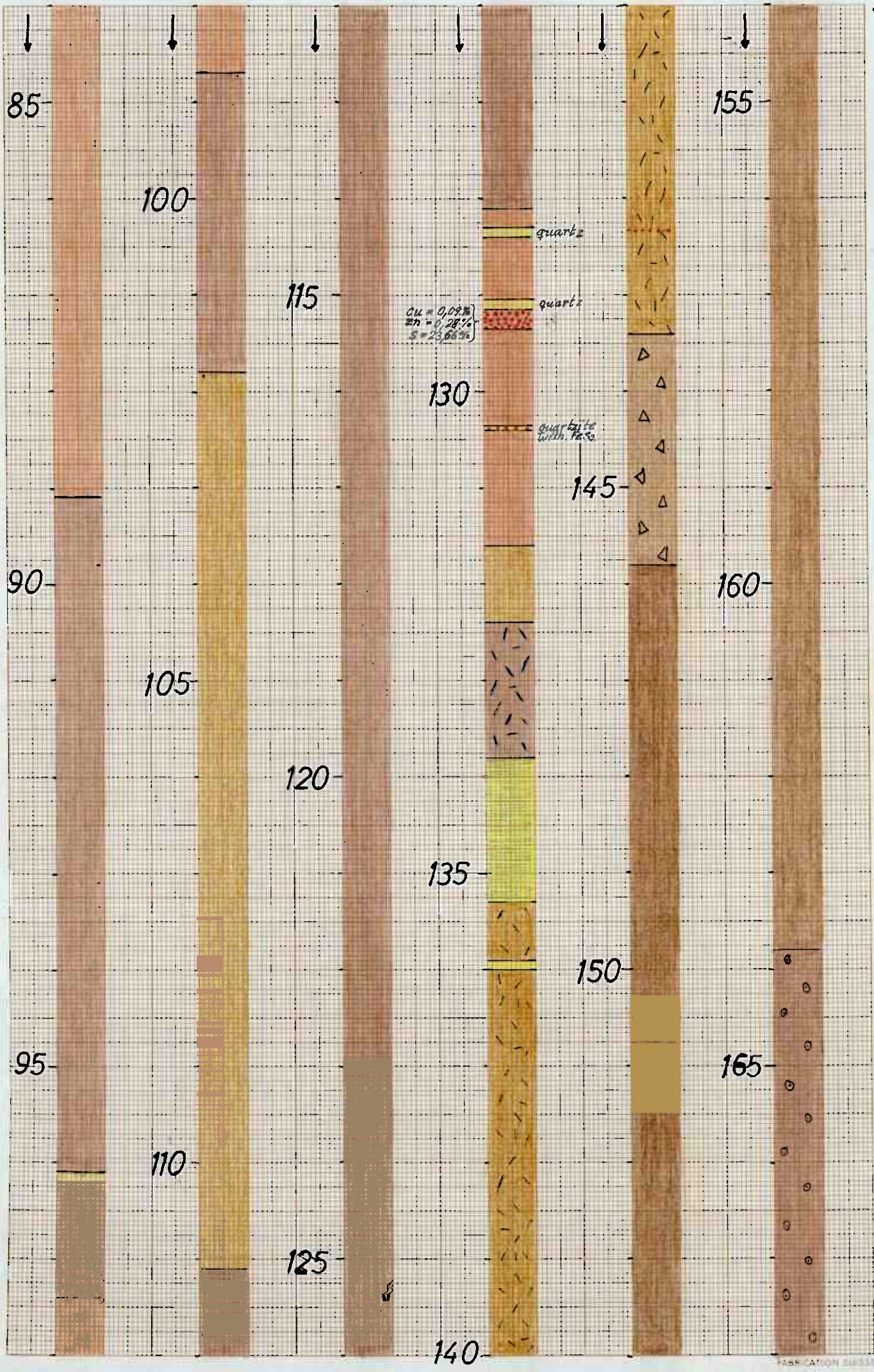


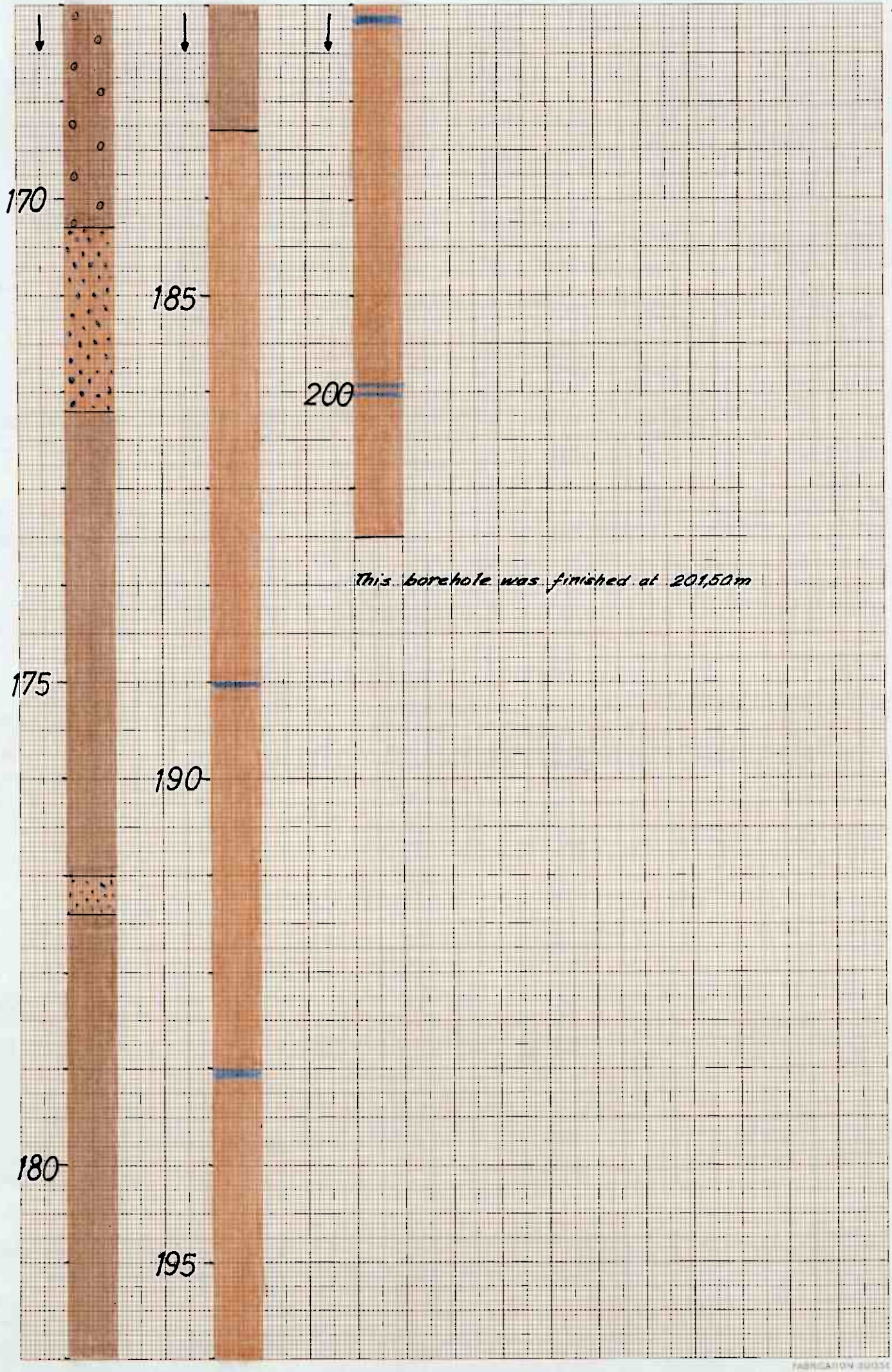
Diagram for avviksmåling for borrhull 63G

THE BOREHOLE NR. 64 G., Tverrfjellet-gruva,
on the level 5th.

The profile of the borehole nr. 64G., Tverrfjellet, the level 5th.




85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
quartz
quartz
Cu = 0,09%
Zn = 0,28%
S = 23,66%
quartzite
with Fe-S



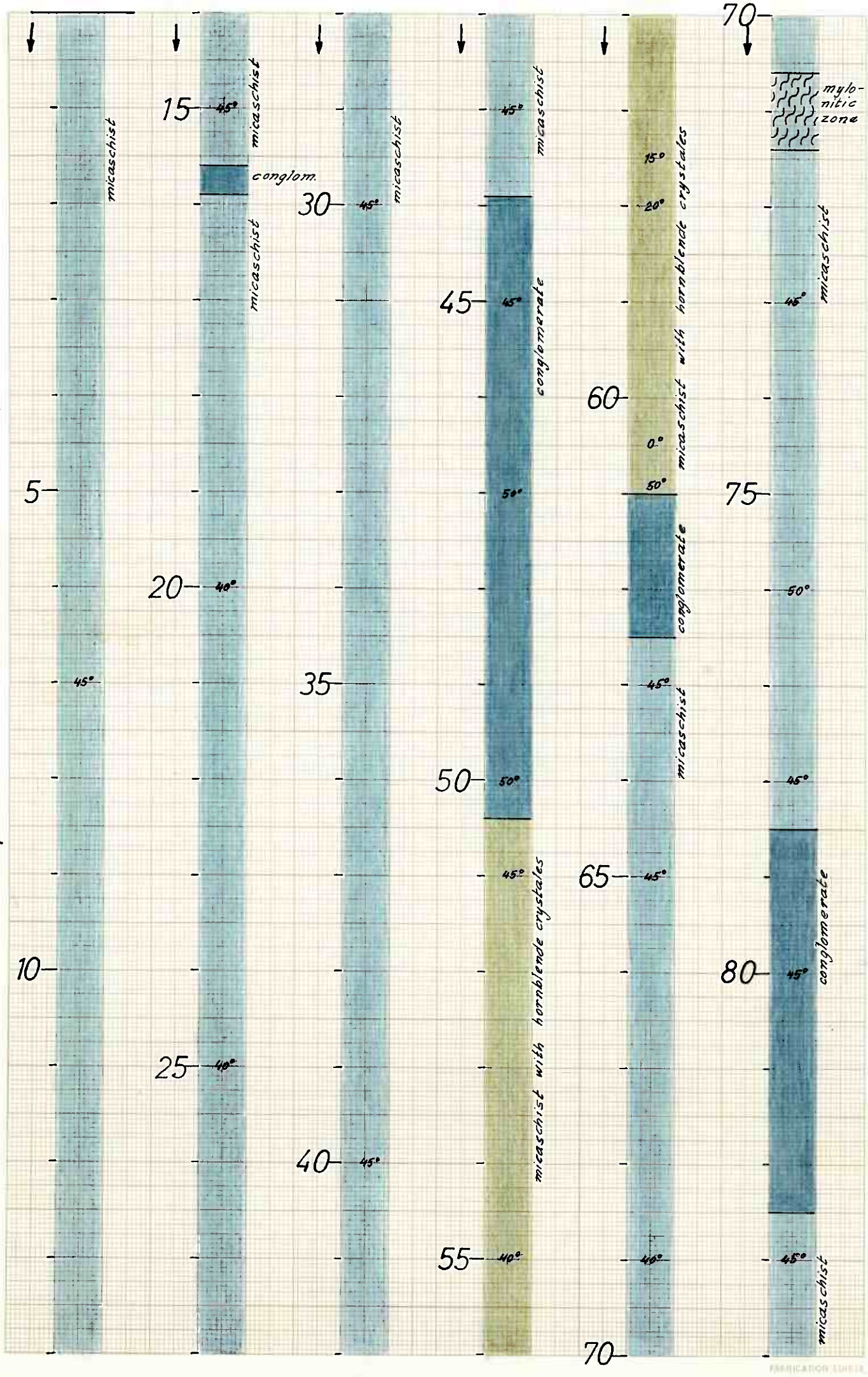
This borehole was finished at 201,50m

THE BOREHOLE NR. 65 G

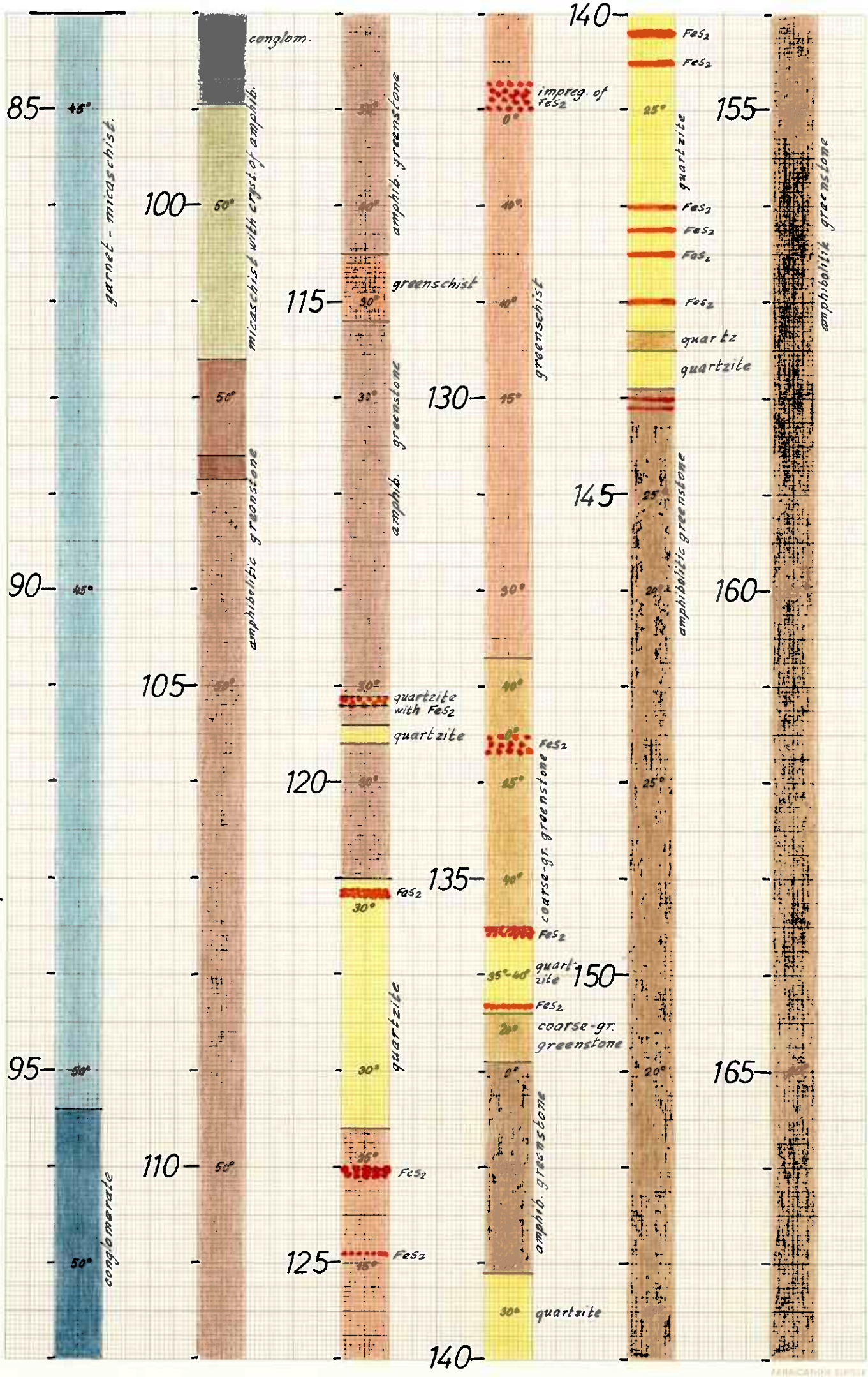
Tverrfjelletgrva

level VI.-crosscut to S.

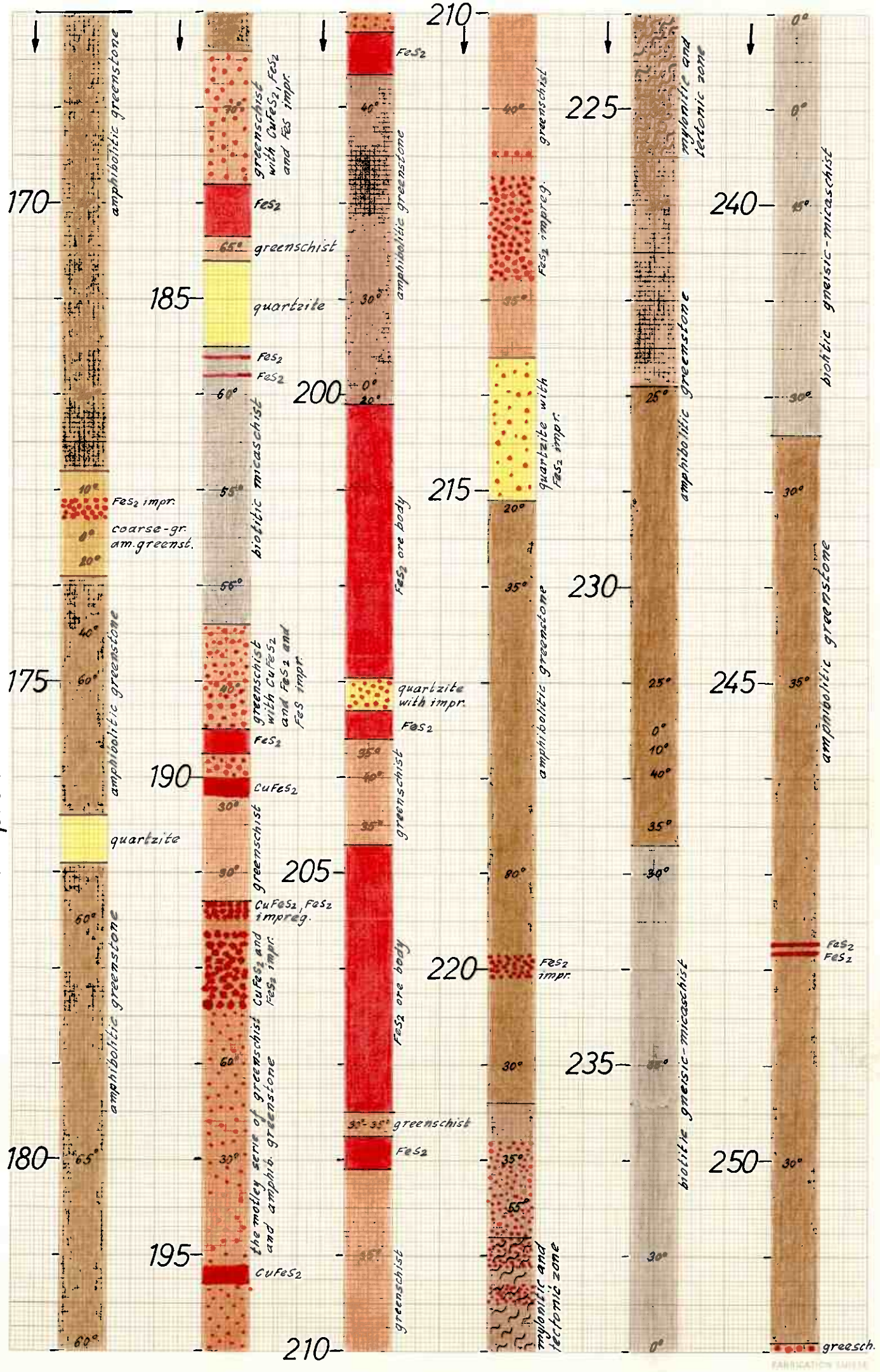
The profile of the borehole nr. 65G

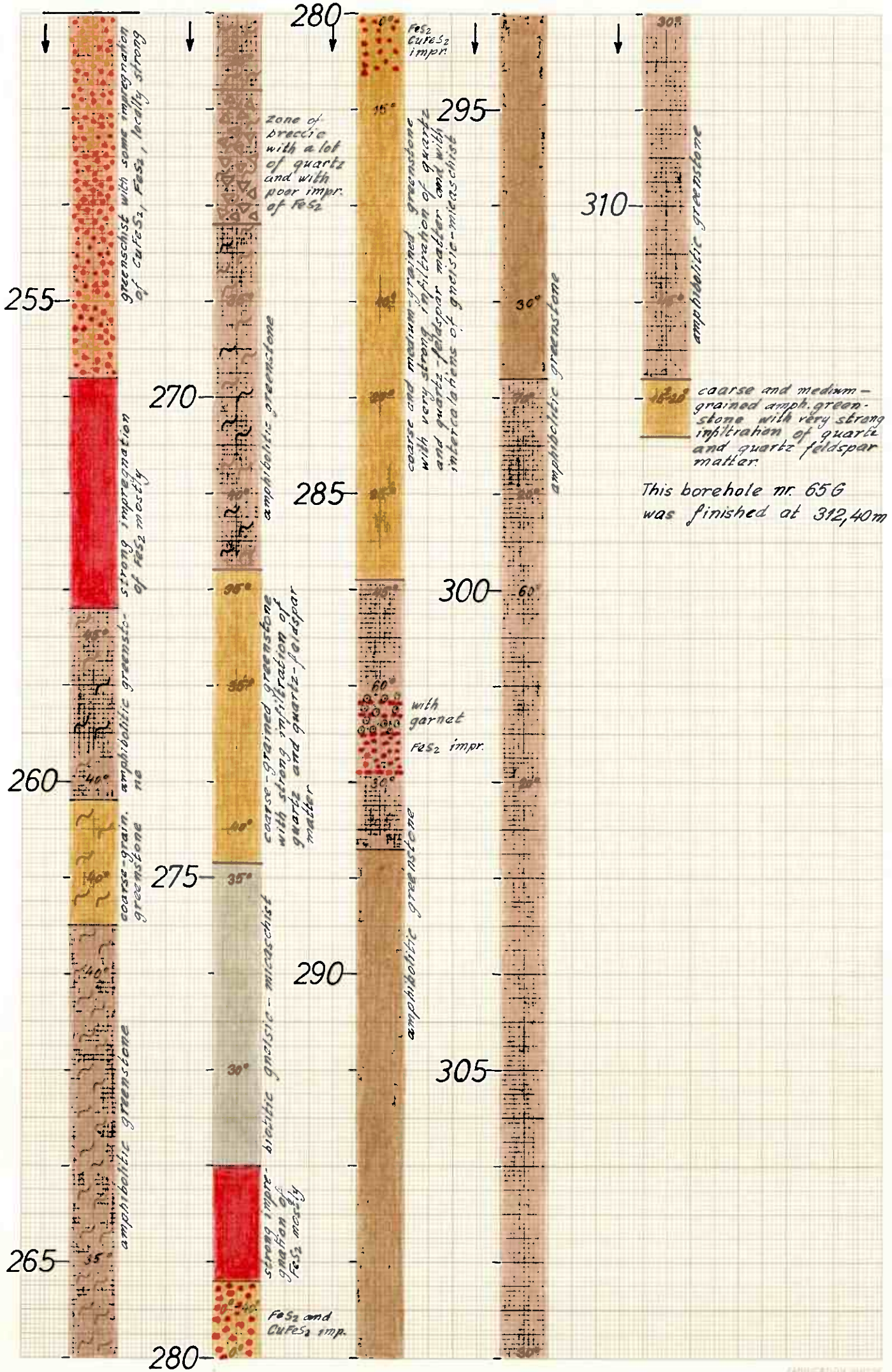


The profile of the borehole nr. 65G



The profile of the borehole nr. 650





This borehole nr. 65G was finished at 312,40m

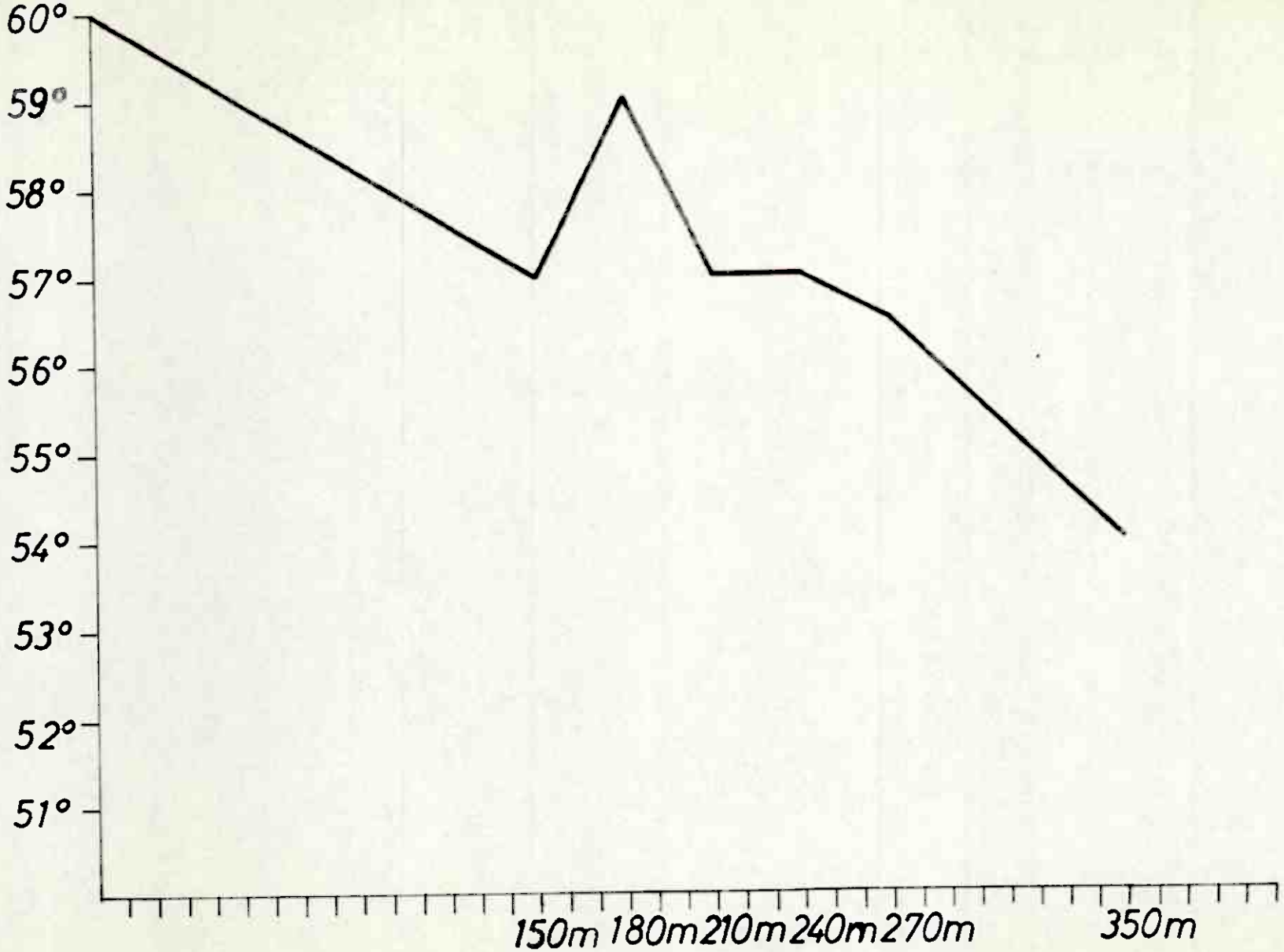
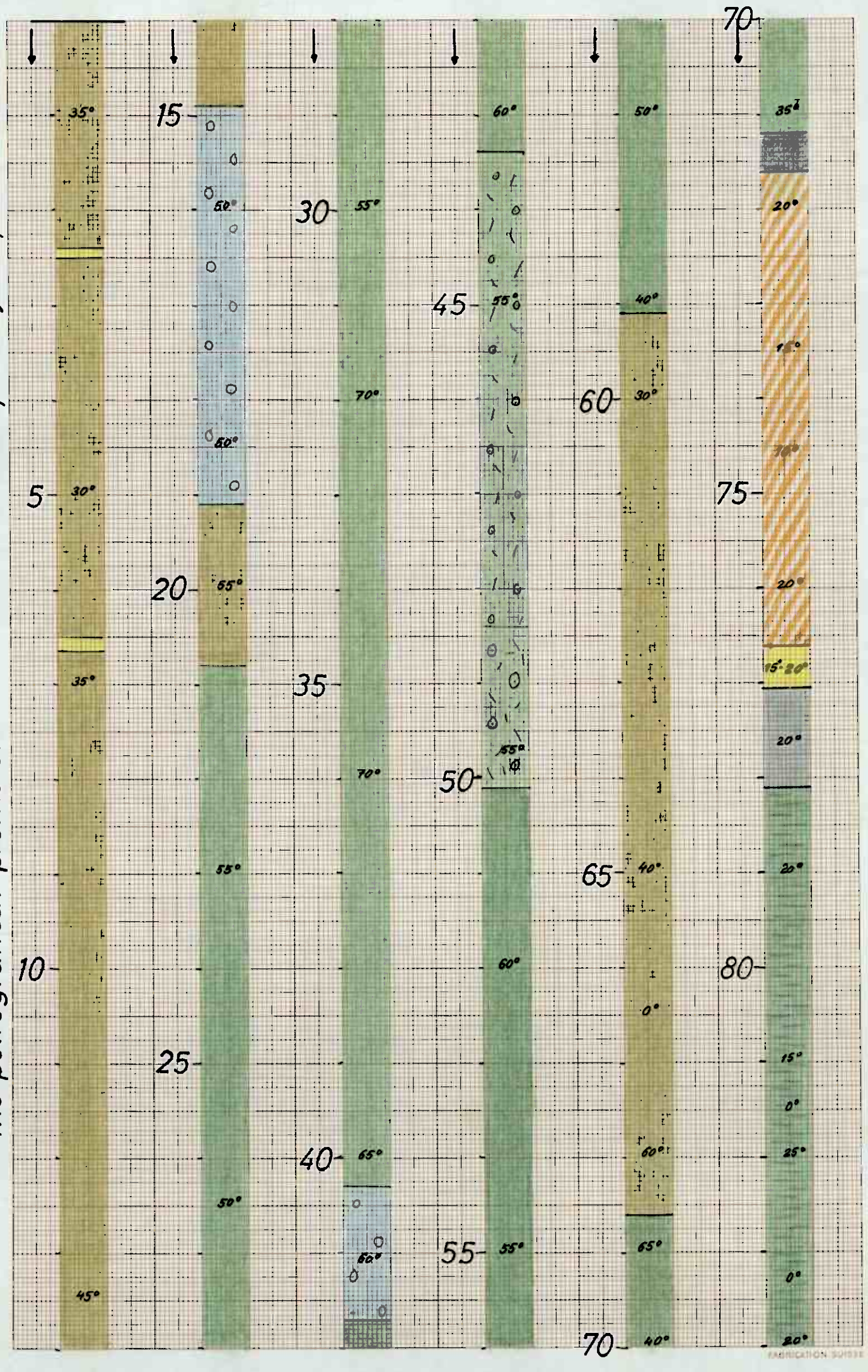
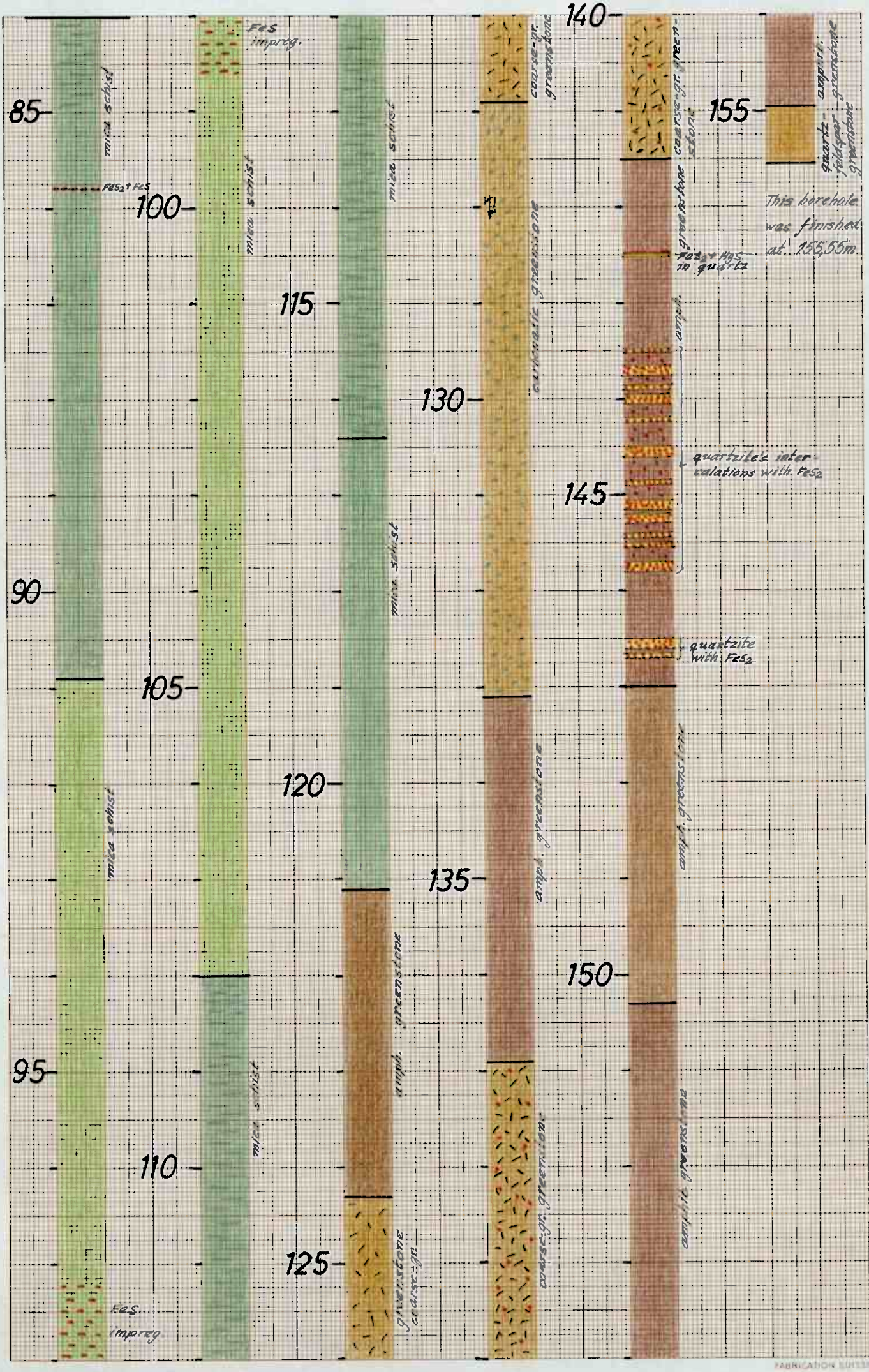


Diagram for avviksmäling for borrhull 65G

THE BOREHOLE NR. 66 G., Tverrfjellet gruva,
on the level 5th-West.

The petrografical profile of the borehole nr. 66G., Tverrfjellet, the level 5th.

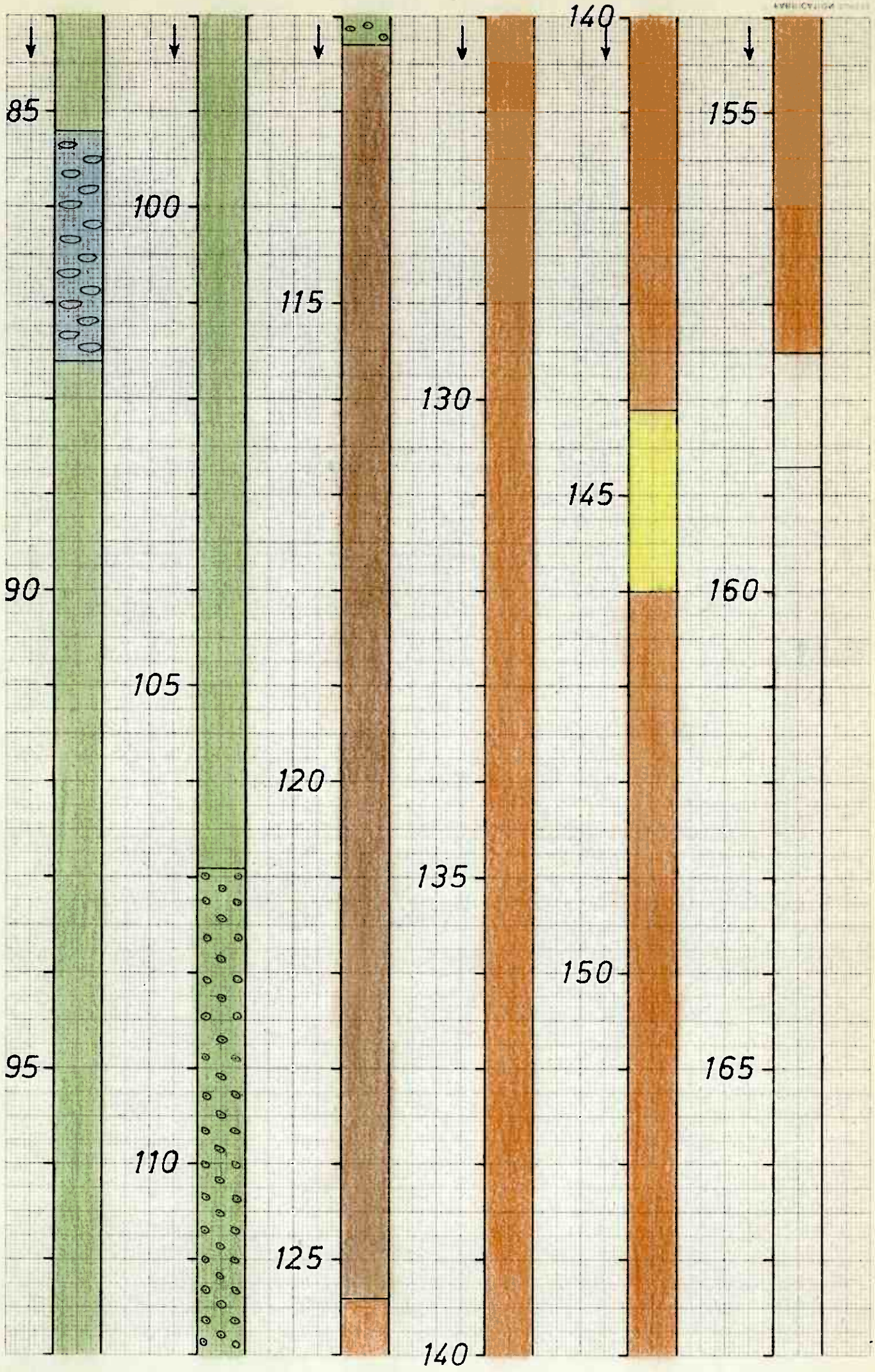



85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
mica schist
FeS2 + FeS
FeS impreg.
mica schist
mica schist
mica schist
mica schist
FeS impreg.
mica schist
mica schist
amphib. greenstone
coarse-gr. greenstone
amphib. greenstone
amphib. greenstone
amphib. greenstone
coarse-gr. greenstone
amphib. greenstone
amphib. greenstone
amphib

BOREHOLE NO. 67 G.

Tverrfjellet mine, level VI:-vest.

The petrografical profile of the borehole nr. **67 G level 6th. Tv.fj.**


85
90
95
100
105
110
115
120
125
130
135
140
140
145
150
155
160
165

67.G

169,80 - 173,00 Hstiny granit amphibolitic greenstone with hornblende crystales and with some micas of biotite and with little irregular intercalations or little veins of quartz locally are present some irregular spots schliers and pellets of quartz or quartzite ~~and~~. The structure is plagioclal schistose or pellmell mostly locally are present some little intercalations of the mylonitic matter and this places commemorate some old tectonic zones

173,00 - 174,50 the tiny granit amphibolitic greenstone as well as 169,80 - 173,00 mts, but with more chlorite and with some more epidote and with not so mated intercalations or lamicles with little bit strong impregnation of ~~as~~ FeS_2 mostly. The average gradient of this foliation 40-45°

174,50 - 179,70 the white gray quartzite with some irregular ~~very~~ very little intercallations or irregulars schliers of mylonitic matter locally. The impregnation of FeS_2 mostly are present, but very weak and poor only. In 179,40 - 179,45 mts are present some irregular schliers and pellets of more strong FeS_2 impregnation, ~~round~~ round with chlorite mostly

179,70 - 189,90 the tiny granit amphibolite greenstone with like as in 169,80-173,00, but somewhere with more big ~~amphibolitic eye~~ rodlice and acicular crystals of hornblende. The average gradient of this foliations is 30 - 35° mostly.

197,90 - 197,50 the motley serie in with are exchanged the positions of the biotite-chlorite gneiss and biotite-epidotic gneiss and tiny granit chlorite-epidotic amphibolite gneiss rock with a lot of irregular intercalations & schlieren and pellets of quarz with some positions of the white-grey gneiss mostly with more strong impregnation of FeS_2 mostly, in example 197,90-192,10 ; 192,15-192,30 from 192,50-197,50 are present the a lot of irregular intercalations & schlieren and pellets of the black-grey mylonitic matter and with more strong impregnation of FeS_2, but locally with $CuFeS_2$ and FeS_2. Some irregular positions are locket compact more with $CuFeS_2$. The total structure is pale-wall mostly. Average gradient of foliation is 40° about.

197,50 - 206,40 The very strong impregnation of FeS_2 mostly in grey or white-grey quartzite

206,40 - 207,25 medium granit and little bit course granit amphibolite-chlorite, in filtrate gneiss rock with a lot of small aciculare crystales of hornblende, but with more quarz and quarz feldspar matter. The total impregnation is very poor only. The average gradient of this foliation is 50-55° about.

207,25-207,60 (ca) 197,50-206,40 mts

207,60-214,90 Motley serie of the infiltrate medium granit and tiny granit amphibolite gneiss rock, locally with more chlorite and epidote but. and with a lot of rodlike aciculare crystales of hornblende wich are locally little bit more long (1cm in average). The quarz and

quartz-feldspate matter is created more dominant matter of this rock. In some places are present thin position of white-gray quartzite with strong or strongly impregnation of FeS_2 mostly (in example 210,20-210,25; 210,55-210,60; 212,70-212,15). The average gradient of this foliation is 35-40° about. The total structure is mostly irregular porphyroblastic and total schistozity is not so clear everywhere.

214,70-220,65 The big grauit amphibolite greenstone with a list of little irregular interchelations, scattered pellets and irregular little tendrils of quartz. The average gradient of foliation is 20-25° about. The total structure is schistose and phacoidal schistose too. In this rock are present the very poor impregnation of FeS_2 and scarce of FeS_2 too.

THE BOREHOLE NR. 68 G., Tverrfjelletgruva,
on the level 5th-West.

THE BOREHOLE NR. 68 G , Tverrfjelletgruva , the level 5th - West

the horizontal borehole,in the begining with the direction N
The petrografical description : V : - 76E

0,00 - 0,60 The conglomerate (position) in the amphibolitic,quartzy garnet mica schist. This conglomerate is created by the rolled pebbles,which are strongly stretched mostly and which are created by quartzite, quartz,keratophyre and scarcely by limestone too. The small rodlike or acicular porphyroblasts of hornblende are mobilisated in some schliers or pellets. The bassement matter creat amphibolitic,quartzy biotitic and little bit chloritic mica schit with not much little grains of garnet. The structure is phacoidal and conglomeratic. The total average colour of this rock is gray and little bit bright gray too.

0,60 - 5,70 The amphibolitic,strongly quartzy,little bit chloritic,biotitic and sericitic mica schist,scarcely with some small grains of garnet too. In the bassement matter are present soda-lime feldspars too enough. The total structure is blastoporphyric with little bit clear only total schistosity or some grain clongation along it. The total average colour of this rock is little bit green bright gray. The total average gradient of this not so clear foliation is 50° about. Some irregular little grain or little flakes of some ore sulphidic minerales are present very scarcely only.

5,70 - 6,30 The metaquartzite or maybe some type of keratophyre rock with a lot of acicular and rodlike porphyroblasts of hornblende(the average grain size is 5mm but 10mm or 15mm maximally too, and very scarcely with some small grains of garnet. The bassement matter is created by quartz and quartzite,but soda-lime feldspars are present very much too in. The structure of this rock is blastoporphyric. The total colour of this rock is bright gray. Some foliation isn't cleat enough. This rock is without ore sulphidic mineralisation.

6,30 - 18,50 The biotitic and strongly quartzy and amphibolitic,little bit sericitic and chloritic mica schist with not much small grains of garnet,irregular mostly only. Hornblende creat a lot of acicular and rodlike porphyroblasts which have the grai size 3-5mm in average, but 10mm maximally too. The structure is blastoporphyric and phacoidal-schistose. The total colour of this rock is gray and locally little bit green gray. The average gradient of this foliation is 50°- - 60° round. Some ore sulphidic mineralisation isn't present.

18,50 - 39,80 The chloritic-biotitic,quartzy garnet mica schist with a lot of small and little acicular and rodlike porphyroblasts of hornblende and scarcely aktinolite too. Garnet creat some small irregular grains mostly and quartz creat a lot of schliers,pellets and spots. The structure of this rock is phacoidal and phacoidal-schistose. The total colour of this rock is little bit geen gray. The average gradient of this foliation is 6 0° about,locally 20°too(35,00m).

39,80 - 47,90 The strongly quartzy,perhaps keratophyre rock with a lot of rodlike and acicular porphyroblasts of hornblende(the grain size is 1cm in average,but locally 1,5cm and more too) and with some big,but mostly irregular and crushed grains of garnet(the grain size is 1cm in average about,but 0,5cm too). In the bassement matter are present very much soda-lime feldspars(albite mostly). Locally are present some little spots of carbonates(dolomite-ancerite?). Some ore sulphidic mineralisation isn't present mostly. The structure of this rock is blastoporphyric and blastoophitic mostly. The total colour of this rock is bright gray. The average gradient of this

rock isn't so clear,but little bit only along some grain elongation is 50° and 60° about and along some thin the chloritic,biotitic garnet mica schist's intercalations.

47,90 - 52,10 The chloritic,biotitic,strongly quartzy mica schist,mostly without some grains of garnet. Quartz cceat a lot of small schliers and pellets. Some ore sulphidic mineralisation isn't present mostly. The structure is phaccidal-schistose and schistose. The total colour of this rock is little bit green bright gray.

52,10 - 60,40 The chloritic-biotitic,quartzy garnet mica schist as well as in 18,50 - 39,80m,but mostly with more big irregular grains of garnet. Some ore sulphidic mineralisation isn't present mostly. The average gradient of this foliation is 60°- 65° round,but locally 40° and 45° about.

60,40 - 62,60 The strongly chloritic,biotitic quartzy mica schist,with a lot of schliers or pellets and spots of quartz and scarcely only with some small rodlike and acicular porphyroblasts of hornblende. Some grains of garnet are present very scarce only. Locally only are present some little irregular grains or some little flakes of FeS_2 and more scarcely of FeS. The structure is phacoidal and phacoidal schistose and locally little bit folded by the flat folds mostly of the CM and MM amplitude. The total colour of this rock is little bit green gray. The average gradient of this foliation is 60°-65° about,but locally 75° and 80° too.

62,60 - 62,65 The bright gray quartzite with some little sciliers of the chloritic mica schist's matter and with little bit strongly impregnation of FeS_2 mostly,but very poor and weak in the total.

62,65 - 63,90 The strongly chloritic,biotitic quartzy mica schist as well as in 60,40 - 62,60m,but with little bit more FeS_2 impregnation,which is in the total very poor and weak too. The average gradient of this foliation is 75°- 80° about.

63,90 - 68,35 The chloritic,biotitic quartzy mica schist,with a lot of schliers and pellets of quartz and quartzite and with some small grains of garnet too. In this rock and especially in the quartzitic intercalations are present some impregnations of FeS_2 mostly,little bit strongly,but poor and weak in the total. The structure is phacoudal schistose and phacoidal locally with some flat folds of the CM amplitude mostly. Between 66,10 - 66,30m are present some irregular schliers and little irregular intercalations of dark gray myllonitic matter. The total colour of this rock is little bit bright green-gray or gray. The average gradient of this foliation is 75° about,but locally 60°- 65° too.
Between 64,15 - 64,18m , 64,35 - 64,50m , 65,10 - 65,35m , 67,00 - - 67,03m , 67,70 - 67,90m and between 68,00 - 68,15m are present some position of bright gray quartzite,locally only with some little schliers of chloritic matter and with strongly impregnation of FeS_2 mostly,but poor in the total.

68,35 - 75,10 The strongly chloritic,hornblende green schist (motley serie),with a lot of acicular and rodlike porphyroblasts of hornblende and with some schliers and pellets of quartz matter and with some irregular grains of FeS_2mostly. The total structure is blastoporphyric-schistose. The total colour of this rock is little bit dark green-gray. The average gradient of this foliation is 35° about. Round 68,50 - 68,60m is present some irregular intercalation of bright gray quartzite,with some small irregular grains of FeS_2 mostly and with the pyritic hem on the borders. The same intercalations of quartzite are present in 69,30 - 69,55m and in 71,35 - 71,50m.

75,10 - 77,70 The medium-grained and little bit coarse-grained,very strongly infiltrated(by quartz - soda-lime feldspar matter) amphibolitic and chloritic greenstone,with not so clear the total schistosity and without clear the total grain elongation too. In this rock are present some small and little irregular grains and flakes of FeS_2 mostly. The structure of this rock is blastoporphyric and blastoophitic too. The total colour of this rock is gray and little bit green gray too.

77,70 - 82,90 The tiny-grained amphibolitic greenstone,with a lot of schliers and little pellets of quartz. Scarcely are present some irregular little grains or flakes of FeS_2 mostly only. The total structure is banded paralel,locally little bit phacoidal schistose. The total colour of this rock is dark green-gray. The average gradient of this foliation is 35^0 about.

82,90 - 85,60 The strongly chloritic,hornblende greenschist with not much little schliers of quartz,with a lot of small and little acicular and rodlike porphyroblasts of hornblende and with some little irregular grains or flakes of FeS_2 mostly. The total strusture of this rock is blastoophitic and blastoporphiric-schistose. The total colour of this rock is green gray and little bit bright green-gray too. The average gradient of this foliation is 45^0 - 50^0 about.

85,60 - 101,60 The tiny-grained amphibolitic greenstone,only locally with some little scliers and intercalations of quartz and locally only with some spots or grains of some carbonates(dolomite-ancerite). The structure of this rock is unstratified,but locally is the banded schistose structure little bit clear too. The total colour of this rock is dark green-gray. The average gradient of this foliation is 55^0 - 60^0 about. Locally are present some little irregular grains or little flakes of FeS_2 mostly only. In 95,70m about is present some vein of white hydrothemal quartz (1,5cm thickness),with some spots and grains of some carbonates(ancerite-dolomite) and with some little irregular and crushed grains of FeS_2.

101,60 - 106,00 The chloritic and amphibolitic,quartzy greenschist,with a lot of small and little acicular and rodlike porphyroblasts of hornblende and,with a lot of little schliers and pellets of quartz,locally with some little spots or little grains of some carbonates (ancerite and dolomite) and ca to 105,00m with a lot of flakes of biotite too. In this rock are present some poor and wery weak impregnation of FeS_2 mostly (some little irregular grains or flakes too). From ca 105,70m this rock remind more the chloritic medium-grained amphibolitic greenstone with strongly infiltration of quartz matter aö with some soda-lime feldspar too. The total structure of this complex of other rock's types is blastoporphyric-schistose. The total colour of this rock is green-gray and dark green-gray too. The average gradient of this foliation of this rock is 80^0 - 85^0 about.

This borehole nr. 68 G was finished at 106,00m.

19.11.1969 M.Motys

FOLLDAL VERK A/S

DRIFTSANALYSER

Tatt 20/11 19 69

Skift:	% Cu	% Zn	% S	% Fe				% H_2O	Sikt	Anmerkning
Rågods, tørt	0,07	0,60	11,55	Fe 68 %		Overfl.	Nivå 5		64,-	Kl 65,35 m.
Cu–konsentrat										
Cu–avgang										
Zn–konsentrat										
Zn–avgang										
S–konsentrat										
S–avgang										
Cu–retur										
Zn-retur										
Cu–tørke										
Zn–tørke										
S–tørke I										
S–tørke II										

Folldal Verk ____ 19____

A. SÆTHER, HAMAR

THE BOREHOLE NR. 69 G., Tverrfjelletgruva,
on the level 5th-West.

TH E BOREHOLE NR. 69 G (on the level 5th - West,Tverrfjelletgruva)

the angle of dip of this borehole is 60°,in the begining and direction

The petrografical description:

N. profil
med sk. 68

0,00 - 2,10 The strongly quartzy hornblende,biotitic and little bit chloritic mica schist,with a lot of schliers of quartz. The amphibolite creat very much small acicular porphyroblasts,which have locally some not so clear the total grain clongation. In this rock is presentthe soda-lime feldspar,strongly enough. The total structure of this rock is blastoporphyric and blastoophitic schistose. The total colour of this rock is bright gray,locally little bit green too. The average gradient of this foliation is 20° about.

2,10 - 5,30 The conglomerate,with the rolled pebbles of quartz or quartzite and scarcely of keratophyre too. The groundmass of this conglomerate is created by the hornblende,chloritic and little bit biotitic,strongly quartzy mica scist,with some small grains of garnet scarce only. The total colour of this rock is little bit green gray and gray. The total rock cleavage is little bit clear only and the average gradient of it is 20°- 25° about.

5,30 - 12,90 The strongly quartzy hornblende,biotitic and little bit chloritic mica schist as well as in o,oo - 2,10m. The average gradient of this foliation is 20° about,but round 12,00m 45° too.

12,90 - 39,20 The strongly quartzy,biotitic and little bit chloritic,hornblende and garnet mica schist. The hornblende creat a lot of rodlike and acicular porphyroblasts and garnet some small irregular grains. The total grain clongation is little bit clear. The structure is blastoporphyric-schistose. The total colour of th is rock is gray, little bit green gray and bright gray too. The average gradient of this foliation is 40° about.

39,20 - 53,20 The sericitic,chloritic and biotitic garnet mica schist,wuth a lot of schliers and pellets of quartz. Locally are present some small rod-like and acicular porphyroblasts of hornblende. The total structure of this rock is phacoidal-schistose and schistose. The total colour of this rock is gray and little bit green gray too. The average gradient of this foliation is 50° - 55° about.

53,20 - 59,00 The conglomerate as well as in 2,10 - 5,30m. The average gradient of this total foliation is 55° about.

59,00 - 98,40 The biotitic,little bit chloritic and sericitic,strongly garnetic mica schist,with some schliers or pellets of quartz. The garnet creat very much small automorphic and little bit hypidiomorphic grains of brown-pink colour mostly. The total structure of this rock is phacoidal-schistose and schistose. The total colour of th is rock is bright green gray and gray. The average gradient of this foliation is 40°about and in 79,00m round 20° about.

98,40 - 105,80 The strongly quartzy rock,withsoda-lime feldspars and wit a lot of small acicular and rodlike porphyroblasts of hornblende and with very much small grains of garnet(hypidiomorphic and crushed too). This rock remind some type of the metakeratophyre-tuphite atc. The structure of this rock is blastoporphyric mostly,with not so clear the total grain clongation. The average colour of this rock is bright gray. In this rock are present some little flakes or another little irregular forms of FeS and of FeS_2,but more scarcely. The average gradient of this foliation (?) is 20°round.

105,80 - 110,80 The strongly quartzy metakeratophyre rock as well as in 98,40 - - 105,80m,but with more big,mostly rodlike,but with acicular porphyroblasts of hornblende and with biger grains(crushed oftenly) of garnet too. The total structure is blastoporphyric,without clear grain clongation,but locally with little bit clear banded structure in the groundmass(quartz-soda-lime feldspar). The prblematic average gradient of this foliation is 50°- 55° about.

110,80 -115,00 The biotitic,chloritic and strongly quartzy mica schist,with some small and little rodlike and acicular porphyroblasts of hornblende too,with soda-lime feldspars,but without garnet mostly. This rock has phacoidal and maculose-schistose structure. The total colour of this rock is little bit green gray and gray. The average gradient of this foliation is 55° about.

115,00 - 117,20 The strongly quartzy metakeratophyre rock as wellas in 105,80 - - 110,80m. The total average gradient of this problematic foliation is 35° about.

117,20 - 131,30 The biotitic and chloritic,little bit sericitic,quartzy and garnet mica schist,with a lot of little schliers and pellets of quartz matter. The grains of garnet are little bit biger and idiomorphic and hypidiomorphic,crushed too. This rock has phacoidal-schistose structure,locally with some flat folds of the DM and CM amplitude. The total colour of this rock is little bit green gray. The average gradient of this foliation of this rock is 20° and 25° about.

131,30 - 138,50 The strongly quartzy,sericitic and chloritic,little bit biotitic mica schist,but without garnet mostly,with a lot of schliers, pellets and intercalations of quartz matter and with some mineralisation of FeS(pyrhotine) mostly,which creat very much little irregular flakes or irregular small schliers and pellets and the other irregular forms. This FeS forms clongate mostly by the total schistosity. The total structure of this rock is phacoidal-schistose and maculose-schistose too. The total average colour of this rock is gray and little bit bright gray too. The average gradient of this foliation is 15°- 20° about,but locally 0° and 30° too. This rock is strongly folded,but by the flat folds only,of the DM and locally CM amplitude.

138,50 - 147,40 The quartzy,chloritic,sericitic and biotitic mica schist as well as in 131,30 - 138,50m,but with some little flakes of FeS scarce only,and locally with some little rodlike and acicular porphyroblasts of hornblende. The total structure is phaccidal schistose. The average gradient of this foliation is 25°- 30° about,but round 139,00 - 139,50m is 0° about only.
Between 145,55 - 145,75m is present some position (irregular) of quartzite,with some little flakes,schliers and with the some local network of little veins of FeS mostly only.

147,40 - 151,50 The strongly quartzy hornblende and chloritic mica schist,with not much sericite and biotite too andwith a lot of schlier and intercalations of quartz or quartzitic matter. In this rock are present some positiojsof very strong impregnation,locally of FeS mostly only and locally of FeS_2 wit little bit FeS too. These positions' average thickness are 1 - 1,5cm maximally only. FeS creat some little irregular forms or little flakes too and FeS_2,which is present scarcely,creat some irregular grains mostly. In the total scale is this impregnation poor and weak only. The total structure of this rock is parallel and phaccidal schistose,locally folded by the flat folds of the DM amplitude. The total colour of this rock is gray and little bit bright gray too. The average gradient of this foliation is 10°- 15° and round 150,00 - 151,00m 0° only.

Between 150,40 - 150,90m is present some position of little bit chloritic and sericitic quartzite,with some schlierc and intercalations of the strongly quartzy hornblende,chloritic mica schists and locally only with some little flakes or another irregular forms of FeS mostly and FeS_2 scarcely only.

151,50 - 152,00 The little bit chloritic and sericitic quartzite,with little bit clear the total banded structure and with some little flakes or irregular forms of FeS mostly and of FeS_2 scarcely only. Scarce only are present some little bit biger irregular forms of FeS mostly. The total colour of this rock is bright gray and gray. The average gradient of this the banded structure is 20° about and locally is this rock folded by the folds of the DM and CM amplitude.

152,00 - 155,80 The quartzy,chloritic and little bit biotitic mica schist with some little rodlike and acicular porphyroblasts of hornblende and with a lot of schliers and pellets of quartz matter. The soda-lime feldspar and some carbonates are present too. Scarcely are present some little irregular forms or little flakes of FeS_2 and FeS too. The structure of this rock is phaccidal and maculose-schistose. The total colour of this rock is little bit green gray. The average gradient of this foliation is 20°and 25° about,but round 154,50 - 155,00m is 0° too. This rock is locally folded by the flat folds of the the folds of the DM amplitude.
Between 155,10 - 155,30m is present some old myllonitic zone with a lot of irregular schliers and intercalations of the dark myllonitic matter.

155,80 - The quartzy,amphibolitic green schist,locally with some intercalations of amphibolitic greenstone. The chlorite and scarcely sericite are present too. The hornblende creat some little rodlike and acicular porphyroblasts. In this rock are present a lot of schliers,pellets of quartz and some spots or grains of soda-lime feldspar and of some carbonates(dolomite-ancerite) too. Some very poor and weak impregnation of little flakes and of another irregular forms of FeS and FeS_2 too is present too in this rock. The total structure is maculose-schistose and phaccidal schistose too. The total colour of this rock is green gray and gray. The average gradient of this foliation is 15°- 20° about,but round 162,00 - - 163,00m is 40°- 45° about.
Between 162,20 - 162,60m is present the position of the amphibolitic-chloritic green schist with very strong infiltration of the quartz feldspar matter,with biger(coarse grain) acicular and more rodlike porphyroblasts of hornblende. In this position are present much more little flakes or another irregular forms of FeS and FeS_2.

THE BOREHOLE NR. 71 G,
Tverrfjellet mine, level V

THE BOREHOLE NO. 71 G, Tverrfjellet mine, level V, west X = + 15,5, Y = + 767,4 (horizontal to south-east.

The brief petrografical description.

0,00 - 5,80	The strongly chloritic, biotitic and quartzy garnet mica schist with s phacoidal schistose structure. The average gradient of this foliation is 55° - 60° about.
5,80 - 5,95	The biotitic and sericitic very strongly quartzy mica schist with sheeting structure. The average gradient of this foliation is 80° around.
5,95 - 7,95	The strongly chloritic, biotitic and quartzy garnet mica schist as well as in 0,00 - 5,80 m. The average gradient of this foliation is 55° around.
7,95 - 8,60	The strongly quartzy biotitic and little bit chloritic and sericitic garnet mica schist with a lot of rodlike acicular porphyroblasts of hornblende, without some grain clongation in generally. The structure is massive-sheeting and the texture is blastoporphyric.
8,60 - 15,20	A conglomerate in a quartzy chloritic, sericitic garnet mica schist with some small rodlike and acicular porphyroblasts of hornblende. The rolled pebbles are created by quartzite mostly and by meta-ceratophyre too.
15,20 - 17,90	The quartzy, biotitic and little bit chloritic and sericitic garnet mica schist with a phacoidal schistose structure. The average gradient of this foliation is 55° around.
17,90 - 23,40	A conglomerate as well as in 8,60 - 15,20 m. Between 21,00 - 23,00 m is present some tectonic and myllonitic zone.
23,40 - 27,90	The myllonitic and tectoni zone in the quartzy, biotitic and chloritic garnet mica schist. Between 26,70 - 26,95 m is present a hydrothermal barren quartz.
27,90 - 88,40	The quartzy, chloritic and biotitic garnet mica schist with a phacoidal schistose structure. Between 42,60 - 42,80 m is present the quartzy myllonitic, tectonic barren breccie. Between 75,80 - 76,20 m is present a position of a hydrothermal barren quartzy breccie too.

88.40 - 89,60	The quartzy, biotitic and little bit chloritic and sericitic garnet mica schist with a lot of transversal or oblique joints which are filled by barren hydrothermal quartz.
89,60 - 98,90	The biotitic, chloritic and little bit serisitic garnet mica schist with a phacoidal schistose and schistose structure. The average gradient of this foliation is 45° - 50° about.
98,90 - 103,50	The strongly chloritic, little bit sericitic and little bit biotitic garnet mica schist with a lot os small and bigger rodlike and acicular porphyroblasts of hornblende (without some clear grain glongation). The grains of garnet (bright pink) are mostly little bit bigger too (2-3 mm in average). The structure is sheeting and the texture is blastoporphyric. The average gradient of this foliation is 45° - 50° around.
103,50 - 112,10	The biotitic, chlorititic and little bit sericitic garnet mica schist with schistose and a phacoidal schistose structure. The very much grains of garnet are more small (the size in average is 1-2 mm maximally). The average gradient of this foliation is 50° around.
112,10 - 115,50	The chloritic little bit sericitic and biotitic garnet mica schist with a lot of small and little acicular and rodlike porphyroblasts of hornblende. The structure is sheeting and the texture is blastoophitic and blastoporphyric. The average gradient of this foliation is 50° - 55° around.
115,50 - 117,30	The strongly quartzy biotitic and little bit chloritic and little bit sericitic mica schist, but without garnet. Some flakes of biotite are transversal too. The structure is phacoidal-schistose, but locally fluidal or rope too. The average gradient of this foliation is 65° - 70° about.
117,30 - 124,90	The strongly chloritic, sericitic and biotitic little bit fyllitic mica schist with sheeting and schistose structure. The average gradient of this foliation is 70° - 75° about.
124,90 - 139,50	The biotitic and little bit sericitic and little bit chlorititic quartzitic rock, which has thin-banking structure. Little positions or intercalations of quartzite (with some little flakes of biotite) have between some very thin little intercalations, little bit irregular too, of a sericitic

and biotitic and little bit chlorititic schist (mica schist). This rock has in generally a flysch character. This thin banking structure is folded locally by the folds of a cm and dm amplitude. The average gradient of this foliation is 55° - 60° about.
Between 129,90 - 131,30 m is present a tectonic breccie which has a cement matrix created by white barren hydrothermal quartz.

139,50 - 182,10 The sericitic quartzite, with some chloritic substance too. The structure is massive in generally, but phavoidal or pell-mell and phacoidal schistose in detail, with little schliers or irregular intercalations of sericitic and little bit chloritic matrix. The average gradient of this foliation is 60° - 70° around. Between 158,70 - 158,90 m is present a position of a white barren hydrothermal quartz.

182,10 - 256,95 The sericitic and little bit chloritic flysch serie of quartzite, locally with some flakes of biotite too, as well as in 124,90 - 139,50 m. Between 189,10 - 212,20 m and between 250,50 - 256,60 m are present a positions of quartzite, like in 139,50 - 182,10 m. The average gradient of the foliation from this serie is 60° - 65° about, but locally 50° around too.

This borehole 71 G was stopped at 256,95 m on February 27th 1970, at 13.oo p.m.

March 5th 1970.

(M. Motys).

THE BOREHOLE NR. 72 G.

Tverrfjellet mine, sublevel

THE BOREHOLE NO. 72 G, Tverrfjellet mine, sublevel X = - 25,1, Y = + 335,0. (horizontal to north-west.)

The brief petrografical description.

0,00 - 0,70	The quartzy, sericitic and biotitic mica schist, with a lot of schliers, irregular intercalations and pellets of quartz and of quartz-feldspatic matrice locally too. The hornblende creats some small and little acicular or rodlike porphyroblasts, which have clear grain-clongation parallel with the total schistose. Some flakes or allotriomorphic grains or amorphic forms, which are present locally only are created by FeS_2 mostly and FeS too. The structure is phacoidal schistose and fluidal too. The average gradient of this foliation is 60° - 65° about.
0,70 - 1,60	The quartzite little bit sericitic and little bit chloritic too, with a massive or little bit sheeting structure. Some little hypidiomorphic and allotriomorphic grains of FeS_2 mostly are locally only present too.
1,60 - 2,90	The sericitic, chloritic and quartzy mica schist, with some little flakes of biotite locally and scarcely only and with a lot of schliers, spots, pellets of a quartz and quartz-feldspatic matrice. The structure is phacoidal-schistose and locally maculose. The average gradient of this foliation is 50° about.
2,90 - 5,20	The tectonic quartzy breccie with a cement matrice, which is created by hydrothermal barren quartz. Some inclusions are created by chloritic and chloritic-sericitic and biotitic mica schist.
5,20 - 10,90	The chloritic and sericitic mica schist with a lot of spots idioblasts of soda-lime feldspars and of quartz too. Very scarcely is present some little flakes of biotite, locally only. The structure is phacoidal-schistose, fluidial-schistose and little bit maculose too. The average gradient of this foliation is 65° - 70° about, but locally 45° - 50° around too. Between 8,00 - 8,30 m is present a position of the little bit chloritic and sericitic mataquartzite with some very little allotriomorphic and hypidiomorphic grains of FeS_2 mostly.

10,20 - 15,30	The motley serie of a coarse-grained amphibolitic greenstone, which is strongly infiltrated by a quartz and quartz-feldspatic matrice, with a lot of bigger and big rodlike and acicular porphyroblasts of hornblende, locally with some schliers or chambers in which is acumulated flakes of biotite and locally with some positions of metaquartzite, together with very poor impregnation of FeS_2 mostly. Some amorphic forms, flakes of FeS or some allotriomorphic grains or amorphic forms of FeS_2 are present in this motley serie locally too. The structure is pell-mell and maculose and compact too. Between 13,50 - 13,90 m is present a position of metaquartzite with poor impregnation of FeS_2 mostly.
15,30 - 22,10	The medium-grained, locally little bit coarse-grained amphibolitic greenstone, strongly infiltrated by quartz-feldspatic matrice, with a lot of small and locally bigger acicular and rodlike porphyroblasts of hornblende, without some a total grain clongation. The structure is massive and shetting. The texture is blastoporphyric and blastoophitic. Between 16,30 - 17,20 m is present a chloritic, amphibolitic coarse and medium-grained greenstone with some idioblasts and spots of soda-lime feldspars. Between 17,20 - 18,10 m is present a tiny-grained amphibolitic greenstone, together with some idioblasts of soda-lime feldspars locally only.
22,10 - 27,30	The medium-grained, feldspatic, chloritic amphibolitic greenstone, with small rodlike and acicular porphyroblasts of hornblende, with a lot of idioblasts of soda-lime feldspars and with a very fine-grained chloritic-amphibolitic groundmass. The structure is massive-maculose and little bit sheeting. The texture is blastoporphyric and blastoophitic. Some grains, allotriomorphic or flakes of FeS_2 are locally present too.
27,30 - 29,20	The biotitic, chloritic and sericitic, quartzy mica schist with some little crushed porphyroblasts acicular or rodlike of hornblende and with some schliers, lenticles of quartz matrix. The structure is phacoidal schistose. The average gradient of this foliation is 65° about.
29,20 - 30,40	The biotitic metaquartzite locally only with some little chambers of a chloritic matrix. The structure is massive and little bit sheeting. Locally only are present some very little allotriomorphic grains of FeS_2 mostly only.

30,40 - 31,90	The biotitic and chloritic and little bit sericitic gneiss or gneissic schist with a augen structure, with a lot of idioblasts of soda-lime feldspars. The texture is blastoporphyric. The average gradient of this foliation is 55° about.
31,90 - 32,50	The chloritic and sericitic mica schist with some little acicular and rodlike porphyroblasts of hornblende and with some little flakes of biotite and with some little idioblasts of soda-lime feldspars. The structure is phacoidal or maculose-schistose. The average gradient of this foliation is 60° about.
32,50 - 35,40	The chloritic and sericitic quartzy mica as well as in 5,20 - 10,90 m. The average gradient of this foliation is 70° - 75° about.
35,40 - 35,60	The chloritic and myllonitic metaquartzite with some little amorphic forms or little flakes of FeS and with some irregular schliers of a dark myllonitic matrix.
35,60 - 37,35	The strongly chloritic and amphibolitic greenschist with some flakes of biotite too. In this rock are present a lot of schliers or intercalations of quartzite. Some ore sulphides are present very scarce only. The structure is phacoidal schistose. The average gradient of this foliation is 70° - 75° around. Between 37,15 - 37,25 m is present a position of a gray barren quartzite.
37,35 - 37,50	The gray quartzite with some little schliers or spots, which are created bye some allotriomorphic fine-grains of FeS_2 mostly and with some flakes of FeS together. The structure is massive and shetting.
37,50 - 38,00	The strongly quartzy, chloritic, sericitic and little bit biotitic and amphibolitic green mica schist, with not much acicular and rodlike little porphyroblasts of hornblende. Some ore sulphides are present scarcely only. The structure is phacoidal schistose and a texture is blastoporphyric. The average gradient of this foliation is 70° about.
38,00 - 40,00	The gray metaquartzite with some poor impregnation of FeS_2, FeS and scarce of $CuFeS_2$ and Zn S. Between 38,00 - 38,20 m is present the position of the very strong impregnation of FeS_2 mostly with massive structure. Between 39,10 - 39,60 m are present some little schliers, which are

created by very fine-grained FeO + Fe_2O_3 together with some spot or amorphic forms of FeS, oftenly with $CuFeS_2$ (some little amorphic forms too). The total structure is massive and locally only sheeting. The result of the chemical analyses from this position are:

37,15 - 38,00 m is: Cu 0,07 %, Zn 0,10 %, S 2,50 %.
38,00 - 38,20 m is: Cu 0,06 %, Zn 0,25 %, S 28,00 %
38,20 - 40,00 m is: Cu 0,08 %, Zn 0,10 %, S 4,00 %

40,00 - 40,60 The motley serie of the coarse-grained amphibolitic greenstone, locally little bit more infiltrated by quartz-feldspatic matrice. The structure is massive and the texture is blastoporphyric. Some ore sulphides (FeS_2 or FeS) are present scarce only.

40,60 - 45,50 The motley serie of the chloritic and biotitic amphibolitic greenschist and green-micaschists with some intercalations of medium-grained or little bit coarse-grained amphibolitic greenstones, which are oftenly infiltrated by quartz-feldspatic matrice. In 42,85 m about are present some schliers (0,5 cm thickness) of little bit strong impregnation of FeS_2 mostly with FeS too. Between 43,70 - 44,05 m is present a position of quartzite with some poor impregnation of FeS_2 mostly with some schliers of little bit more strong impregnation of FeS_2 with some FeS too (compact impregnation 3-4 cm is situated between 43,85 - 43,90 m about). The total structure of this motley serie is sheeting, phacoidal-schistose and schistose. The texture is blastoporphyric and blastoophitic. The average gradient of this foliation is 70° about, but locally 80° around too.

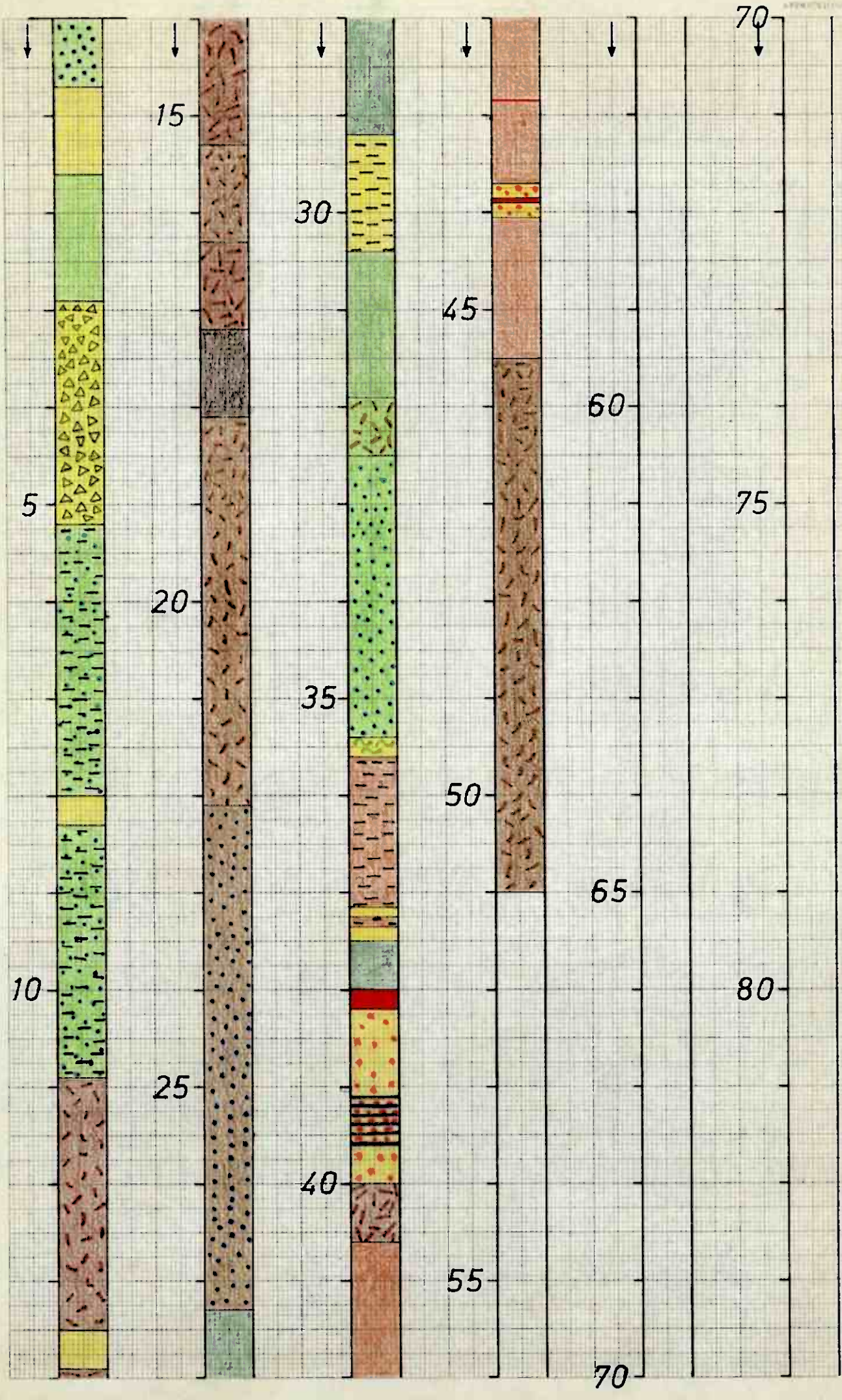
45,50 - 51,00 The medium-grained, locally little bit coarse-grained feldspatic, amphibolitic greenstone, with a lot of rodlike and acicular porphyroblasts of hornblende, strongly infiltrated by quartz-feldspatic matrice. The structure is massive and locally little bit sheeting. The texture is blastoporphyric and blastoophitic. Locally are present some allotriomorphic grains of FeS_2.

This borehole no. 72 G was stopped on February 9th 1970 at 8.00 p.m.

February 12th 1970.

(Milosh Motys).

The petrografical profile of the borehole nr.72G., Tverrfjellet



THE BOREHOLE NR. 72aG.
Tverrfjellet mine, sublevel

THE BOREHOLE NO. 72 aG, Tverrfjellet mine, sublevel X = 25,0
Y = + 336,0 (horizontal to north-west

The brief petrografical description.

0,00 - 0,90	The quartzy, chloritic, sericitic and biotitic mica schist with a lot of schliers irregular intercalations, pellets of quartz and locally of quartz feldspatic matrix and with very much little acicular and rodlike porphyroblasts of hornblende. Some flakes or allotriomorphic grains or amorphic forms of FeS_2 or scarcely of FeS are present locally too. The structure is phacoidal schistose and fluidial. The average gradient of this foliation is 60° - 65° about.
0,90 - 1,30	A sencitic and chloritic quartzite with massive and little bit sheeting structure. Some little hypidiomorphic grains are present scarcely and locally only.
1,30 - 1,60	The quartzy tectonic breccie with the cement matrix, created by hydrothermal barren quartz. Some another incluzions are created by chloritic and sericitic, quartzy mica schist.
1,60 - 6,10	The chloritic, sericitic, quartzy micaschist locally and scarcely mostly with some little flakes of biotite, with some schliers, pellets and spots of quartz or quartz-feldspatic matrice too. The structure is phacoidal schistose and fluidial too. The average gradient of this foliation is 45° around.
6,10 - 9,80	The quartzy breccie as well as in 1,30 - 1,60 m.
9,80 - 10,75	The bright green gray hydrometakeratophyre with a lot of acicular and rodlike porphyroblasts of hornblende and with the chloritic and little bit sericitic substance. Very much spots and pellets and corones around the porphyroblasts of hornblende are created by soda-lime feldspars. The structure is massive and locally maculose with little bit clear the total grain clongation (hornblende).
10,75 - 12,90	The quartzy, chloritic and sericitic and biotitic mica schist with a lot of spots, little schliers and pellets which are created by soda-lime feldspar and by quartz or quartz-feldspatic matrice too. The structure is maculose, phacoidal schistose

and sheeting too. The average gradient of this foliation is 70° - 75° about. In 12,20 m about is present some mineralisation of FeS and little bit FeS_2 in the three schliers (0,5 cm thickness maximally) together with some little bit bigger and small porphyroblasts of hornblende.

12,90 - 14,00 The bright gray quartzite locally with chloritic substance and locally only with some very little allotriomorphic and hypidiomorphic grains of FeS_2 or little flakes of FeS. The structure is massive.

14,00 - 15,90 The zoisite-epidotic and feldspatic amphibolitic greensone, with some small and locally with bigger rodlike and acicular porphyroblasts of hornblende and locally with some flakes of biotite too. Locally is this greensone chloritic and amphibolitic only. Some spots, little schliers and a filling of joints are created by quartz or quartz-feldspatic matrice. Some allotriomorphic grains or flakes of FeS_2 or FeS are present locally too onlu. The structure is massive and the texture is blastoporphyric and blastoophitic too.

15,90 - 17,20 The tiny-grained amphibolitic greenstone, locally only with some little spots (idioblasts) of soda-lime feldspars. Some little allotriomorphic grains or little flakes of FeS_2 mostly are present too. The structure is massive and sheeting.

17,20 - 18,70 The chloritic, sericitic and biotitic greem mica schist with schliers and pellets of quartz and quartz-feldspatic matrix. Locally are present some positions or schliers of qmartzite with very poor impregnation of FeS_2 oftenly. Some schliers locally are created by very strong concentration of biotitic flakes, transversal too. The structure is phacoidal schistose. The average gradient of this foliation is 65° - 70° about.

18,70 - 19,50 The strongly chloritic, sericitic, locally zoisite-epidotic and amphibolitic greenstone schist, with not much flakes of biotite locally and with a lot of spots, idioblasts of soda-lime feldspar and with a lot of rodlike and acicular porphyroblasts of hornblende. Locally are present some allotriomorphic grains or flakes of FeS_2 mostly. The structure is sheeting. The texture is blastoporphyric and blastoophitic. The average gradient of this foliation is 70° around.

19,50 - 25,90	The tiny-grained amphibolitic greenstone as well as in 15,90 - 17,20 m.
25,90 - 26,90	The medium-grained and locally coarse-grained amphibolitic greenstone with a lot of small and little bit bigger acicular and rodlike porphyroblasts of hornblende, without some clear grain clongation. Some little idioblasts, spots of soda-lime feldspar are present too. The structure is massive and the texture is blastoophitic and blastoporphyric.
26,90 - 27,20	The tectonic breccie with cement matrice, created by barren hydrothermal quartz. The inclusions are created by amphibolitic greenstone and by biotitic and chloritic greenschist. The biotite's flakes are mobli-sated to schliers or to chambers. Some inclusions are created by quartzite with very poor impregnation of FeS_2 or FeS too.
27,20 - 28,40	The biotitic and chloritic augen or maculose gneiss with idioblasts of soda-lime feldspar. The structure is augen or maculose. Some grain clongation isn't clear. The texture i blastoporphyric.
28,40 - 30,25	The chloritic and sericitic greenschist with a lot of little acicular and rodlike porphyroblasts of hornblende, with very much idioblasts of soda-lime feldspar and with some schliers of quartz feldspatic matrice. The structure is little bit phacoidal-schistose and maculose together. The texture is blastoophitic and blasto-porphyric. The average gradient of this foliation is 75° - 80° about.
30,25 - 30,50	The tectonic breccie with hydrothermal, barren quartz's cement matrix and with inclusions created by biotitic and chloritic mica-schist and locally only with some allotriomorphic grains or with flakes of FeS_2.
30,50 - 33,80	The sericitic and chloritic mica schist with some little flakes of biotite and with a lot of little acicular and rodlike porphyroblasts of hornblende, with very much little idio-blasts or spots of soda-lime feldspar. The structure is sheeting and texture is blastoophitic and blastoporphyric with clear the total grain clongation. The average gradient of this foliation is 80° - 85° about.
33,80 - 35,60	The sericitic and chloritic quartzy mica schist with some spot or idioblasts of soda-lime feldspar and locally with some schliers

of quartz matrice. The structure is phacoidal-schistose and locally together with little bit maculose structure too. The average gradient of this foliation is 80° - 85° around Between 34,90 - 35,10 m is present the tectonic quartzy breccie which has cementred matrix created by barren hydrothermal quartz.

35,60 - 36,95 The strongly chloritic and locally biotitic, quartzy greenschist, with a lot of schliers, pellets or intercalations of quartz or quartzite. Some small or little acicular or rodlike porphyroblasts of hornblende are present locally only. The structure of this rock is maculose or phacoidal and phacoidal schistose too. The average gradient of this foliation is 80° - 85° around.

36,95 - 39,55 The quartzite (gray), with massive and with sheeting structure locally only too, with a lot of schliers with small or bigger rod-like or acicular porphyroblasts of hornblende (the average thickness of these schliers of coarse-grained quartzy, chloritic, amphi-bolitic greenstone are 2-3 cm, maximally. Some poor impregnation of FeS_2 mostly and FeS too is present too. Between 38,35 - 38,40 m, between 38,70 - 38,80 are present the positions with little bit more strong impregnation of FeS_2 mostly and with not much FeS too. Between 39,40 - 39,55 m are present some little schliers, which are created by very fine-grained FeO + Fe_2O_3. The average gradient of this foliation is 80° or 85° about. The result of the chemical analyse from this position between 37,95 - 38,65 m is: Cu 0,07 %, Zn 0,10 %, S 2,50 %. between 38,65 - 39,55 m is: Cu 0,05 %, Zn 0,00 %, S 4,00 %.

39,55 - 41,05 The chloritic and little bit sericitic meta-quartzite with a lot of small and little bit bigger rodlike and acicular porphyro-blasts of hornblende. Some little grains (hypidiomorphic or allotriomorphic) of FeS_2 are present scarcely only and the same some little flakes or little amorphic forms of FeS. Some schliers of quartzite are present too. The structure is massive and sheeting too and the texture is blastoporphyric oftenly. The average gradient of this foliation is 85° - 90° around.

41,05 - 41,35 The coarse-grained amphibolitic greenstone with some schliers of the quartzite and metaquartzite. Some grains of FeS_2 or some flakes or amorphic forms of FeS are present scarcely only. The texture is blastoporphyric and the structure is massive and banking. The result of the chemical analyse from this position between 39,55 - 41,35 m is: Cu 0,00%

Zn 0,00 %, S 0,00 %.

41,35 - 41,70 — The gray massive metaquartzite with sheeting structure and with some little schliers with some impregnation of FeS_2 mostly and FeS too. The result of the chemical analyse from this position between 41,35 - 41,70 m is: Cu 0,05 %, Zn 0,00 %, S 5,00 %.

41,70 - 41,82 — The medium-grained amphibolitic greenstone, strongly infiltrated by a quartz-feldspatic matrix. Some little allotriomorphic grains of FeS_2 or some flakes or amorphic forms of FeS are present too, but locally only. The structure is massive and the texture is blastoporphyric. The result of the chemical analyse from this position between 40,70 - 41,82 m is: Cu 0,00 %, Zn 0,10 %, S 1,00 %.

41,82 - 42,05 — The gray quartzite with some schliers, pellets or little amorphiw formes of FeS, oftenly together with not much $CuFeS_2$ and with some allotriomorphic grains of FeS_2. The structure is massive. The result of the chemical analyse from this position between 41,82 - 42,05 m is: Cu 0,10 %, Zn 0,00 %, S 3,50 %.

42,05 - 42,43 — The coarse-grained amphibolitic and little bit chloritic greenstone with some schliers or intercalations of the chloritic, quartzite. Some grains or flakes or amorphic forms of FeS_2 or FeS are present scarcely only. The structure is massive and sheeting locally only. The result of the chemical analyse from this position between 42,05 - 42,43 m is: Cu 0,12 %, Zn 0,10 %, S 1,00 %.

42,43 - 43,25 — The very strong impregnation of FeS_2 mostly in quartzite with a massive structure. The texture is porphyroblastic and cataclastic too. The resutl of the chemical analyse from this ore position between 42,43 - 43,25 m is: Cu 0,15 %, Zn 0,00 %, S 28,00 %.

43,25 - 43,95 — The coarse-grained amphibolitic greenstone, strongly infiltrated by a quartz-feldspatic matrix and with some schliers of metaquartzite or metaceratophyre. Some ore sulphides are present very scarce only. The structure is massive and the texture is blastoporphyric.

43,95 - 44,70 — The chloritic and little bit sericitic amphibolitic greenschist with a lot of schliers and pellets of quartz or quartzite and with a lot of small and little rodlike or acicular porphyroblasts of hornblende. Some flakes of biotite are present too. Some

ore sulphides are present scarce only, the structure i phacoidal and phacoidal-schistose. The average gradient of this foliation is 80° about, locally 85° too.

44,70 - 45,55 The medium-grained amphibolitic and little bit chloritic greenstone, strongly infiltrated by quartz-feldspatic matrix, with a lot of little acicular and rodlike porphyroblasts of hornblende. Some ore sulphides are present scarce only. The structure is massive and the texture is blastoporphyric and blastoophitic. Between 44,73 - 44,90 m is present a position of whitegray barren metaquartzite.

45,55 - 46,10 The tiny grained and little bit medium-grained amphibolitic greenstone with massive structure. Some allotriomorphic or hypidiomorphic grains of FeS_2 are locally present. In this rock are present some little schliers or little pellets of quartz or quartzite.

This borehole nr. 72 aG was finished at 46,10 m on February 16th 1970.

February 20th 1970.

(M. Motys).

THE BOREHOLE NR 73 G

Tverrfjellet mine , level 4th East

THE BOREHOLE NR. 73 G, on the level 4th, East, near the vertical shaft (the dip of borehole on the beginning is 35° down to south). (X = ∓ 91,o, Y = + 96,2).

The petrografical description:

0,00 - 3,20 The tiny-grained amphibolitic greenstone with a lot of schliers, pellets and spots or grains of carbonates local by. Some more soda-lime feldapars together with quartz are present locally too more in the groundmass. Some ore sulphides (FeS_2 mostly) are present like little hypidiomorphic grains, locally only and more scarcely is present FeS (some little flakes). The tecture is massive sheeting and locally maenless.

3,20 - 5,10 The littel bit epidotic and amphibolitic geratophyre rock with quartz - feldspar matrix, with some grains or spots of carbonates locally and with poor and weak impregnation of pyrite and pyrrhotine. Locally are present some oblique little schliers of chloritic-myllonitic matrice. In 3,4o m around and in 4,3o - 4,35 m are present some positions of metaquartzite with little bit more strongly impregnation of FeS_2 mostly and with FeS too. The structure of this rock is banking and sheeting. The average gradient of this foliation is 4o° around.

5.10 - 6,00 The tiny-graines amphibolitic greenstone as well as in 0,00 - 3,20 m.

6,00 - 10,10 The amphibolitic keratophyre rock with the quartz-feldspatic matrix, together with a lot of small and locally little bit bigger porphyroblasts of hornblende. Locally are present some small and little grains or flakes of FeS_2 and FeS too. The structure is massive and texture is blastoporphyric or blastoophitic.

10,10 - 11,00 The metaquartzite, with very much little porphyroblasts of hornblende and with some schliers or pellets of white (bydrothermal) quartz. Some very poor and weak impregnation is present only locally. The structure is massive, but little bit sheeting too locally.

11.00 - 12.10 The medium-graines and locally more coarse-graines amphibolitic greenstone, with acicular and rodlike porphyroblasts of hornblende, scarecly with some little scales of biotite and locally with some little irregular or bypidiomorphic grains of pyrite and with some little flakes of pyrrhotite. The structure is massive and texture is blastoporphyric.

12,10 - 12,95 The amphibolitic beratophyre rock, like the same in 6,00 - 10,10 m, but locally with much more carbonates in.

12,95 - 15,60 The tiny-graines and tender-graines amphibolitic greenstone, locally only with some byphidiomorphic or allotrimorphic grains of FeS_2 or scarcely of FeS. The structure is massive. Scarcely only are present some oblique joints, which are filles by white quartz mostly.

15,60 - 17,60 The amphibolitic keratophyre rock as well as in 6,00 - 10,10 m, but in average with little bit more acicular and rodlike porphyroblasts of hornblende. Between 15,80 - 15,95 m, between 16,10 - 16,15 m and between 16,25 - 16,35 m are present some positions of metaquartzite with little bit strongly impregnation of FeS_2 mostly with FeS like miner mineral. Another sulphides are present microscopely and scarcely only. In these impregnated positions are present a lot of schliers and pellets of quarts or quartzite.

17,60 - 20,20 The tiny-grained amphibolitic greenstone as well as in 0,00 - 3,20 m.

20,20 - 25,50 The serie of the tiny-graines amphibolitic greenstone as well as in 0,00 - 3,20 m mostly, but with much more schliers or pellets of quartz and locally with a lot of joints, which are filled by the quartz too.

25,50 - 29,40 The tiny-graines and tender-graines amphibolitic greenstone as well as in 12,95 - 15,60 m. Between 27,00 - 27,40 m is present the tectonic quartz breccie (white hydrothermal barren quartz creat the cement matrice).

29,40 - 36,80 The motley serie of the chloritic, amphibolitic greenschists, with biotite, with some schliers of carbonatic greenschists and locally with schliers or intercalations of metakeratophyre or metaquartzite. In these greenschists are present a lot of rodlike or acicular porphyroblasts of hornblende. Some ore sulphides are present only locally and scarcely more (mostly hypidiomorphic or allotriomorphic grains of FeS_2, scarcely some flakes of FeS). The strucutre is scheeting and locally phacoidal schistose too. The texture are blastoporphyric and locally only blastoophitic. The average gradient of this folation is 35° about.

36,80 - 41,10 The strongly carbonatic, ekloritic and little bit biotitic greenschist with much little acicular or rodlike porphyroblasts of hornblende, with a lot of grains, spots or schliers of carbonates, locally with schliers of quartz or quartzite or metakeratophyre, oftenly with grains or spots of carbonates too. Some sulphides (FeS_2 mostly) are

present scarcely only. The structure is phaecidal schistose. The average gradient of this foliation is 40° around. Between 39,30 - 39,65 m is present the position of a barren hydrothermal quartz.

41.10 - 47,85 The motley serie of the tiny-graines and locally little bit medium-grained amphybolitic greenstone, with very much little schliers and little spots of quartz, with some little intercalations or schliers of metaquartzite or metakeratophyre which have spots or grains or carbonates oftenly and with very poor and weak impregnation of FeS_2 mostly. Locally (in example between 44,95 - 45,20 m) are present some carbonatic epidotic - amphibolitic greenstone with a lot of acicular or rodlike porphyroblasts of hornblende and somewhere together with poor impregnation of FeS_2 and FeS mostly and with some grains of carbonates too. The structure is scheeting mostly. The average gradient of this foliation is 45° - 50° about. In 45,10 and in 45,20 m about is present little bit more strongly impregnation of FeS_2 and FeS (2 cm and 1 cm are average thickness).

47.85 - 48,50 The white-gray or bright-gray metaquartzite with very poor impregnation of FeS_2 and FeS (some allotriomorphic grains or flakes). Between 47,85 - 48,00 m is present very strong impregnation of FeS_2 and FeS together with not so much small acicular and rodlike porphyroblasts of hornblende and with some schliers or pellets of quartz or quartzite matrice.

48,50 - 49,70 The tiny-graines and medium-grained amphibolitic greenstone, with some little grains or little spots of carbonates or more scarcely of soda-lime feldspar too, with some little hypidiomorphic or allotriomorphic grains of FeS_2 locally only (more scarce with some little flakes of FeS). Between 48,50 - 48,60 m is present the coarse grained amphibolitic greensone with epidote and with chlorite locally too. The sulphidic impregnation is very poor only.

49,70 - 51,70 The motely serie of the quartzy, chloritic, amphibolitic greenschists with biotite as well as in 29,40 - 36,80 m, but with little bit more pyritic impregnation which is very poor in average. Locally are present some schliers which are created by mobilisation flakes of biotite. Between 50,00 - 50,15 m is position metakeratophyse with not much porphyroblasts (rodlike and acienlar) of hornblende and with little bit strong impregnation of pyrite mostly. The average gradient of this foliation is 55° about.

51,70 - 52,00 The white-gray and bright-gray metaquartzite with very poor and weak impregnation of pyrite

mostly. The structure is massive.

52,00 - 59,70 The tiny-grained and tender-grained amphibolitic greenstone as well as in 0,00 - 3,20 m, but with more little carbonates in matrice.

59,70 - 60,20 The epidotic, zoisite-epidotic and amphibolitic, coarse-grained greenstone with big and small rodlike and acicular porphyroblasts of hornblende. The structure of this rock is massive and texture is blastoporphyric and blastoophitic. Some schliers or intercalations of metaquartzite or metakeratophyre are present locally and oftenly with little bit strong impregnation of pyrite mostly, but with FeS too. Somewhere are very clear small amorphic forms of $CuFeS_2$ and locally are clear little irregular grains of ZnS (in example around 60,00 m). Little bit strongly impregnation is present around 60,00 m (2 cm) and around 60,15 m (1,5 cm).

60,20 - 60,40 The amphibolitic metakeratophyre with a lot of rodlike and acicular porphyroblasts of hornblende. The structure is massive and texture is blasteporphyric.

60,40 - 60,85 The bright-gray and white-gray quartzite, with some impregnation of sulphides scarcely only, but between 60,40 - 60,45 m is present more strong impregnation of pyrite mostly.

60,85 - 62,10 The mostly serie of the chloritic, quartzy, amphibolitic greenschists as well as in 29,40 - 36,80 m. The average gradient of this foliation is 55° around.

62.10 - 67,90 The metakeratophyre rock, more metaquartzite locally too, with bigger and small rodlike or acicular porphyroblasts of hornblende and locally with not much little flakes of biotite. Some impregnation of sulphides isn't present mostly. The structure is massive and texture porphyroblastic.

67,90 - 70,60 The motley serie of the chloritic, quartzy, amphibolitic greenschists as well as in 29,40 - 36,80 m. The average gradient of this foliation is 55°.

70,60 - 71,80 The sericitic metakeratophyre, locally with little rodlike and acicular porphyroblasts of hornblende and with some schliers and intercalations of metaquartzite. The structure is sheeting and locally schistose too. The average gradient of this foliation is 55° about. Between 70,60 - 70,75 m and between 71,65 - 71,80 m are present some intercalations of metaquartzite with poor impregnation of pyrite mostly.

71,80 - 75,45 The motley serie of the chloritic sericitic and biotitic mica schist, locally with some small and little porphyroblasts (rodlike or acicular) of hornblende. This rock is strongly quartzy and locally has some more strong infiltration of quartz-feldspar matter. Locally are present some position of metaquartzite, oftenly with poor impregnation of FeS_2 mostly (71,70 - 71,80 m). Between 73,50 - 73,80 m is present position of very strong impregnation of pyrite mostly in quartzite. The structure of this mica schist is parallel schistose. The average gradient of this foliation is 50° about.

75.45 - 82,05 The very strong impregnation of FeS_2 mostly in quartzite. The pyrite creats allotriomorphic and hypidiomarphic grains, which have locally on the borders some little microscopic amorphic forms of ZnS or of FeS and scarcely of $CuFeS_2$ too. Some microscopic little joints are filled by amorphic $CuFeS_2$ or FeS, together oftenly. The texture is porphyric and bataclastic and the structure is massive. Between 80,85 - 82,05 m are present more schliers or pellets of quartz or quartzite. The result of the chemical analyse from this compact ore position between 75,45 - 80,85 m is = Cu = 0,30 %, Zn = 2,10 % and S = 41,50 %. The other result of the chemical analyse from this ore position between 80,85 - 82,05 is: Cu = 0,48 %, Zn = 1,70 %, S = 32,50 %.
The result of the chemical analyse from this ore position between 75,45 - 82,05 m is: Cu = 0,34 %, Zn = 1,90 % and S = 40,00 %.

82,05 - 82,30 The sericite metaquartzite with some schlier of chlorite matrice, with poor impregnation of FeS_2 mostly and scare only with some microscopic amorphic forms of ZnS, FeS and very scare of $CuFeS_2$. The structure is sheeting and schistose. The result of the chemical analyse from this impregnated position between 82,05 - 82,30 m is: Cu = 0,08 %, Zn = 0,15 % and S = 6,00 %.
The average compostion of the all thickness of this ore body:
1. Between 75,45 - 82,05 m = 6,60 m
   Cu = 0,33 %, Zn = 2,03 %, S = 39,85 %
2. Between 75,45 - 82,30 m = 6,85 m
   Cu = 0,32 %, Zn = 1,96 %, S = 37,17 %

82,30 - 82,90 The sericitic and quartzy metakeratophyre schist, with little bit chlorite and with some small and little rodlike or acicular porphyroblasts of hornblende and locally with some little flakes of biotitic. Some impregnation of sulphides is present too, but very poor only. The structure is sheeting and schistose too.

82,90 - 98,05 The chloritic and biotitic and amphibolitic greenschists motley serie, like in 29,40 - 36,80 m, but with not carbonates. In this motley serie

are present a lot of position, schliers and intercalations of quartzite, mostly with some poor impregnation of sulphides/pyrite or pyrrhotite). In example these quartzitic positions are situated between 86,25 - 87,00 m, between 87,30 - 87,50 m, between 88,00 - 88,20 m, between 89,50 - 90,00 m and between 90,40 - 91,05 m. Between 90,90 - 91,05 m is present a very strong impregnation of FeS_2 mostly in quartzite. The structure of the greenschist is schistose and phacoidal schistose. The average gradient of this foliation is 60°-70° about.

98,05 - 98,20 The strongly impregnation of pyrite in quartzite

98,20 - 100,30 The bright gray or white-gray quartzite with very poor impregnation of FeS_2 mostly. This rock has massive structure.

100,30 - 104,20 The tiny-graines amphibolitic greenstone with a lot of little schlier of quartz or quartzite and with some little oblique joints, which are filled by quartz too. Some grains of sulphides (FeS_2) are locally present, but not much. The structure of this rock is banking or little bit massive too.

104,20 - 120,90 The motley serie of the keratophyre rocks with some Schliers or intercalations of amphibolitic, chloritic greenschists or with the positions of feldspatig medium-grained amphibolitic green-stones. Between 105,60 - 105,80 m and between 108,50 - 108,75 m are present positions of barren white hydrothermal quartz. Locally (in example around 106,60 m) are present in quartzite some schliers with pyritic impregnation oftenly. In metakeratophyre are present a lot of little acicular or rod-like porphyroblasts of hornblende too. The structure is sheeting, banking, but phacoidal schistose locally too. The average gradient of this foliation is 50° about.

120,90 - 123,50 The tiny-grained amphibolitic greenstone as well as in 100,30 - 104,20 m.

123,50 - 123,80 The position of the gray or bright gray barren quartzite with a massive structure.

123,80 - 127,60 The medium-grained and tiny-grained amphibolitic greenstone with little bit chlorite and with a lot of very little schliers of quartzfeldspar matrice and with biotite too. The structure is scheeting schistose and texture is blastoophitic and porphyric. The average gradient of this foliation is 55° about. Some grains of sulphides are present scarcely only.

127,60 - 129,50 The chloritic or epidotic, amphibolitic, medium-grained or little bit coarse-grained greenstone, rather quartzy, with a lot of grains of garnet. The structure of this rock is massive and texture is blastoporphyric.

129,50 - 130,20 The metakeratophyre with a lot of little acicular or rodlike porphyroblasts of hornblende and with a lot of little grains of garnet. The structure is massive and the texture is blastoophitic or blastoporphyric.

130,20 - 135,00 The biotic, chloritic and amphibolitic greenschist with some intercalations of the tiny-grained amphibolitic greenstone. The structure of this rock is thin banking and sheeting. Some sulphides impregnation is present scarcely only. The average gradient of this foliation is 55° - 60° about.

135,00 - 144,40 The tiny-grained amphibolitic greenstone as well as in 100,30 - 104,20 m. Locally are present some little intercalations of metakeraphyre or metaquartzite with some poor impregnation of FeS_2 mostly, together with FeS locally too. (the maximally thickness of those little positions are 1 - 2 cm.).

144,40 - 145,30 The medium-grained, feldsaptic, amphibolitic greenstone, with not much little spots or grains of carbonates too, but scarce and locally only. The texture is blastoporphyric and structure is banking or sheeting. Some ore sulphides are present scarcely only.

145,30 - 146,30 The strongly quartzy chloritic and amphibolitic greenschists with a lot of little and bigger acicular or rodlike porphyroblasts of hornblende and with a lot of schliers of quartz or quartzite. Some ore sulphides are present scarse only. The structure is phacoidal and phacoidal schistose and texture is porphyric. The average gradient of this foliation is 60° around.

146,30 - 147,60 The strongly quartzy chloritic schist with a lot of schliers and pellets of quartz or quartzite matrix. Some sulphides isn't present mostly. The structure is phacoidal and phacoidal schistose. The average gradient of this foliation is 65° around. Hornblende or biotite are present scarsely only, like minor minerals.

147,60 - 153,43 The sericitic, chloritic and biotitic, quartzy, garnet mica schist without some sulphides. The structure is phacoidal or phacoidal schistose. The average gradient of this foliation is 65° around.

This borehole nr. 73 G was finished at 153,43 m on January 19th 1970 at 10 h. a.m.

January 21st 1970.

(Milosh Motys).

THE BOREHOLE NR. 74 G.
Tverrfjellet mine , level 4th East

HULL Nr. : 1 med plugg

RETNING 365.32 (GRAD) ny
eller gon ?

FALL -1.33 (DEG. fra horisont)

KOORDINATER I TOPPEN AV HULLET :

X =	-90.856
Y =	96.760
Z =	845.851

HULL Nr. : 2

RETNING 362.73 g (GRAD)

FALL 1.48 o (DEG. fra horisont)

KOORDINATER I TOPPEN AV HULLET :

X = -91.181
Y = 96.546
Z = 845.874

THE BOREHOLE NR: 74 G , Tverrfjelletgruva , level 4th - East
(X = -93,0 , Y = +97,5) horizontal to SE.

The petrografical description.

0,00 - 4,70 The tiny-grained and tender-grained amphibolitic greenstone with a lot of schliers and pellets of quartz and quartz-feldspar and carbonatic matter. Locally is present some very poor and weak impregnation of FeS_2 mostly. This rock is very homogenetic and the total foliation isn't clear.

4,70 - 6,80 The quartzy,hornblende,chloritic,scarce biotitic schist with a lot of rodlike and acicular porphyroblasts of amphibole,with zoisite-epidote and with some vwry poor and weak impregnation of FeS_2 and of FeS too. The structure is blastoophitic and blastoporphyric. In this rock are present much irregular inclusions of tiny-grained amphibolitic greenstone.

6,80 - 8,35 The gray quartzite with not so strong impregnation of FeS_2 mostly. The hypidiomorphic or allotriomorphic grains of pyrite are acumulated to some little irregular schliers and pellets atc. This rock is very compact with some pell-mell structure.
1,55 m
The resultate of the chemical analyse of this impregnated position between 6,80 - 8,35m is : Cu =

8,35 - 9,90 The tiny-grained amphibolitic greenstone with some little schliers of quartz and quartz-feldspar matter,scarce with some grains of carbonates,locally only with allotriomorphic grains or amorphic forms of FeS_2 and FeS. The total structure is sheeting mostly. The average gradient of this totad foliation is 40° and 45° about.

9,90 - 11,25 The feldspatic and carbonatic tiny-grained amphibolitic greenstone with a lot of spots or little schliers and pellets of quartz and feldspar matter and with very much spots and grains of some carbonates(dolomite,ancerite). In this rock are present a lot of little intercalations or schliers of metaquartzites and metakeratophyres with some poor impregnation of FeS_2 and FeS around in borders or in middle of these positions. The total structure is sheeting mostly. The average gradient of this foliation is 40° about.

11,25 - 11,95 The white hydrothermal quartz locally (in 11,50 - 11,65m round)with some small irregular inclusions of greenstones with some weak impregnation of FeS and FeS_2 around together.

11,95 - 12,80 The tectonic old and myllonitic zone with quartz bassement matter,with inclusions of greenstones and greenschists and with a lot of little schliers and irregular intercalations of dark myllonitic matter. Locally are present some little irregular schliers and pellets created by irregular grains and amorphic forms of FeS_2 and FeS. Locally are present some small acicular and rodlike porphyroblasts of hornblende.

12,80 - 27,00 The motley serie of the tiny-grained amphibolitic greenstone,locally with a lot of schliers or pellets of quartz and quartz-feldspar matter and locally with some grains and spots of carbonates too. The total structure is sheeting. The average gradient of this foliation is 55°and 60°about.

27,00 - 28,80 The chloritic, little bit biotitic greenschist with much little acicular and rodlike porphyroblasts of hornblende and locally with some schliers and intercalations of quartzite or metaquartzite oftenly with some impregnation of FeS and FeS_2 and locally with some small grains of carbonates too. The total structure is banking-schistose. The average gradient of this foliation is 60° about.
In 27,40 - 27,55m around is present quartzite with some little schliers of dark myllonitic matter.
In 27,70m around is present the position of strong impregnation (6cm) of FeS_2 mostly with some little acicular porphyroblasts of hornblende. This impregnated position is situated in quartzite(average dip is 50° around).
From 28,10m ca are present in chloritic hornblende greenschist a lot of grains of carbonates(ancerite and dolomite).

28,80 - 30,50 The motley serie of the chloritic and amphibolitic greenschists with a lot of rodlike and acicular porphyroblasts of hornblende, locally more than 70% of the groundmass of this rock. Locally are present some schliers, spots or grains of carbonates, scarcely are present some flakes of biotite. Pyrite mostly only creat the hypidiomorphic or allotriomorphic grains or some amorphic forms, which are locally concentrated to small schliers or pellets. Locally are present some schliers or little intercalations of quartz or quartzite(metaquartzite or metakeratophyre too), which have oftenly some poor impregnation of FeS_2 and scarce FeS too. The total structure is blastoporphyric, locally with little bit clear the total schistosity. The average gradient of t this foliation is 55°- 60° around.

30,50 - 35,10 The motley serie of the chloritic, hornblende greenschists as well as in 28,80 - 30,50m, but totally with much more spots or grains of carbonates and locally with some little intercalations of chloritic medium-grained, carbonatic amphibolitic greenstone. The average gradient of this foliation is 60° around.

35,10 - 36,40 The motley serie of the chloritic hornblende greenschists as well as in 28,80 - 30,50m, but with more chloritic matter in the groundmass of this rock and with much more schliers intercalations or pellets of quartz or quartzite. The average gradient of this foliation is 60° about.

36,40 - 37,85 The tiny-grained and little bit medium-grained amphibolitic greenstone, with a lot of clear, more big(the average size is 1-2mm max. 3mm) porphyroblasts of hornblende, which have little bit clear the total grain clongation. Locally are present soschliers of quartz or quartzite too. The total structure is sheeting mostly. The average gradient of this foliation is 60° around.

37,85 - 38,20 The chloritic, quartzy and feldspatic and calcarcose(carbonatic)greenschist with much more strongly impregnation of FeS_2 mostly and with FeS too. Some small acicular and rodlike porphyroblasts of hornblende are present too enough. The total structure is pell-mell, but locally phacoidal and phacoidal-schistose too. The average gradient of this foliation is 60° about.
0,35 m
The result of the chemical analyse of this impregnated position between 37,85 - 38,20m is : Cu =

38,20 - 39,80 The amphibolitic greenstone as well as in 36,40 - 37,85m, but mpstly medium-grained with very clear acicular porphy-

roblasts of hornblende the average gradient of this not so clear foliation is 60° around.

39,80 - 42,90 The motley serie of the chloritic hornblende greenschists as well as in 28,80 - 30,50m. The average gradient of this foliation is 60° about. Locally are present some intercalations of metakeratophyre or metaquartzite with some poor impregnation of FeS_2 mostly. In 39,90m round is present the little position of very strong impregnation of pyrite mostly only(the average thickness 2cm)and with some small acicular porphyroblasts of hornblende. This position is situated in metaquartzite(metakeratophyre?) too.

42,90 - 45,90 The motley serie of the amphybolitic greenstone,mostly like in 36,40 - 37,85m. The average gradient of this foliation is 60° around.

45,90 - 47,70 The tiny-grained and tender-grained amphybolitic greenstone with not much little schliers of quartz and quartzite too and with some thin banking structure totally. The average gradient of this foliation is 60° about.

47,70 - 48,55 The tiny-grained and tender-grained strongly carbonatic, amphibolitic greenstone,locally with some little spots of soda-lime feldspar. The total structure is sheeting and banking too. The average gradient of this foliation is 55° 60° about.

48,55 - 51,40 The chloritic,biotitic and hornblende green mica schist, with a lot of spots or grains of carbonates and with some small rodlike and acicular porphyroblasts of hornblende and scarce only with some amorphic little forms or little allotriomorphic grains of FeS_2 mostly. The total structure is blastoporphyric-schistose,locally phacoidal schistose with some schliers of quartzite. The average gradient of this foliation is 50° about.

51,40 - 52,05 The little bit sericitic and little bit chloritic metaquartzite,without some impregnation of the ore sulphidic minerales. Between 51,60 - 51,85m is present some position of white hydrothermal quartz,barren only. The total schistosity is little bit clear along some very little schliers of the chloritic and sericitic very little flakes. The average gradient of this foliation is 50° - 55° around.

52,05 - 57,10 The very weakly chloritic and sericitic quartzite,with the compact banking structure,without clear detail schistosity and with any mineralisation of some ore sulphidic minerales. Some little spots and very little pellets are created by soda-lime feldspars and scarcely by some carbonates too.

57,10 - 63,40 The little bit chloritic and sericitic and hornblende green mica schists,locally strongly quartzy,with some small rodlike and acicular porphyroblasts of hornblende,with some spots of quartz or soda-lime feldspar and with klinozoisite in groundmass too. The total structure is blastoporphyric-schistose and locally phacoidal-schistose too. Some impregnation of the sulphidic ore minerales is very scarce present only. The average gradient of this foliation is 45° - 50° around.
Between 58,70 - 58,90m is present the position of a keratophyre rock with a lot of little acicular and rodlike porphyroblasts of hornblende,but on the borders of this position are present some medium-grained and coarse-grained amphibolitic greenstone,little bit infiltrated by the quartz-fel. matter.

63,40 - 63,65 (0,25 m) The very strong impregnation of FeS_2 mostly in quartzite. The pyrite creat hypidiomorphic and allotriomorphic grains (70%) in groundmass from quartz mostly(28%).Another ca 2% are for the other minerales in example carbonates,chlorite, hornblende,FeS and scarcely ZnS and $CuFeS_2$,which are creat some amorphic forms filling the little joints in pyritic grains or are situated on the borders of the pyritic grains. The result of the chemical analyse from this ore position between 63,40 - 63,65m is : Cu =

63,65 - 67,70 The gray quartzite with some sulphidic ore minerals,like FeS_2 and FeS,which are present very scarce only and creat some allotriomorphic grains or amorphic forms. Locally like accesoric mineral is present chlorite. This quartzite is very compact with thick banking structure.

67,70 - 67,90 (0,20 m) The strong impregnation of FeS_2 mostly in quartzite as well as in 63,40 - 63,65m,but with more SiO_2 in groundmass,ca 40 - 45%.
The result of the chemical analyse fron this ore position between 67,70 - 67,90m is : Cu =

67,90 - 69,70 The gray quartzite as well as in 63,65 - 67,70m.

69,70 - 69,95 The metaquartzite and metakeratophyre with a lot of small rodlike and acicular porphyroblasts of hornblende and with some chlorite little bit too locally. Scarce are present some little allotriomorphic grains of FeS_2. The total structure of this rock is blastoporphyric with little bit clear grain elongation only.

69,95 - 70,25 The chloritic,little bit more quartzy hornblende greenschist as well as in 28,80 - 30,50m,locally with some small allotriomorphic grains of FeS_2,scarce with some flakes of FeS. The average gradient of this foliation is 45°- 50° about.

70,25 - 71,10 The compact gray quartzite without some impregnation of the sulphidic ore minerales or they are present very scarce only (some amorphic forms or allotriomorphic grains of FeS_2,but scarcely of FeS too).

71,10 - 79,65 The motley serie of the chloritic and hornblende greenschist as well as in 28,80 - 30,50m. The average gradient of this foliation is 55°- 60° about.
Between 74,20 - 74,40m is present some position of metakeratophyre which has on the both boerdres the infiltrated coarse-grained amphibolitic greenstone with big rodlike and acicular porphyroblasts of hornblende.

79,65 - 80,20 The gray and white gray quartzite,which has locally some poor impregnation of pyrhotine mostly(in example in 79,70 - 79,80m and in 80,00 - 80,15m,with some schliers of FeS impr.

80,20 - 80,40 The coarse-grained amphibolitic greenstone with big rodlike and acicular porphyroblasts of hornblende. In 80,35 - 80,40m is present the irregular position of white hydrothermal quartz. Locally are present zoisite-epidote and soda-lime feldspars and some hypidiomorphic or allotriomorphic grains of FeS_2 mostly. The structure is blastoporphyric.

80,40 - 82,65 The zoisite-epidotic and epidotic,amphibolitic greenstone rock with very much soda-lime feldspars in groundmass and locally with some schliers and little intercalations of the quartz and quartz-feldspar matter. Some sulphidic ore minerales are present scarce only. In this rock are present

a lot of small rodlike and acicular porphyroblasts of hornblende. Scarcely are present some little scliers and intercalations of more quartzy matter with some flakes of biotite. The total structure is blastoophitic and blastoporphyric mostly.

82,65 - 82,85 The coarse-grained amphibolitic greenstone with big rodlike and acicular porphyroblasts of hornblende and locally with some small hypidiomorphic and allotriomorphic grains of pyrite. The structure is blastoporphyric.

82,85 - 83,05 The white-gray quartzite without some sulphidic ore minerales' impregnation. This quartzite is homogenetic.

83,05 - 84,50 The motley serie of the amphibolitic and biotitic rock with strong infiltration of quartz and quartz feldspar matter with a lot of small rodlike and acicular porphyroblasts of hornblende and with some poor impregnation of pyrite mostly. This FeS_2 impregnation is little bit more strongly between 83,05 - 83,50m. The structure is blastoporphyric and blastoophitic too. Some total grain clongation or the total schistosity isn't clear in this rock. Locally is present chlorite and the flakes of biotite are acumulated to little spots and irregular schliers. In 84,50m is dip of a inclination of this schistosity 55° about.

84,50 - 85,50 The gray and white-gray quartzite with some little scliers and with some little intercalations of a more dark matter. Locally is present some very poor impregnation of of pyrite mostly. The structure is sheeting and banking. Between 85,00 and 85,20m is gradient of a foliation along the some more dark little intercalations 0° only and in 84,70m 60°. In 85,45 - 85,50m is present little bit more strongly impregnation of pyrite mostly with not much small rodlike and acicular porphyroblasts of hornblende.

85,50 - 85,90 The coarse-grained amphibolitic greenstone with chlorite and with some flakes of biotite and locally with some schliers and irregular positions of white-gray quartz. Some poor and very weak impregnation of pyrite is present too in this rock. The total structure is blastoporphyric.

85,90 - 86,35 The coarse-grained amphibolitic greenstone as well as in 85,50 - 85,90m, but with much more chlorite in groundmass and with more flakes of biotite and locally with little bit clear schistosity (the average gradient is 60° and 65° about).

86,35 - 86,80 (0,45 m) The gray quartzite with some little bit more strong impregnetion of pyrite mostly. The pyrite creat some small hypidiomorphic and allotriomorphic grains, but some small automorphic grains are present too in the bassement quartzy groundmass. Some the other ore sulphides are present very scarce only FeS, ZnS and $CuFeS_2$).
The result of the chemical analyse from this impregnated position between 86,35 - 86,80m is : Cu =

86,80 - 87,00 The coarse-grained amphibolitic greenstone as well as in 85,50 -85,90m.

87,00 - 87,10 The gray quartzite as well as in 86,35 - 86,80m, but with much more weak and much more poor impregnation of FeS_2 mostly only.

87,10 - 90,45 The strongly chloritic, quartzy, amphibolitic and biotitic greenschist with a lot of schliers, pellets and little intercalations of quartz, quartzite and locally of quartz-feld-

spar matter too. Biotite is present too and creat some small flakes and locally these flakes are acumulated to some little schliers or spots. Locally are present some little acicular and rodlike porphyroblasts of hornblende, but not much. Some grains or irregular little forms of the ore sulphidic minerales are present very scarce only. The total structure is phacoidal and phacoidal schistose and locally only parallel schistose. The average gradient of this foliation is 60° and 65° about. In some quartzitic scliers,which are situated locally only is present some little bit more strongly impregnation of FeS_2 mostly.

90,45 - 93,40 The gray and bright gray quartzite with little bit clear banking structure and with some very poor and weak impregnation of pyrite(hypidiomorphic and allotriomorphic grains and irregular little amorphic forms too) and pyrhotine too (mostly some little amorphic forms or flakes).

93,40 - 94,60 The strongly quartzy,chloritic,biotitic and hornblende green mica schist with a lot of schliers and pallets of quartz or quartzite,with some little and small acicular and rodlike porphyroblasts of hornblende and with the flakes or little acumulations of flakes of biotite. Some ore sulphidic minerales(FeS_2 mostly) are present scarce only. The total structure is phacoidal and locally phacoidal-schistose too,but pell-mell structure is locally too. The average gradient of this foliation is 60° and 65° about.

94,60 - 95,25
0,65m
The little bit more strong impregnation of the pyrite mostly in a gray and bright gray quartzite with some little acicular and rodlike porphyroblasts of hornblende, but locally only and scarce with some chlorite too. This rock is compact with little bit clear banking structure. The pyrite creat some little hypidiomorphic and allotriomorphic grains in the bassement quartzy groundmass. Some the other ore sulphides (FeS,ZnS and $CuFeS_2$)are present very scarce only.
The result of the chemical analyse from this impregnated position between 94,60 - 95,25m is : Cu =

95,25 - 96,40 The quartzy,chloritic,biotitic and hornblende green mica schist as well as in93,40 - 94,60m. The average gradient of this foliation is 60° and 65° about.

96,40 - 104,60 The motley serie of the quartzy,chloritic,biotitic and hornblende green mica schict and greenschist as well as in 93,40 - 94,60m. The average gradient of this foliation is 60° about. Locally are present much more little and small acicular and rodlike porphyroblasts of hornblende.

104,60 - 113,90 The serie of the gray and light gray quartzites(meta) with some little acicular and rodlike prphyroblasts of hornblende locally with not much chlorite and with some positions which commemorate more metakeratophyre rock. The flakes of biotite are present locally too. Some ore sulphides(FeS_2 and FeS) are present,but scarce mostly. Locally is present sericite too. Some banking and thin banking structure is locally more clear. The average gradient of this foliation is 60° round mostly. Locally are present some intercalations or schliers of quartzites and metaquartzites or metakeratophyres too, oftenly with some poor and weak impregnation of pyrite mostly,but these little bit more strongly impregnations are concentrated on the borders of those positions.

113,90 - 114,80 The medium-grained and little bit coarse-grained, chloritic, amphibolitic greenstone with a lot of schliers and pellets of quartz and quartz-feldspar matter with soda-lime feldspars in groundmass and with very much small rodlike and acicular porphyroblasts of hornblende. Some spots or grains of some carbonates are locally scarce present too. Some impregnation of the ore sulphides is present very scarce only. The structure is blastoporphyric and blastoophitic locally only with little bit clear banking structure.

114,80 - 115,60 The old myllonitic zone in the complex of the tiny-grained amphibolitic greenstones with some little schliers or irregular intercalations of a dark myllonitic groundmass. Locally are present some schliers or pellets of quartz or quartzite. The structure is phacoidal and myllonitic too. Some ore sulphides (FeS_2) are present scarce only.

115,60 - 116,40 The tiny-grained and tender-grained amphibolitic greenstone, with some little schliers and pellets of quartz or quartzite matter. The structure is sheeting or banking. Some ore sulphides are present scarce only. The average gradient of this foliation is 65°- 70° about.

116,40 - 124,20 The motley serie of the tiny-grained and tender-grained amphibolitic greenstones with some little schliers and pellets or irregular little intercalations of quartz, of quartzite too and with some positions or intercalations of chloritic amphibolitic greenschists which have some schliers of quartzite too, with small flakes of biotite. Some ore sulphides are present scarce only. The structure is phacoidal-schistose locally and sheeting or banking too. The average gradient of this foliation is 65°- 70° about.
Between 122,50 - 123,40m is present some old myllonitic zone. Some little schliers of the myllonitic dark matter are present very often.
Between 123,40 - 123,50m is present the position of the barren hydrothermal, white quartz.

124,20 - 127,90 The chloritic and biotitic, amphibolitic greenschist (the motley serie too), with little bit clear schistose structure. The flakes of biotite are situated oblique too. Some impregnation of ore sulphides is present scarcely only. The structure is sheeting or schistose. The average gradient of this foliation is 60°-65° about.

127,90 - 128,60 The epidotic and locally chloritic, amphibolitic and biotitic greenschist, with strong infiltration of the quartz and quartz feldspar matter and with a lot of small rodlike and acicular porphyroblasts of hornblende. Some impregnation of ore sulphides is present scarce only (FeS_2). The structure is massive-sheeting and locally only schistose. The average gradient of this foliation is 60° around.

128,60 - 128,80 The tiny-graines amphibolitic greenstone as well as 115,60 - 116,40 m.

128,80 - 131,75 The medium-graines infiltrated greenstone schist, with biotite, chlorite and with a lot of rodlike and acicular porphyroblasts of hornblende. In this infiltrated quartz-feldsaptic matrice are present a lot of small and little grains of garnet. The structure is sheeting and little bit schistose. The texture is blastoporphyric or blastoophitic. Some little allatriomorphic and crush grains of FeS_2 mostly are present locally only. The average gradient of this foliation is 50° - 60° around.

131,75 - 133,20 The medium-grained amphibolitic and chloritic greenstone with a lot of rodlike and acicular porphyroblasts of hornblende and with some small grains of garnet (locally with the average size 1-3 mm). Some small flakes of biotite are locally only present too. Some small and little allotriomorphic and scarcely hypidiomorphic grains of FeS_2 are present too, but not much and locally only. The structure is massive and banking. The texture is blastoporphyric. The average gradient of this foliation is 65° around.

133,20 - 134,10 The medium-grained amphibolitic greenstone, strongly infiltrated by quartz-feldspatic matrix, with á lot of rodlike and acicular porphyroblasts of hornblende and with a lot of small grains of pink garnet. Locally are present some flakes of biotite, oftenly oblique too. Some allotriomorphic grains FeS_2 mostly only are present locally only. The structure is massive and the texture is blastoporphyric.

134,10 - 136,95 The tiny-grained, locally tender-grained amphibolitic greenstone as well as in 115,60 - 116,40 m, with some schliers and spots of quartz (hydrothermal) locally only.

136,95 - 137,50 The tiny-grained, feldspatic and little bit chloritic amphibolitic greenstone with some intercalations of the chloritic amphibolitic greenschists, together with a lot of schliers or positions of metateratophyre or metaquartzite with the strong substance of garnet in and locally with some poor impregnation of FeS_2 but with FeS locally too. The structure of this rock is sheeting and schistose locally too. The average gradient of this foliation is 65° around.

137,50 - 139,10 The amphibolitic metakeratophyre-schist, with some flakes of biotite locally and with some chlorites too. The groundmass creat quartz-feldspatic matrice. The acicular and rodlike, small porphyroblasts are present very much and oftenly have some little bit clear grain clongation. Some small and little grains of garnet are present too. The total structure is sheeting-schistose and the texture is blastoporphyric and blastoophitic. The average gradient of this foliation is 70° about.

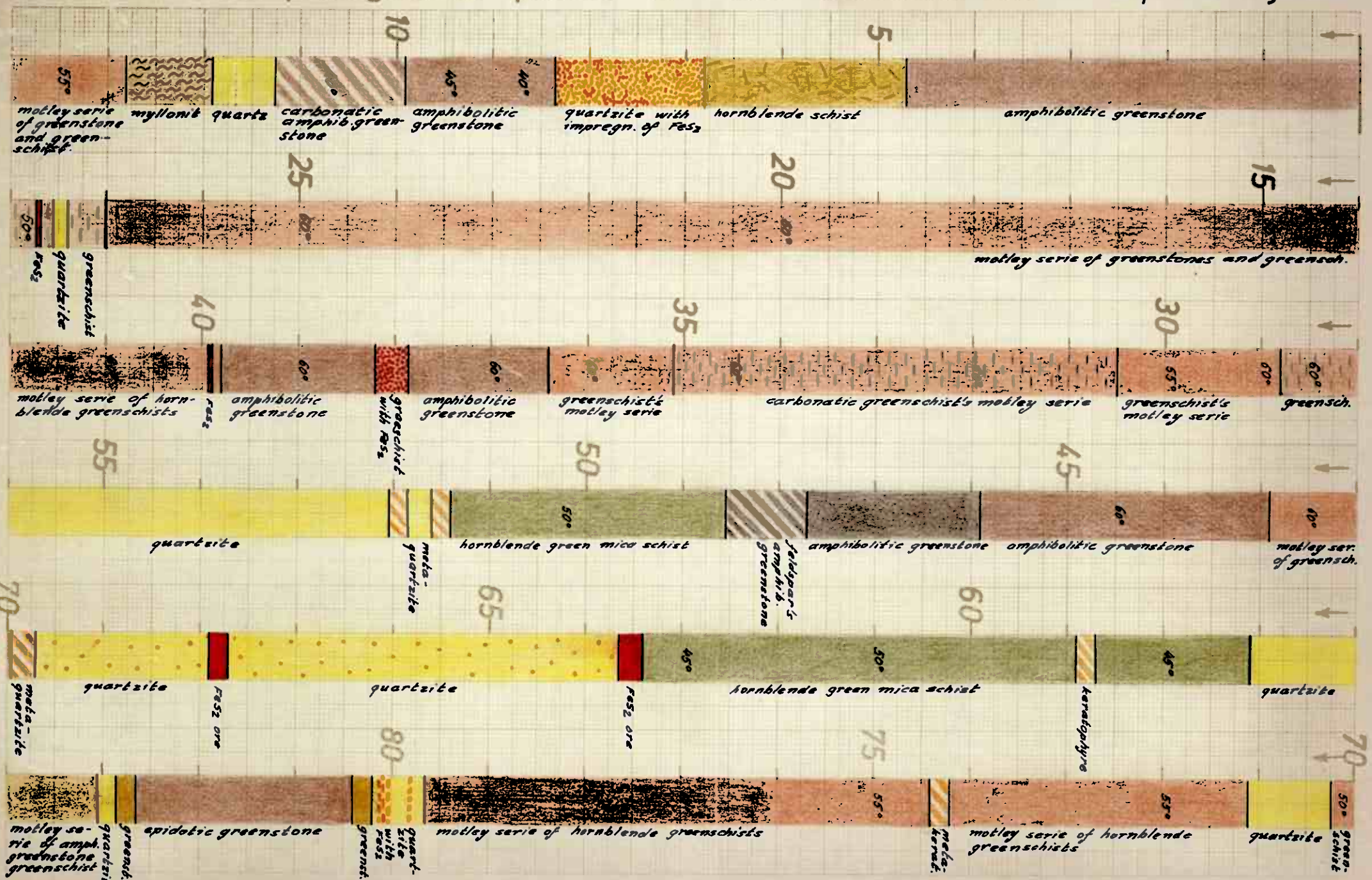
139,10 - 143,20 The myllonitic quartzy and feldspatic, biotitic and little bit chloritic schist, locally with some very poor impregnation of FeS2 and FeS. Locally are present some schliers of the dark myllonitic matrix. Some grains or spots of carbonates are present scarcely too.

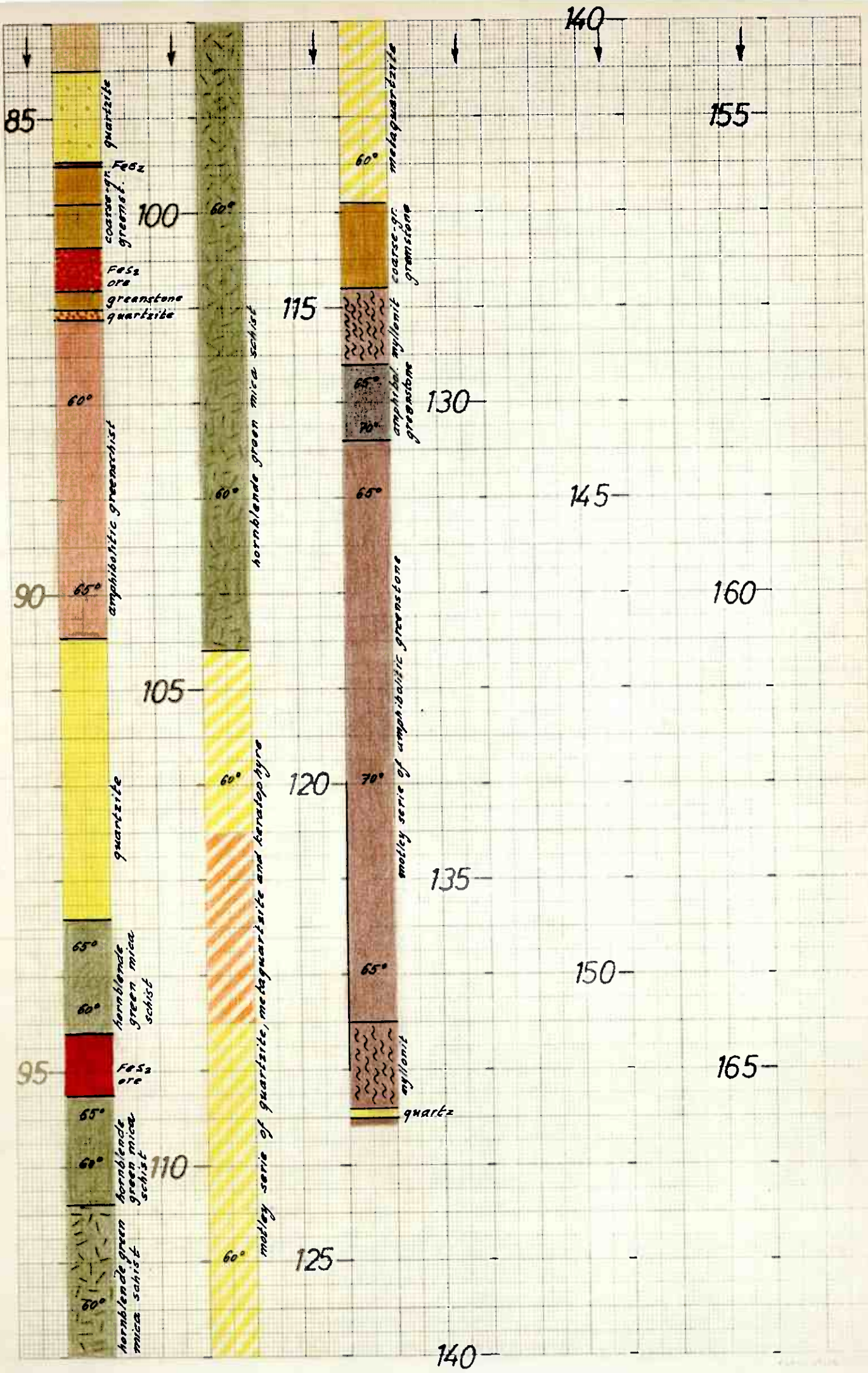
143,20 - 145,20	The amphibolitic keratophyre rock, with a lot of acicular and rodlike porphyroblasts of hornblende, with the massive structure and with the blastoporphyric texture.
145,20 - 146,90	The strongly quartzy biotitic and amphibolitic and feldspatic (soda-lime feldspar)schist. The hornblende creats a lot of small rodlike and acicular porphyroblasts. Locally only are present some little flakes or crushed allotriomorphic grains of FeS_2 or FeS. The hornblende porphyroblasts grain-clongation is little bit and locally clear enough. The structure is shessting-schistose and the texture is porphyroblastic. The average gradient of this foliation is 65° about, but locally (in example at 146,00 m around) 30° about only.
146,90 - 148,60	The myllonitic, quartzy tectonic in the chloritic and biotitic, little bit quartzy green schists. Locally only are present some little crushed grains of FeS_2 or little flakes of FeS. The structure is myllonitic and breccietic.
148,60 - 152,00	The chloritic and biotitic quartzy garnet mica schist with a lot of little schliers and spots of quartz matrix. Some ore sulphides, like impregnation minerales aren't present mostly. The structure is phacoidal and phacoidal schistose. The average gradient of this foliation is 70° about.

This borehole 74 G was finished at 152,00 m on January 8th 1970.

(Milosh Motys).

The petrografical profile of the borehole nr. 74 G, Tverrfjellet




85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
quartzite
FeS2 ore
coarse-gr. greenst.
FeS2 ore greanstone
quartzite
amphibolitic greenschist
quartzite
hornblende green mica schist
FeS2 ore
hornblende green mica schist
hornblende green mica schist
60°
65°
70°
hornblende green mica schist
motley serie of quartzite, metaquartzite and keratophyre
metaquartzite
quartzose greenstone
sericite phyllonite
amphibolitic greenschist
massive greenstone
sericite phyllonite
quartz

THE BOREHOLE NR. 75 G.
Tverrfjellet mine, sublevel

THE BOREHOLE NO. 75 G, Tverrfjellet mine, sublevel,
X = - 24,8 , Y = + 336,4.
(horizontal to north-west).

The brief petrografical description.

0,00 - 1,20	The strongly quartzy biotitic chloritic and sericitic mica schist with fluidal and phacoidal-schistose structure. The average gradient of this foliation is 45° - 50° about.
1,20 - 2,00	The bright gray metaquartzite with some chloritic substance and with not much sericite, but with spots or pellets of soda-lime feldspar too. The structure is massive.
2,00 - 12,50	The chloritic and sericitic quartzy phyllitic mica schist, with a lot of schliers and pellets and intercalations of quartz or quartz-feldspatic matrice with some spots or grains of carbonates locally too. The structure is phacoidal schistose and rope or fluidial too. The average gradient of this foliation is 75° about.
12,50 - 13,80	The bright gray metaquartzite, locally with some little inclusions of chloritic substance and with not much little flakes or allotriomorphic grains of FeS_2 or FeS. Between 13,05 - 13,10 m is present the position of massive impregnation of pyrrhotite
13,80 - 20,30	The strongly chloritic, amphibolitic greenstone with fine-grained chloritic matrix and with a lot of big rodlike and acicular porphyroblasts of hornblende and with a lot of idioblasts (porphyroblasts) or spots of soda-lime feldspars. Locally is this feldspatic chloritic and amphibolitic greenstone medium-grained without some bigger porphyroblast of hornblende. The structure is massive and locally fluidal too. The texture is porphyroblastic and blastoophitic.
20,30 - 22,80	The motley serie of the strongly chloritic, sericitic and biotitic green mica schist, locally with some little idioblasts of a soda-lime feldspar and with a lot of schliers and pellets or spots og quartz or of quartz-feldspar matrice, oftenly together with some poor impregnation of FeS_2 mostly. The flakes of biotite are locally acummulated to some spots, lenticles or pellets and schliers. The structure is phacoidal-schistose, phacoidal or fluidal. The average gradient of this foliation is 65° around.

22.80 - 26,50	The strongly chloritic amphibolitic and locally feldspatic too, greenstone as well as in 13,80 - 20,30 m. The average gradient of this foliation is 65° around. Between 22,80 - 22,90 m is present the position of a gray quartzite with a little bit more strong impregnation of FeS_2 mostly.
26,50 - 27,80	A ceratophyre rock with a lot of small and bigger acicular and rodlike porphyroblasts of hornblende. The structure is massive and the texture is blastoporphyric.
27,80 - 28,70	The chloritic, sericitic and biotitic mica schist with a pell-mell or fluidal structure and with blastoporphyric structure. Some idioblasts or spots of soda-lime feldspars are present too. The average gradient of this foliation is 65° about.
28,70 - 28,90	The white barren hydrothermal quartz, without some inclusions too.
28,90 - 29,80	The sericitic, chloritic and biotitic mica schist, strongly infiltrated by quartz and quartz-feldspatic matrix, with fluidal and phacoidal structure. The average gradient of this foliation is 50° - 60° about, but 40° - 45° around locally too.
29,80 - 31,20	The ceratophyre with a lot of small rodlike and acicular porphyroblasts of hornblende and locally with some very little flakes of biotite or with not much micas of sericitic too. The structure is massive and a texture is blastoporphyric.
31,20 - 32,95	The sericitic, chloritic and quartzy mica schist with not much little flakes of biotite and with a lot of little rodlike porphyroblasts of hornblende, crushed oftenly too. Some schliers and spots of quartz or soda-lime feldspar are present very oftenly too. The structure is fluidal schistose and phacoidal-schistose. The texture is blasto-porphyric and blastoophitic. The average gradient of this foliation is 70° around.
32,95 - 34,10	The sericitic, quartzy metaceratophyre with a lot of idioblasts of soda-lime feldspars, with some rodlike and acicular porphyroblasts of hornblende, oftenly little bit bigger. The structure is massive and the texture is porphyroblastic.
34,10 - 35,20	The sericitic, chloritic and biotitic mica schist with a lot of spots schliers and pellets of quartz or quartz feldspatic matrix. The structure is pell-mell, phacoidal and fluidal schistose too. The average gradient of this foliation is 70° - 75° about.

35,20 - 38,40	The hydrometaquartzite with a weak chloritic substance, with a lot of joints, which are filling by hydrothermal quartz. Locally are present some little micas of biotite or of illmenite. Some impregnation of the ore sulphides is present very scarce only. The structure is massive. Between 35,40 - 35,70 m is present the tectonic breccie with metaquartzite which has colitic or eye's structure (the colites or eyes are created by soda-lime feldspars) in groundmass. Between 35,70 - 35,80 m is present a white barren hydrothermal quartz.
38,40 - 40,73	The chloritic, sericitic and scarcely biotitic green micaschist, locally with some schliers or pellets of quartz, or quartz-feldspatic matrice. The structure is schistose and phacoidal schistose. The average gradient of this foliation is 60° around.
40,73 - 40,80	The strong impregnation of FeS_2 mostly in gray quartzite with a massive structure. The texture is cataclastic and porphyro-blastic. The grains of FeS_2 are hypidiomorphic and allotriomorphic, crushed oftenly too.
40,80 - 41,75	The sericitic, little bit chloritic and biotitic mica schist, quartzy too, with clear schistose a locally phacoidal schistose structure and with a lot of schliers or little intercalations of quartz or quartzite. Some ore sulphidic mineralisation is present scarce only. The average gradient of this foliation is 55° - 60° about.
41,75 - 42,82	The strong impregnation of FeS_2 mostly in quartzite with some microscopic little amorphic formes of CuFeS, ZnS or FeS too, but oftenly scarcely only. Chalcopyrite, pyrrhotite or sphalerite have been filling the little microscopic joints in the pyritic, hypidiomorphic or allotriomorphic grains or situated around those grains in the quartz groundmass. The structure is massive and texture is kataclastic oftenly. The result of the chemical analyse from this position between 41,75 - 42,82 m is: Cu 0,07 %, Zn 0,70 %, S 32,50 %.
42,82 - 42,90	The chloritic and biotitic, quartzy green-schist with schistose structure and with some poor impregnation of FeS_2 mostly, which creat some little irregular allotriomorphic, crushed grains or irregular flakes. The result of the chemical analyse from this rock position is: Cu 0,10 %, Zn 0,35 %, S 2,50 %.

42,90 - 43,75 The strong impregnation of FeS_2 mostly in quartzite as well as in 41,75 - 42,82 m. The result of the chemical analyse from this ore position between 42,90 - 43,75 m is: Cu 0,07 Zn 1,10 %, S 24,50 %.

43,75 - 45,30 The white gray quartzite with very poor impregnation of FeS2 mostly only, with some little schliers of chlorite, with some little flakes of chlorite and locally with some little allotriomorphic grains of FeO + Fe_2O_3 and with some little flakes of illmenite too. The texture is massive mostly. Between 44,00 - 44,10 m, 44,25 - 44,30 m, 44,40 - 44,90 m and 45,00 45,05 m are present some positions with strong impregnation of FeS_2 like in 41,75 - 42,82 m, but with some schliers of quartzitic matrix together. The total structure is massive. In 45,28 - 45,30 m around is present some tectonic zone with socondar covers after agressive surface water. The result og the chemical analyse from this position between 43,75 - 45,30 m is: Cu 0,10 %, Zn 0,30 %, S 10,00 %.

45,30 - 45,80 The strong impregnation of FeS_2 mostly in quartzite as well as in 41,75 - 42,82 m. The result of the chemical analyse from this ore position between 45,30 - 45,80 m is: Cu 0,16 %, Zn 0,65 %, S 25,50 %.

45,80 - 46,20 The white gray and gray quartzite with the poor and weak impregnation of FeS_2 and accecoricly with the other sulphides only, but with some weak impregnation of FeO + Fe_2O_3, oftenly which acummulated to small and little schliers. This impregnation of very fine irregular grains of FeO + Fe_2O_3 are not strong, weak only. The average gradient of the total foliation allong the little bit more dark schliers with magnetite is 85° -90° around. The structure of this rock is massive. The result of the chemical analyse from this position between 45,80 - 46,20 m is: Cu 0,10 %, Zn 0,10 %, S 9,50 %.

46,20 - 48,50 The strong impregnation of FeS_2 mostly in quartzite as well as in 41,75 - 42,82 m, but locally with some schliers of quartzite matrix without some impregnation only. The structure is massive. The result of the chemical analyse from this ore position between 46,20 - 48,50 m is: Cu 0,15 %, Zn 1,30 %, S 24,75 %.

48,50 - 48,90 The bright gray and dark gray quartzite with massive structure and with very poor and very weak impregnation of FeS_2 mostly, like very little irregular allotriomorphic and oftenly crushed grains locally only. The pyrrhotite

or sphalerite are present scarcely only and chalcopyrite isn't present oftenly. Some microscopic impregnation of FeO + Fe_2O_3 is present too, but very weak only and in the more dark part of quartzite. The result of the chemical analyse from this rock position between 48,50 - 48,90 m is: Cu 0,10 %, Zn 0,20 %, S 2,30 %.

48,90 - 49,45 The strong impregnation in quartzite as well as in 46,20 - 48,50 m. The result of the chemical analyse of this ore position between 48,90 - 49,45 m is: Cu 0,25 %, Zn 0,10 %, S 22,00 %.

The average compostion of the all thickness of this ore body:

41,75 - 42,82 m = 0,07 m - Cu 0,07 %, Zn 0,70 %, S 32,50 %
42,82 - 42,90 m = 0,08 m - Cu 0,10 %, Zn 0,35 %, S 2,50 %
42,90 - 43,75 m = 0,85 m - Cu 0,07 %, Zn 1,10 %, S 24,50 %
43,75 - 45,30 m = 1,55 m - Cu 0,10 %, Zn 0,30 %, S 10,00 %
45,30 - 45,80 m = 0,50 m - Cu 0,16 %, Zn 0,65 %, S 25,50 %
45,80 - 46,20 m = 0,40 m - Cu 0,10 %, Zn 0,10 %, S 9,50 %
46,20 - 48,50 m = 2,30 m - Cu 0,15 %, Zn 1,30 %, S 24,75 %
48,50 - 48,90 m = 0,40 m - Cu 0,10 %, Zn 0,20 %, S 2,30 %
48,90 - 49,45 m = 0,55 m - Cu 0,25 %, Zn 0,10 %, S 22,00 %

The average compostion of this ore body's position between 41,74 - 49,45 m = 6,70 m Cu 0,13 %, Zn 0,74 %, S 16,62, Fe 16,60 %.

49,45 - 50 05 The coarse-grained and medium-grained infiltrated amphibolitic greenstone locally with some schliers or spots of quartz or quartz-feldspar matrix. Some impregnation of sulphides is present scarcely only. The structure is massive and texture is blasto-porphyric. The average gradient of this foliation is 65° - 70° about.

50,05 - 50,70 The medium-grained amphibolitic greenstone, strongly infiltrated by the quartz-feldspatic (soda-lime feldspar) matrice, locally with zoisite-epidote or chlorite. The structure is massive and the texture is blastoporphyric. Some grains of FeS_2 are present locally only.

50,70 - 50,95 The gray metaquartzite with massive structure and locally only with some little flakes of FeS. In 50,85 m about is present the position of a massive pyrrhotite which has thickness 1,5 cm about.

50,95 - 57,25 The motley serie of the tiny-grained strongly chloritic and amphibolitic greenstone, which has locally some thin schliers of quartz or of quartz-feldspartic matrix, with a lot of little acicular porphyroblasts of hornblende and with very much hypidiomorphic and allotriomorphic grains or flakes of FeS_2

mostly. Locally are present some little spots or idioblasts of soda-lime feld-spars (in example at 53,00 - 54,50 m). Some intercalations of chloritic amphibolitic greenschists are present too, together with the same poor impregnation of FeS_2 mostly only. The structure is sheeting, phacoidal-schistose and the texture is blastoophitic and blastoporphyric too. The average gradient of this foliation is 75° - 80° about.

57,25 - 57,55 The biotitic and chloritic gneissic schist with a lot of irregular idioblast of the soda-lime feldspars mostly. The structure is maculose. The texture is nematoblastic. Some ore sulphides are present scarce only. The average gradient of this foliation is 65° about.

57,55 - 62,40 The tiny-grained amphibolitic greenstone, locally little bit more chloritic too and locally more feldspatic, with some little and small spots, idioblast of a soda-lime feldspar. Some ore sulphides are present locally too like little flakes or little hypidiomorphic or allotriomorphic grains (FeS_2 and more scarcely FeS too). The structure is massive and sheeting.

The borehole nr. 75 G was stopped at 62,40 m on February 5th 1970 at 10 a.m.

February 8th 1970.

(M. Motys).

THE BOREHOLE NR. 76 G.

Tverrfjellet mine , sublevel

THE BOREHOLE NO. 76 G, Tverrfjellet mine, sublevel X = - 24,6, Y = + 336,9 (horizontal to west ca.)

The brief petrografical description.

0,00 - 3,40	The sericitic, biotitic and chlorititic, quartzy mica schist, locally with the strong infiltration of quartz (hydrothermal) matrice. The structure is phacoidal-schistose or fluidial too. The average gradient of this foliation is 60° around.
3,40 - 6,40	The bright green-gray hydrometaquartzite with a chloritic substance and with a lot of joints (oblique or transversal too) which are filled by hydrothermal quartz or by quartz-feldspatic matrice, mostly with big acicular or rodlike porphyroblasts of hornblende, crushed too. The structure is massive and the texture is blastoporphyric. Locally are present some little flakes or allotriomorphic little grains of FeS_2 or FeS.
6,40 - 9,10	The sericitic and chloritic and biotitic quartzy mica schist with a lot of little schliers, spots and pellets of the quartz and quartz-feldspatic matrice. Some ore sulphides are present scarcely only. The structure is phacoidal or fluidial-schistose. The average gradient of this foliation is 40° and 35° about.
9,10 - 9,90	The quartzy white-gray or white- keratophyre rock, locally with some dykes of hydrothermal quartz with hydrometamorphic-contact zones around oftenly. The structure is massive.
9,90 - 12,50	The sericitic, chloritic and little bit biotitic, quartzy mica schist as well as in 6,40 - 9,10 m. The average gradient of this foliation is 30° about.
12,50 - 13,50	The maculose or augen (flaser), chloritic and sericitic, feldspatic gneiss or gneiss schist, with a lot of eyed or phacoid's idioblasts of soda-lime feldspars. The dtructure is maculose or eyed (augen) and texture is blastoporphyric. The average gradient of this foliation is 30° about.
13,50 - 13,70	The quartzy tectonic breccie in chloritic, biotitic and sericitic mica schist. The cement quartz matrix (hydrothermal and barren only) has some inclusions or amorphic forms on the bordres which are created by soda-lime feldspars, ortherclase and scarcely by ancerite or dollomite.

13,70 - 18,70	The sericitic, chloritic and biotitic, quartzy mica schist as well as in 6,40 - 9,10 m. The average gradient of this foliation is 25° - 30° about, but oftenly 55° around.
18,70 - 19,30	The sericitic, biotitic and chloritic maculose or augen gneiss or gneissic schist as well as in 12,50 - 13,50 m. The average gradient of this foliation is 40° about.
19,30 - 20,80	The bright green-gray hydrometaquartzite as well as in 3,40 - 6,40 m. The average gradient of this foliation is 35° around.
20,80 - 21,90	The sericitic, chloritic and biotitic, quartzy mica schist as well as in 6,40 - 9,10 m. The average gradient of this foliation is 50° about.
21,90 - 22,80	The chloritic and biotitic and little bit sericitic quartzy mica schist locally more strongly infiltrated by quartz and quartz-feldspatic matrice. Some poor and strong impregnation of FeS_2 mostly are present locally too in some schliers or intercalations, which are 1-2 cm and maximally 5 cm thick in average (in example at 22,00 m around - 2-3 cm thickness). The structure of this rock is phacoidal-schistose and fluidial-schistose. The average gradient of this foliation is 40° about.
22,80 - 27,20	The strongly chloritic, medium-grained and coarse-grained amphibolitic greenstone, with very fine-grained chloritic-amphibolitic groundmass and with a lot of small and big rodlike and acicular porphyroblasts of and with a lot of little schliers of quartz-feldspatic matrix, with some spots or idioblasts of feldspar (soda-lime feldspar). Locally is this rock infiltrated by quartz-feldspatic matrice. The structure is massive or little bit sheeting. The texture is blastoporphyric and blastoophitic.
27,20 - 28,70	The tiny-grained amphibolitic greenstone locally only with some spots or idioblasts of soda-lime feldspar, with some joints, which are filled by quartz or quartz-feldspatic matrice. Locally are present some allotriomorphic grains or flakes of FeS_2 mostly. The structure is massive or sheeting too.
28,70 - 36,10	The medium-grained and locally tiny-grained amphibolitic and chloritic greenstone, oftenly little bi infiltrated by quartz-feldspatic matrice or with some parallell or oblique schliers, which are created by

quartz-feldspatic matrix too. Some spots or idioblasts of soda-lime feldspar are present locally too. The structure is massive or little bit sheeting. The average gradient of this foliation is 40° about.

36,10 - 37,10 — The strongly biotitic, chloritic and amphibolitic augen gneissic mica schist, with a lot of big rodlike, crushed porphyroblasts of hornblende with a lot of schliers or lenticles of a strong accumulation of flakes of biotite. Some spots or idioblasts of soda-lime feldspar are present oftenly too. Some schliers of metaquartzite have impregnation of FeS_2 or little bit of FeS too (in example in 36,65 - 36,70 m and 36,72 - 36,75 m about). Another some allotriomorphic, hypidiomorphic grains or flakes of FeS_2, scarcely of FeS are present locally too. The structure is pell-mell, phacoidal and phacoidal-schistose. The texture is blastporphyric, blastoophitic and cataclastic.

37,10 - 37,40 — The sericitic and little bit chloritic hydrometaquartzite, very strong infiltrated by quartz-feldspatic matrice, with very little micas of biotite and locally with some small and little acicular porphyroblasts of hornblende and locally with some amorphic forms or allotriomorphic grains or flakes of FeS_2 mostly. The structure is compact and little bit sheeting.

37,40 - 39,50 — The strongly sericitic and biotitic quartzy mica schist with a lot of schliers and lenticles of quartz feldspatic matrice and with a lot of schliers and joints, which are filled by hydrothermal quartz. The structure is phacoidal-schistose and fluidial. The average gradient of this foliation is 45° -50° about.

39,50 - 40,90 — The sericitic, chloritic and biotitic, quartzy mica schist as well as in 6,40 - 9,10 m. The average gradient of this foliation is 45° - 50° about.

40,90 - 46,40 — The hydrometakeratophyre with some chloritic and sericitic substance and locally only with some amorphic forms or little flakes of FeS_2 or FeS, but scarce only. Very much schliers or pellets are created by hydrothermal quartz. The structure is massive or fluidial too.

46,40 - 50,00 — The sericitic and little bit chloritic and biotitic mica schist with a lot of little rodlike porphyroblasts of hornblende and with a lot of spots or irregular or eyed idioblasts of soda-lime feldspar. Some ore sulphides are present scarcely only.

The structure of this rock is maculose and augen. The texture is blastoophitic. The average gradient of this foliation is 40° - 45° around.

50,00 - 51,80 The metaceratophyre with some flakes of biotite, with not much little micas of illemenite and with not much little rod-like porphyroblasts of hornblende. The structure is massive.

51,80 - 52,30 The sericitic and little bit chloritic and biotitic mica schist as well as in 46,40 - 50,00 m. The average gradient of this foliation is 40° about.

52,30 - 56,80 The sericitic, chloritic a little bit biotitic quartzy mica schist as well as in 6.40 - 9,10 m. The average gradient of this foliation is 30° -35° around.

56,80 - 57,70 The chloritic and sericitic quartzy mica schist, with a lot of little schliers and spots of quartz and locally only with some little acicular or rodlike porphyroblasts of amphibolitite or aktinolite. Some mineralisation by FeS_2 mostly is present very scarce only. The structure is phacoidal-schistose or parallel schistose too. The average gradient of this foliation is 40° about.

57,70 - 58,25 The sericitic and chlorititic quartzy mica schist as well as in 56,80 - 57,70 m, but with much more sericitic. The average gradient of this foliation is 40° about.

58,25 - 62,60 The very strong impregnation of FeS2 mostly only in quartzite. Some amorphic microscopic forms of FeS. ZnS are present scarcely only and some very little microscopic amorphic forms or the fillings of the little joints in pyritic grains, of $CuFeS_2$ are present very scarce only. The pyritic grains are allotriomorphic oftenly and locally hypidio-morphic too, but not much. The groundmass is quartz, locally with little bit chlorite or sericite. The structure of this ore position is massive and texture is cataclastic - porphyroblastic. In 62,60 m around is present the position of dark myllonitic chloritic matter (rock), without some ore impregnation (the thickness 1 cm about). The result of the chemical analyse from this ore position between 58,25 - 62,60 m is: Cu 0,30 %, Zn 1,20 %, S 30,00 %.

62,60 - 64,65	The very strong impregnation of FeS mostly only in quartzite as well as in 58,25 - 62,60 m, but with more schliers or spots of a barren quartzite. The result of the chemical analyse from this ore position between 62,60 - 64,65 m is: Cu 0,20 %, Zn 0,30 %, S 29,00 %. The average compostion of chemical analyses from the ore body position between 58,25 - 64,65 m is: between 58,25 - 62,60 m - Cu 0,30 %, Zn 1,20% S 30,00 %. between 62,60 - 64,65 m = 2,05 m - Cu 0,20 %, Zn 0,30 %, S 29,00 %. The average from analyses 1 and 2 is: Cu 0,27 %, Zn 0,91 %, S 29,68 %.
64,65 - 65,20	The chloritic and biotitic amphibolitic greenschist, with some little rodlike and acicular porphyroblasts of hornblende and with some schliers and pellets of quartzite and with some spots or grains of feldspar (soda-lime feldspar). The structure is schistose and phacoidal schistose too. The average gradient of this foliation is 50° around.
65,20 - 65,30	The metaquartzite, gray or bright-gray, barren only with some little irregular schliers or pellets, which are created by the chloritic matrix. The structure is sheeting-schistose. The average gradient of this foliation 50° about.
65,30 - 65,80	The chloritic, coarse-grained amphibolitic greenstone, with some spots or schliers of the infiltrated quartz-feldspar matrix. The hornblende creat some big rodlike and acicular porphyroblasts. The structure is sheeting, but without clear foliation and without some grain-clongation.
65,80 - 66,00	The keratophyre with the parallel banking or schistose structure, locally with some thin little intercalation of chloritic, biotitic greenschists and with some rodlike or acicular porphyroblasts of hornblende, scarcely with some little flates of biotite and locally with some allotriomorphic grains of FeS_2. The average gradient of this foliation is 40° around.
66,00 - 66,40	The sericitic, chloritic and scarce biotitic, quartzy mica schist as well as in 6,40 - 9,10 m. The average gradient of this foliation is 55° - 60° about.
66,40 - 70,00	The medium-grained and locally coarse grained amphibolitic greenstone, strongly infiltrated by quartz and quartz feldspatic matrice, with a lot of small and bigger rodlike and acicular porphyroblasts of horn-

blende which have locally some little bit clear grain clongation and locally with some flakes of biotite too. In 68,70 m about is present the thin position (2 cm ca.) FeS impregnation with not much FeS_2 too. The structure is massive and locally only little bit schiting. The texture is blastoporphyric and blastoophitic.

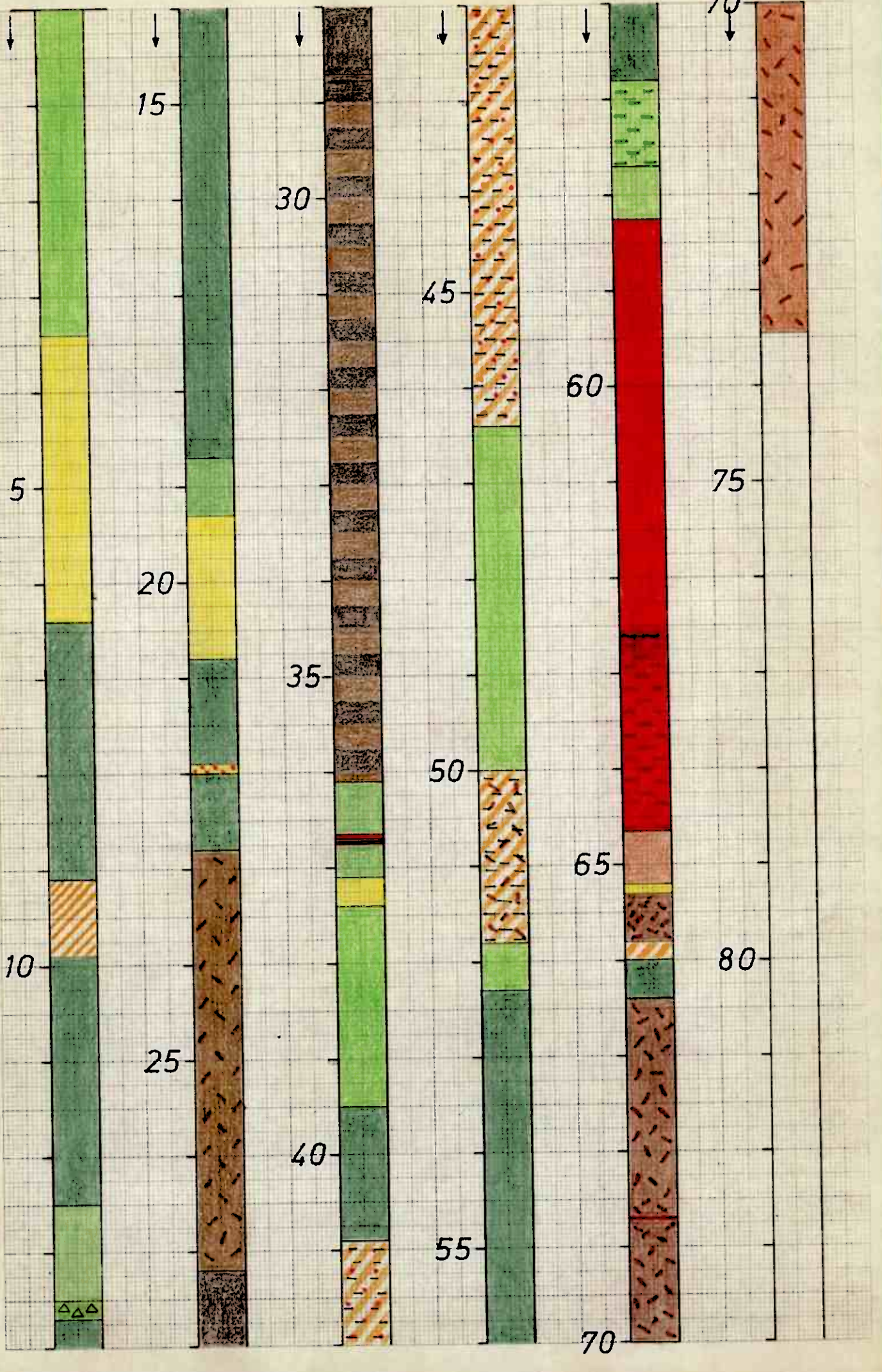
70,00 - 73,44 The strongly chloritic and amphibolitic greenschist with a lot os parallel schliers and little intercalations or pellets of quartz and quartz feldspatic matrice and with a lot of little acicular and rodlike porphyroblasts of hornblende. The structure is banking and parallel schistose. The average gradient of this foliation is 45° - 50° about.

This borehole no. 76 G was stopped at 73,44 m on February 12th 1970 at 13 p.m.

February 18th 1970.

(Milosh Motys).

The petrografical profile of the borehole nr.76G., Tverrfjellet



THE BOREHOLE NR. 77 G.

Tverrfjellet mine, sublevel

THE BOREHOLE NO. 77 G, Tverrfjellet gruve, sublevel X = - 2,8 , Y = + 388,7 (horizontal to north-west).

The brief petrografical description.

0,00 - 3,90	The strongly chloritic maculose greenschist, scarcely with some flakes of biotite and with some little acicular porphyroblasts of hornblende or actinolite and with a lot of schliers and pellets of quartz matrix with spots of soda-lime feldspar or carbonates scarcely too. The structure is phacoidal schistose and schistose. The average gradient of this foliation is 60° around.
3,90 - 8,40	The quartzy sericitic, chloritic and biotitic mica schist with phacoidal parallel schistose structure. The average gradient of this foliation is 55° around.
8,40 - 8,80	The chloritic, biotitic and quartzy greenschist, with a lot of schliers, lenticles or pellets of quartzite or of quartz matrice and with some poor impregnation of FeS_2, FeS mostly. The structure is phacoidal schistose. The average gradient of this foliation is 70° - 75° about.
8,80 - 13,10	The chloritic, sericitic, quartzy phyllitic mica schist, scarcely with some little flakes of biotite and with some grains or spots of soda-lime feldspars or of carbonates locally only. The structure is schistose and phacoidal schistose. The average gradient of this foliation is 60° about.
13,10 - 14,40	The medium-grained amphibolitic rock, very strongly infiltrated by quartz-feldspatic matrix (metakeratophyre) with rodlike and acicular porphyroblasts of hornblende. The structure is massive and the texture is blastoporphyric.
14,40 - 22,10	The strongly quartzy chloritic and sericitic mica schist with some little flakes of biotite too. Locally are present some schliers or pellets of quartz or quartzite and locally are present small spots or grains of soda-lime feldspars or of carbonates too. The structure is phacoidal schistose. Between 19,60 - 19,90 m is present position of barren hydrothermal quartz. The average gradient of this foliation is 65° about.

22,10 - 25,10	The chloritic and sericitic phyllitic mica schist with a phacoidal and phacoidal schistose structure and with a lot of spots of quartz or of quartz-feldspatic matrice. The average gradient of this foliation is 75° about.
25,10 - 25,50	The metakeratophyre with little bit sericite and chlorite too, with some very little flakes og ellemenite locally only. The structure is massive.
25,50 - 31,80	The chloritic and sericitic quartzy green mica schist, with some very little flakes of biotite too, but locally only. Some schliers are created by quartz matrice. Some spots or little pellets are created by soda-lime feldspar, quartz or carbonates scarcely too. The average gradient of this foliation is 60° about.
31,80 - 37,15	The metakeratophyre with a lot of little and small acicular or rodlike porphyreblasts of hornblende and scarcely only with some flakes of biotite and with microscopic substance of chlorite. The structure is massive or sheeting. The texture is blastoporphyric. Locally only, in example between 35,20 - 35,40 m and between 37,10 - 37,15 m are present the positions with a very poor impregnation of FeS_2 mostly only.
37,15 - 44,10	The tiny-grained amphibolitic greenstone with a lot of joints, which are filling by quartz matrix. The structure is massive mostly.
44,10 - 45,60	The strongly chloritic, coarse and medium-grained greenstone with some schliers or pellets of a quartz matrix. Some little grains of FeS_2 (Hypidiomorphic) are present too, but locally only. The structure is massive and the texture is blastoporphyric and blastoophitic.
45,60 - 47,10	The metaceratophyre, locally with some little flakes of biotite and scarcely only of illmenite or pyrrhotite. The structure is massive.
47,10 - 48,50	The amphibolitic ceratophyre with a lot of little and little bit bigger acicular and rodlike porphyroblasts of hornblende. Chlorite, sericite and little flakes of biotite are present too. Some little flakes of illmenite, pyrrhotite or pyrite are present too but locally only. The structure is massive and the texture is blastoporphyric and blastoophitic.

48,50 - 49,20 The chloritic, sericitic and biotitic mica schist, with a lot of schliers, pellets and spots of quartz-feldspatic matrix. The structure is pell-mell or, phacoidal or fluidal. The texture is blastoporphyric. The average gradient of this foliation is 70° - 75° about.

49,20 - 50,40 The quartzty metaceratophyre with not much little acicular porphyroblasts of hornblende, locally with some substance of chlorite and with some little flakes of pyrrhotite or illmenite and of pyrite scarcely too. The sericite or very little flakes of biotite are locally present too, but few only. The structure is massive mostly.

50,40 - 54,40 The chloritic and biotitic, locally sericitic too, mica schist or gneissic mica schist too with a lot of schliers or pellets and spots of quartz or quarts-feldspatic and feldspatic (soda-lime feldspar) matrix. The flakes of biotite are mostly transversal and oblique too. In this rock are present little and very little acicular porphyroblasts of hornblende or actinolite may be too. The structur is locally pell-mell, but fluidal, phacoidal-schistose and rope are more oftenly. The texture is blastoporphyric and blastoophitic. The average gradient of this foliation is 80° - 85°, but 51,00 m and 52,00 m around 10° or 0° only. Between 52,60 - 52,65 m is present the position of metaquartzite with poor impregnation of FeS_2 mostly only.

54,00 - 61,35 The very strong impregnation of pyrite mostly in a gray quartzite groundmass. The grains of pyrite are hypidiomorphic mostly, but allotriomorphic too, oftenly crushed. Sphalerite creats some microscopic amorphic forms around the pyritic grains and more scarcely are present pyrrhotite (amorphic forms around the pyritic grains or a filling of the microscopic joints which are in pyritic grains present very oftenly). The chalcopyrite is present too, but very scarce only like filling of microscopic joints in pyritic grains or like some very little amorphic forms around. The structure is massive and a texture is porphyric and cataclastic. The result of the chemical analyses from this ore body's position are:

54,40 - 57,70 m is: Cu 0,13 %, Zn 1,10 %, S 36,50 %
57,70 - 61,35 m is: Cu 0,35 %, Zn 0,70 %, S 44,50 %

The average compostion from the ore body which is situated between 54,40 - 61,35 m (6,95 m) is: Cu 0,25 %, Zn 0,89 %, S 40,70 %.

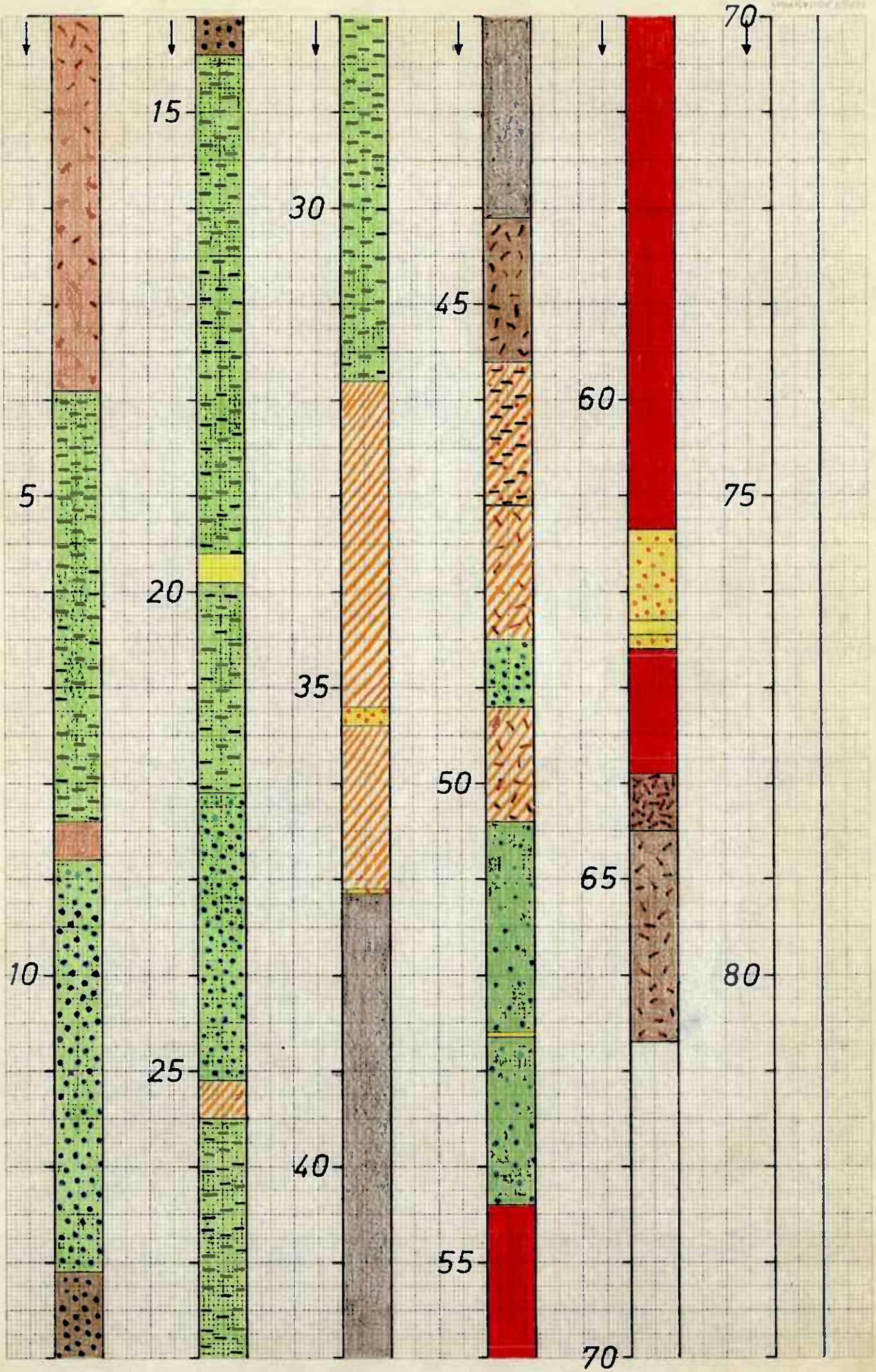
61,35 - 62,30	The gray and bright gray quartzite with very poor impregnation of FeS_2 mostly. The structure is massive.
62,30 - 62,45	A hydrothermal white, barren quartz, with some little pellets (inclusions) of a chloritic matrice.
62,45 - 62,60	The gray and bright gray quartzite with very poor impregnation of FeS_2 mostly as well as in 61,35-62,30 m. The result of the chemical analyse from these positions between 61,35 - 62,60 m is: Cu 0,20 %, Zn 0,25 %, S 6,00 %.
62,60 - 63,90	The very strong impregnation of FeS_2 mostly in quartzite as well as in 54,40 - 61,35 m. The result of the chemical analyse from this ore body's position between 62,60 - 63,90 m is: Cu 0,55 %, Zn 0,25 %, S 33,00 %. The average compostion from the ore body between 54,40 - 63,90 m = 9,50 m is: Cu 0,28% Zn 0,72 %, S 35,08 %.
63,90 - 64,50	The chloritic, coarse-grained amphibolitic greenstone with big rodlike and acicular porphyroblasts of hornblende, with a lot of schliers pellets or spots of quartz and quartz-feldspatic matrice, locally too. Very oftenly are present some small and little amorphic forms of FeS or some little hypidiomorphic and allotriomorphic grains of FeS_2. The structure is massive and the texture is porphyroblastic. Some grain clongation isn't clear.
64,50 - 66,70	The strongly chloritic, medium-grained and locallye only little bit coarse-grained amphibolitic greenstone, with some schliers or pellets and spots of quartz and of quartz feldspatic matrice locally too. Some little hypidiomorphic or allotriomorphic grains of FeS_2 or little amorphic forms of FeS are present too but not much. The structure is massive mostly and the texture is blastoporphyric ant blastoophitic.

The borehole no. 77 G was stopped at 66,70 m on February 23rd 1970 at 13.00 p.m.

February 25th 1970.

(M. Motys).

The petrografical profile of the borehole nr. 77 G., Tverrfjellet



THE BOREHOLE NR. 78 G.
Tverrfjellet mine, level 6th East

THE BOREHOLE NR. 78 G, Tverrfjellet gruve, level 6th east (X = - 15,5, Y = - 90,0) (45° down to south).

The petrographical description.

0,00 - 4,90 The tiny-grained and tender-grained amphibolitic greenstone, locally with some little oblique joints, which are filled by quartz matric mostly. Locally are present some spots or joints of soda-lime feldspar or quartz and scarcely of carbonates. Some ore sulphides creat little allotriomorphic or hypidiomorphic grains or little flakes, locally only. The structure of this rock is massive and locally banking. The average gradient of this foliation is 5o° or 55° around.

4.90 - 16,35 The tiny-grained amphibolitic greenstone as well as in 0,00 - 4,90 m. but with much more schliers or irregular intercalations of quartz or quartzite and with some little spots or irregular grains of soda-lime feldspar, scarcely of carbonates too. Some schliers or intercalations of quartzite (metaquartzite) have on the borders a very poor and weak impregnation of pyrite mostly.
In 11.10 - 11,60 m is present the position of epidotic and quartzy metakeratophyre, with some schliers and spots of white hydrothermal quartz.
In 9,10 - 9.45 m is present the position of metaquartzite with spots of grains of soda-lime feldspar and with some very weak and poor impregnation of FeS_2 mostly on the both bordres (the average gradient of foliation is 0° - 1o° about).
In 12.70 - 13.50 m is present the position of strongly feldspartic and carbonatic amphibolitic greenstone with some impregnation of FeS and FeS_2 mostly only (the gradient of this foliation is 0° - 5° about).

16.35 - 16.90 *0,55 m* The very strong impregnation of pyrite mostly in metaquartzite. From the accessorie sulphides are present pyrrholite and sphalerite and very scarcely only chalcopyrite. In the quartz matrix are present little bit chlorite and some little rodlike and acicular porphyroblasts of hornblende. The result of the chemical analyse of this impregnated position between 16,35 - 16,90 m is: Cu 0,04 %, Zn 0,10%, S 32,00 %.

16.90 - 17.00 The white-gray quartzite with very poor and weak impregnation of FeS_2 mostly only and locally with some schliers of little bit more strongly impregnation of pyrite too. The structure is massive.

17.00 - 18.10 The motley serie of the medium-grained amphibolitic greenstone, with a lot of little and small porphyroblasts of hornblende, with some chlorite and apidote locally too. The matrix of this rock is created by quartz - feldspar (soda-lime feldspars). The structure is blastoporphyric and maculose. The total average gradient of this foliation is 55° about. Locally are present some flat folds of the em and dm amplitude.

18.10 - 18.35 The quartzy tectonic breecie (white hydrothermal quartz), with inclusions of the tiny-grained amphibolitic greenstone and locally grains and flakes of pyrite and pyrrhotine mostly. The structure is breecietic.

18.35 - 38.70 The serie of the tiny-grained and tender-grained amphibolitic greenstone as well as in 0,00 - 4,90 m, but locally with some positions or intercalations of the gneisic quartzy, chloritic and amphibolitic schist (around 24,60 - 25,20 m in example) and locally with a lot of schliers or little intercalations of quartzite or of metaquartzite with very much feldspar (soda-lime feldspars) in the matrix of them. Locally is this amphibolitic greenstone more medium-grained too with a lot of little acicular and rodlike porphyroblasts of the hornblende. The structure is banking, locally massive, maculose and phacoidal. The average gradient of this foliation is 45° - 50° about and between 20,00 - 25,00 m 65° around.

38.70 - 40.60 The medium-grained amphibolitic greenstone as well as in 17.00 - 18.10 m, which is strongly infiltrated by quartz-feldspar matter. The average gradient of this foliation is 60° around. Locally are present some schliers or irregular veins of white hydrothermal quartz. Some sulphides (FeS_2 mostly) are present too, but not so much.

40.60 - 46.00 The serie of the chloritic, amphibolitic greenschists and greenstones with flakes of biotite and with some big rodlike and acicular porphyroblasts of hornblende and with some spots or grains of carbonates and of soda-lime feldspars too. Locally is this rock infiltrated by the quartz-feldspatic matter. Between 45,65 - 45,90 m are present some several little and small intercalations of quartzite with poor and weak impregnation of FeS_2 mostly. The structure is maculose and phacoidal schistose. The average is 25° - 30°, but locally 60° around.

46.00 - 46.20 (0,20 m) The strong impregnation of ore sulphides (FeS_2 mostly, with minor the other sulphides, like ZnS, FeS, and very scarcely with $CuFeS_2$) in quartzite or metaquartzite, with some little acicular or rodlike porphyroblasts locally only. Some schliers or pellets are created by quartz matrix only. The structure is massive. The texture is nematoblastic. The result of the chemical analyse from this impregnated position is: Cu 0,02%, Zn 0,05 %, S 34,50%.

46,20 - 51,25 The motley serie of the medium-grained and coarse-grained amphibolitic, chloritic locally or some where epidotic greenstone, which is strongly infiltrated by quartz-feldspatic matter, with some schliers or irregular positions of metakeratophyre (with some rodlike or acicular porphyroblasts of hornblende and with some flakes or spots and schliers which is created by chlorite. The structure is massive and fluidial mostly and the texture is blastoporphyric or blastoophitic. Locally are present some grains of some carbonates too. The average gradient of this foliation is 30° - 35° around. Between 51,15 - 51,25 m is present chloritic myllomitic matrix only.

51,25 - 61,50 The very strong impregnation of the ore sulphides in quartzite (the minor ore minerals are ZnS and more scarcely $CuFeS_2$ and FeS). The structure of this ore body is massive and texture is nemoto-blastic, porphyroblastic kataclastic. Pyrite creats the hypidiomorphic anre more allotrio-morphic grains in the groundmas of quartz mostly. The other minor ore sulphides like sphalerite and pyrrhotite creat some microscopic amprphic forms mostly around the pyritic grains and pyrrhotite together with chalcopyrite creat the filling of the little microscopic joints in pyritic grains. Locally the chalcopyrite creats also some little microscopic amorphic forms around, on the borders of the pyritic grains.

61,50 - 64,70 The very strong impregnation of the ore sulphides in quartzite as well as in 51,25 - 61,50 m, but with some little schliers and very little intercalations, which are created by very fine-grained magnetite and with some little acicular or rodlike porphyroblasts of hornblende in the quartzy groundmass. The structure is more thin banking. Between 63,70 - 63,90 m is present some dislecation some with myllonitic matrix.

64,70 - 81,40 The very strong impregnation of the ore sulphides in quartzite as well as in 51,25 - 61,50 m, but with little bit more $CuFeS_2$ in the totals contant. In 65,00 m around is present the little position (schlier) of

quartzite, which has the average thickness 1,5 cm about. In 67,95 m about, in 68.90 m about, between 71,70 - 72,25 m about, between 74,00 - 74,50 m and between 74,90 - 75,10 m are present some tectonic zones.

81,40 - 83,85 The strong impregnation of the ore sulphides (pyrite mostly and with the other minor sulphides like pyrrhotite, sphalerite and chalcopyrite) in the quartzite, with a lot of little schliers and little intercalations, which are parallel mostly with the general filiation of the bordres of this ore body. The pyrites grains are hypidiomorphic mostly and locally allotriomorphic, but scarcely indiomorphic too. Chalcopyrite and pyrrhotite creat mostly some little and microscopic irregular amorphic forms and also the filling of the little, microscopic joints in the pyritic grains. These chalcopyritic and locally pyrrhotinic amorphic forms (irregular very little veins) penetrate the little schliers or little intercalations, which are created by very fine-grained (irregular, allotriomorphic grains) magnetite. Sphalerite is present too, like minor ore minerale and creats mostly also some little, microscopic amorphic forms or allotriomorphic grains. The texture of this ore position is porphyroblasts - cataclastic and strukture is thin - banking. Locally are present some spots, schliers or lenticles of white-pink or white hydrothermal quartz, which has mostly on the bordres some amorphic forms of $CuFeS_2$ (the size of thise forms is 2-5 m in average, in example at 82,60 m around is quartz lentick which has ca. thickness 2 cm about). The average gradient of the total foliation, according the magnetites schliers is between 65° and 80° about.

83,85 - 85,00 The very strong impregnation of the ore sulphides in quartzite, as well as at 51,25 - 61,50 m.

85.00 - 87,40 The very strong impregnation of the ore sulphides, with the little schliers of magnetite as well as at 81,40 - 83,85 m, but Fe_2O_3 + FeO is present not so much and in the matrix is little bit more SiO_2 and locally together with some little acicular and rodlike porphyroblasts of hornblende and with some little schliers of chloritic matrix. In this ore position is present more schliers of quartz matter. The structure is thin banking and texture is blastoporphyric and cataclastic. The average gradient of this foliation (according the magnetite's or quartzite's schliers) is 75° - 80° about.

The result of the chemical analyses from the all thickness of this ore body's position between 51,25 - 87,40 m (36,15 m) are:

I	3)	51,25 m - 53,90 m	= 2,65 m	- 0,30 % Cu	- 3,20 % Zn	-40,-%S
II	4)	53,90 m - 56,80 m	= 2.90 m	- 1,47 % Cu	- 0,80 % Zn	-46,5% S
III	5)	56,80 m - 59,80 m	= 3,00 m	- 1,03 % Cu	- 1,25 % Zn	-48,75 S
IV	6)	59,80 m - 62,40 m	= 2,60 m	- 1,47 % Cu	- 1,10 % Zn	-43,5% S
V	7)	62,40 m - 65,90 m	= 3,50 m	- 1,77 % Cu	- 0,40 % Zn	-43,-% S
VI	8)	65,90 m - 69,50 m	= 3,60 m	- 1,47 % Cu	- 0,60 % Zn	-48,-% S
VII	9)	69,50 m - 71,90 m	= 2,40 m	- 1,95 % Cu	- 0,70 % Zn	-46,0% S
VIII	D)	71.90 m - 75,10 m	= 3,20 m	- 2,35 % Cu	- 0,70 % Zn	-48,5% S
IX	11)	75,10 m - 78,40 m	= 3,30 m	- 2,25 % Cu	- 0.70 % Zn	-45,-% S
X	12)	78,40 m - 81,40 m	= 3,00 m	- 3,30 % Cu	- 0,65 % Zn	-48,5% S
XI	13)	81,40 m - 84,00 m	= 2,60 m	- 1,70 % Cu	- 0,70 % Zn	-30,0% S
XII	14)	84,00 m - 85,00 m	= 1,00 m	- 1.05 % Cu	- 2,50 % Zn	-43,5% S
XIII	15)	85,00 m - 87,40 m	= 2,40 m	- 2,80 % Cu	- 0.25 % Zn	-35,0% S

The average compisition of the all thickness of this ore body between 51,25 - 87,40 m (36,15 m) is:
1,80 % Cu - 0,94 % Zn - 43,94 % S

87,40 - 92,45 The motley serie of the biotitic and chloritic, amphibolitic greenschists with some schliers and intercalations of metakeratophyre (with rodlike and acicular porphyroblasts of hornblende and locally, mostly in bordres with some very poor impregnation of FeS_2 mostley) and metaquartzite too.
Between 87,70 - 87,90 m are present some little schliers which are created by mobilication biotite mostly. In this rock is present a lot of schliers and pellets of quartz matrix and a lot of spots or little schliers with quartz-feldspar matrix. The structure of this rock is pahcoidal and phacoidal schistose. The average gradient of this foliation is 75° - 80° about and locally 60° about. Locally are present some dip little folding of the MM and CM amphitude.

92.45 - 94,90 The motley serie of the tiny-grained and medium-grained with some little flakes of biotite and with some little schliers of thel chloritic matter. The structure of this rock is banking and locally more massive too. The average gradient of this foliation is 80° - 85° about.

94,90 - 96,40 The amphibolitic, sericitic, chloritic and biotitic maculose gneissic schist, with some irregular little grains of FeS_2 mostly locally only. The structure of this rock is maculose and locally phacoidal. The average gradient of this foliation is 80° - 85° about.

96,40 - 99,00 The motley serie greenschist as well as between 87,40 - 92,45 m. The average gradient of this foliation is 70° - 85° around.

99.00 -100,10 The motley serie of the schliers and intercalations of the tiny-grained amphibolitic greenstones and chloritic-amphibolitic greenschists with a lot of little schliers, spots and pellets of the quartz and quartz-feldspar matrix. Locally only are present some little, mostly irregular grains of FeS_2. The structure is phacoidal and phacoidal schistose, but locally thin-banking too. The average gradient of this foliation is 75° - 80° about.

100,10 -104,70 The amphibolitic, sericitic, chloritic and biotitic gneissic schist as well as between 94,90 - 96,40 m. The average gradinet of this foliation is 70° around.

104,70 -110,30 The motley serie of the amphibolitic greenstones and greenschists like in 99.00 - 100,10 m. The average gradient of this foliation is 65° - 70° about. Between 106,10 - 109,60 m is present the position of gneissic schist as well as in 100,10 - 107,70 m.

110,30 -112,25 The quartzy tectonic breccie in the gray quartzite, with some inclusions of the chloritic matrix and with some schliers, pellets or linticles which are created by FeS_2 grains mostly.

112,25 -113,50 The myllonitic rock, which has in matrix the dark myllonitic matter, some schliers of greenstones and chloritic greenschists and with a lot of spots or schliers of quartz. Ore sulphides are present scarcely only. In this myllonitic rock are present several dislecations zones. The structure is irregular and myllonitic.

113,50 -115,30 1,80 m The quartzy myllonitic rock as well as at 112,25 - 113,50 m but with some little bit strongly impregnation of pyrite, with some amorphic and irregular veins or forms of chalcopyrite, pyrrhotite and very scarcely of sphalerite too.
The result of the chemical analyse of this impregnated position between 113,50 - 115,30 m is : Cu 1.05%, Zn 0,40 %, S 15,50 %.

115,30 -117,65 The strongly quartzy dark myllonitic rock, with a lot of schliers or pellets of quartzite and locally with very poor and weak impregnation of FeS_2 and FeS (flakes or irregular schliers). At 117,50 m and at 117,60 m around are present some small lenticles of more strongly pyritic impregnation.

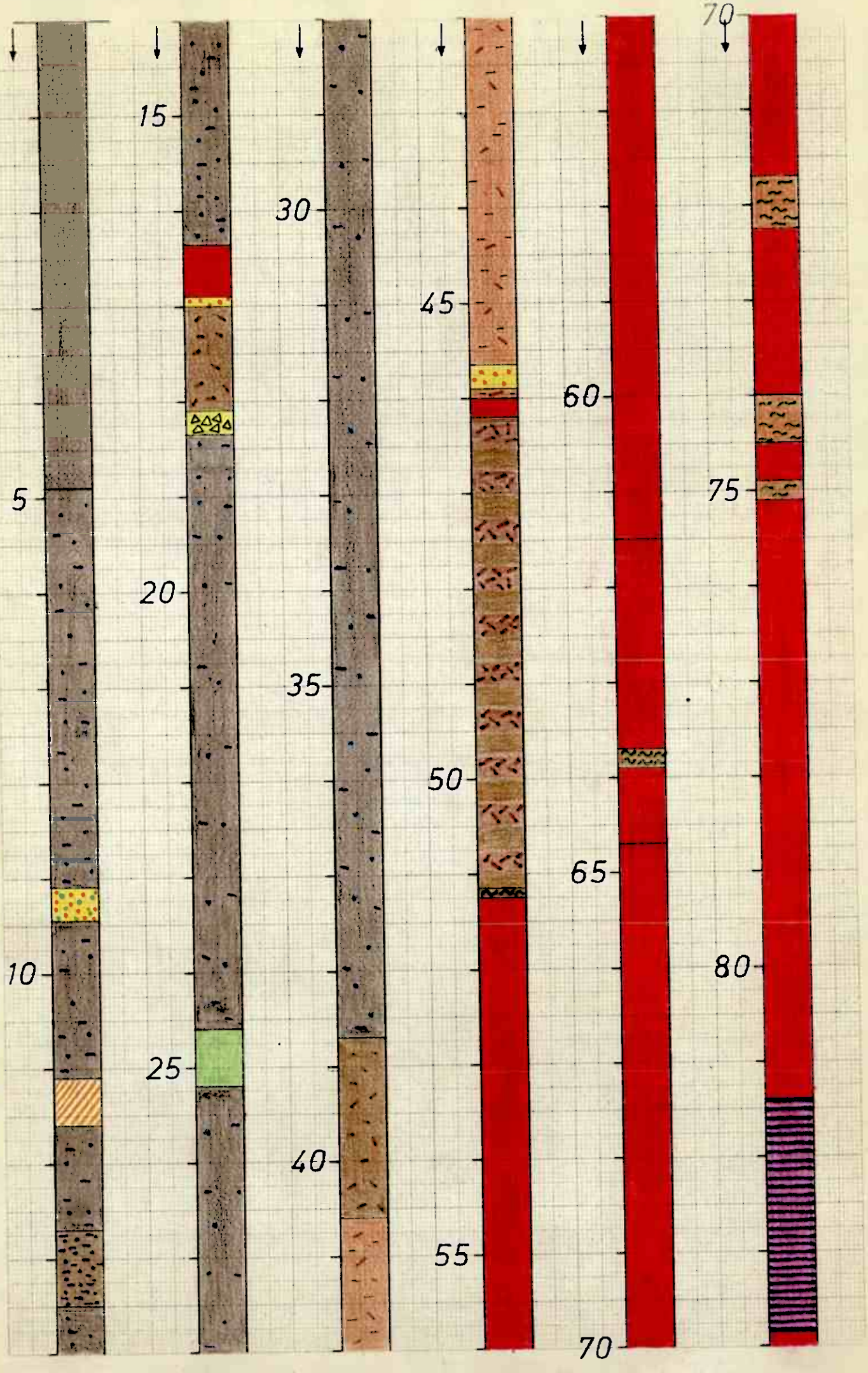
117,65 -119,50 1,85 m	The strong impregnation of ore sulphides in quartzy, myllonitic zone. Locally, in example is present some more clear impregnation of chalcopyrite. The pyrite creats mostly allo-triomorphic grains and chalcopyrite, pyrrhotite, sphalerite, like minor minerals creat only some little, microscopic anorpnic forms. The texture is cataclastic and structure locally massive and locallt breccietic. The result of the chemical analyse of this ore position between 117,65 - 119,50 m is: Cu 3,40 %, Zn 0,95 %, S 30,50%.
119.50 -120,15	The quartzy dark myllonitic rock with some little schliers or spots of quartz, but without some ore minerals impregnation.
120,15 -129,70	The quartzy, biotitic and sericitic garnet mica schist, locally with small rodlike and acicular porphyroblasts of hornblende. Some ore sulphides isn't present oftenly. The structure of this rock is phacoidal schistose. Between 120,15 - 122,00 m is present myllonitic zone with some irregular schliers of dark myllonitic matrix. The average gradient of this foliation is 50° - 55° about.
129,70 -129,95	The conglomerate in the complex of the garnet mica schist with a lot of stretched rolled pebbles of quartzite, metaquartzite, quartz or of keratophyre too. Some rodlike and acicular porphyroblasts of hornblende are present locally too. The average gradient of this the total filoation is 60° - 65° about.

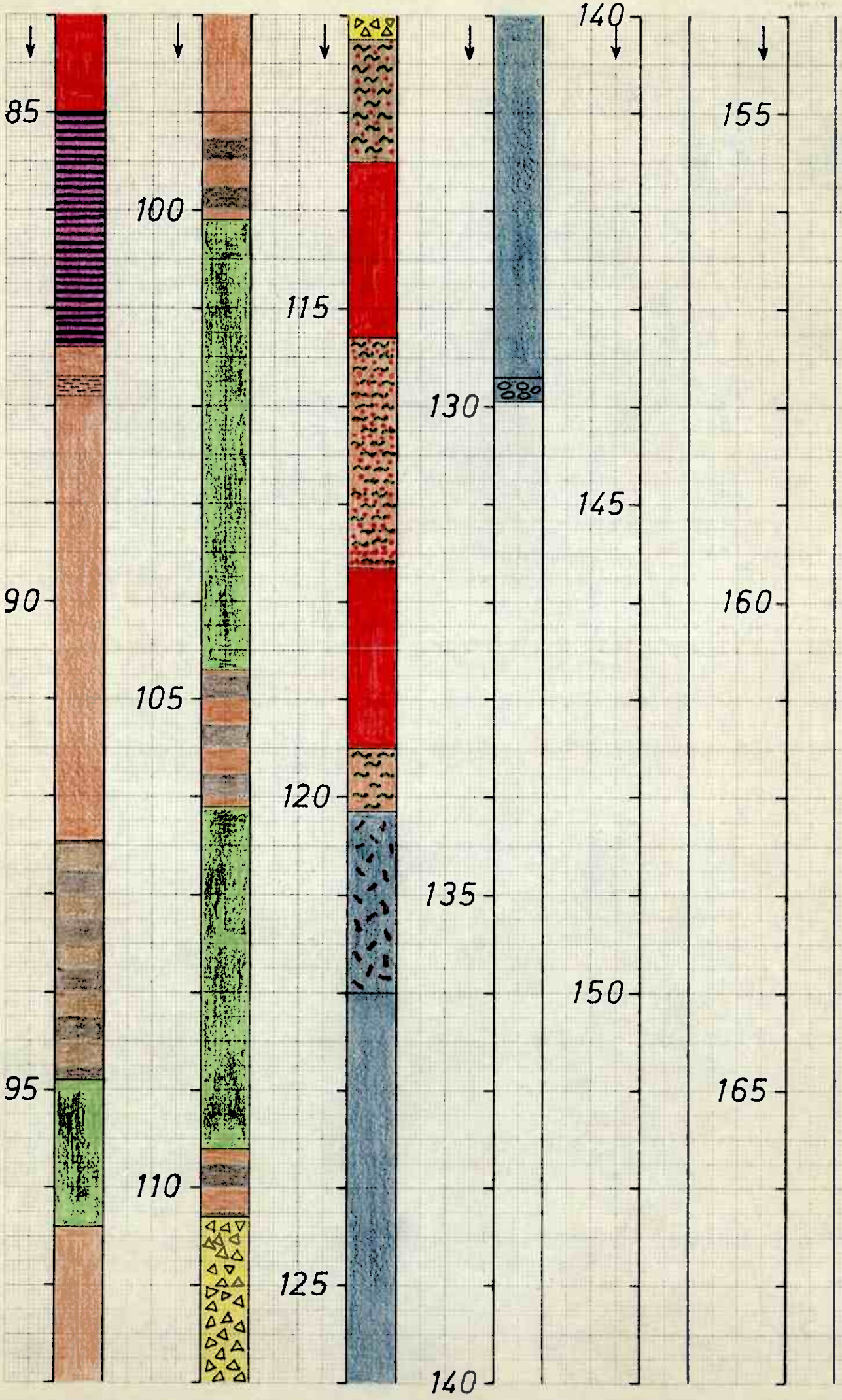
The boreholse 78 G was finished at 129,95 m on January 21st 1970 at 13,00 h p.m.

January 24th 1970.

(Milosh Motys).

The petrografical profile of the borehole nr.78G., Tverrfjellet




85
90
95
100
105
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115
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135
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165

THE BOREHOLE NR. 79 G.
Tverrfjellet mine
on the level 6th-East, 0°

THE BOREHOLE NR. 79 G , Tverrfjelletgruva , level 6th - East (HORIZONTAL)
(X = -15,5 , Y = -110,5)

The petregrafical description.

0,00 - 3,60 The tiny-grained and tender-grained amphibolitic greenstone,locally with a lot of little spots,irregular grains of carbonates and locally with some schliers or pellets of quartz or quartzite. The total structure of this rock is banking or sheeting. The average gradient of this foliation is 60°- 65° about.
Between 0,95 - 1,00m is present the small position of quartzite with carbonates,mostly on the borders of it.
Between 2,30 - 2,65m,2,75 - 3,00m,3,30 - 3,35m and 3,40 - 3,50m are present some small positions of gray or bright gray quartzite with some,mostly very poor and weak impregnation of ore sulphides (FeS_2 mostly and FeS,ZnS scarce and $CuFeS_2$ very scarce only). Little bit strongly is this poor impregnation between 2,75 - 2,80m.
The result of the chemical analyse from the impregnated position between 2,30 - 2,65m is : Cu = 0,07% , Zn = 0,50% and S = 4,00%.
The result of the chemical analyse from the impregnated position between 2,75 - 2,80m is : Cu = 0,12% , Zn = 0,50% and S = 6,05%.

3,60 - 8,30 The tiny-grained and tender-grained amphibolitic greenstone,very homogenic,with the banking structure and locally only with some little oblique joints,which have been healing by quartz matter. Some little irregular grains or little flakes of FeS_2 mostly are present scarce only. The average gradient of this foliation is 60°- 65° around.

8,30 - 9,70 The tiny-grained and tender-grained amphibolitic greenstone as well as in 3,60 - 8,30m,but with very much oblique joints,fulfiled by the quartz matter mostly and locally are present some spots or little irregular grains of carbonates. Some impregnation of ore sulphides is present very scarce only.

9,70 - 43,25 The motley serie of the chloritic,locally little bit biotitic amphibolitic greenstones and chloritic,biotitic and amphibolitic greenschists with some schliers and pellets of quartz and quartzite,but locally with some more thick positions of them,oftenly together with some poor impregnation of FeS_2 mostly. Locally are present some grains and little pellets of some carbonates and locally only are present some little hypidiomorphic and allotriomorphic and scarce idiomorphic grains of FeS_2. The soda-lime feldspar minerales are present too and hornblende creat small and little acicular and rodlike porphyroblasts more clear in greenschists facies. The total structure of this rock is blastoporhiric-schistose and locally sheeting too. The average gradient of this foliation is in 15,0m 75°about and in 25,0m 45°about and in 40,0m 65°- 70° about.
Between 24,30 - 27,70m is present some little bit strongly impregnation of sulphides (FeS_2 mostly). The small and little pyritic grains are hypidiomorphic and allotriomorphic and scarce only idiomorphic.
The result of the chemical analyse of this impregnated position between 24,30 - 27,70m is : Cu = 0,09% , Zn = 0,40% and S = 2,00%.
Between 32,25 - 32,30m is present position of quartzite with some very poor impregnation of FeS_2 mostly.
Between 39,50 - 43,00m are present much more spots or little grains of some carbonates.

43,25 - 43,60 The quartzy tectonic and myllonitic breccie with inclusions of chloritic amphibolitic schists,of dark chloritic myllonitic matter and locally with small,but big acicular and rodlike porphyroblasts of hornblende. The groundmass is created by quartz. Some sulphides (FeS_2) are present very scarce only.

43,60 - 48,30 The motley serie of the chloritic,biotitic,amphibolitic greenstones and greenschists as well as in 9,70 - 43,25m,but with much more acicular and rodlike small and little porphyroblasts of hornblende in average.
Between 44,45 - 45,10m is present the position of quartzite with some poor impregnation of ore sulphides (FeS_2 and ZnS,FeS scarcely and $CuFeS_2$ very scarce only.).
The result of the chemical analyse of this impregnated position between 44,45 - 45,10m is : Cu = 0,14% , Zn = 0,60% , and S = 3,30% .
Between 47,80 - 48,30m is present the position of quartzite with poor impregnation of FeS_2 mostly which is little bit more strongly between 48,25 - 48,30m.

48,30 - 49,50 The gray quartzite with some little flakes of chlorite and with some small and little hypidiomorphic and locally idiomorphic grains of FeS2.Theis rock is very compact with little bit clear banking structure only.

49,50 - 51,30 The medium-grained strongly quartzy,infiltrated amphibolitic greenstone with small and little acicular and rodlike porphyroblasts of hornblende,locally more chloritic,but locally epidotic too. Soda-lime feldspars are present enough too,together with quartz in the groundmass mostly. Locally and oftenly scarcely are present some little and small hypidiomorphic and idiomorphic grains of FeS_2. Scarecely are present some little flakes of biotite,locally only. Quartz and quartzite creat some schliers and pellets too. The total structure of this rock is blastoporphiric,phacoidal schistose. The average gradient of this foliation is 60°about.

51,30 - 55,85 The epidotic and amphibolitic medium-grained and little bit coarse-grained greenstone with small and big acicular and rodlike porphyroblasts of hornblende. Locally are present some small schliers and pellets of quartz and soda-lime feldspars. Some sulphides(FeS2mostly) are present very scarce only. The total structure of this rock is blastoporphyric and blastoophitic. The average gradient of this not clear foliation is 65° about.

55,85 - 56,35 The medium-grained,very strongly infiltrated amphibolitic greenstone (with small and little acicular and rodlike porphyroblasts of hornblende).This rock has stron infiltration by the quartz - soda-lime feldspar matter. Some sulphides (FeS_2 mostly) are present very scarce only. Locally are present some lenticles,chambers or nests which are created by big acicular and rodlike porphyroblasts of hornblende. The same position (1cm thickness)is between the rock before and this position ca around 55,85m.

56,35 - 57,45 The gray quartzite or metaquartzite with some very little chambers or nests of chlorite and locally with some little hypidiomorphic and scarcely idiomorphic grains of FeS_2 and locally with small schliers, pellets or chambres of ore sulphides (FeS_2 and FeS mostly),in example around 56,85m. Locally are present some little irregular schliers and pellets of $FeO+Fe_2O_3$ in example 57,30m around. This rock is very compact and the banking structure isn't so clear.

57,45 - 57,90
0,45 m The strong impregnation of pyrite mostly in the gray quartzite,locally with some little spots or little nests of chlorite and scaree with some little acicular or rodlike porphyroblasts ofhornblende,but locally only. The groundmass creat quartz matter. Pyrite creat little hypidiomorphic grains,locally allotriomorphic and scarcely idiomor-

phic too. Pyrhoyine and sphalerite and scarcely chalkopyrite creat some little amorphic or allotriomorphic forms of the microscopic size around the pyritic grains or the filling of the little microscopic joints in the pyritic grains.
The result of the chemical analyse from this impregnated ore position between 57,45 - 57,90m is ! Cu = 0,13% , Zn = 1,50% , S = 39,35%

57,90 - 59,10 The bright gray and gray quartz,locally with some lenticles or nests which are fulfiled by $CuFeS_2$,ZnS and FeS_2 with FeS.

59,10 - 62,30 The motley serie of the medium-grained and locally only tiny-grained or locally coarse-grained amphibolitic and epidotic greenstone, infiltrated mostly by the quartz-feldspar matter and locally with the positions of quartz or quartzite which have on both borders' sides some dark myllonitic matter or myllonitic rock with mobilisation biotite,with little bit chlorite and quartz and with a lot of flakes or irregular forms of FeS2 mostly,but $CuFeS_2$ or FeS are present together with ZnS too. Thie ore minerales' impregnation is rather poo and weak.(in example the myllonitic,biotitic matter are present in 58,70 - 58,95m,59,30 - 59,40m and in59,50 - 59,60m and the quartz or quartzite are present in 59,20-59,30m,59,40-59,50m and in 59,60 - 59,70m together with some little scliers and nests of the amphibolitic and epidotic greenstone's matter.) The total structure is thin banking and phacoidal locally too. The average gradient of this foliation is 65° and 70°round.

62,30 - 6 4,05 The white gray and gray quartzite,locally with some schliers of amphibolitic greenstone's matter and locally with some schliers or nests or little positions of some poor impregnation of FeS_2 mostly and with FeS little bit too(in example around 62,50m = 1cm, and between 62,85 - 62,95m and 64,00 - 64,05m).

64,05 - 64,20 The medium-grained and between 64,15 - 64,20m coarse-grained amphibolitic greenstone and epidotic-amphibolitic greenstone which are little bit infiltrated by quartz and quartz-feldspar matter,with some little schliers and little lenticles of quartz or quartzite and with chlorite and with small or little acicular and rodlike porphyroblasts of hornblende. The structure is blastoporphyric and banking,but little bit phacoidal locally too. The average gradient o of this foliation is 70° about. Locally only are present some hypidiomorphic little grains or flakes of pyrite mostly only.

64,20 - 67,05
2,85 m

The very strong impregnation of sulphides (pyrite mostly and with pyrhotine and sphalerite like accessoric minerales and with chalcopyrite like accessoric minerale too,but more scarce only) in gray and little bit bright gray quartzite. The texture of this impregnated ore is cataclastic and structure compact,locally only with some schliers of quartz or quartzite and in 66,40 - 66,45m with little position of quartzite which has very poor impregnation of FeS_2 only. From 66,30m is this ore little bit reach of $CuFeS_2$. In this impregnated ore the pyrite creat little hypidiomorphic grains and more scarcely allotriomorphic and idiomorphic grains which are situated in quartz groundmass and on or aruond the borders with the little amorphic forms of FeS,Zns and locallY $CuFeS_2$ too. Chalcopyrite and pyrhotine filing some very little joints in the pyritic grains,locally together with sphalerite too. Sphalerite which creat some little amorphic forms is present more around on the bordres of the pyritic grains or independent in quartz groundmass locally too.
The result of the chemical analyse from this ore position between 64,20 - 67,05m is : Cu = 0,67% , Zn = 2,00% and S = 39,50%.

67,05 - 68,15
1,10m

The very strong impregnation of the sulphides (pyrite and chalkopyrite mainly and sphalerite and pyrrhotine too) in the quartzite's matrix(Quartz),but wit very much small and little schliers and little intercalations of magnetite(tiny and tender-grained),which have been following the primary foliation,but locally are little bit oblique and irregular too. The grains of FeO + Fe_2O_3 are very little only and allotriomorphic mainly,scarcely hypidiomorphic. Pyrite creat mostly small hypidiomorphic grains,locally allotriomorphic too. Chalkopyrite cceat some amorphic forms and filling of the little joints,mainly in the pyritic grains. Sphalerite and pyrrhotine cceate also amorphic forms and FeS mainly the filling of pyritic grains togedher with chalcopyrite. The matrice is quartz mostly only. From the other accesoric rock forming minerals are present chlorite and hornblende,but very scarce only. The total structure is massive-schistose.
The result of the chemical analyse of this ore position between 67,05 - 68,15m is : Cu = 2,50% , Zn = 1,10% and S = 20,00% .

68,15 - 68,70
0,55m

The very strong impregnation of the sulphides as well as in 64,20 - 67,05m,but with little bit more $CuFeS_2$ in average.
The result of the chemical analyse of this ore position between 68,15-68,70m is : Cu = 2,80% , Zn = 0,50% and S = 42,90% .

68,70 - 71,30
2,60m

The strog impregnation of the sulphides with magnetite's schliers and little intercalations aswell as in 67,05 - 68,15m,but with little bit morequartz in matrix and with much more little schliers and pellets of quartz too.
The result of the chemical analyse from this ore position between 68,70 - 71,30m is : Cu = 1,35% , Zn = 0,30% and S = 13,90% .

71,30 - 71,65
0,35m

The very strong impregnation of the sulphides fith the schliers and little intercalations of magnetite as well as in 67,05 - 68,15m,but with more small and little schliers and pellets of quartz or quartzite and with much more strongly impregnation of $CuFeS_2$. Sphalerite are present mainly scarcely only,but FeS is present together with $CuFeS_2$.
The result of the chemical analyse from the ore position between 71,30 - 71,65m is : Cu = 4,24% , Zn = 0,98% and S = 22,00% .

71,65 - 72,20
0,55m

The very strong impregnation of the sulphides (the massive structure) in the quartzite as well as in 64,20 - 67,05m,but with much more $CuFeS_2$ in average.
The result of the chemical analyse of this ore massive position between 71,65 - 72,20m is : Cu = 3,25% , Zn = 2,00% and S = 39,06% .

72,20 - 72,70
0,50m

The strong impregnation of the sulphides(mainly FeS_2, and $CuFeS_2$ with FeS and more scarcely ZnS too) in metaquartzite,with some little schliers and little intercalations,irregular oftenly,of magnetite (the magnetite is very fine-grained or tender-grained in those little schliers and microscopicly has allotriomorphic,scarcely hypidiomorphic grains). From the other rock-forming minerales(accessoric mostly are present chlorite and very little acicular and rodlike porphyroblasts of hornblende and some little grains of soda-lime feldspar too. The pyrite creat small and little allotriomorphic and mostly hypidiomorphic grains,chlkopyrite creata some amorphic forms or locally the fillings of the little microscopic joints in the pyritic grains. Together with $CuFeS_2$ is present amorphic pyrrhotite and more scarcely in average are present some small and little amorphic forms or allotriomorphic grains of sphalerite,locally like inclusions in the chalcopyrite or more oftenly pyrite matrix. The the quartz creats groundmass of the rock-forming minerales together locally with chalcopyrite and amphibolite,but more scarcely. Quartz matrix creats a lot of chliers and pellets or little irregular intercalations,macroscopickly. The structure is phacoidal-schistose mainly.
The result of the chemical analyse from this ore position between 72,20 - 72,70m is : Cu = 3,00% , Zn = 0,26% and S = 17,35% .

72,70 - 73,10 (0,40 m) The quartzy,chloritic and biotitic green mica schist or greenschist with strong and very strong,locally impregnation of the sulphides (mainly of FeS_2 and more scarcely of $CuFeS_2$,FeS and with some ZnS too. The structure of this rock is phasoidal-schistose and phacoidal too. Locally only and more scarce are present some little acicular and rodlike grains of hornblende. Quartz creat some little spots,little schliers or little pelets. Pyrite creat little hypidiomorphic and allotriomorphic grains,mostly crushed too and with a lot of little joints. Chalkopyrite and pyrrhotite creat some little,microscopic amorphic forms or the microscopic fillings of the little joints in the pyritic grains. Sphalerite is present more scarcely and creats also little,microscopic amorphic forms or little allotriomorphic grains and locally has some very little microscopic inclusions of $CuFeS_2$ or FeS. The average gradient of this foliation is 75° around. The result of the chemical analyse from this impregnated position between 72,70 - 73,10m is : Cu = 1,80% , Zn = 0,65% and S = 12,10% .

THE AVERAGE COMPOSITION OF THE ALL THICKNESS OF THIS ORE BODY :

I.	between 64,20 - 67,05m	= 2,85m	is	Cu = 0,67 %	Zn = 2,00 %	S = 39,50 %
II.	between 67,05 - 68,15m	= 1,10m	is	Cu = 2,50 %	Zn = 1,10 %	S = 20,00 %
III.	between 68,15 - 68,70m	= 0,55m	is	Cu = 2,80 %	Zn = 0,50 %	S = 42,90 %
IV.	between 68,70 - 71,30m	= 2,60m	is	Cu = 1,35 %	Zn = 0,30 %	S = 13,90 %
V.	between 71,30 - 71,65m	= 0,35m	is	Cu = 4,24 %	Zn = 0,98 %	S = 22,00 %
VI.	between 71,65 - 72,20m	= 0,55m	is	Cu = 3,25 %	Zn = 2,00 %	S = 39,06 %
VII.	between 72,20 - 72,70m	= 0,50m	is	Cu = 3,00 %	Zn = 0,26 %	S = 17,35 %
VIII.	between 72,70 - 73,10m	= 0,40m	is	Cu = 1,80 %	Zn = 0,65 %	S = 12,10 %

The averages :

1.	between 64,20 - 72,20m	= 8,00m	is	Cu = 1,623%	Zn = 1,760%	S = 27,937%
2.	between 64,20 - 72,70m	= 8,50m	is	Cu = 1,704%	Zn = 1,122%	S = 27,314%
3.	between 64,20 - 73,10m	= 8,90m	is	Cu = 1,708%	Zn = 1,101%	S = 26,630%

73,10 - 79,60 The amphibolitic and epidotic,little bit more soda-lime feldspatic and quartzy greenstone,tiny and tender-grained with a lot of little schliers and little intercalations of quartz and feldspar(soda-lime feldspatic). Locally are present some very little,oftenly microscopic,hypidiomorphic and allotriomorphic grains or little flakes of FeS_2 and scarce of FeS too. The total structure of this rock is thin banking and sheeting with the clear total schistosity. The average gradient of this foliation is 65° and locally 70° around.

79,60 - 82,15 The keratophyre rock,with a lot of little acicular and rodlike porphyroblasts of hornblende and with a lot of soda-lime feldspars in the matrix. locally are present some schliers or pellets which are created by quartz-soda-lime feldspar's matrix only. Some sulphides impregnation is rather scarce,but around 81,90m are present some schliers and little irregular intercalations of FeS_2 hypidiomorphic and allotriomorphic grains together with little irregular intrecalations of the tender-greined magnetite agregates. The structure is blastoporphyric without the very clear foliation. The average gredient of this foliation is 45°,but around 81,90m 0° about.

82,15 - 82,85 The amphibolitic and biotitic gneissic-schist with little parallel intercalations of quartz and quartz-feldspar matrix(soda-lime feldspar) The structure is gneissic with clear the total schistosity. Some impregnation of the sulphides is present scarcely and locally only. The average gradient of this foliation is 50° about.

82,85 - 83,15 The gray barren massive quartzite,scarcely and locally only with some little idiomorphic and more hypidiomorphic grains of pyrite.

83,15 - 85,00 The biotitic and little bit chloritic and hornblende gneissic schist with a lot of the parallel,but obliquae too,schliers of the dark myllonitic matrice. The quartz-feldspar(soda-lime feldspar)matrix creates little parallel schliers or little intercalations or little spots and pellets which by their clongations following the total schistosity. The structure is gneisic and gneissic-schistose,locally myllonitic too,but locally with the flat folds of the CM an DM and scarce of the MM amplitude. The average gradient of this foliation is 30°- 40° about,but locally 0° and 20° too. Locally are present some small schliers and pellets of quartz or quartzite. Scarcely are present some small and little allotriomorphic and hypidiomorphic grains or little flakes of sulphides(FeS_2 mostly).

85,00 - 86,40 The motley complex of rocks,which is created by intercalations and schliers of the strongly chloritic,amphibolitic greenschists,of chloritic tiny-grained greenstones,locally with small and little rodlike or acicular porphyroblasts of hornblende and with a lot of schliers and intercalations of the metaquartzites and locally of the quartzy keratophyres too. Some very poor and very weak impregnation of the ore sulphides(FeS_2 mostly) is locally present in the intercalations of metaquartzites or around the borders of them and on the borders of intercalations of keratophyre little bit locally too. The structure of this rock is phacoidal-schistose and little bit sheeting too. This motley rock's complex is folded locally by the flat and scarcely by the little bit dip folds of the DM and CM amplitude. The average gradient of this foliation is 45°- 50°,but locally 60°- 75° aruond.

86,40 - 100,40 The tiny-grained amphibolitic greenstone,with massive structure mostly,but ca from 93,60m with a lot of schliers and small intercalations of the quartz,metaquartzite and keratophyre,locally too. Partly ca from 93,60m are present in apmhibolitic greenstone a lot little spots and grains of soda-lime feldspars and of some carbonates too. Some position of the feldspatic keratophyre is present arond 98,10m(thickness ca 10cm). Some impregnation of the ore sulphides is present,but scarcely only. The total structure is sheeting and banking with little bit clear schistosity. The average gradient of this foliation is 60°and 65° around,but locally in 98,10m 35°- 40° around. Between98,50 - 100,40m around are present a lot of joints which are filed by quartz mostly.

100,40 - 104,00 The quartzy amphibolitic greenstone with a lot of schliers of quartz and quartzite and with a lot of little schliers and little irregular intercalations which are created by the small and little grains of garnet and by the compact agregates of the garnet too. Some impregnation of the ore sulphides is present scarce only. The total structure is sheeting and banking,but locally phacoidal schistose too. The average gradient of this foliation is 70°about.

104,00 - 105,40 The sericitic and little bit chloritic and biotitic gneissic schist with some small and little rodlike and acicular porphyroblasts of hornblende. The matrix is created by quartz and soda-lime feldspars. The structure is gneissic and schistose. The average gradient of this foliation is 55°- 60° about. Some impregnation of the ore sulphides is present scarce only.

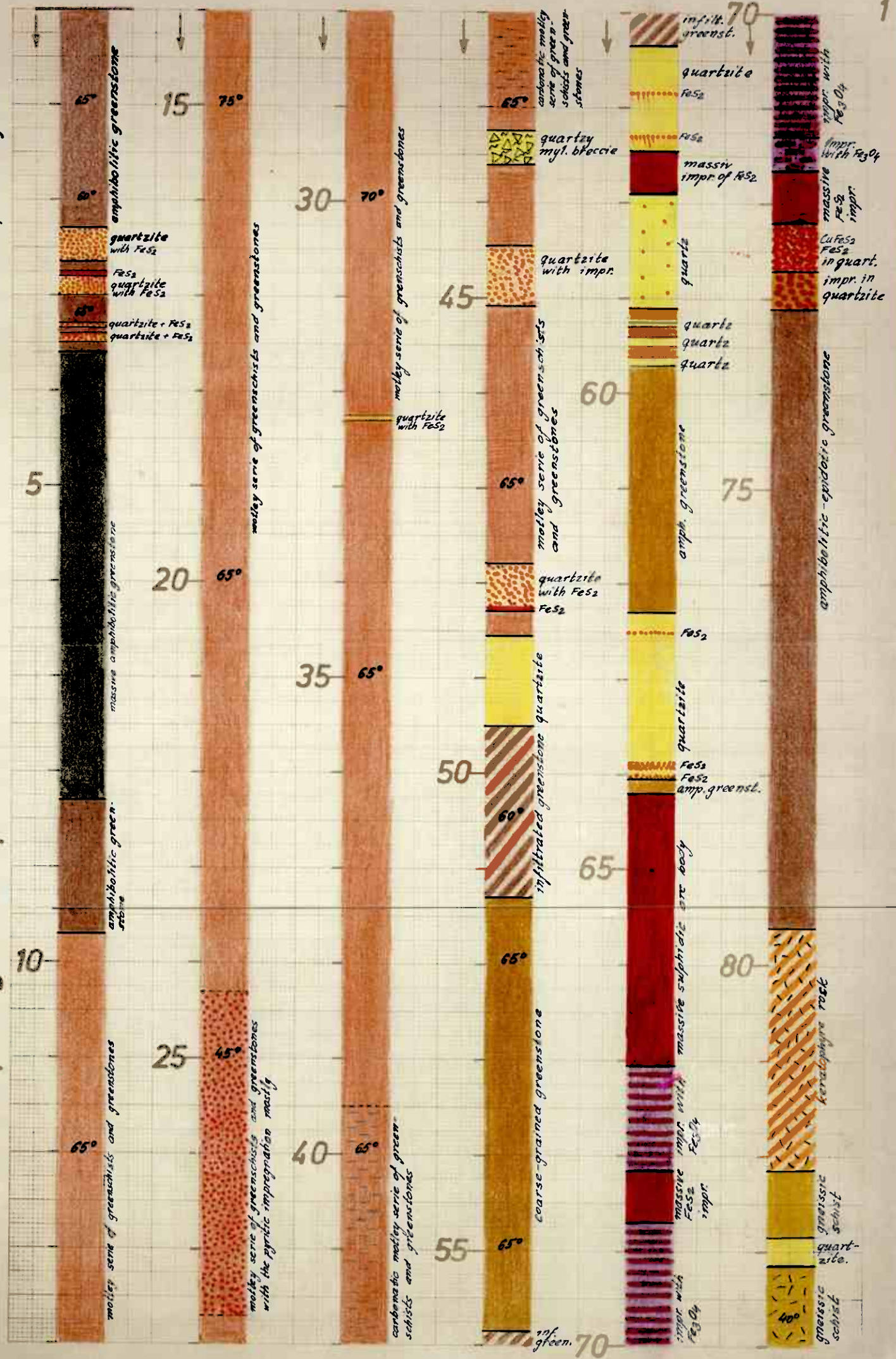
105,40 - 107,30 The keratophyre rock with some small and little rodlike and acicular porphyroblasts of hornblende,with chlorite and locally with sericite in the quartz - soda-lime feldspatic matrix and with a lot of schliers and irregular intercalations of quartz or quartzite. The average gradient of this foliation is 45°- 50° about.

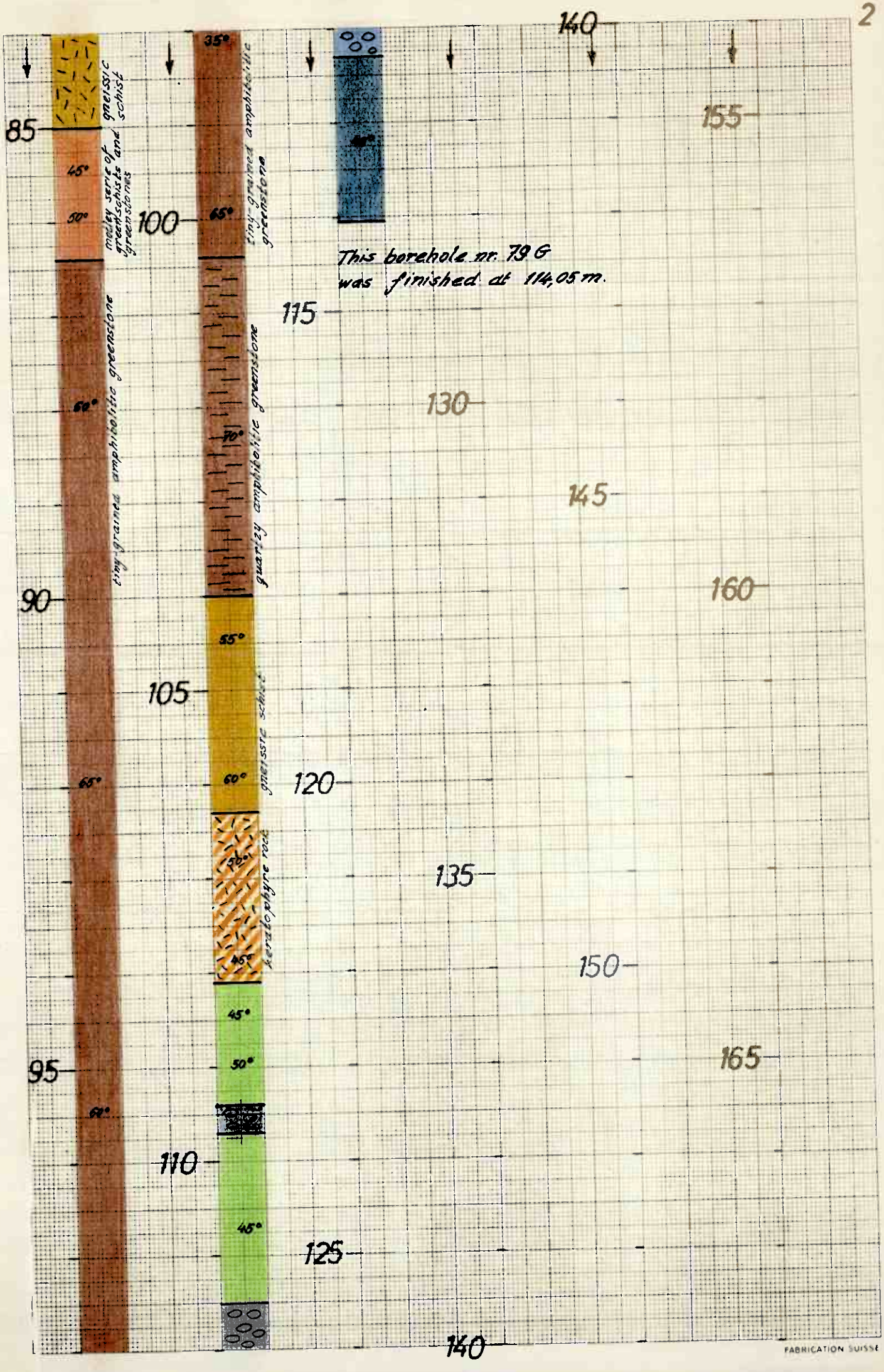
107,30 - 108,10	The conglomerate in the hornblende sericitic and little bit chloritic mica schist with some rodlike and acicular porphyroblasts of hornblende,with some schliers and rolled pobbles of quartz or quartzite. In the matrix are present mostly quartz and soda-lime feldspars too. The structure is conglomeratic,but with little bit clear foliatio which has average gradient 45° or 50° about. Some impregnation of the ore sulphides isn't present mostly.
108,10 - 109,40	The very strongly quartzy sericitic and little bit biotitic and fewly chloritic mica schist wit a lot of small rodlike and acicular porphyroblasts of hornblende and locally with some little schliers or pellets of quartz or quartzite too. The structure is blastoporphyric and banking. The average gradient of the not so clear foliation is 50°and 55° about.
109,40 - 109,70	The conglomerate as well as in 107,30 - 108,10m.
109,70 - 111,50	The very strongly quartzy sericitic hornblende mica schist as well as in 108,10 - 109,40m. The average gradient of this foliation is 45° around.
111,50 - 112,30	The conglomerate as well as in 107,30 - 108,10m.
112,30 - 114,05	The chloritic and locally little bit sericitic,garnet mica schist with some flakes of biotite,oftenly in some little schliers or pellets and with a lot of small and little grains of allotriomorphic and hypidiomorphic garnet. The structure of this rock is phaccidal schistose mostly. Some impregnation of the sulphides isn't present oftenly. The average gradient of this total foliation is 45° around.

This borehole nr. 79 G was finished at 114,05m on January 9th 1970.

M.Motys 13.1.1970

The petrografical profile of the borehole nr. 79 G., Tverrfjellet




gneissic schist
mainly series of greenschists and greenschistose rocks
fine-grained amphibolite greenstone
silty, calcareous fine-grained greenstone
quartz amphibolitic greenstone
quartz-sericite schists
serpentinized rock
This borehole nr. 79 G
was finished at 114,05 m.
FABRICATION SUISSE

THE BOREHOLE NR.81 G

Tverrfjellet

62/F.V.

The borehole nr. 81 G, Tverrfjellet mine, on the level VI-east, - 50° down to south-east.
(X = - 1,50, Y = - 92,0)

The petrografical description.

0,00 - 10,70 The fine, tiny-grained amphibolitic greenstone, locally more feldspatic and locally with some grains of carbonates too. In this rock are present some schliers or pellets and intercalations of metaquartzite, metaceratophyre or of white hydrothermal quartz too. Some hypidiomorphic or allotriomorphic grains or flakes of FeS_2 and more scarcely of FeS are presnnt too, but not much. The structure is massive or sheeting. The average gradient of this foliation is 0° - 15° above and only locally 30° around.

10,70 - 10,85 The white-gray metaquartzite with very poor impregnation of FeS_2 mostly and scarcely with FeS too. The structure is massive.

10.85 - 34,40 The fine grained, tender- and tiny-grained amphibolitic greenstone like as in 0,00 - 10,70 m, but around the intercalations or schliers of metakeratophyre or metaquartzite with more hypidiomorphic or allotriomorphic crushed grains of FeS_2, scarcely with some little flakes of FeS and with some small schlier which are created by the klinozoisite-epidotic matrix. Some oblique joints are filed by quartz matrix mostly. The average gradient of this foliation is 30° - 40° about, but locally 0° - 10° around (in example between 11 - 13 m around).

34.40 - 34,65 The chloritic and little bit biotitic, strongly infiltrated amphibolitic greenstone by the quartz-feldspatic (soda-lime feldspar) matrix. Hornblende creats a lot of little acicular and rodlike porphyroblasts. Some schliers are created by klinozoisite-apidote matrix. Some grains of carbonates are present too. The hypidiomorphic and allotriomorphic crushed grains of FeS_2 and some flakes of FeS, like the very poor impregnation are present too. The structure is sheeting-schistose and the texture is blastoporphyric and blastoophic. The average gradient of this foliation is 35° around.

34,65 - 35,75 The biotitic and little bit chloritic and locally amphibolitic gneissic-schist with a lot of the clear porphyroblasts of the soda-lime feldspar. The structure is maculose-schistose. Some allotriomorphic grains of FeS_2 or flakes of FeS and of FeS_2 are locally present too. The average gradient of this foliation is 40° about.

35,75 - 43,40 The tiny-grained and medium-grained amphibolitic and little bit feldspatic greenstone, with a lot of little schliers of the quartz-feldspatic matrix and of the quartz. Locally are present chlorite, zoisit-epidote and some grains of carbonates too. The little acicular and rodlike porphyroblasts are clear. Some very poor impregnation of FeS_2 mostly and scarcely of FeS is present too, like some littlehypidiomorphic or allotriomorphic crusher-grains or flakes. The structure is sheeting or thin-banking with little bit clear the total grain-clongation. The average gradient of this foliation is 30° - 35° around.

43,40 - 48,70 The myllonitic zone in the complex of the tiny-grained amphibolitic greenstone with a lot of schliers matrix, with some schlier or spots of quartz (hydrothermal, barren only) and locally with some positions of the myllonitic, quartz breccie. Some crusher allotriomorphic and hypidiomorphic grains of FeS_2 or flakes of FeS are locally green too, but not so much. The structure is myllonitic and locally only breccietic too.

48.70 - 50,00 The tiny-grained and medium-grained amphibolitic greenstone as well as in 35,75 - 43,40 m. The average gradient of this foliation is 50° - 60° around.

50,00 - 55,30 The white-gray metaquartzite with some very little acicular and rodlike grains of hornblende? with some little flakes or irregular grains of FeS_2 or FeS and with not much little irregular grains of FeO + Fe_2O_3, locally onlu too. The structure is massive. The chlorite are present in some little schliers locally too.

55,30 - 60,10 The chloritic, medium-grained and locally little bit coarse-grained amphibolitic greenstone with a lot of clear bigger acicular and rodlike prophyroblasts of hornblende. Locally are present in groundmass zoisit-epidote too. Soda-lime feldspar creats also a lot of little grains or spots ore is presnt together with quartz in some little schliers. Locally are present some little schliers of metakeratophyre or metaquartzite, oftenly with some very poor impregnations of FeS_2 mostly, with some FeS, ZnS or scarcely $CuFeS_2$ accessorcly only. Locally are these intercalations of metaquartzite or metakeratophyre little bit folded by the folds of the cm or dm amplitude (59,20 m). The structure is massive and sheeting and the texture is blastoporphyric and blastophitic within some clear grain-clongation. The total average gradient of this foliation is 50° - 55° about, but locally 25° - 30° around too.

60.10 - 61,90 The tiny-grained amphibolitic greenstone, with some schliers or little intercalations of quartz matter and locally only with some little spots of feldspar too (soda-lime feldspar). The structure is banking or sheeting. The average gradient of this foliation is 40° about. Some ore sulphides are present too, but locally only like little irregular (allotriomorphic grains or flakes, FeS2, mostly only.)

61.90 = 62,35 The medium-grained, feldspatic amphibolitic greenstone with zoisite-epidote, with some infiltration of quartz-feldspatic matrix, locally with some schliers of quartz and locally with some grains or spots of carbonates too. Some mineralisation of ore sulphides (FeS_2 mostly) are present, but like some little allotriomorphic grains or flakes locally only. Structure of this rock is massive or little bit sheeting and texture is blastoporphyric. The rodlike or acicular porphyroblasts of hornblende are present very much. The average gradient of this foliation is 40° around. Locally has this rock some schliers of the dark myllonitic matrice.

62,35 - 62,50 The coarse-grained and medium-grained amphibolitic greenstone with some spots grains or schliers of quartz, quartz-feldspar matrix or of soda-lime feldspar or more scarcely of some carbonates too. Locally are present some irregular allotriomorphic grains or flakes of ore sulphides (FeS_2 mostly). The structure is massive and the texture is blastoporphyric. Some grain clongation along the total foliation is little bit clear only.

62,50 - 64,65 The very strong impregnation of FeS_2 mostly in the quartzite with some accessoric impregnation of the other sulphides like chalcopyrite, sphalerite and pyrrhotite. Locally only are present some schliers of quartzite matrix without impregnation. The structure is massive and texture is porphyroblastic - cataclastic. The pyrite creats hypidiomerphic or allotriomorphic porphyroblasts in a quartz groundmass and sphalerite, pyrrhotite and chalcopyrite (more scarcely) creat some irregular microscopic amorphic forms around or the filling of the little microscopic joints in the pyritic grains. The result of the chemical analyse from this ore position between 62,50 - 64,65 m is: Cu 1,26 %, Zn 1,60 %, S 38,50 %.

64,65 - 69,60 The very strong impregnation of ore sulphides in quartzite with some thin or little schliers or intercalations of FeO - Fe_2O_3. From the sulphides is present mainly FeS_2 and $CuFeS_2$. FeS and ZnS are present minorly, but $CuFeS_2$

more than FeS and ZnS like accerssioric mineral only. Pyrite creats some crushed allotriomorphis or hypidiomorphic porphyroblasts in the quartz groundmass, and chalcopyrite and pyrrhotite or more scarcely sphalerite too creat some microscopic or very little irregular amorphic forms around or creat the filling of the little microscopic joints in the FeS_2 grains. The structure of this ore is massive and locally sheeting or thin banking. The texture of ore is blastoporphyric - cataclastic. The magnetite in the schliers are very fine-grained or tender-grained (grains of FeO + Fe_2O_3 are allotriomorphic). The result of the chemical analyse from this ore position between 64,65 - 69,60 m is: Cu 1,80 %, Zn 0,35 %, S 26,00 %.

69,60 - 73,30 The very strong impregnation of sulphides in quartzite with a lot of schliers or intercalations of magnetite. This ore is the same as in 64,65-69,60 m, but with much more FeO + Fe_2O_3 and with little bit more $CuFeS_2$. The structure is sheeting. The average gradient of the foliation of these FeO + Fe_2O_3 schliers or intercalations is 50° - 55° about. The result of the chemical analyse of this ore positions are: a) between 69,60 - 71,25 m is: Cu 1,52 %, Zn 0,20 %, and S 11,30 %. b) between 71,25 - 73,30 m is: Cu 3,05 %, Zn 0,20 %, S 20,20 %.

73,30 - 73,95 The very strong impregnation of sulphides in quartzite as well as in 62,50 - 64,65 m, but with more $CuFeS_2$. The structure is massive too. The result of the chemical analyse of this ore position between 73,30 - 73,95 m is: Cu 2,18 %, Zn 0,10 %, S 43,00 %.

73,95 - 76,40 The impregnation of sulphides in quartzite with a lot of schliers or compact positions of FeO + Fe_2O_3. The tiny-grained or tender-grained magnetite creats the compact, massive intercalations or positions which have 2-3 cm thickness too. The structure is sheeting or banking. The average gradient of a foliation of these FeO + Fe_2O_3 positions or intercalations or schliers is 50° about. The result of the chemical analyse of this ore position between 73,95 - 74,60 m is: Cu 2,18 %, Zn 0,05 %, S 8,95 %.

The average composition from these analyses between 62,50 - 76,40 m, from the ore body position:

62,50 - 64,65 = 2,15 m - Cu 1,26 %, Zn 1,60 %, S 38,50 %
64,65 - 69,60 = 4,95 m - Cu 1,80 %, Zn 0,35 %, S 26,00 %
69,60 - 71,25 = 1,65 m - Cu 1,52 %, Zn 0,20 %, S 11,30 %
71,25 - 73,30 = 2,05 m - Cu 3,05 %, Zn 0,20 %, S 20,20 %
73,30 - 73,95 = 0,65 m - Cu 2,18 %, Zn 0,10 %, S 43,00 %
73,95 - 76,40 = 2,45 m - Cu 2,18 %, Zn 0,05 %, S 8,95 %

The average compostion of the ore body position between 62,50 - 76,40 m is:

62,50 - 76,40 = 13,90 m - Cu 1,95 %, Zn 0,37 %, S 23,12 %

76,40 - 77,65 The strongly quartzy biotitic and amphibolitic gneissic schist with some schliers of quartz or quartzite and with a lot of schliers of fine-grained FeO + Fe_2O_3 and with some impregnation of ore sulphides. Pyrite creats the little crushed allotriomorphic grains and chalcopyrite creats some small amorphic irregular forms, irregular flakes etc. The sphalerite and pyrrhotite are present too, mostly together with chalcopyrite but more scarcely only, especially sphalerite. The composition of chalcopyrite is more high than of pyrite. The structure of this impregnated position is sheeting or phacoidal schistose too. The average gradient of this foliation is 50° about. Between 77,45 - 77,65 m is present the position of metaquartzite with poor impregnation of sulphide, but on the borders with the very strong impregnation of $CuFeS_2$ mostly only. The result of the chemical analyse of this impreganted position between 76,40 - 77,65 m is: Cu 3,30 %, Zn 0,20 %, S 7,15 %.

77,65 - 78,05 The dark amphibolitic and chloritic, myllonitic greenstone-schists or myllonite with some impregnation of chalcopyrite mostly and of pyrite little bit too(some crushed little allotriomorphic grains). The pyrrhotite creats some little microscopic amorphic forms and it's present oftenly together with chalcopyrite. The sphalerite is present scarcely only. Between 77,85 - 78,05 m is the impregnation of $CuFeS_2$ more strong. The result of the chemical analyse from the position between 77,65 - 78,05 m is: Cu 9.15 %, Zn 0,10 %, S 14,00 %.

78,05 - 81,10 The myllonitic, amphibolitic and chloritic schist and greenschist and myllonite, with a lot of porphyroblasts of hornblende, locally little bit crushed. Some impregnation of $CuFeS_2$ and FeS and FeS_2 are present too, but very poor and weak only. Locally are present some big amorphic forms of $CuFeS_2$ with little bit FeS. The structure is myllonitic only. The result of the chemical analyse from this rock position between 78,05 - 81,10 m is: Cu 0,87 %, Zn 0,10 %, S 2,00 %.

81,10 - 84,60 The strong impregnation of ore sulphides, with a lot of schliers and intercalations of FeO + Fe_2O_3, but locally only with some positions of the massive impregnation of sulphides. This ore position is like that between 69,60 - 73,30 m. The structure is sheeting and thin banking too. The average gradient of this foliation allong the magnetites schliers is 60° - 65° about, but from 81,80 m to 84,20 m is 0° - 10° about together

with very flat folds of the cm and dm amplitade. The result of the chemical analyse from the position between 81,10 - 81,60 m is: Cu 4,85 %, Zn 0,20 %, S 11,10 %. The result from the chemical analyse of the position between 81,60 - 84,60 m is: Cu 4,80 %, Zn 0,30 %, S 16,80 %.

84,60 - 87,60 The metaquartzite with some poor, not so strong impregnation of sulphides (FeS_2, FeS and $CuFeS_2$) and with a lot of schliers or little intercalations of FeO + Fe_2O_3. Locally are present some little bit more big amorphic forms of $CuFeS_2$. The structure is sheeting and locally banking. The average gradient of this foliation is 0 - 10° locally 30° - 40° only. This rock is little bit folded by the folds of the cm and dm amplitudes folds, very flat only. The result of the chemical analyse from this impregnated position between 84,60 - 87,60 m is: Cu 2,50 %, Zn 0,20 %, S 7,15 %.

87,60 - 88,80 The strong impregnation of the ore sulphides (FeS_2, $CuFeS_2$ and FeS) and of magnetite in quartzite the same as in 73,95 - 76,40 m. The structure is banking and sheeting. The average gradient of this foliation (allong the elongation of the schliers of magnetite) is 50° - 60°, but locally only 70° about too. The result of the chemical analyse from this impregnated position between 87,60 - 88,80 m is: Cu 3,50 %, Zn 0,20 % S 7,60 %.

88,80 - 89,70 The medium-grained locally only little bit coarse-grained amphibolitic greenstone with some schliers of dark myllonitic matrice and locally with some schliers of quartz. The impregnation of chalcopyrite and scarcely of pyrite isn't so strong. Locally are present some amorphic forms of $CuFeS_2$ (max. size 1 cm in average). This rock has mostly the myllonitic structure. The result of the chemical analyse from this rock position between 88,80 - 89,70 m is: Cu 4,75 %, Zn 0,20 %, S 9,10 %.

89,70 - 90,60 The quartzite with some poor and weak impregnation of ore sulphides together with some little schliers of magnetite like as in 84,30 - 87,60 m. The average gradient of this foliation is 35° - 40° and locally only 50° about too. The result of the chemical analyse from this position between 89,70 - 90,60 m is: Cu 4,25 %, Zn 0,10 %, S 6,80 %.

90-60 - 106,35 The motley serie of the chloritic amphibolitic greenschists and of the medium grained amphibolitic greenstones with a lot of schliers and intercalations of quartzite and with some irregular positions or schliers or lenticles of white hydrothermal quartz. The structure is schistose, phacoidal schistose and sheeting too. The impregnation of all this complex is little bit strong. From the impregnation sulphides are present $CuFeS_2$, FeS and FeS_2 like main ore minerals and ZnS like accesoric ore mineral only. From the other ore minerales are present mainly magnetite, which creats a lot of schliers or intercalations, in quartzite oftenly only. The chalcopyrite and pyrrhotite creat some big amorphic forms too. Pyrite is present like allotriomorphic, crushed grains or flakes. The impregnation of ore sulphides is more acumulate in the positions of quartzite or in positions ate of hydrothermal quartz and around them ($CuFeS_2$. Between 93,00 - 93,90 m is present little bit more strong impregnation in more quartzy position. Between 94,85 - 95,70 m is present strong impregnation of sulphides with a lot of schliers and intercalations of magnetite like as in 73,95 - 76,40 m. Between 101,25 - 101,50 m and 104,40 - 104,60 m are present the massive position of FeS_2 impregnation in quartzite with FeS and $CuFeS_2$. From 105,00 m about is present more pyrrhotite than chalcopyrite. The average gradient of this foliation is: 40° about , but in 102,30 - 102,70 m 0° - 10° about only. The result of the chemical analyses from this motley serie of impregnated rocks are:

a. 90,60 - 93,00 m is: Cu 3,50 %, Zn 0,10 %, S 8,25 %
b. 93,00 - 93,90 m is: Cu 7,10 %, Zn 0,15 %, S 15,80 %
c. 93,90 - 95,90 m is: Cu 4,50 %, Zn 0,10 %, S 11,00 %
d. 95,90 - 96,10 m is: Cu 4,00 %, Zn 0,10 %, S 6,75 %
e. 96,10 - 98,65 m is: Cu 6,50 %, Zn 0,10 %, S 12,10 %
f. 98,65 - 99,40 m is: Cu 1,65 %, Zn 0,10 %, S 3,60 %
g. 99,40 -100,70 m is: Cu 5,25 %, Zn 0,10 %, S 10,20 %
h. 100,70 -103,35 m is: Cu 4,50 %, Zn 0,10 %, S 14,45 %
i. 103,35 -106,35 m is: Cu 4,85 %, Zn 0,10 %, S 17,06 %

The averago compostion from these analyses between 76,40 - 106,35 m from the impregnation of rocks, which are situated on the south from the main ore body:

7. 76,40 - 77,65 m = 1,25 m - Cu 3,30 %, Zn 0,20 %, S 7,15 %
8. 77,65 - 78,05 m = 0,40 m - Cu 9,15 %, Zn 0,10 %, S 14,00 %
9. 78,05 - 81,10 m = 3,05 m - Cu 0,87 %, Zn 0,10 %, S 2,00 %
10. 81,10 - 81,60 m = 0,50 m - Cu 4,85 %, Zn 0,20 %, S 11,10 %
11. 81,60 - 84,60 m = 3,- m - Cu 4,80 %, Zn 0,30 %, S 16,80 %
12. 84,60 - 87,60 m = 3,- m - Cu 2,50 %, Zn 0,20 %, S 7,15 %
13. 87,60 - 88,80 m = 1,20 m - Cu 3,50 %, Zn 0,20 %, S 7,60 %
14. 88,80 - 89,70 m = 0,90 m - Cu 4,75 %, Zn 0,20 %, S 9,10 %

15. 89,70 - 90,60 m = 0,90 m - Cu 4,25 %, Zn 0,10 %, S 6,80 %
16. 90,60 - 93,00 m = 2,40 m - Cu 3,50 %, Zn 0,10 %, S 8,25 %
17. 93.00 - 93,90 m = 0,90 m - Cu 7,10 %, Zn 0,15 %, S 15,80 %
18. 93,90 - 95,90 m = 2,-- m - Cu 4,50 %, Zn 0,10 %, S 11,00 %
19. 95,90 - 96,10 m = 0,20 m - Cu 4,00 %, Zn 0,10 %, S 6,75 %
20. 96,10 - 98,65 m = 2,55 m - Cu 6,50 %, Zn 0,10 %, S 12,10 %
21. 98,65 - 99,40 m = 0,75 m - Cu 1,65 %, Zn 0,10 %, S 3,60 %
22. 99,40 -100,70 m = 1,30 m - Cu 5,25 %, Zn 0,10 %, S 10,20 %
23.100.70 -103,35 m = 2,65 m - Cu 4,50 %, Zn 0,10 %, S 14,45 %
24.103,35 -106,35 m = 3,-- m - Cu 4,85 %, Zn 0,10 %, S 17,06 %

The average compostion of the impregnation position between 76,40 - 106,35 is:

76,40 -106,35 m =29,95 m - Cu 4,10 %, Zn 0.14 %, S 10,52 %

The average compostion of the ore body and impregnated position together, which are situated between 62,50 - 106.35 m is:

62,50 -106,35 =43,85 m - Cu 3,42 %, Zn 0,21 %, S 14,52 %

106,35-114,85 The motley serie of the medium-grained and tiny-grained amphibolitic greenstone with a lot of schliers and positions of quartzite and metaquartzite or keratophyre, with some thin positions of the coarse-grained amphibolitic greenstone, between 107,00 - 109,00 m mostly. Some impregnation of the ore sulphide are present scarcely only in quartzite intercalations too. The structure is banking or sheeting and massive locally only. The average gradient of this foliation is 55° - 60° about. The result from the chemical analyses from this rock position are:

a. 106,36-109,35 m is: Cu 0,22 %, Zn 0,05 %, S 1,75 %
b. 109,35-112,35 m is: Cu 0,08 %, Zn 0,05 %, S 0,75 %
c. 112,35-114,85 m is: Cu 0,07 %, Zn 0,05 %, S 1,00 %

The average from these analyses between 106,35 - 114,85 m is:

106,35 - 114,85m = 8,50m - Cu 0,13% , Zn 0,05% , S 1,18%

114,85-116,05 The very strong impregnation of ore sulphides (FeS_2 mostly) in quartzite as well as in 62,50 - 64,65 m, but with more $CuFeS_2$ in average. The structure is massive. The result of the chemical analyse from this ore position between 114,85 - 116,05 m is: Cu 2,25 %, Zn 2,40 %, S 38,50 %

116,05-117,80 The motley serial of the amphibolitic and chloritic greenschist and of the chloritic amphibolitic tiny-grained and medium-grained greenstone like as in 106,05 - 114,85 m. Between 116,05 - 116,90 m are present a lot of little schliers and intercalations of quartzite. In 116,10 m is present the position (1,5 cm thickness) of the strong impregnation of FeS_2 mostly in quartzite. The structure of this rock is sheeting and schistose too. The average

gradient of this foliation is 55° about. The result of the chemical analyse from the rock position between 116,05 - 117,80 m is: Cu 0,13 %, Zn 0,05 %, S 0,50 %.

117,80-118,30 The biotitic, garnet gneissic mica schist with little bit chlorite too. Some hornblende porphyroblasts (very little only) are present accessoricly only. The structure is parallel schistose and gneissic schistose. Some ore sulphides isn't present oftenly. The average gradient of this foliation is 55° around.

118,30-118,80 The amphibolitic, little bit chloritic and biotitic garnet gneissic schist, with a lot of little acicular and rodlike porphyroblasts of hornblende, with a lot of little grains and schliers or spots, which are created by the little grais of garnet too. In this rock are present some little flakes of FeS and some little grains (allotriomorphic) of FeS_2, but locally only. The structure is phacoidal schistose. The average gradient of this foliation is 50° and 55° around.

118,80 -120,15 The medium-grained and locally only little bit coarse-grained amphibolitic and zoisite-epidotic greenstone, strongly infiltrated by the quartz-feldspatic (soda-lime feldspar) matrix. The chlorite are present locally too. Some ore sulphides are present only locally like some groups of the flakes of FeS mostly. FeS_2 (allotriomorphic) little grains are present scarcely. The structure is sheeting and banking and the texture is blastoporphyric and blasto-ophitic. The average gradient of this foliation is 50° around.

120,15-120,90 The medium-grained and tiny-grained amphibolitic greenstone, locally with some little schliers or pellets, which are created by quartz or quartz feldspar matrice. Some little allotrio-morphic grains of FeS_2 or some little flakes of FeS are present scarcely only. The structure is massive and sheeting. The texture is blasto-porphyric. The average gradient of this foliation is 50° about.

120,90-123,55 The sericitic and little bit chloritic metaquart-zite, with a lot of small rodlike and acicular porphyroblasts of hornblende, without some clear grain-clongation oftenly. Some ore sulphides isn't present oftenly. The structure is massive and sheeting. The average gradient of this foliation is 50° and 55° around.

123,55-133,10 The sericitic and biotitic, quartzy, garnet micaschist, with a lot of schliers, pellet or spots of quartz matrice. Very carcely are present some little rodlike or acicular porphyroblasts of hornblende, locally only. Some ore sulphides isn't present at all. The structure is phacoidal schistose. The size of grains of garnet is 2-3 mm and 5 mm too in average locally, but oftenly 1 mm around. The average gradient of this foliation is 40° and 45° about, but in 130,00 m $20-30^{o}$ about.

The borehole nr. 81 G was finished at 133,10 m on the 13th February 1970 at 11.30 a.m.

(Milosh Motys).

THE BOREHOLE NR. 82 G.
Tverrfjellet mine, level 6th East

The Borehole no. 82 G, on the level VIth -East horizontal to South-West. (X = - 15,0 , Y = - 90,0)

The petrographical description.

0,00 - 2,45	The tiny-grained little bit chloritic amphibolitic greenstone, with a lot of little schliers or spots or pellets of quartz and with some spots or grains of soda-lime feldspar, locally with some little bit bigger acicular or rodlike porphyroblasts of hornblende. Some spots or grains are created by carbonates. In this rock are present some little allotriomorphic, scarcely hypidiomorphic grains or flakes of FeS_2 and very scarcely some flakes of FeS. The texture is maasive mostly, sheeting locally only. The result of the chemical analyse from this rock position between 0,00 - 2,45 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.
2,45 - 3,00	The gray and bright gray metaquartzite, locally with some little acicular or rodlike porphyroblasts of hornblende and scarcely with some little spot or little schliers of chloritic matrix. Some very poor impregnation of FeS_2 mostly (little grains, allotriomorphic and oftenly crushed) and more scarce with FeS. Some microscopic impregnation of FeO + Fe_2O_3 is locally present too. The structure is massive, but locally is present the little bit clear grain-clongation (the acicular or rodlike porphyroblasts of hornblende). The average gradient of this foliation is 40° about. The result of the chemical analyse from this rock position between 2,45 - 3,00 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.
3.00 - 12,40	The motley serie of the tiny-grained and medium-grained amphibolitic and locally amphibolitic-chloritic greenstone, locally more feldspatic (soda-lime feldspar), with a lot of schliers, pellets or spots of quartz matrix or of soda-lime feldspatic-quartz matrix and locally with some thin intercalations of metaquartzite or metaceratophyre, which have some very poor impregnation of FeS2 mostly. The spots or grains of carbonates are present locally too. The structure is sheeting or banking. The average gradient of this foliation is 50° about. The result of the chemical analyses from this rock position between 3,00 - 12,40 m are: Between 3,00 - 7,40 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 % and between 7,40 - 12,40 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

12,40 - 13,20 The amphibolitic, chloritic and biotitic gneissic schist with a lot of spots or irregular porphyroblasts of soda-lime feldspars and with the total maculose structure. Some grain clongation is little bit clear. The average gradient of this foliation is 50° - 55° around. Some grains or flakes of FeS_2 mostly only are present locally only. The result of the chemical analyse from this rock position between 12,40 - 13,20 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

13,20 - 49,20 The motley serie of the chloritic and amphibolitic and biotitic greenschists, with some thin schliers or intercalations of the tiny-grained amphibolitic greensone, with a lot of little schliers or pellets of the quartzite, or of the quartz-feldspatic (soda-lime feldspar) matrice. The little and small acicular and rodlike porphyroblasts of hornblende and of actiuclite (more scarce) are very clera, but without some the grain-clongation mostly. Some irregular allotriomorphic grains or hypidiomorphic grains of FeS_2 and some little flakes of FeS are locally present too, but not much. The structure is sheeting and locally schistose and the texture is blastoporphyric and blastoophitic. The average gradient of this foliation is 40° - 50° around. The result of the chemical analyses from this rock position between 13,20 - 49,20 m are: between
13,20 - 18,00 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
18,00 - 22,10 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
22,10 - 25,20 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
25,20 - 29,80 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
29,80 - 34,35 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
34,35 - 38,70 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
38,70 - 43,20 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %
43,20 - 49,20 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %

49,20 - 51,25 The motley serie of the chloritic and amphibolitic greensone, with some flakes of biotitic, with a lot of bigger rodlike and acicular porphyroblasts of hornblende and locally with some spots or grains of carbonates too. Some schliers and pellets are created by quartz or soda-lime feldspatic - quartz matrix. The soda-lime feldspars are present like spots or grains (porphyroblasts) too. Locally only are present some allotriomorphic and hypidiomorphic grains of FeS_2 and some little flakes of FeS and of FeS_2 too. The structure of this rock is schistose-sheeting and the texture is blastoporphyric and blastoophitic. Some total grain-clongation isn't clear enough. The average gradient of this foliation is 45° - 50° about. The result of the chemical analyse from this rock position between 49,20 - 51,25 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

51,25 - 52,30 The medium-grained amphibolitic greenstone with the strong infiltration of quartz feld-

spatic (soda-lime feldspars) matrice. The chlorite and zoizit-epidote are present too. The acicular and rodlike small or little porphyroblasts are present very much. They heven't some clear grain- clongation. Some schliers of quartz or quartz-feldspar matrice are present too. Some allotriomorphic or hypidiomorphic grains of FeS_2 and some flakes of FeS are present too, but oftenly locally only. The structure is massive and sheeting with blastoporphyric and blastoophitic structure. Some not so clear average gradient of this foliation is 35° - 40° about. The result of the chemical analyse from this position between 51,25 - 52,30 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

52,30 - 54,40 — The bright-gray metaquartzite with a lot of flakes of FeS and with a lot of little allotriomorphic, oftenly crushed grains of FeS_2. The structure is massive abs locally only phacoidal. Between 52,40 - 52,50 m and between 53,45 - 53,55 m are present some positions, which have ca 5 cm coarse grained, chloritic amphibolitic greenstone, with poor impregnation of FeS_2 and FeS and ca. 5 cm strong impregnation of FeS_2 mostly (in quartzite too), with some acicular or rodlike porphyroblasts of hornblende too. The result of the chemical analyse from this position between 52,30 - 54,40 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

54,40 - 55,15 — The barren white hydrothermal quartz, locally with some thin schliers or little pellets of chloritic matrice and locally only with some flakes or little pellets of FeS with some little amorphic forms of $CuFeS_2$. The structure of the chemical analyse from this position is: Cu 0,00 %, Zn 0,00 %, S 0,00 %

55,15 - 56,20 — The gray and dark-gray quartzite, locally with some poor, microscopic impregnation of FeS and FeS_2 oftenly only. The structure is massive. The result of the chemical analyse from this position between 55,15 - 56,20 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

56,20 - 57,25 — The tiny-grained and locally tender-grained amphibolitic greensone with a lot of schliers or intercalations of metaquartzite or quartzite. Some irregular little allotriomorphic grains or flakes of FeS_2 are present, but oftenly around the quartzitic schliers or in FeS is present more scarcely too. The structure is sheeting and locally banking. The average gradient of this foliation is 55° - 60° around. Between 57,10 - 57,25 m is present a position of a myllonitic, chloritic and amphibolitic gneissic-schist with some grains of FeS mostly too. The result of the chemical analyse of this

rock position, between 56,20 - 57,25 m is: Cu 0,05 %, Zn 0,00 %, S 3,00 %.

57,25 - 61,30
4,05m

The very strong impregnation of FeS_2 mostly in quartzite, together with some little, microscopic amorphic forms of sphalerite and pyrrehitite and chalcopyrite too, which are present accessoricly only. The pyrite creats some little microscopic, allotriomorphic grains or hypidiomorphic, crushed grains. The sphalerite, pyrrhotite and chalcopyrite creat some microscopic amorphic forms around or chalvopyrite, oftenly together with pyrrhotite creat some filling of the little microscopic joints in the pyritic-grains. The groundmas is created by quartz. The structure is massive and the texture is blastoporphyric and cataclastic. The result of the chmeical analyse from this ore position between 57,25 - 61,30 m is: Cu 0,28 %, Zn 1,40 %, S 3,75 %.

61,30 - 64,10

The motley serie of the myllonitic amphibolitic and chloritic schist and of the medium and tiny-grained amphibolitic greensone, with some schliers and positions of quartzite or meta-quartzite. Some ore sulphides (FeS_2) are present scarcely mostly. The structure os this rock is sheeting and myllomitic locally too. The average gradient of this foliation is 55° - 60° around. The result of the chemical analyse from this rock position between 61,30 - 64,10 m is: Cu 0,08 %, Zn 0,37 %, S 3,50 %.

64,10 - 72,05
7,95m

The very strong impregnation of the ore sulphides (FeS_2 mostly) as well as in 57,25 - 61,30 m, with the massive structure. The result of the chemical analyse from this ore position between 64,10 - 72,05 m are: between
64,10 - 65,90 m: Cu 0,40 %, Zn 1,55 %, S 37,50 %
65,90 - 68,80 m: Cu 0,40 %, Zn 3,10 %, S 41,00 %
68,80 - 72,05 m: Cu 0,80 %, Zn 1,70 %, S 41,00 %.

72,05 - 72,40

The chloritic and little bit sericitic, quartzy myllonitic schist with a lot of schliers of quartzite and with some more poor impregnation of the ore sulphides (FeS2 mostly). The structure is schistose. The average gradient of this foliation is 65° about. The result of the chemical analyse from this rock position between 72,05 - 72,40 m is: Cu 0,20 %, Zn 0,50 %, S 16,50%

72,40 - 72,75
0,35m

The very strong impregnation of the ore sulphides (FeS2 mostly) as well as in 57,25 - 61,30 m, but locally with some little schliers of magnetite. The structure is massive, but locally sheeting. The result of the chemical analyse from this ore position between 72,40 - 73,75 m is: Cu 1,75 % Zn 0,55 %, S 36,00 %.

73,75 - 75,70
1,95m

The strong impregnation of FeS_2 mainly in quartzite, with the other ore sulphides (FeS, ZnS and $CuFeS_2$ accessoricly) in quartzite with a lot of little schliers and little intercalations of FeO + Fe_2O_3. The magnetite ine these schliers creats allotriomorphic very fine-grains agregates. The pyrite creats allotriomorphic and scarcely hypidiomorphic grains, crushed oftenly. The other ore sulphides, like chalcopyrite, sphalerite and pyrrhotite creat some little and mostlu microscopic amorphic forms, which are situated around the pyritic grains or creat ($CuFeS_2$ together with FeS) some filling of the microscopic joints in the pyritic grains. The structure is sheeting and thin banking. The average gradient of this foliation is 65° - 70°. The result of the chemical analyse from this ore position between 72,75 - 75,70 m is: Cu 4,00 %, Zn 0,45 %, S 17,50 %.

75,70 - 78,30
2,60m

The strong impregnation of the ore sulphides (FeS_2 mainly) with a lot of schliers of magnetite in quartzite like as in 73,75 - 75,70 m. Between 76,80 - 77,30 m and between 77,80 - 77,90 m are present the position of the very strong impregnation of the ore sulphides with a massive structure as well as in 57,25 - 61,30 m. The result of the chemical analyse from this ore position between 75,70 - 78,30 m is: Cu 2,30 %, Zn 0,22 %, S 26,00 %.

78,30 - 80,90
2,60m

The strong impregnation of the ore sulphides (FeS_2 and $CuFeS_2$ mainly) in quartzite with a lot of intercalations and schliers of FeO + Fe_2O_3 as well as in 73,75 - 75,70 m, but with much more intercalation and more thick intercalations of FeO + Fe_2O_3. The structure is banking. The average gradient of this foliation is 60° - 65° about. The result of the chemical analyse from this ore position between 78,30 - 80,90 m is: Cu 2,80 %, Zn 0,20 %, S 13,00 %.

80,90 - 81,40
0,50m

The very strong impregnation of the ore sulphides in quartzite, locally only with some little schliers of FeO + Fe_2O_3 as well as in 72,40 - 73,75 m. The result of the chemical analyse from this ore position between 80,90 - 81,40 m is: Cu 4,30 %, Zn 0,28 %, S 27,00 %.

The average compostion from the ore body position which is situated between 57,25 - 81,40 m is:

57,25 - 61,30 m = 4,05 m - Cu 0,28 %, Zn 1,40 %, S %
61,30 - 64,10 m = 2,80 m - Cu 0,08 %, Zn 0,37 %, S 3,50 %
64,10 - 65,90 m = 1,80 m - Cu 0,40 %, Zn 0,40 %, S 37,50 %
65,90 - 68,80 m = 2,90 m - Cu 0,40 %, Zn 3,10 %, S 41,00 %
68,80 - 72,05 m = 3,25 m - Cu 0,80 %, Zn 1,70 %, S 41,00 %
72,05 - 72,40 m = 0,35 m - Cu 0,20 %, Zn 0,50 %, S 16,50 %
72,40 - 73,75 m = 1,35 m - Cu 1,75 %, Zn 0,55 %, S 36,00 %

- 73,75 - 75,70 m = 1,95 m - Cu 4,00 %, Zn 0,45 %, S 17,50 %
- 75,70 - 78,30 m = 2,60 m - Cu 2,30 %, Zn 0,22 %, S 26,00 %
- 78,30 - 80,90 m = 2,60 m - Cu 2,80 %, Zn 0,20 %, S 13,00 %
- 80,90 - 81,40 m = 0,50 m - Cu 4,30 %, Zn 0,28 %, S 27,00 %

The average compostion between 57,25 - 81,40 m = 24,15 m is: Cu 1,22 %, Zn 1,12 %, S 29,28 %

The average compostion between 64,10 - 81,40 m = 17,30 m is: Cu 1,64 %, Zn 1,18 %, S 30,23 %.

81,40 - 84,65
3,25 m

The motley serie of the chloritic, amphibolitic and myllonitic greenschist, with flakes of biotite too and with a lot of schliers or little intercalations of quartzite and with some little bit more, strong impregnation of FeS_2 and $CuFeS_2$ and scarcely of FeS too. The crushed allotriomorphic pyrritic grains are mostly concentrated in some schlier, which are parallel with the total schistose. The chalcopyrite creats oftenly little amorphic forms, which are 0,5 cm maximally big in average. The structure is myllonitic and schistose or phacoidal schistose. The hornblende creat a lot of little and small porphyroblast, without some grain-clongation. The average gradient of this foliation is 55° around. The result of the chemical analyse from the impregnated position between 81,40 - 82,95 m is: Cu 2,50 %, Zn 0,22 %, S 7,00 %. The result of the chemical analyse from the impregnated position between 82,95 - 83,40 m is: Cu 1,80 %, Zn 0,15 %, S 8,00 %.

The average chemical compostion of the position between 81,40 - 83,40 m = 2,00 m is: Cu 2,34 %, Zn 0,20 %, S 7,23 %.

The average chemical compostion of the position between 64,10 - 83,40 m = 19,30 m is: Cu 1,70 %, Zn 1,07 %, S 27,85 %.

The average chemical compostion of the position between 57,25 - 83,40 m = 26,15 m is: Cu 1,31 %, Zn 1,05 %, S 27,59 %.

The results from the other analyses from this position, but more poor of impregnation, which is situated between 83,40 - 84,65 m are:

83,40 - 84,20 m = 0,80 m - Cu 0,33 %, Zn 0,15 %, S 4,00 %
84,20 - 84,65 m = 0,45 m - Cu 0,10 %, Zn 0,15 %, S 2,00 %

The average chemical compostion of the position between 83,40 - 84,65 m = 1,25 m is: Cu 0,25 %, Zn 0,15 %, S 3,28 %.

The average chemical compostion of the position between 81,40 - 84,65 m = 3,25 m is: Cu 1,54 %, Zn 0,18 %, S 5,71 %.

The average chmeical compostion of the position between 64,10 - 84,65 m = 20,55 m is: Cu 1,61 %, Zn 1,02 %, S 26,35 %.

The average chemical compostion of the position between 57,25 - 84,65 m = 27,40 m is: Cu 1,26 %, Zn 1,01 %, S 26,49 %.

84,65 - 88,10

The chloritic and biotitic greenschist with some intercalations of sericitic, chloritic and biotitic micaschist. Locally are prensent some little acicular or rodlike porphyroblasts of hornblende and locally, mostly in strongly chloritic and biotitic greenschists, is present some mineralisation of FeS_2 mostly like little flakes or irregular flake grains. A lot of schliers, lenticles, spots, or intercalations are created by quartz. Very much the other spots are created by soda-lime feldspars and not much by some carbonates too. The structure is phacoidal schistose and schistose and the texture is porphyroblastic. The average gradient of this foliation is 50° about. The result from the chemical analyses from this position between 84,65 - 88,10 m are: between 84,65 - 86,40 m is: Cu 0,00 %, Zn 0,00 %, S 0,00%. Between 86,40 - 88,10 m is: 0,00 % Cu, 0,00 % Zn, 0,00 % S.

88,10 - 89,90

The feldspatic and carbonatic, epidotic, amphibolitic greenstone, but chloritic too, with a lot of schliers of quartz or quartz-feldspatic matrix. Some little rodlike and acicular porphyroblasts are created by hornblende. The structure is sheeting and phacoidal schistose. The texture is blastoporphyric mostly. The average gradient of this foliation is 55° around. The result from the chemical analyse from this position between 88,10 - 89,90 m is: Cu 0,00 %, Zn 0,00 %, S 0,00%

89,90 - 91,80

The coarse grained, chloritic and little bit zoisite-epidotic amphibolitic greensone, locally with some flakes or acumulations of flakes of biotite. The hornblende creats a lot of big acicular and rodlike porphyroblasts, which have some clear grain-clongation, parallel with the total foliation (schistosity). The structure is massive or little bit sheeting and the texture is blastoporphyric. The average gradient of this foliation is ca. 45° - 50° about. The result from the chemical analyse from this position between 89,90 - 91,80 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %

91,80 - 96,40

The amphibolitic and chloritic quartzy greenstone-schist or greenschist with biotite too, with a lot of little schliers and intercalations of quartz or quartzite. The structure is schistose or sheeting. The average gradient of this foliation is 35° - 40° about. Between 92,00 - 92,90 m and between 93,80 - 94,15 m are present the positions of a gray metaquartzite, locally

only, around the bordres with some little schliers of a chloritic and amphibolitic matrice together with some poor impregnation of FeS_2 mostly. The result of the chemical analyse from this position between 91,80 - 96,40 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %

96,40 - 104,05 — The tiny-grained amphibolitic and chloritic greensone with a parallel sheeting and banking structure with a lot of little schliers, pellets or little intercalations of quartz or quartz-feldspatic matrice. Some ore sulphides mineraliastion isn't present mostly or scarcely only. The average gradient of this foliation is 50° - 55° around. Between 99,25 - 99,60 m is present the myllonitic zone with a lot of schliers of the dark myllonitic matrix. Some ore sulphides mineraliaation is present very scarce only. Between 103,00 - 104,05 m are present some little grains of garnet and some little schliers of a dark myllonitic matrix too. The result of the chemical analyse from this position between 96,40 - 104,05 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

104,05 - 105,10 m — The medium-grained amphibolitic greensone, which is very strong impregnated by a quartz-feldspatic matrice. Locally only are present some little allotriomorphic grains of FeS_2 mostly. The structure is massive and a texture is blastoophitic and blastoporphyric too.

105,10 - 109,70 — The chloritic and amphibolitic greenschist with little bit sericite and biotite, with a lot of bigger rodlike and acicular porphyroblasts of hornblende, which have locally little bit clear grain clongation too. The structure is phacoidal schistose and pell-mell too. The texture is blastoporphyric and blastoopitic too. Between 105,40 - 106,50 m is present the myllonitic and tectonic zone with a lot of schliers of a dark myllonitic matrix. The result of the chemical analyse from the positions between 104,05 - 109,70 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

109,70 - 110,80 — The quartzite or metaquartzite with a lot of mostly irregular schliers or little intercalations of chloritic, sericitic and biotitic green-mica-schist, locally with some garnet matrice too in quartzite groundmass. Some ore sulphides isn't present mostly. The structure is phacoidal schistose and sheeting. The average gradient of this foliation is 55° around. The result of the chemical analyse from this position between 109,70 - 110,80 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

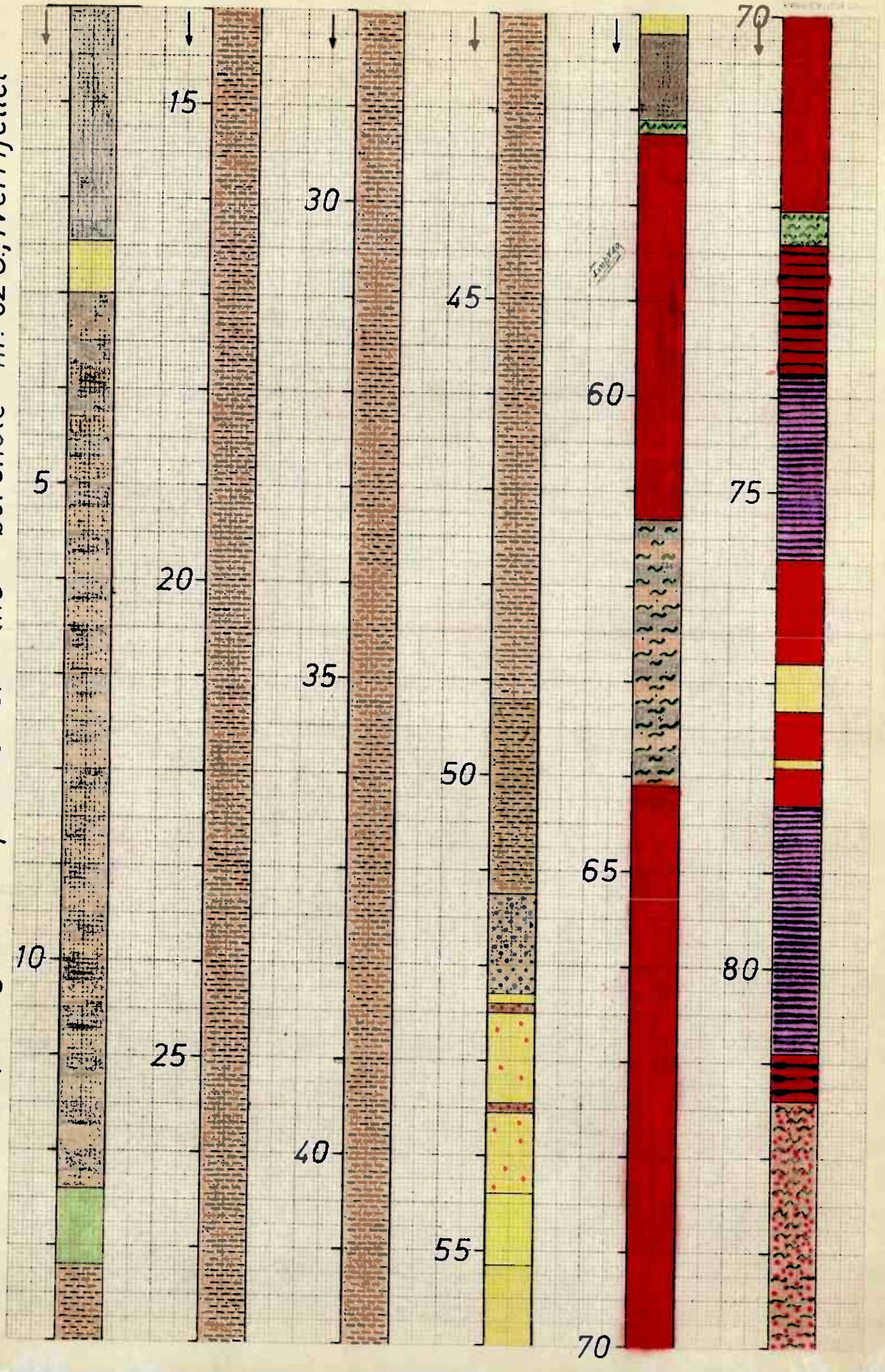
110,80 - 115,50	The quartzy, amphibolitic keratophyre rock with a lot of little and little bit bigger rodlike and acicular porphyroblasts of hornblende, which have some little bit clear grain clongation, but locally only. The total structure is massive or banking locally too and a texture is blastoporphyric and blastoophitic. Between 114,00 - 115,50 m is present the position of a myllonitic and tectonic zone. The result of the chemical analyses from this position between 110,80 - 115,50 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.
115,50 - 119,00	The chloritic, biotitic and quartzy garnet mica schist with a lot of lenticles, schliers and pellets of quartz matrix and with a lot of small and little grains of garnet. The structure is phacoidal and phacoidal schistose. The average gradient of this foliation is 45° - 50° around. The result of the chemical analyse from this position between 115,50 - 119,00 m is: Cu 0,00 %, Zn 0,00 %, S 0,00 %.

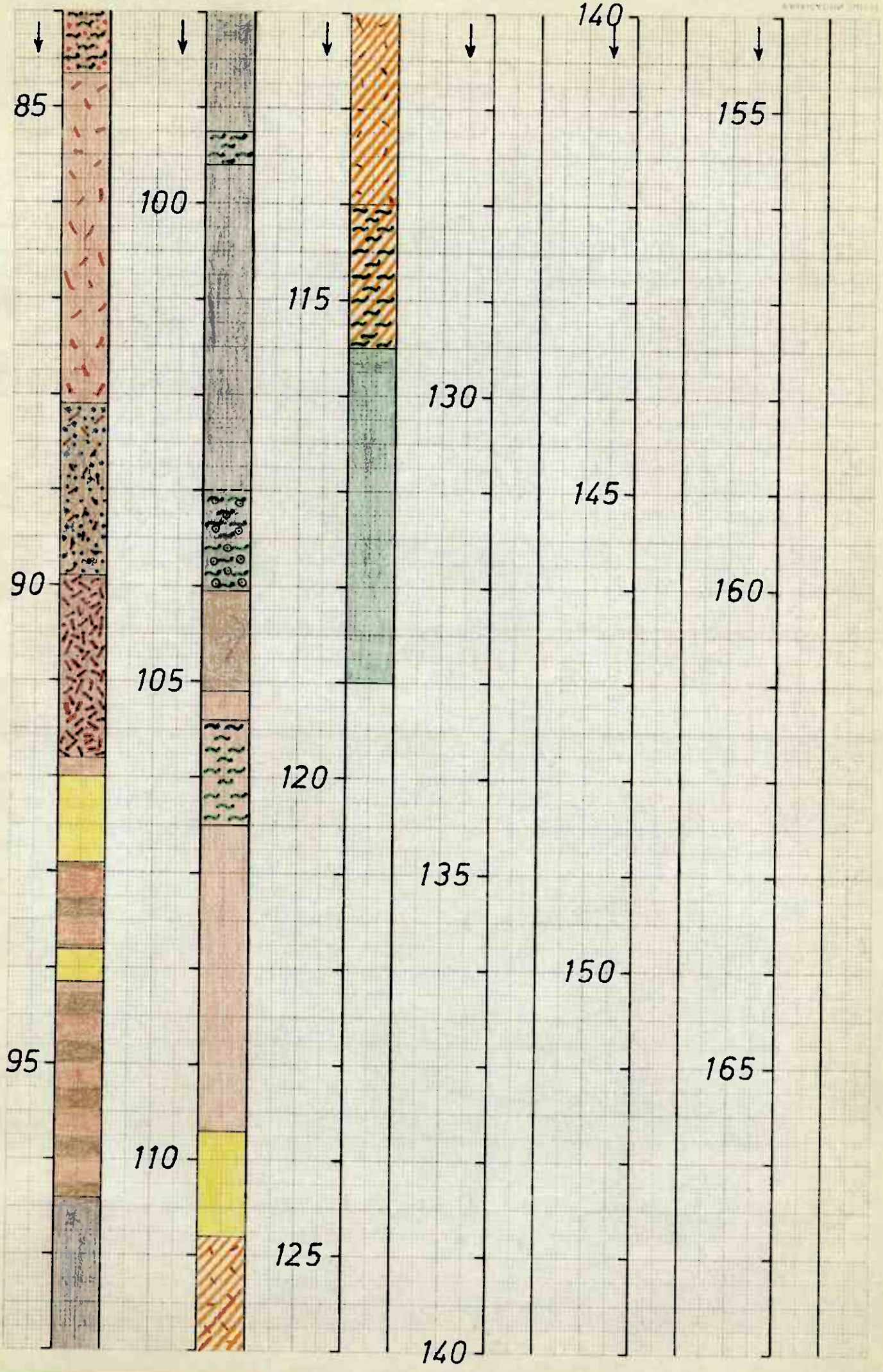
The borehole no. 82 G was stopped at 119,00 m in the garnet mica schist on February 26th 1970, at 11.oo a.m.

March 3rd 1970.

(M. Motys).

The petrografical profile of the borehole nr. 82 G., Tverrfjellet




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THE BOREHOLE NR. 83 G.

Tverrfjellet mine, level 6th East

THE BOREHOLE NO. 83 G, Tverrfjellet mine, level VI - East X = - 25,5, Y = - 89,0.

(The beginning of a gradient of this borehole is 45°).

The brief petrografical description.

0,00 - 6,50	The tiny-grained amphibolitic greenstone, with a lot of schliers and pellets of quartz or quartz feldspatic matrix and locally of carbonatic matrix too, but scarcely only. Locally are present a lot of spots or little blasts of soda-lime feldspars or scarce of carbonates too. The structure is massive mostly.
6,50 - 12,80	The tiny-grained and a medium-grained amphibolitic and feldspatic greenstone with a lot of little acicular and rodlike porphyroblasts of hornblende a which very much schliers, spots of soda-lime feldspars and quartz-feldspatic matrice and locally of carbonate too. The structure is massive and locally only sheeting, but very oftenly maculose. Some small allotriomorphic grains of FeS_2 are locally present too.
12,80 - 13,00	The bright gray quartzite with very weak and poor impregnation of very little allotriomorphic grains of FeS_2 mostly only. The structure is massive.
13,00 - 20,80	The tiny-grained amphibolitic greenstone, with a lot of schliers and pellets of quartz and of quartz-feldspatic matrix. The structure is massive mostly. Between 15,65 - 16,10 m is present a position of a bright gray quartzite, with a very poor and a very weak impregnation of FeS_2 only, which is present like very little allotriomorphic grains only.
20,80 - 22,00	The feldspatic, medium-grained amphibolitic greenstone, with a lot of idioblasts of soda-lime feldspars. The structure is sheeting or banking too. The average gradient of this foliation is 60° about. Some flakes or parallel sschliers of flakes of biotite are present around 22,00 m together with poor impregnation of FeS_2.
22,00 - 22,85	The metaquartzite, with a strong and very strong impregnation of FeS_2 mostlt, with a lot of rod-like and acicular small porphyroblasts of horn-blende and with a lot of little spots and little

schliers of a quartz or quartz-feldspatic matrix. The structure is massive and a texture is blastoporphyric and cataclastic.

22,85 - 34,10 — The motley serie of the tiny-grained and medium-grained amphibolitic greenstone, locally feldspatic, with a lot of schliers pellets and spots of quartz and quartz-feldspatic matrice. The structure is massive and locally sheeting and banking or little bit maculose too.

34,10 - 35,15 — The tectonic, myllonitic zone which is created by a chloritic, amphibolitic matrix, with some schliers, pellets etc. of a quartz, quartz - feldspatic and scarce carbonatic matrix. Some sulphides are present scarce only (allotriomorphic grains of FeS or FeS_2).

35,15 - 54,40 — The motley serie of the tiny-grained and locally medium-grained amphibolitic greenstone as well as in 22,85 - 34,10 m.

54,40 - 65,70 — The motley rocks, which are created by a chloritic, quartzy and biotitic greenschist or green mica schist with a lot of schliers or pellets of quartz and locally only quartz-feldspatic matrix. The structure is sheeting, banking and phacoidal schistose too. The average gradient of this foliation is 40° - 50° about.

Between 59,20 - 60,70 m is present a position of quartzite with a poor and very weak impregnation of FeS_2 and locally with some schliers of more strongly impregnation too (in example at 59,30 - 59,40 m, at 60,20 - 60,30 m and at 60,55 - 60,65 m about.) Between 61,50 - 61,90 m and in 60,90 m about are present some little schliers of quartzite with some poor impregnation too. In 65,90 - 65,95 m and in 66,45 - 66,60 m are present the positions of quartzite with a poor impregnation of FeS_2 mostly with FeS little bit together too.

65,70 - 75,60 — The motley serie of a tiny-grained and of a medium-grained amphibolitic greenstone as well as in 22,85 - 34,10 m. Between 70,50 - 70,52 m, 71,50 - 71,55 m and between 75,10 - 75,20 m are situated the positions and schliers of quartzite with a poor and weak impregnation of FeS_2 mostley and scarce with FeS too. Thsi rock is folded locally by the folds of a dm or cm amplitude.

75,60 - 75,90 — The quartzite with some flakes of biotite and with some very poor and weak impregnation of FeS_2 and scarce with FeS too. The structure is massive mostly but locally sheeting too.

75,90 - 76,10 — Coarse-grained amphibolitic greenstone with some schliers and pellets of a white, hydrothermal quartz, barren only. The acicular and

rodlike porphyroblasts of hornblende are without some grain clongation. Locally only are present some allotriomorphic grains of FeS_2 mostly.

76,10 - 76,60 — The medium-grained amphibolitic greenstone, which are strongly infiltrated by a quartz-feldspatic matrix. Scarce are present some allotriomorphic grains of FeS_2 or some flaked of FeS. The small rodlike and acicular porphyroblasts of hornblende are without a grain clongation. The structure of this rock is massive and a texture is blastoporphyric.

76,60 - 76,80 — The myllonitic, strongly chloritic, amphibolitic and little bit biotitic greenschists, with some little schliers of a dark myllonitic matrix. The structure is pell-mell and phacoidal. Some little allotriomorphic grains of FeS_2 are present, but scarce only.

76,80 - 78,10 — The very strong, massive impregnation of FeS_2 mostly in quartzite, with some little microscopic amorphic forms of pyrrhotite, sphalerite and chalcopyrite around the hypidiomorphic or allotriomorphic, little bit crushed grains of pyrite or these another ore sulphides creat a filling of microscopic joints in the pyritic grains too. The structure is massive and the texture is cataclastic mostly.

78,10 - 78,50 — The medium-grained amphibolitic greenstone which is strongly infiltrated by a quartz - feldspatic matrice, with a lot os schliers of quartzite. The small acicular and rodlike porphyroblasts of hornblende are without a grain clongation. Some little grains, allotriomorphic oftenly of FeS_2, are present not much. Between 78,45 - 78,50 m is situated a position of a coarse-grained amphibolitic greenstone. The structure i massive mostly and a texture is blastoporphyric.

78,50 - 103,25 — The very strong impregnation of FeS_2 mostly in a quartzite, as well as in 76,80 - 78,10 m. Between 88,40 - 88,50 m and between 94,85 - 95,00 m are present some intercalations of the myllonitic and chloritic greenschists with some small rodlike, little bit crushed porphyroblasts of hornblende and with schliers of quartzite, oftenly with impregnation of FeS_2 mostly. The result of the chemical analysis from this ore body position, which is situated between 76,80 - 103,25 m are:

76,80 - 80,30 m: Cu 0,50 %, Zn 1,70 %, S 38,00 %
80,30 - 83,30 m: Cu 0,56 %, Zn 2,60 %, S 39,00 %
83,30 - 86,05 m: Cu 2,05 %, Zn 1,50 %, S 45,00 %
86,05 - 88,35 m: Cu 1,10 %, Zn 4,00 %, S 46,00 %
88,35 - 93,15 m: Cu 2,00 %, Zn 0,85 %, S 45,80 %
93,15 - 95,60 m: Cu 1,90 %, Zn 0,70 %, S 46,50 %
95,60 - 98,60 m: Cu 0,50 %, Zn 1,70 %, S 40,00 %

98,60 - 101,15 m: Cu 0,55 %, Zn 1,00 %, S 42,00 %
101,15 - 103,25 m: Cu 1,28 %, Zn 0,70 %, S 39,00 %

The average compostion between 76,80 - 103,25 m = 26,45 m is: Cu 1,19 %, Zn 1,59 %, S 42,43 %.

103,25 - 105,25

The motley serie of a biotitic and chloritic greenschists with some poor impregnation of FeS_2, ZnS and FeS, but with not so poor impregnation of $CuFeS_2$, like some small amorphic forms in this rock. Some schliers and pellets of quartz and scarcely of a quartz-feldspatic matrix are present too. The structure is phacoidal schistose mostly. The result of the chemical analyse from this rock impregnated position, which is situated between 103,25 - 105,25 m is: Cu 1,08 %, Zn 0,25 %, S 4,50 %. The average compostion from the ore body and impregnated rock together, which are situated between 76,80 - 105,25 m is: Cu 1,18 %, Zn 1,49 % S 39,77 %.

105,25 - 110,15

The motley serie of a biotitic, strongly chloritic greenschists with some little schliers of quartz matrix and with poor and very weak impregnation of FeS_2 and FeS mostly only. The structure is phacoidal schistose mostly. The average gradient of this foliation is 50° about. The result of the chemical analysis from the position between 105,25 og 110,00 m are:

105,25 - 107,50 m : Cu 0,20 %, Zn 0,25 %, S 4,00%
107,50 - 109,05 m : Cu 0,45 %, Zn 0,20 %, S 4,50%
107,50 - 110,15 m : Cu 0,10 %, Zn 0,20 %, S 0,50%

110,15 - 112,10

The bright grey quartzite with some flakes of biotite, with some chlorite too and with some very poor impregnation of FeS_2 and FeS too. The structure is massive.

112,10 - 123,70

The motley serie of the biotitic quartzy and chloritic greenschist, with some positions and schliers of a tiny-grained and medium-grained chloritic, talc and amphibolitic greenstones. Some positions and schliers of quartzite are present locally too and with some poor impregnation of FeS_2 oftenly, in example between 120,30 - 120,45 m and between 120,70 - 121,40 m. The structure is phacoidal schistose and locally sheeting. Some piercements folds and some slip or diagonal folds of cm and dm amplitude are are present locally too. The average gradient of this foliation 45° about, but locally 30° and more then 55° about. The result of the chemical analysis from the position between 110,15 - 123,70 m are:

110,15 - 114,55 m: Cu 0,05 %, Zn 0,00 %, S 1,00 %
114,55 - 118,05 m: Cu 0,05 %, Zn 0,00 %, S 2,00 %
118,08 - 121,75 m: Cu 0,05 %, Zn 0,00 %, S 1,00 %
121,75 - 123,70 m: Cu 0,05 %, Zn 0,00 %, S 0,50 %

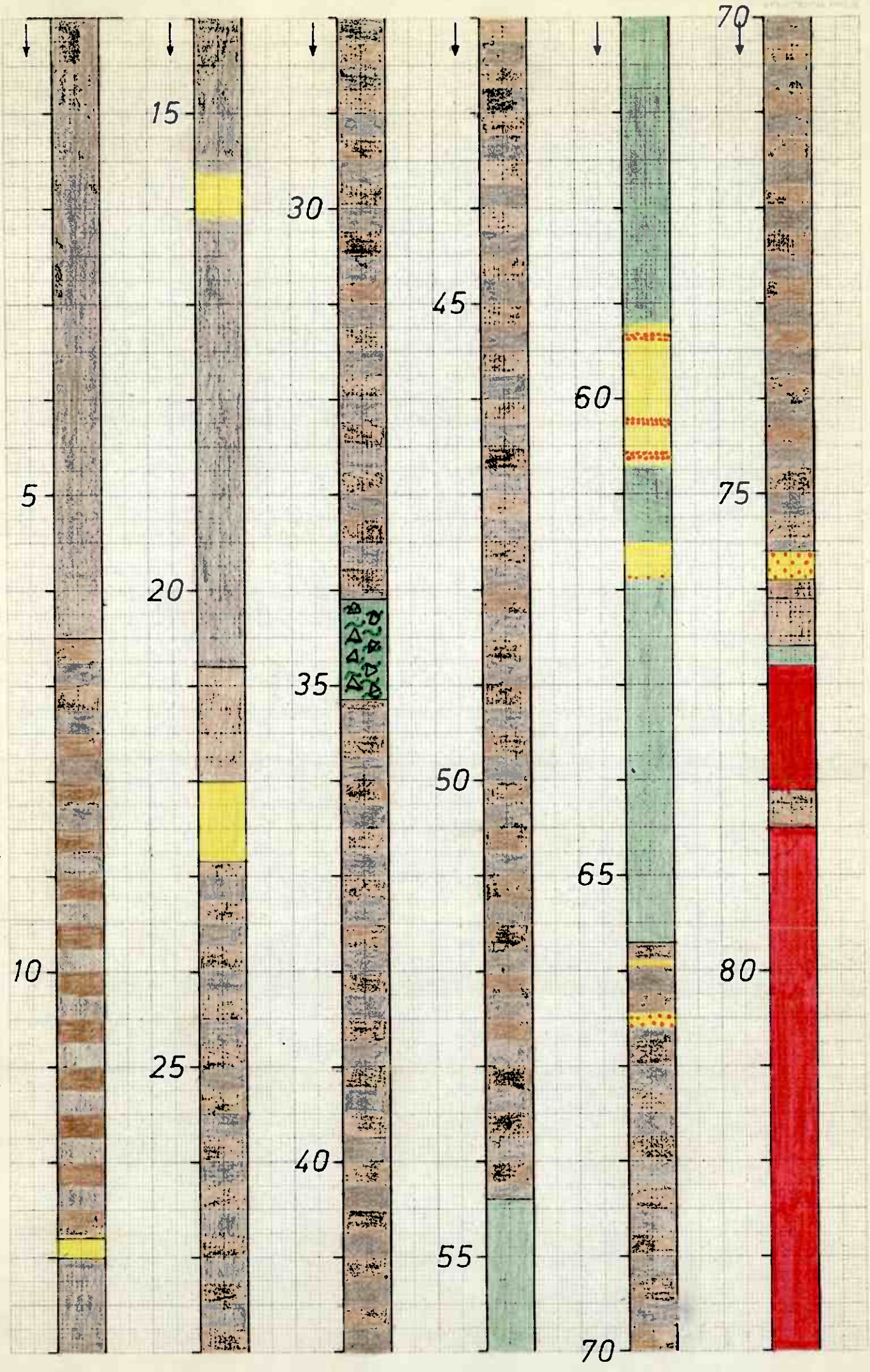
123,70 - 124,90	The quartzite with some little schliers of chlorite with little flakes of biotite. Some very poor and very weak sulphides mineralisation (impregnation) is present locally too. In example between 124,65 - 124,90 m. (FeS_2, $CuFeS_2$ and FeS). The result of th chemical analyse from the position between 123,70 - 124,90 is: Cu 0,90 %, Zn 0,30 %, S 3,50 %.
124,90 - 126,80	The very strong impregnation of FeS_2 mostly in a quartzite as well as in 78,50 - 103,25 m. The structure is massive. The result of the chemical analyse from this ore position between 124,90 - 126,80 m is: Cu 1,40 %, Zn 1,60 %, S 40,00 %.
126,80 - 133,40	The motley serie of the strongly chloritic amphibolitic greenschists, with a lot of schliers, pellets or intercalations of quartzite which have locally some poor impregnation of FeS_2 mostly only. The acicular and rodlike porphyroblasts of hornblende are present oftenly too. Between 130,35 - 130,45 m is present more strong impregnation of FeS_2 mostly. The structure is schistose, phacoidal-schistose and banking too. Some folds are locally present too. The average gradient of this foliation is 45° - 50° about.
133,40 - 134,90	A gray quartzite with massive structure mostly which has some few infiltrations of chlorite and of very little biotitic flakes.
134,90 - 136,80	The biotitic, sericitic and little bit chloritic quartzy mica schist with a phacoidal schistose or fluidial structure. The average gradient of this foliation is 45° - 50° about, but locally 20° - 30° around only.
136,80 - 137,20	A quartzite, amphibolitic schist, with rodlike and acicular porphyroblasts of hornblende, with flakes or with chambres of flakes of biotite. The structure is phacoidal and phacoidal schistose. Some hypidiomorphic and allotriomorphi grains of FeS_2 are present too.
137,20 - 137,60	The gray, massive quartzite with some very poor impregnation of little allotriomorphic grains of FeS_2 mostly only.
137,60 - 144,75	The tiny-grained amphibolitic greenstone with some flakes of biotite and with nut much schliers of quartz and locally quartz feldspatic matrix. The structure is massive and locally only little bit sheeting too.
144,75 - 146,30	The biotitic, sericitic, chloritic and quartzy mica schist as well as in 134,90 - 136,80 m. The average gradient of this foliation is 50° - 60° about.

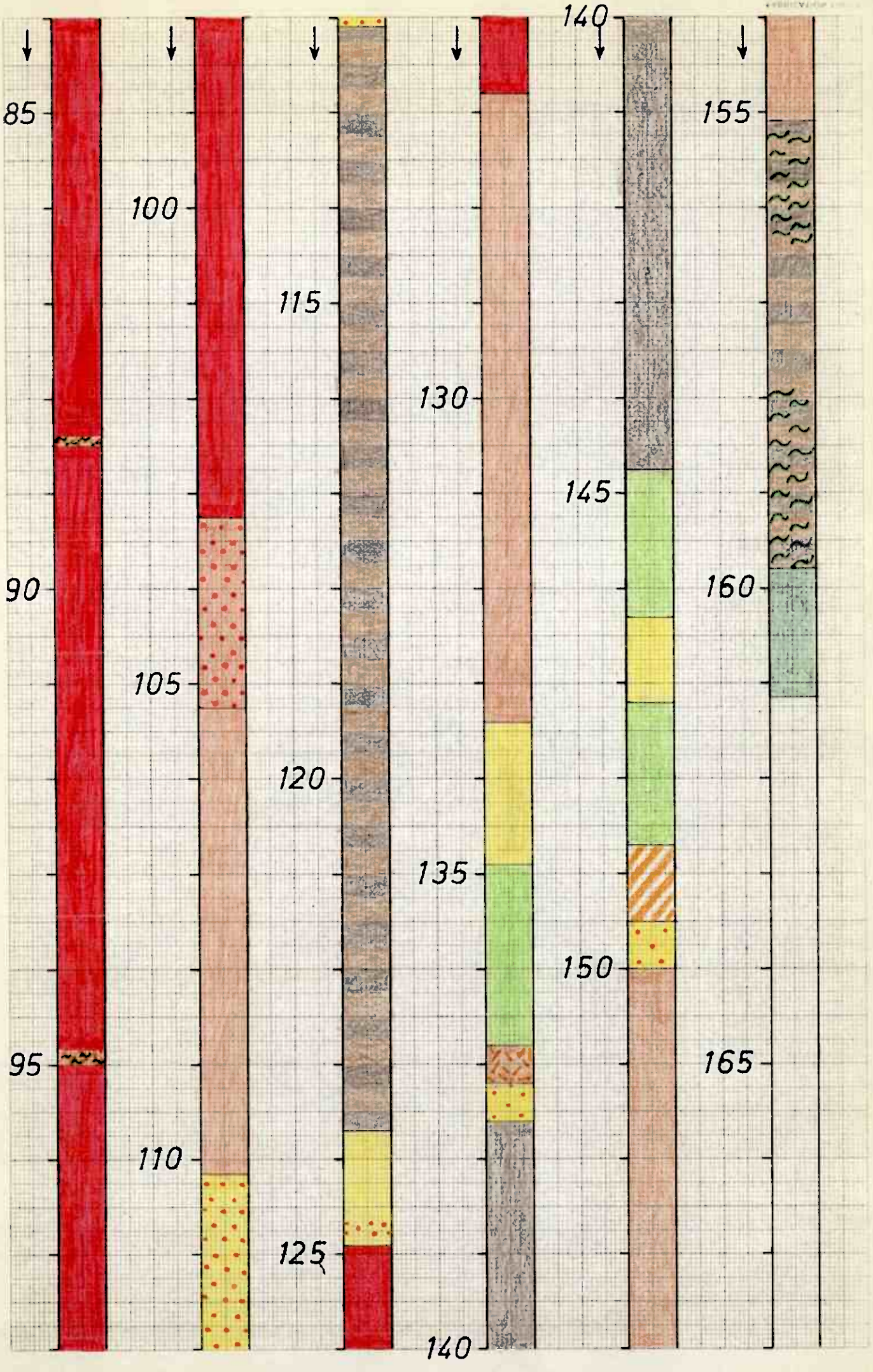
146,30 - 147,20	The gray, massive quartzite with flakes of FeS and locally with some small chambres of chloritic matrix together with pyrrhotite too.
147,20 - 148,70	The sericitic and biotitic and locally chloritic mica schist as well as in 134,90 - 136,80 m. The average gradient of this foliation is 50^{0} - 55^{0} about.
148,70 - 149,50	A keratophyre rock with small and little acicular and rodlike porphyroblasts of hornblende, with chlorite and with flakes of biotite too. Locally are present some grains of garnet too. The structure is massive and sheeting locally too.
149,50 - 150,00	The gray and bright gray quartzite, which has locally very poor impregnation of FeS_2 mostly (some flakes or little irregular chambres). The structure is massive mostly.
150,00 - 155,10	The chloritic, amphibolitic and little bit biotitic greenschist with a lot of schliers and little intercalations of quartzite (quartz) and with a poor impregnation of FeS_2 mostly (irregular allotriomorphic grains). The structure is schistose and phacoidal schistose. The average gradient of this foliation is ca. 45^{0} about .
155,10 - 159,80	The motley serie of a tiny-grained and locally little bit medium-grained amphibolitic greenstone with a lot of schliers, pellets and little intercalations of quartzite, of quartz-feldspatic matrix or scarce of talc-epidotic or talc-zoisit-epidotic matrix. Some very poor impregnation of FeS_2 or FeS is present too. The structure is banking or sheeting, locally phacoidal. The average gradient of this foliation is 50^{0} about. In 155,20 - 156,40 m and between 157,90 - 159,80 m are present myllonitic zones with a lot of little schliers and pellets of a dark myllonitic matrix.
159,80 - 161,15	The chloritic, biotitic and little bit sericitic garnet mica schist, together with small rodlike and acicular porphyroblasts of hornblende. The structure is phacoidal-schistose and pell-mell. The average gradient of this foliation is 55^{0} - 60^{0} about.

This borehole no. 83 G was finished at 161,15 m on March 17th 1970 at 10.00 a.m.

(Milosh Motys).

The petrografical profile of the borehole nr.836 Tverrfjellet.




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THE BOREHOLE NR. 85 G.
Tverrfjellet mine, level 6th East

THE BOREHOLE NO. 85 G, Tverrfjellet mine, level VI - East
X = 63,9 , Y = - 118,5.

(The beginning of a gradient of this borehole is + 30°).

The brief petrografical description.

0,00 - 1,50	The medium-grained and tiny-grained amphibolitic greenstone with some schliers of quartz locally and with massive structure mostly.
1,50 - 6,80	The medium-grained feldspatic amphibolitic greenstone with massive structure mostly. Locally only is little bit clear a total grain clongation (mostly of little and small acicular porphyroblasts of hornblende). Between 2,40 - 4,20 m are present very much more clear a bigger idioblasts of soda-lime feldspars.
6,80 - 7,50	The coarse-grained amphibolitic and ziosite epidotic greenstone with bigger rodlike and acicular porphyroblasts of hornblende and with massive structure.
7,50 - 9,90	The motley serie of the medium-grained and locally little bit coarse-grained amphibolitic and zoisite-epidotic greenstone with a lot of schliers and pellets of quartz and quartzite and with some hypidiomorphic grains of FeS_2 locally too.
9,90 - 14,10	The tiny-grained amphibolitic greenstone with some schliers or pellets or intercalations (irregular) of quartzite, but locally only, together with some very poor impregnation of FeS_2 and FeS oftenly.
14,50 - 15,20	The medium-grained feldspatic little bit chloritic and ziosite-epidotic amphibolitic greenstone with massive and sheeting structure and locally with little bit clear a total grain-clongation.
15,20 - 27,40	The motley serie of the tiny-grained and medium-grained chloritic amphibolitic greenstone with a sheeting and banking structure and with some schliers or intercalations of quartz or quartzite locally together with some poor impregnation of FeS_2 and FeS oftenly. Between 22,60 - 22,80 m are present a lot of schliers and pellets of quartz or quartzite with some poor impregnation of FeS_2 and FeS together too. The average gradient of this foliation is 65° - 70° around.
27,40 - 27,90	The strong impregnation of FeS_2 and FeS

	in quartzite or metaquartzite, with some schliers barren only too.
27,90 - 28,45	Quartzite with some very little allotriomorphic or hypidiomorphic grains of FeS_2 locally. The structure is massive. Between 28,10 - 28,45 m is present some poor impregnation of FeS_2 and FeS.
28,45 - 29,60	The tiny-grained, little bit chloritic, amphibolitic greenstone
29,60 - 30,10	The feldspatic and more scarcely carbonatic amphibolitic tiny-grained and medium-grained greenstone.
30,10 - 37,80	The tiny-grained amphibolitic greenstone with massive structure.
37,80 - 39,90	The tiny-grained amphibolitic greenstone with a lot of schliers and spots of quartzite or quartz too and with some idioblasts of soda-lime feldspar.
39,90 - 45,60	The tiny-grained and locally little bit medium-grained amphibolitic greenstone with some schliers of quartz and quartzite.
45,60 - 46,10	The quartzite with some very poor impregnation of FeS_2 and FeS and with some schliers of a strong impregnation of FeS and FeS_2.
46,10 - 49,80	The amphibolitic and little bit feldspatic tiny-grained and medium-grained locally only greenstone with some poor impregnatio of FeS_2 and FeS. Between 48,80 - 49,80 m are present more idioblasts of soda-lime feldspar.
49,80 - 69,20	The tiny-grained amphibolitic greenstone with a lot of little schliers and pellets of quartz, locally together with soda-lime feldspar. The structure is massive and locally banking or sheeting too. The average gradient of this foliation is 60° about.
69,20 - 76,00	The chloritic and amphibolitic tiny and medium-grained greenschist with some chambers or flakes of biotite too and with a lot of schliers or pellets of quartz or quartzite, together with very poor impregnation of FeS2 or FeS, locally. Between 75,50 - 75,60 m is present the position of a very strong impregnation of FeS_2 mostly in metaquartzite with some small and little acicular porphyroblasts of hornblende.

76,00 - 77,10	The medium-grained feldspatic amphibolitic greenstone with massive structure, with a lot of little acicular and rodlike porphyroblasts of hornblende and with a lot of idioblasts of soda-lime feldspar.
77,10 - 88,40	The motley serie of a chloritic greenstone and greenschist with a lot of schliers or intercalations of a medium and coarse-grained amphibolitic greenstone and with very much schliers and intercalations of quartzite, which has oftenly some poor impregnation of FeS_2 and FeS, in example between 77,60 - 77,70 m, 77,85 - 78,00 m and between 83,65 - 84,00 m is present a very strong impregnation like in 75,50 - 75,60 m. In 87,60 m around is present the 3 - 4 cm thick position of a compact pyrrhotite.
88,40 - 88,90	The barren gray or white gray quartzite with a compact massive structure.
88,90 - 92,30	The motley serie of a biotitic and chloritic, amphibolitic greenstone and greenschist with a lot of small and little acicular and rodlike porphyroblasts of hornblende with some allotriomorphic and hypidiomorphic grains of pyrite and with some flakes of FeS. Some a total grain clongation isn't so clear.
92,30 - 93,05	The bright gray quartzite, with some poor impregnation of FeS_2 or FeS locally only.
93,05 - 94,90	The medium-grained, chloritic and locally epidotic amphibolitic greenstone.
94,90 - 95,25	The quartzite with some poor impregnation of FeS and FeS_2 and locally, on the borders too, with some schliers of a little bit strongly impregnation of FeS + FeS_2. Locally are present some schliers of a chloritic, amphibolitic greenschist or greenstone.
95,25 - 96,70	The tiny-grained and medium-grained amphibolitic greenstone with a lot of small and little grains (hypidiomorphic and allotriomorphic) of pyrite mostly. In 95,80 m about is present the position (a thickness 2 cm about) of quartzite with impregnation of FeS_2.
96,70 - 98,40	The feldspatic, chloritic, biotitic and amphibolitic greenschists with some little schliers of quartz or quartzite and with a lot of little grains (allotriomorphic oftenly) of FeS_2, scarcely flakes of FeS. The average gradient of this foliation is 55° - 60° about.

98,40 - 99,00	The tiny-grained amphibolitic greenstone with a lot of schliers and pellets of quartz. Some oblique or antithetic joint are filled by quartz mostly too.
99,00 - 100,60	The myllonitic zone in a tiny-grained amphibolitic greenstone, very strongly crushed by a oblique joints and with a a lot of schliers of a dark myllonitic matrix.
100,60 - 100,80 *0,20 m*	The strong impregnation of FeS_2 mostly in quartzite with some microscopic amorphic forms of FeS too.
100,80 - 101,00	The quartzy, feldspatic and amphibolitic medium-grained greenstone with a strong infiltration of quartz-feldspatic matrix and locally with bigger rodlike and acicular porphyroblasts of hornblende.
101,00 - 101,35 *0,35 m*	The strong impregnation of FeS2 mostly in a quartzite. The structure is massive and the texture is porphyric and cataclastic. The result of the chemical analyse from this ore position between 101,00 - 103,35 m is: Cu 0,00 %, Zn 0,20 % and S 33,00 %.
101,35 - 102,80	The tiny-grained amphibolitic greenstone, with some schliers of quartzite.
102,80 - 103,40	The myllonitic zone with some intercalations of quartzite, with some schliers of a myllonitic dark matrix. Some poor impregnation of FeS_2 or of FeS is present too.
103,40 - 104,90	The biotitic, chloritic and amphibolitic greenschist. The structure is phacoidal and phacoidal schistose.
104,90 - 105,10 *0,20 m*	The strong impregnation of FeS_2 mostly in quartzite. The result of the chemical analyse from this ore position between 104,90 - 105.10 m is: Cu 1,60 %, Zn 0,25 %, S 31,50 %.
105,10 -106,15	The biotitic, chloritic and amphibolitic greenschist with some little schliers of quartzite. The structure is phacoidal schistose.
106,15 - 106,40	The bright gray barren quartzite.
106,40 - 107,55	The medium-grained amphibolitic and zoisite epidotic greenstone, locally strongly infiltrated by quartz-feldspatic matrix and with some schliers of quartzite locally too.
107,55 - 108,35 *0,80 m*	The quartzite with a poor impregnation of FeS_2 and locally with some poor microscopic impregnation of Fe_2O_3 + FeO or with

	little schliers of magnetite. Between 107,75 - 107,95 m is present appreximatly very strong impregnation of FeS_2 mostly. The result of the chemical analyse from this impregnated position between 107,55 - 108,25 m is: Cu 0,00 %, Zn 0,00 %, S 18,50%
108,35 - 110,00	The chloritic and strongly chloritic, amphibolitic and little biotitic locally greenschist, which is oftenly strongly impregnated by quartz feldspatic matrice. The structure is sheeting and banking too. The average gradient of this foliation is 65° about.
110,00 - 112,20	The strongly quartzy sericitic, chloritic and little bit biotitic mica schist but locally more like sericitic quartzite. Some poor impregnation is locally present too in example at 111,80 m around. The structure is massive and sheeting.
112,20 - 114,60	The coarse-Grained epidotic, amphibolitic greenstone, with big rodlike and acicular porphyroblasts of hornblende, with some flakes of biotite locally too and with some allotriomorphic or hypidiomorphic grain of FeS_2 or with some amorphic forms of FeS locally only. The structure is pell - mell and massive with a porphyroblastic texture. Locally are present some schliers or intercalations of quartzite or metaquartzite.
114,60 - 115,90	The white barren hydrothermal quartz.
115,90 - 117,80	The chloritic and sericitic quartzite, locally with some flakes of biotite. The structure is sheeting or banking. The average gradient of this foliation is 60° around.
117,80 - 119,10	The strongly quartzy sericitic and biotitic mica schist, little bit chloritic too. The structure is parallel schistose and sheeting. The average gradient of this foliation is 60° about.
119,10 - 122,00	The quartzy, chloritic and biotitic, amphibolitic, locally zoisite-epidotic greenschist, with a lot of schliers of quartzite and with schliers or chambers of biotite. The structure is schistose, phacoidal schistose and sheeting too. The average gradient of this foliation is 55°-60° around.
122,00 - 128,65	The tiny-grained amphibolitic greenstone with a lot of little schliers and pellets of quartzite, locally with flakes of biotite or with some small chambers of biotite. Some allotriomorphic grains or

amorphic forms of FeS_2 or FeS are locally present too. The structure is phacoidal or pell-mell.

128,65 - 129,10 — The medium-grained, garnet amphibolitic greenstone which is strongly infiltrated by a quartz-feldspatic matrix. The hornblende creats a lot of little acicular and rodlike porphyroblasts, without a clear grain clongation.

129,10 - 130,00 — The tiny-grained chloritic amphibolitic greenstone with a lot of schliers and pellets of quartz, quartzite and quartz-feldspatic matrix, as well as in 122,00 - 128,65 m.

130,00 - 130,90 — The medium-grained and locally coarse-grained amphibolitic greenstone, chloritic and locally with zoisite-epidote too, but with a lot of grains of garnet. Some little amorphic forms or flakes of FeS are present too, FeS_2 more scarcely. The structure is pell-mell and massive and the texture is blastoporphyric and blastoophitic too.

130,90 - 131,90 — The tiny-grained amphibolitic greenstone, locally with some little schliers of a quartz-feldspatic matrix. Some little allotriomorphic grains of FeS_2 are present too, but locally only. The structure is massive.

131,90 - 132,20 — The white barren hydrothermal quartz.

132,20 - 141,90 — The tiny-grained amphibolitic greenstone, with some flakes or chambers of biotite and with some schliers or little intercalations of quartz, quartzite or of a quartz-feldspatic matrix too. The structure is sheeting and banking. The average gradient of this foliation is 55° about.

141,90 - 145,20 — The tiny-grained amphibolitic greenstone with a massive structure and locally with some little schliers and pellets of a quartz-feldspatic matrix. Between 144,20 - 144,90 m are present a lot of little and small grains of a garnet.

145,20 - 146,20 — The amphibolitic, tiny-grained and little bit chloritic greenstone with some allotriomorphic grains or flakes of FeS_2, scarcely FeS too and with a lot of schliers or little intercalations, which are parallel with the total foliation of this rock. The structure is sheeting and banking. The average gradient of this foliation is 55° about.

146,20 - 146,90 The chloritic and biotitic quartzy schist (primary a tuphitic matrix), with the very clear parallel schistose and sheeting structure and with a lot of flakes or schliers of accumulations of pyrrhotite. The average gradient of this foliation is 55° around. In 146,50 m is present a compact position of a strong impregnation of FeS mostly.

146,90 - 150,30 The medium-grained and locally little bit coarse grained, chloritic, sericitic and zoisite-apidotic, amphibolitic greenstone, with small rodlike and acicular porphyroblasts of hornblende and with a lot of schliers, pellets of quartz and of quartz feldspatic matrix. The structure is massive and sheeting. The texture is blastoporphyric and blastoophitic little bit too.

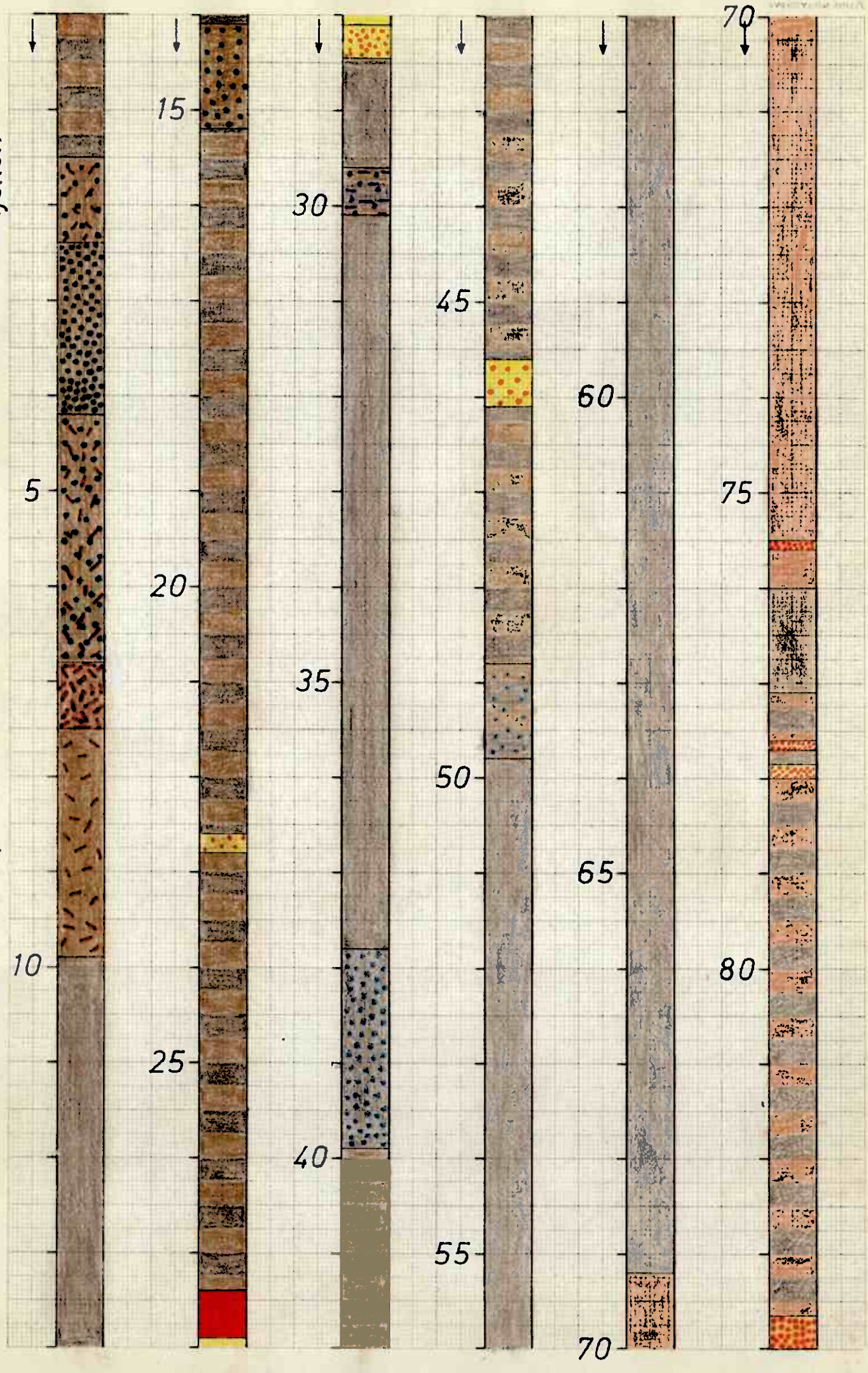
150,30 - 153,45 The chloritic, biotitic garnet mica schist with sericitic too and with a lot of little schliers of quartz matrix. The structure is phacoidal and phacoidal schistose. The average gradient of this foliation is 55° about.

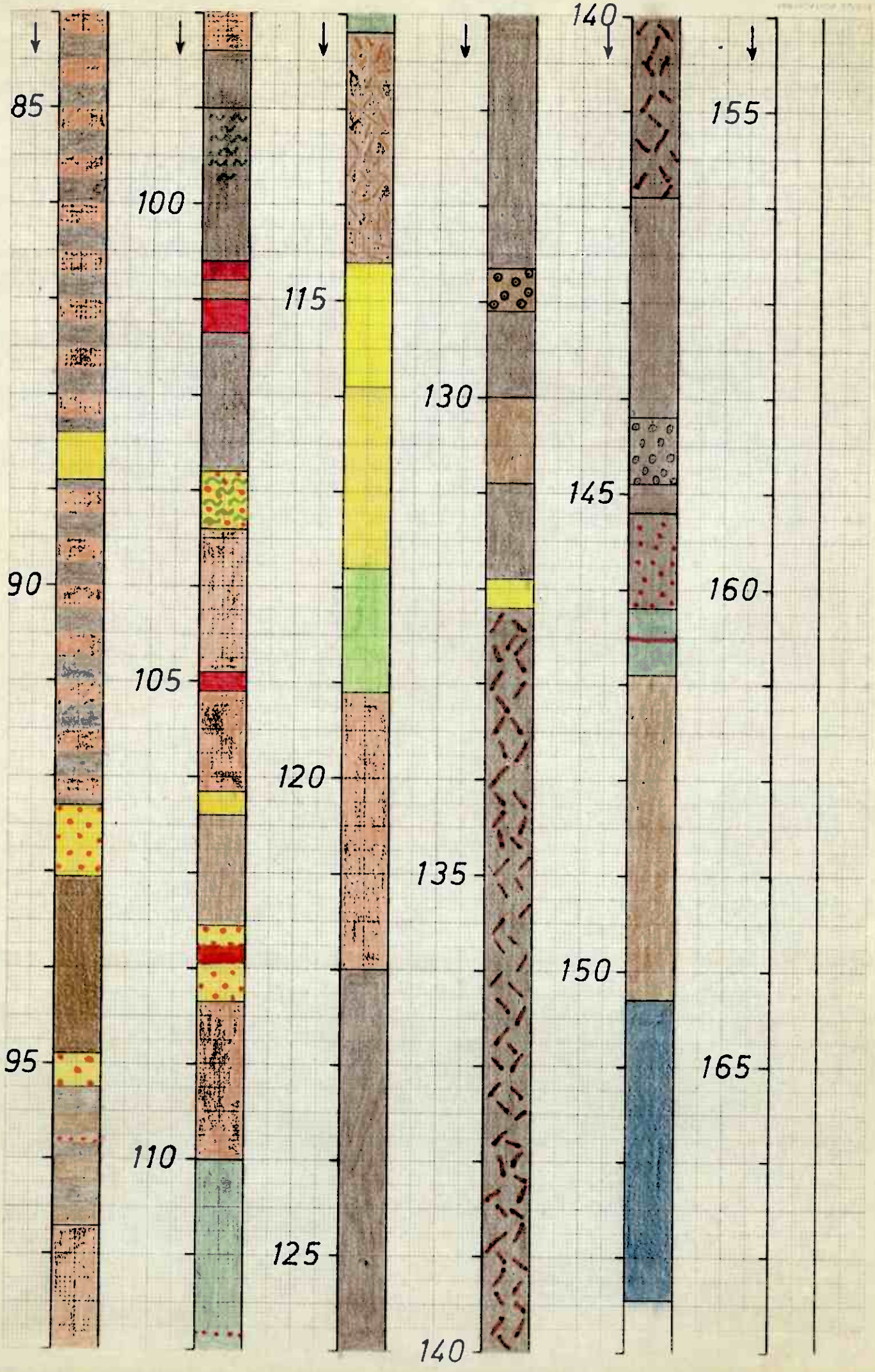
This borehole no. 85 G was stopped at 153,45 m on March 20th 1970 at 13.00 p.m.

March 28th 1970.

(Milosh Motys).

The petrografical profile of the borehole nr. 85G Tverrfjellet.




85
90
95
100
105
110
115
120
125
130
135
140
140
145
150
155
160
165

THE BOREHOLE NR. 89G.

Tverrfjellet mine, level 6 th East

THE BOREHOLE NO. 896, Tverrfjellet mine, level VI - East
X = - 117,8 , Y = - 155,3.

(The beginning of a gradient of this borehole is - 35°).

The brief petrografical description.

0,00 - 3,10	The tiny-grained amphibolitic greenstone with a lot of little parallel schliers and pellets of a quartz-feldspatic matrix. Some little hypidiomorphic grains of FeS_2 are locally present too. The structure is banking and sheeting. The average gradient of this foliation is 35° about.
3,10 - 9,70	The hornblende gneiss with a lot of intercalations of keratophyre rock with big acicular and rodlike porphyroblasts of hornblende too. The structure is banking and sheeting. The average gradient of this foliation is 35° about.
9,70 - 19,10	The tiny-grained chloritic amphibolitic greenstone, locally with some little acicular or rodlike porphyroblasts of hornblende, with a lot of little allotriomorphic grains of FeO + Fe_2O_3 and with a lot of schliers and intercalations of quartz-feldspatic matrix with some grains of ancerite together locally too. The structure is sheeting and banking. The average gradient of this foliation is 40° - 45° about. Locally are present some intercalations of amphibolitic gneiss (as well as in 3,10 - 9,70 m), in example between 14,80 - 15,05 m.
19,10 - 20,80	The medium-grained, feldspatic amphibolitic greenstone with a massive structure and with some little schliers or pellets of quartz-feldspatic matrix.
20,80 - 25,90	The tiny-grained amphibolitic greenstone as well as in 0,00 - 3,10 m. The average gradient of this foliation is 40° about.
25,90 - 30,10	The amphibolitic (hornblende) gneiss, like in 3,10 - 9,70 m. The average gradient of this foliation is 35° - 40° about.
30,10 - 32,20	The coarse-grained amphibolitic greenstone, locally strong infiltrated by a quartz-feldspatic matrix and with someschliers or pellets of a quartz-feldspatic matrix. The structure is massive and the texture is blastoporphyric and blastophitic locally too.
32,20 - 37,00	The tiny-grained amphibolitic greenstone, little bit chloritic as well as in 0,00 - 3,10 m. The average gradient of this foliation is 45° about.
37,00 - 39,80	The hornblende gneiss as well as in 3,10 - 9,70m but with much more rodlike and acicular porphyr-

oblasts of hornblende. The structure is more massive and the texture is blastoporphyric.

39,80 - 40,90 The seritic hornblende and garnet gneiss with a little bit clear parallel schistose structure. The rodlike and acicular porphyroblasts of hornblende are 1 cm long minerally and the irregular grains of garnet have 0,5 cm in average too. The average gradient of this foliation is 40° about.

40,90 - 47,20 The hornblende gneiss as well as in 37,00 - 39,80 m but with grains of garnet too and with a lot of schliers and pellets of a quartz-feldspatic matrix. The average gradient of this foliation is 40° - 45° about.

47,20 - 49,90 The medium-grained amphibolitic greenstone, infiltrated by a quartz-feldspatic matrix and with some schliers and pellets of a quartz-feldspatic (soda-lime feldspars) matrix too. Locally are present some intercalations of a keratophyre rock. The structure is sheeting and banking locally too. The average gradient of this foliation is 50° about.

49,90 - 59,70 The tiny-grained amphibolitic greenstone as well as in 0,00 - 3,10 m. The average gradient of this foliation is 40° about. Some hypidiomorphic grains of FeS_2 are present too, but locally only.

59,70 - 61,40 The amphibolitic (hornblende) and little bit chloritic gneissic schist. with a lot of little allotriomorphic grains of garnet. The hornblende creats a lot of little acicular porphyroblasts, without some clear total grain clongation. The structure is massive, the texture is blastoporphyric and blastophitic. Some schliers and pellets of quartz-feldspatic matrix are present locally too.

61,40 - 82,70 The biotitic, chloritic and little bit amphibolitic greenschist, with a lot of little schliers and little pellets of a quart-feldspatic matrix. Locally are present some pellets and chambres of a acumulation of biotite's flakes. This rock has schistose, phacoidal-schistose and sheeting structure. Some parts are folded by the folds of dm and cm of mm amplitude.

82,70 - 92,90 The biotitic, chloritic and hornblende greenschist, locally with some chambres of talc and of soisit-epidote.hornblende creats a lot of little acicular and rodlike porphyroblasts. The structure is sheeting, locally little bit schistose. The average gradient of this foliation is 50° about.

92,90 - 95,80 The motley serie of a chloritic, hornblende and garnet greenschist and of a chloritic coarse-grained and feldspatic, amphibolitic greenstone

with a big rodlike and acicular porphyroblasts of hornblende and with a lot of irregular grains of garnet. Some intercalations, schliers and pellets of a quartz-feldspatic matrix or of a keratophyre are present oftenly. The structure is massive or sheeting and a texture is blastoporphyric.

95,80 - 97,00 — The strongly quartzy, chloritic and little bit seritic greenschist, with a lot of little intercalations or schliers of quartzite or keratophyre and with some poor impregnation of FeS_2 which is present mostly in a chloritic matrix. The structure is banking and schistose. Locally is this rock folded by the flat folds of the cm and dm amplitude. The average gradient of this foliation is 10°-15° about, but locally 0° too.

97,00 - 100,00 — The medium-grained amphibolitic greenstone with some little schliers and pellets of a quartz-feldspatic matrix. Some poor impregnation of pyrite which is concentrated in little schliers or flat chambres is present locally too. The structure is phacoidal, but massive mostly. The average gradient of this foliation is 0° - 10° about.

100,00 - 108,30 — The tiny-grained amphibolitic greenstone, feldspatic weakly too. Some little schliers or pellets of a quartz-feldspatic matrix are present locally too. The hypidiomorphic grains of FeS_2 are present scare only. The structure is massive and sheeting.

108,30 - 110,20 — The coarse-grained and medium-grained amphibolitic and feldspatic greenstone, locally with some irregular chambres of zoisot-epidote and with a lot of schliers and intercalations of metaquartzite and metakeratophyre, with some poor and scarcely little bit strong impregnation of FeS_2 mostly. The structure is massive and sheeting. The average gradient of this foliation is 20° around. Between 103,00 - 103,10 m, 103,40 - 103,45 m and between 104,05 - 104,10 m are present some intercalations of a metaquartzite with some impregnation of FeS_2, poor only.

110,20 - 132,50 — The tiny-grained amphibolitic greenstone as well as in 0,00 - 3,10 m.

132,50 - 140,10 — The carbonatic (ancerite and magnesite, dolomite) chloritic, tiny-grained amphibolitic greenstone, with a lot of little schliers of a quartz-feldspatic matrix and with some intercalations of a metaquartzite with some poor impregnation of FeS_2 mostly together. The structure is sheeting and maculose. The average gradient of this foliation is 30° about. Between 139,30 - 139,45 m are present a lot of

intercalations of a metaquartzite with some poor impregnation of FeS_2 weakly.

140,10 - 160,50 The tiny-grained amphibolitic greenstone as well as in 0,00 - 3,10 m.

160,50 - 169,50 The tiny-grained and locally medium-grained, feldspatic amphibolitic greenstone, with some bigger rodlike and acicular porphyroblasts of hornblende too. Some little schliers of a quartz-feldspatic matrix are present locally too. The structure is sheeting and phacoidal-schistose locally too. Some phygmatitic folds of a cm amplitude are locally pre ent too. The average gradient of this foliation is 50° around Some little grains of FeS_2, hypidiomorphic and scarely antomorphic are present too, but locally and scarely only, together with some little flakes or little irregular chambres of FeS.

169,50 - 175,20 The strongly chloritic, amphibolitic greenschist with biotite's flakes and with some little schliers of quartzite, which have oftenly a strongly impregnation of FeS_2 mostly only. The results of the chemical analyses from this positions between 169,50 - 175,20 m are:
1) between 173,10 - 175,20 m is:
Cu = 0,00 %
Zn = 0,05 %
S = 2,50 %
between 170,50 - 170,65 m is present a position of a quartzite with a little bit strongly im pregnation of FeS_2 mostly.

175,20 - 175,80 The bright gray quartzite with massive structure which has a poor or very poor and very weak impregnation of FeS_2 and FeS too.

175,80 - 176,20 The myllonitic tectonic sone in a quartzite, without some little bit clear and poor impregnation.

176,20 - 177,20 A carbonatic, little bit chloritic and talkic amphibolitic greenstone, with some flakes of biotite. Some very poor and very weak impregnation of FeS are present too. In 177,18 - 177,20 m is some little bit strong impregnation of FeS_2 mostly. In this rock are present a lot of frains or spots of karbonates. The structure is a banking and little bit maculose. The average gradient of this foliation is 40° about.

177,20 - 180,60 The bright gray and gray quartzite with very poor impregnation of FeS_2 mostly, but with FeS little bit too. The structure is massive. Locally only are present some little chambres with morestrong impregnation of the ore sulphides.

180,60 - 180,80 The chloritic and myllonitic quartzy schist together with a poor impregnation of FeS_2 and FeS mostly. The structure is myllonitic.

180,80 - 181,00 The secretion quartz very bright gray, locally with some little chambres or irregular forms of $CuFeS_2$, FeS and FeS_2.

181,00 - 181,30 The chloritic, myllonitic and talcic greenschist locally with some very poor impregnation of FeS_2 $CuFeS_2$ and FeS. The structure is myllonitic. The results of the chemical analyses from these positions are:

3) Between 177,20 - 180,80 m is:
Cu = 0,00 %
Zn = 0,00 %
S = 0,00 %

4) between 180,80 - 181,30 m is:
Cu = 0,35 %
Zn = 0,13 %
S = 2,00 %

181,30 - 187,15 The very strong impregnation of FeS_2 mostly in quartzite with FeS, $CuFeS_2$ and ZnS acees-soriely too. The structure is massive and a texture is porphyric and cataclastic.
The results of the chemical analyses from this position which situated between 181,30 - 187,15m are:

5) between 181,30 - 183,00 m is:
Cu = 1,03 %
Zn = 1,50 %
S = 37,00%

6) between 183,00 - 185,00 m is:
Cu = 2,17 %
Zn = 0,20 %
S = 34,00%

7) between 185,00 - 187,15 m is:
Cu = 2,58 %
Zn = 0,15 %
S = 40,00%

187,15 - 192,35 The very strong impregnation of ore sulphides like in 181,30 - 187,15 m, but with a lot of little schliers or positions of FeO + Fe_2O_3. Locally are present some small amorphic forms of $CuFeS_2$. The structure is massive and banking mostly. The results of the chemical analyses from this position which is situated between 187,15 - 192,35 m are:

8) between 187,15 - 189,30 m is:
Cu = 3,25 %
Zn = 0,40 %
S = 31,50%

9) between 189,30 - 192,35 m is:
Cu = 2,75 %
Zn = 0,20 %
S = 26,50%

192,35 - 192,50 The strongly chloritic myllonitic greenschist with a sheeting structure and with poor impregnation of FeS_2, FeS and $CuFeS_2$ scare too.

192,50 - 192,65 The secretion bright pink quartz, with some amorphic forms of $CuFeS_2$ with FeS, little bit too. Some small irregular grains of FeS_2 are present locally too.

192,65 - 193,45 The bright gray quartzite with massive structure and with some very poor impregnation or with some chambres of FeS_2, FeS and scarcely of $CuFeS_2$.

193,45 - 193,65 The bright pink secretion quartz with some little inclusions of a chloritic matrix and some little and small amorphic forms of FeS_2 and $CuFeS_2$ with FeS together.
The result of the chemical analyse from this position which is situated between 192,35 - 193,65 m is:
10) Cu = 1,05 %
Zn = 0,20 %
S = 2,00 %

193,65 - 195,15 The strongly quartzy biotitic and chloritic gneissic schist with a strong impregnation of FeS_2 mostly with $CuFeS_2$ and FeS. The banding and schistosestructure is clear. The average gradient of this foliation is 30° about. The result of the chemical analyse from this position between 193,65 - 195,15 m is:
11) Cu = 2,45 %
Zn = 0,55 %
S = 24,00%

195,15 - 196,90 The gray quartzite with a lot of schliers or pellets of very fine grained magnetite and with some impregnation of ore sulphides. The result of the chemical analyse from this position between 195,15 - 196,90 m is:
12) Cu = 1,54 %
Zn = 0,20 %
S = 8,80 %

196,90 - 198,50 The very strong impregnation of the ore sulphides as well as in 181,30 - 187,15 m, but with very much little schliers and intercalations of magnetite. The result of the chemical analyse from this position between 196,90 - 198,50 m is:
13) Cu = 2,66 %
Zn = 0,30 %
S = 30,50%

198,50 - 200,60 The very strong impregnation of the ore sulphides as well as in 196,90 - 198,50 m, but with not much little schliers or intercalations of magnetite. The result of the chemical analyse from this position between 198,50 - 200,60 m is:
14) Cu = 3,25 %
Zn = 0,70 %
S = 34,00%

200,60 - 207,40 The very strong impregnation of the ore sulphides (FeS_2 mostly) as well as in 181,30 - 187,15 m.
The results of these chemical analyses from this position between 200,60 - 207,40 m are:
15) between 200,60 - 203,00 m is:
Cu = 1,44 %
Zn = 1,30 %
S = 36,00%

16) between 203,00 - 205,00 m is:
Cu = 1,46 %
Zn = 0,60 %
S = 39,20%
17) between 205,00 - 207,40 m is:
Cu = 0,80 %
Zn = 0,55 %
S = 38,00%

207,40 - 210,85 The strongly quartzy, biotitic and little bit chloritic , locally myllonitic gneiss, with the strong impregnation of the ore sulphides (FeS_2 mostly). The banding and schistose structure are clear. The average gradient of this foliation is 40° - 55° abow. Locally is this rock very fine folded. The result of the chemical analyse from this position between 207,40 - 210,85 m is:
18) Cu = 0,05 %
Zn = 0,20 %
S = 2,00 %

210,85 - 212,60 The strongly chloritic, biotitic, and locally carbonatic greenschist, locally with spots and little schliers of a quartz-feldspatic matrix. Some impregnation of the ore sulphides are present too. The schistose, locally little bit maculose-schistose structure is clear. The average gradient of this foliation is 45° about. The results of the chemical analyses from this position between 210,85 - 212,60 m are:
19) between 210,85 - 212,30 m is:
Cu = 0,20 %
Zn = 0,25 %
S = 3,50 %
20) between 212,30 - 212,60 m
Cu = 0,05 %
Zn = 0,15 %
S = 2,00 %

212,60 - 213,60 The strong impregnation of FeS_2 mostly in a biotitic, seritic and locally only chloritic gneiss or gneissic schist. The parallel banking structure is very clear. Locally are present some flat folds of a cm or dm amplitude. The average gradient of this foliation is 40° - 45° about. The result of the chemical analyse from this position between 212,60 - 213,60 m is:
21) Cu = 0,06 %
Zn = 0,75 %
S = 4,00 %

213,60 - 215,40 The strongly chloritic, biotitic greenschist with a lot of schliers and pellets and little intercalations of quartzite, locally with some little schliers of little bit strong impregnation of FeS_2 mostly. The structure is schistose and phacoidal schistose. The average gradient of this foliation is 30° - 40° about. The result of the chemical analyse from this position between 213,60 - 215,40 m is:
22) Cu = 0,00 %
Zn = 0,10 %
S = 1,50 %

215,40 - 216,45

The gray quartzite with a banking structure locally, with some little schliers of magnetite and with some little schliers of impregnation of FeS_2 and ZnS with little FeS and scare with $CuFeS_2$ too. The average gradient of this foliation is 60° about. The result of the chemical analyse from this position between 215,40 - 216,45 m is:

23) Cu = 0,67 %
Zn = 0,26 %
S = 3,00 %

216,45 - 217,30
0,85 m

The strong impregnation of sulphides (of FeS_2 mostly) in quartzite. Locally with some little schliers or pellets of quartz, quartzite or gneissic, biotitic, amphibolitic schist. The structure is massive, but locally is little bit clear banking structure too. In 216,60 m is present a little schlier of ZnS. The result of the chemicalanalyse from this position between 216,45 - 217,30 m is:

24) Cu = 2,37 %
Zn = 1,95 %
S = 36,25%

217,30 - 219,20

The gray quartzite as well as in 215,40 - 216,45m Between 217,30 - 217,50 m are present a lot of rodlike and acicular porphyroblasts of hornblende. The result of the chemical analyse from this position between 217,30 - 219,20 m is:

25) Cu = 0,81 %
Zn = 0,10 %
S = 2,50 %

219,20 - 223,20

The chloritic, carbonatic and little bit feldspatic, biotitic and amphibolitic greenschist as well as in 213,60 - 215,40 m but locally more strongly folded, by the folds of a mm, cm and dm amplitude. The average gradient of this foliation is 10° - 0° about. The results of the chemicalanalyses from this position between 219,20 - 223,20 m are:

26) between 219,20 - 221,20 m is:
Cu = 0,00 %
Zn = 0,00 %
S = 1,50 %

27) between 221,20 - 223,20 m is:
Cu = 0,00 %
Zn = 0,10 %
S = 1,00 %

223,20 - 223,65
0,45 m

The strong impregnation of sulphides (FeS_2 mostly) in a quartzite as well as in 212,60 - 213,60 m. The result of the chemical analyse from this position between 223,20 - 223,65 m is:

28) Cu = 0,10 %
Zn = 0,55 %
S = 30,00%

223,65 - 226,20

The chloritic, carbonatic, little bit feldspatic biotitic and amphibolitic greenschist as well as in 219,20 - 223,20 m. The average gradient of this foliation is 10° - 30° about. The

result of the chemical analyse from this position between 223,65 - 226,20 m is:
29) Cu = 0,00 %
Zn = 0,30 %
S = 1,00 %

226,20 - 229,55 The gray quartzite as well as in 215,40 - 216,45 m, but with not so much little schliers of magnetite and with more clear structure. The results of the chemical analyses from this position between 226,20 - 229,55 m are:
30) between 226,20 - 228,10 m is:
Cu = 0,00 %
Zn = 0,00 %
S = 2,50 %
31) between 228,10 - 229,55 m is:
Cu = 0,00 %
Zn = 0,00 %
S = 0,00 %

229,55 - 230,55 (1,00 m) The strong impregnation of sulphides in quartzite as well as in 212,60 - 213,60 m. The result of the chemical analyse from this position between 229,55 - 230,55 m is:
32) Cu = 0,00 %
Zn = 0,00 %
S = 27,50%

230,55 - 231,30 The gray quartzite as well as in 226,20 - 229,55 m, but with some lenticles of secretion quartz, barren only. Theresult of the chemical analyse from this position between 230,55 - 231,30 m is:
33) Cu = 0,00 %
Zn = 0,00 %
S = 2,50 %

231,30 - 233,15 The chloritic, biotitic and little bit seritic gneissic schist or gneiss witha maculose and maculose-schistose structure. The average gradient of this foliation is 45° - 55° about. The result of the chemical analyse from this position between 231,30 - 233,15 m is:
34) Cu = 0,00 %
Zn = 0,00 %
S = 0,00 %

233,15 - 235,20 The chloritic, biotitic, feldspatic and carbonatic, amphibol tic greenschist as well as in 213,60 - 215,40 m but with some impregnation of some sulphides (FeS$_2$ mostly) scare only. Between 233,40 - 233,75 m is present white secretion barren quartz. The average gradient of this foliation is: 30° - 40° about. The result of the chemical analyse from this position between 233,15 - 235,20 m is:
35) Cu = 0,00 %
Zn = 0,00 %
S = 0,00 %

235,20 - 236,00 The chloritic and little bit seritic gneissic schist, with some schliers or little pellets of a quartz-feldspatic matrix. The structure

is maculose-schistose. The average gradient of this foliation is 55° about.

236,00 - 237,70 — A gray quartzite, with some very little flakes of biotiteor seriteand with some very little chambres of a chloritic matrix and with some very little hypidiomorphic or automorphic grains of FeS_2 locally. Between 236,70 - 236,90 m are present some schliers or intercalations of a strongly chloritic, hornblende greenschist with a lot of big grains of garnet, with not much flakes of biotite, locally only and with a lot of acicular and rodlike porphyroblasts of hornblende. The structure is massive mostly.

237,70 - 243,00 — The chloritic, biotitic and seritic gneissic schist with some little grains or spots of carbonates (ancerite-dolomite) too. Locally are present some schliers or little intercalations of a quartzite or of a quartz-feldspatic matrix. The structure is maculose and maculose-schistose. The average gradient of this foliation is 5° - 10° about. Between 240,50 - 241,90 m is present some poor impregnation of pyrite mostly only. Between 239,15 - 239,35 m somemylonitic-tectonic sone with a bi ger rodlike and acicular porphyroblasts of hornblendeand with a lot of schliers and pellets of a quartz-feldspatic matrix. Some very poor impregnation of FeS_2 and of FeS locally is present too.

243,00 - 244,60 — The white-gray metaquartzite with some little chambres or spots or very little schliers of a chloriticand chloritic-amphibolitic matrix, with some little chrushed acicular or rodlike porphyroblasts of hornblende and with some very little grains of FeS_2 locally only. Some schliers of carbonates are present too. The structure is massive.

244,60 - 250,00 — The strongly chloritic, little bit biotitic and seritic greenschist with a lot of schliers and little intercalations of a quartzite or quartz and with some little bit strongly but poor totally mineralisation is acumulatedin some little schliers which following foliation. The structure is schistose and phacoidal schistose. The average gradient of this foliation is 30° - 35° about.

250,00 - 253,60 — The chloritic and biotitic gneissic greenschist with a lot of little schliers and little spots of a quartz-feldspatic matrix. Some little grains of garnet are resent too, but locally only. The structure is phluidal-schistose. This rock is folded locally too by the flat folds of a cm or dm amplitude. The average gradient of this foliation is 5° - 10° about, 0° locally too.

253,60 - 257,00 — The tiny-grained feldspatic and little bit carbonatic greenstone with a lot of little schliers, pellets and spots of a feldspatic

quartz-feldspatic matrix and with some spots or grains of carbonats (ancerite-dollomite). The structure is massive or banking too.

257,00 - 259,50 The chloritic and biotitic greenschist, locally with some schliers and pellets of a quartz-feldspatic matrix. Some intercalations of quartzite have a poor impregnation of FeS_2 mostly (in example in 257,10 - 257,15 m). The average gradient of this foliation is 55° - 70° about. The structure of this rock is phacoidal-schistose mostly. This rock is folded little bit locally too by the flat folds.

259,50 - 262,00 The tiny-grained, little bit, fewly feldspatic greenstone with some flakes of biotite locally too. The structure is massive mostly.

262,00 - 263,90 The tiny-grained , feldspatic amphibolitic greenstone. The structure is sheeting and banking. Locally are present some carbonates too. The average gradient of this foliation is 60° - 65° about.

263,90 - 268,00 The biotitic, chloritic and amphibolitic gneissic greenschist, locally with some little schliers and intercalations of a quartz or a quartz feldspatic matrix. The structure is schistose and sheeting. The average gradient of this foliation is 0° - 5° about, but locally 40° - 50° about.

268,00 - 271,40 The hornblende gneiss with very much acicular and rodlike porphyroblasts of hornblende (without a clear grain clongation) and with some small chambres or spots of soisite-epidote matrix. The structure is sheeting and banking. The texture is blastophitic and blastoporphyric. The average gradient of this foliation is 25° - 30° about.

271,40 - 272,60 The hornblende keratophyre with a lot of rodlike and acicular porphyroblasts of hornblende and with some chambres (irregular) of a zoisite-episote matrix. The structure is massive. The texture is blastophitic and blastoporphyric. Some allotriomorphic grains of FeS_2 are locally only present too.

272,60 - 278,20 The amphibolitic and chloritic gneiss with some little chambres or little schliers of a zoisite-epidote matrix and with very much little acicular and rodlike porphyroblasts of hornblende. Some allotriomorphic grains of FeS_2 or flakes of FeS are present too. The structure is schistose and banking. The average gradient of this foliation is 55° - 60° about. Locally is this rock folded by the folds of a mm, cm and dm amplitude.

278,20 - 280,00 The chloritic, amphibolitic and little bit biotitic gneissic schist as well as in 263,90 - 268,00 m, but with more irregular grains or

flakes of FeS_2 or FeS. The average gradient of this foliation is 25° - 30° about.

280,00 - 288,70 — The tiny-grained, little bit feldspatic greenstone with some little schliers o some little intercalations of a quartz or a quartz-feldspatic matrix and locally with some allotriomorphic grains of FeS_2 or of FeS too mostly, which are scarely acumulated to some little schliers. The structure is massive and sheeting. The average gradient of this foliation is 0° - 5° about, but from 285,00 m 45° - 50° around. Some schliers of a quartz or of a quart-feldspatic matrix are impregnated by FeS_2 mostly, together with FeS. in example in 283,80 - 283,90 m.

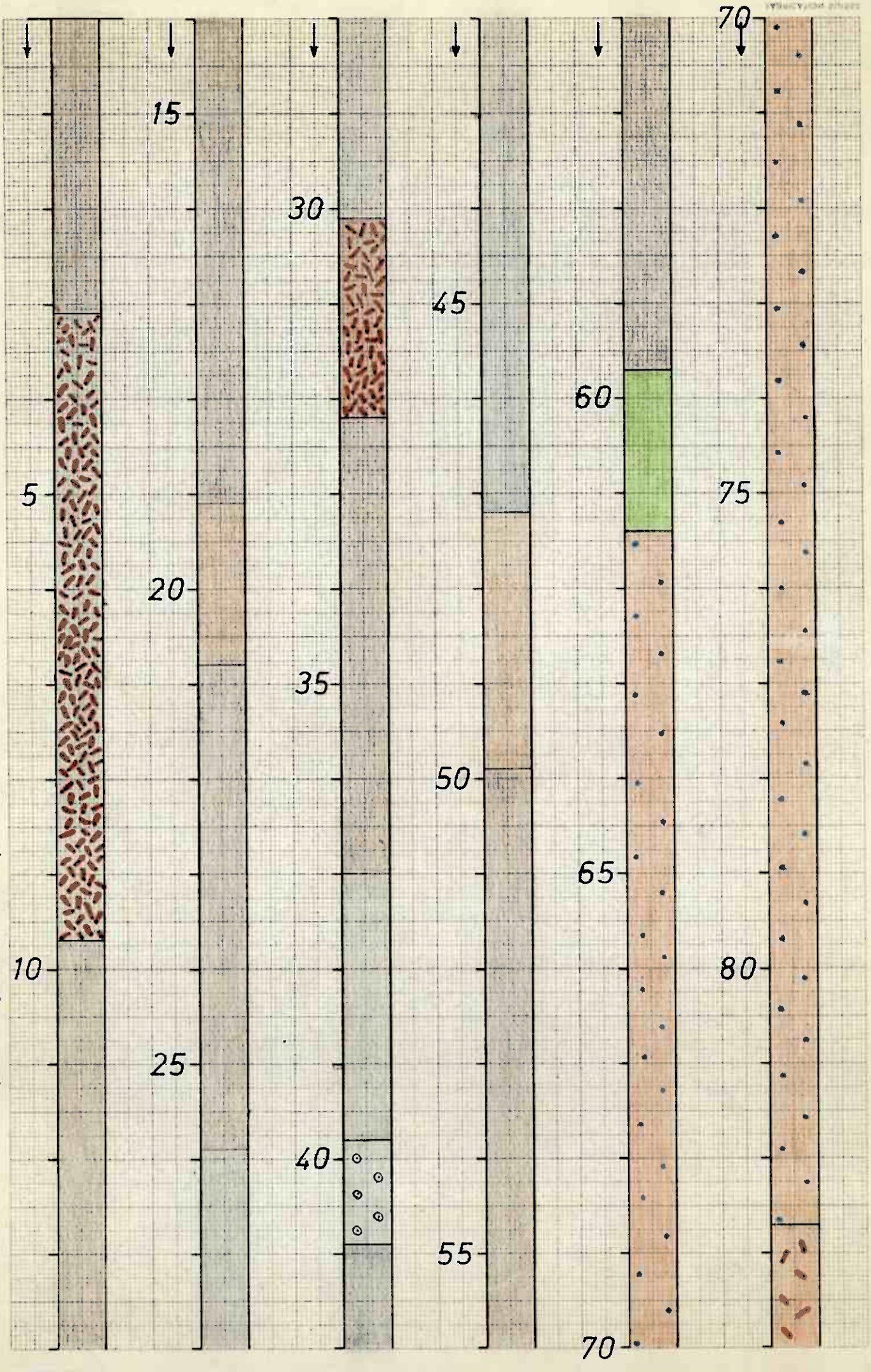
288,70 - 293,20 — Thechloritic and little bit seritic, strongly quartzy, gneissic mica schist, with some flakes of biotite too and with some very poor impregnation of FeS mostly in some little flat chambres or schliers. The structure of this rock is phacoidal and maculose-schistose. Locally is this rock folded too, by the folds of a mm and cm amplitude. The average gradient of this foliation is 40° - 50° about.

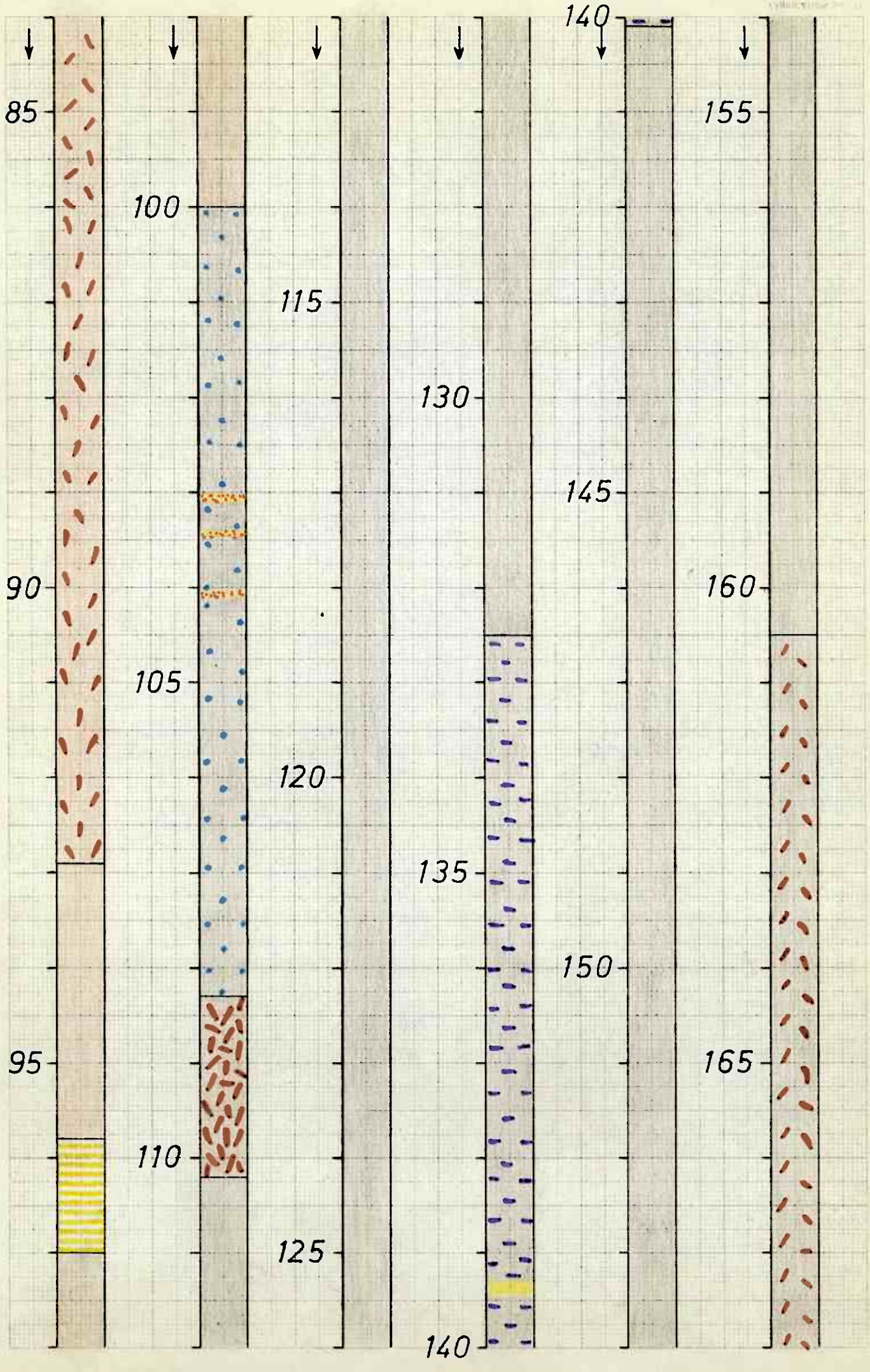
293,20 - 297,00 — The chloritic, little bit seritic and biotitic garnet, gneissic mica schist with a phacoidal schistose structure. The average gradient of this foliation is 50° - 55° about.

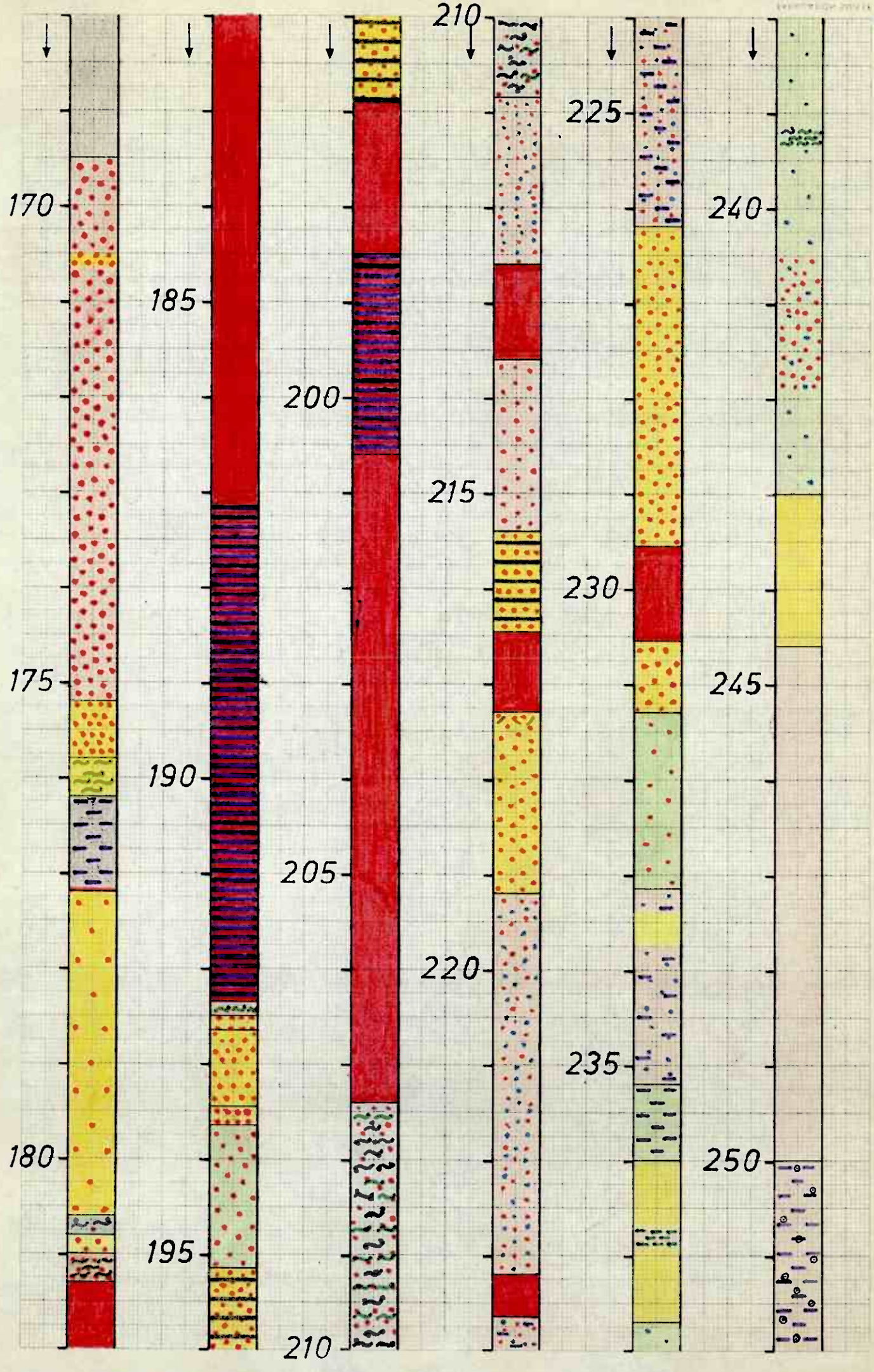
This borehole no. 89 G was stopped at 297,00 m on Juni 22d 1970 at 13 p.m.

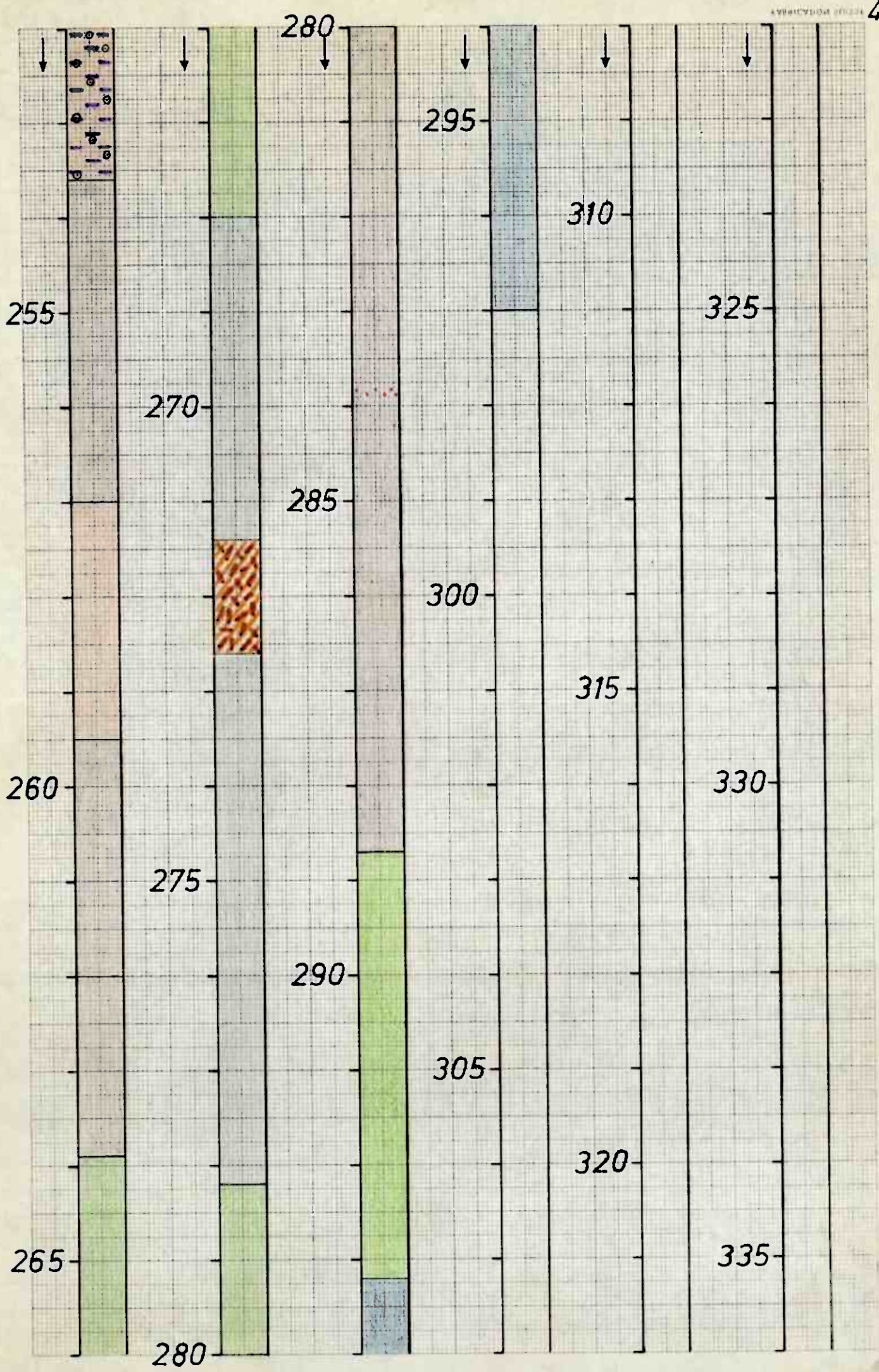
(Milosh Motys).

The petrografical profile of the borehole nr. 89 G, Tverrfjellet mine.




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THE DIAMOND BOREHOLE NO. 94 G
Tverrfjellet mine, level II., sone V.

The borehole no. 94 G, Tverrfjellet mine, level II, sone V, angle of the beginning is - 40° down, coordinates X = - 34,8, Y = + 362,3, Z = + 964,8.

The brief petrografical description.

0,00 - 6,30	The tiny-grained amphibolite (amphibolitic greenstone) with a lot of schliers or oblique joints, which are filled by quartz or quartz-feldspatic matrix. The structure is massive mostly and banking too.
6,30 - 6,70	The strongly quartzy myllonitic or a quartz-myllonitic breccie with myllonitic or phacoidal structure. Locally are present some schliers or allotriomorphic grains of pyrite only, like very poor impregnation. The average gradient of this foliation is 45°-50° around.
6,70 - 8,50	The grey quartzite locally with some little bit more bright schliers, with not much a chloritic substance and locally with many little acicular porphyroblasts of hornblende. The structure is massive mostly but banking locally too.
8.50 - 9,00	The quartzy, chloritic and amphibolitic, myllonite, locally a myllonitic breccic. Some poor impregnation of pyrite and pyrrhotite mostly only are present in some little schliers or like amorphic forms. The structure is myllonitic and phacoidal.
9,00 - 9,40	The tiny-grained and medium-grained strongly feldspatic amphibolite, with some schliers of a quartzitic matrix locally too. The structure is massive and banking. Zoisite-epidote are present in some little chambres too.
9,40 - 11,50	The tiny-grained amphibolite (amphibolitic greenstone) as well as between 0,00 - 6,30 m. (A gradient of foliation is ca. 50°-55°). Between 10,60 - 10,80 m is present a position of a barren white secretion quartz.
11,50 - 11,90	The strongly feldspatic and chloritic medium-grained amphibolite. Some amorphic forms of pyrite and pyrrhotite are present locally only. The structure is massive and locally little bit banking.
11,90 - 13,40	The strongly chloritic, amphibolitic greenschist with many big rodlike and acicular porphyroblasts of hornblende (actinolite), which are crushed oftenly. Some little amorphic forms or allo-triomorphic grains of pyrite and pyrrhotite are locally present too. The structure is massive and banking.

13,40 - 17,60	The chloritic and locally strongly chloritic gneissic greenschist with some flakes of biotite and with some small crushed rodlike and acicular porphyroblasts of actinolite. Some little amorphic forms or allotriomorphic grains of pyrite and pyrrhotite are locally present too. The structure is phacoidal, phacoidal schistose and eyed too. The average gradient of this foliation is 55° about.
17,60 - 20,30	The strongly carbonatic (ancerite-dolomite), chloritic and amphibolitic greenschist with a lot of small crystales (idiomorphic and hypidiomorphic) of carbonate (dolomite) and with many little acicular and rodlike porphyroblasts (locally crushed) of hornblende without a grain-clongation. The total structure is massive and banking.
20,30 - 23,60	The tiny-grained amphibolite (amphibolitic greenstone) with very much schliers and filled joints by a quartz or a quartz-feldspatic matrix and with many hypidiomorphic porphyroblasts of carbonates (ancerite-dolomite). The structure is massive mostly.
23,60 - 25,10	The strongly carbonatic (ancerite-dolomite) chloritic and amphibolitic greenschist as well as between 17,60 - 20,30 m.
25,10 - 26,50	The chloritic coarse-grained amphibolite with big acicular or rodlike (oftenly crushed) porphyroblasts of hornblende (actinolite) and locally with some schliers of a quartz or of a quartz-feldspatic matrix together with some poor impregnation of pyrite and pyrrhotite oftenly mostly only.
26,50 - 28,60	The bright gray and gray metaquartzite, with some very poor impregnation of pyrite mostly and of pyrrhotite more weakly too locally. Some little acicular or rodlike porphyroblasts of actinolite or some little flakes of biotite are locally present too. Some irregular schliers, which are filled by carbonates (ancerite - dolomite) are locally present too. The total structure is massive mostly.
28,60 - 31,30	The quartzy chloritic, tiny-grained amphibolitic schist with many little phacoidal schliers of a quartzite or of a quartz matrix. The structure is phacoidal schistose mostly. The average gradient of this foliation is 50°-55° about.
31,30 - 32,50	The tiny-grained chloritic amphibolite and amphibolitic schist with many big rodlike and acicular, crushed porphyroblasts of actinolite and with a lot of little phacoidal schliers og a quartzite. The structure is massive and banking.
32,50 - 32,90	The chloritic, coarse-grained amphibolite with many irregular schliers and chambres of quartzite

Big acicular and rodlike porphyroblasts of hornblende (actinolite) are crushed oftenly. Between 32,60 - 32,65 m is present in a quartzite position many irregular little schliers and chambres of pyrrhotite mostly only.

32,90 - 39,00 The sericitic, little bit chloritic and biotitic gneissic mica schist with a phacoidal schistose and eyed structure. The average gradient of this foliation is 55° around.

39,00 - 40,20 The white gray or very bright gray ceratophyre with not so much small rodlike and acicular porphyroblasts of hornblende (actinolite) without some grain-clongation. The structure is massive.

40,20 - 46,50 The sericitic and more weakly chloritic, biotitic gneissic mica schist and gneissic schist, locally with some little acicular or rodlike porphyroblasts of hornblende with some total grain-clongation. The structure is phacoidal, phacoidal schistose and eyed. The average gradient of this foliation is 50° and 55° around.

46,50 - 47,40 The white gray keratophyre with many irregular schliers, pellets or chambres of a chloritic and chloritic-amphibolitic matrix together with flakes of biotite too and with some hypidiomorphi or idiomorphic grains of pyrite locally. The total structure is massive mostly.

47,40 - 48,05 The chloritic, sericitic and biotitic, little bit chloritic gneiss or gneissic mica schist. The structure is fluidial and phacoidal schistose. The average gradient of this foliation is 60° about.

48,05 - 48,20 The very strong impregnation of sulphides (pyrite mostly only) in a quartzite. Some little amorphic forms of chalcopyrite are present scarcely on the border of this position ca. in 48,05 m. The structure is massive and texture cataclastic mostly. The result of the chemical analyse from this position between 48,05 - 48,20 m is:
Cu , Zn , S

48,20 - 48,70 The biotitic sericitic and chloritic gneiss and gneissic schist as well as between 47,40 - 48,05

48,70 - 48,85 The very strong impregnation of pyrite mostly like between 48,05 - 48,20 m. The result of the chemical analyse from this position between 48,70 - 48,85 m is: Cu 1,80%, Zn 1,40% S 29,00%

48,85 - 49,25 The biotitic, sericitic and little bit chloritic gneiss and gneissic schist as well as between 47,40 - 48,05 m. This position is folded by the flat folds of a dm amplitude.

49,25 - 49,40 The strongly quartzy biotitic, chloritic gneissic schist with a poor impregnation of pyrite mostly (FeS and $CuFeS_2$ scarcely only). The structure is phacoidal schistose. The result of the chemical analyse from this position between 49,25 - 49,40 m is: Cu 0,90% Zn 0,55% S 23,00 %.

49,40 - 53,30 The very strong impregnation of the ore's sulphide in quartzite (mostly pyrite). The structure is massive mostly and the texture is cataclastic and porphyric. Between 49,50 - 49,95 m are present some little schliers of a tiny-grained magnetite in quartzite too. The average gradient of this schliers os 55° about. The result of the chemical analyses from this position between 49,40 - 53,30 are:

Between 49,40 - 49,95 m: Cu 1,20 Zn 1,50, S 28,50
Between 49,95 - 51,85 m: Cu 0,20 Zn 2,20, S 30,00
Between 51,85 - 53,30 m: Cu 0,50 Zn 1,70, S 41,00

53,30 - 54,65 Biotitic and little bit chloritic and sericitic gneiss and gneissic schist as well as between 47,40 - 48,05 m, but folded by the flat folds of a dm, amplitude. The average gradient of this foliation is 25°-30° about.

54,65 - 55,25 The strongly chloritic gneissic greenschist with some bigger rodlike and acicular porphyroblasts of hornblende locally. The structure is banking and phacoidal schistose. The average gradient of this foliation is 30° about. The result of the chemical analyse from this positions between 53,30 - 55,25 m is: Cu 0,00 , Zn 0,00, S 2,00

55,25 - 60,30 The very strong impregnation of the ore's sulphides in a quartzite (mostly FeS2), like between 49,40 - 53,30 m. Between 55,25 - 55,75 m are present some little schliers of magnetite. Between 55,75 - 56,10 m has the ore massive structure, like between 59,75 - 60,30 m. Between 56,10 - 59,75 m has this ore body a breccic or a conglomerate structure with some chambres and phacoidal schliers of quartz or quartz-feldspatic matrix. Between 57,50 - 58,85 m are present some schliers of very fine-grained magnetite which are folded by the flat folds of a cm and dm amplitude. The result of the chemical analyses from this position between 55,25 - 60,30 m are:

Between 55.25 - 55,75 m : Cu 3,00, Zn 1,10, S 29,5
Between 55.75 - 57,10 m : Cu 1,55, Zn 1,50, S 41,0
Between 57,10 - 58,85 m : Cu 2,90, Zn 1,00, S 27,7
Between 58,85 - 59,75 m : Cu 2,90, Zn 0,90, S 21,50
Between 59,75 - 60,30 m : Cu 0,30, Zn 0,95, S 42,50

60,30 - 70,90 The quartzy, strongly chloritic, amphibolitic and locally weakly biotitic gneissic schist, with some phacoidal schliers of a quartz matrix. Some little crushed rodlike porphyroblasts of hornblende are present scarcely only. The structure is phacoidal schistose and banking.

The average gradient of this foliation is 55° - 60° about.

70,90 - 71,80 — The amphibolitic and little bit sericitic and chloritic gneiss or gneissic schist with a lot of little and small acicular and rodlike porphyroblasts of hornblende without some clear grain clongation. Some little flakes of biotite are present too. The structure is sheeting, banking and phacoidal schistose. The average gradient of this foliation is 55° about.

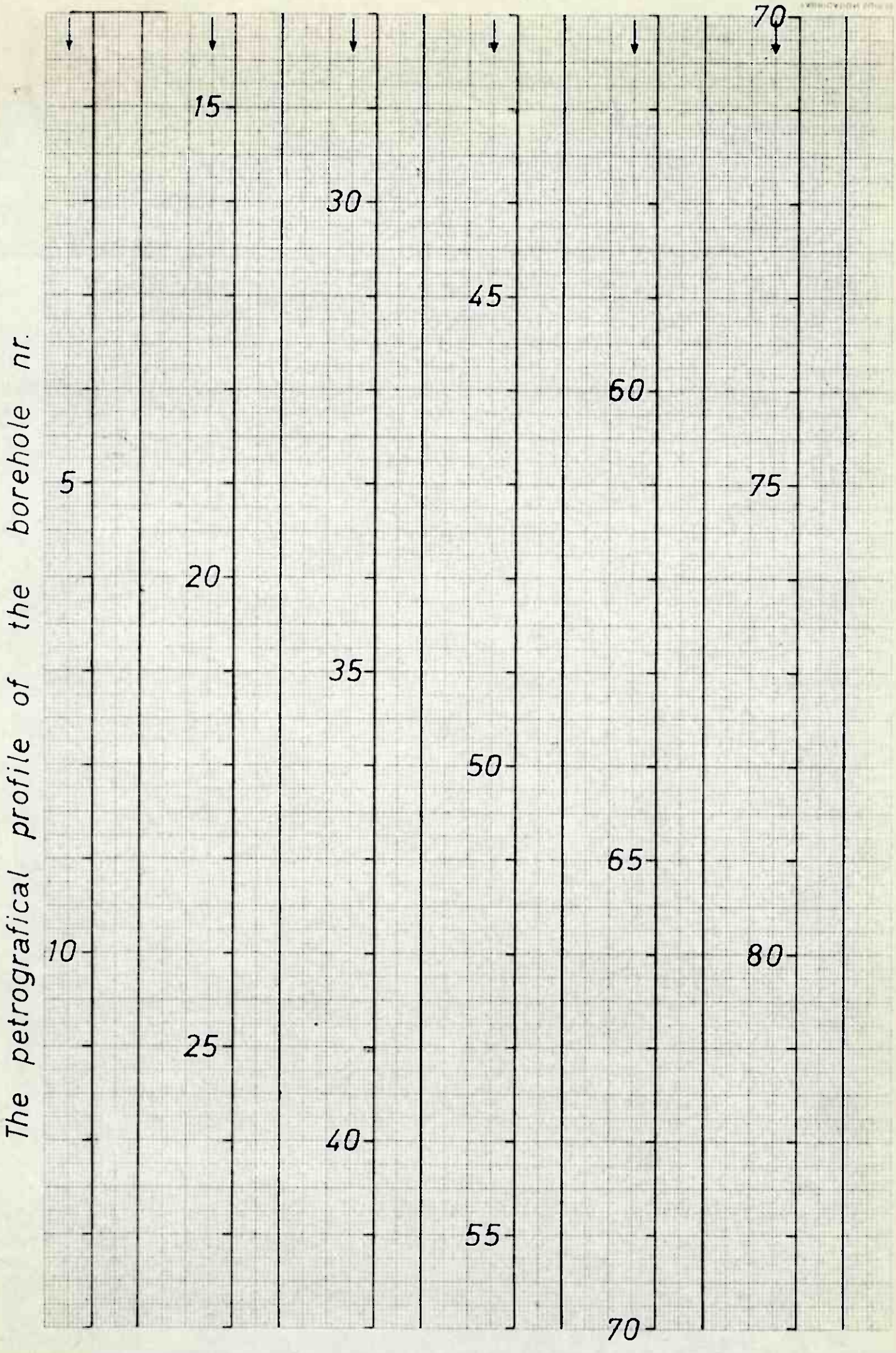
71,80 - 74,10 — The tiny-grained amphibolite (amphibolitic greenstone) with a lot of small schliers or intercalations of a quartz or of a quartz-feldspatic matrix, which have locally some poor impregnation of pyrrhotite and pyrite (the average thickness is 0,5 cm maximally). The structure is banking and massive. The average gradient of this foliation is 55°-60° about.

74,10 - 75,10 — The amphibolitic and little bit chloritic and sericitic gneiss or gneissic schist like between 70,90 - 71,80 m. Between 74,65 - 75,10 m are present more big acicular and rodlike porphyroblasts of hornblende. The structure is banking and phacoidal or phacoidal schistose. The average gradient of this foliation is 50°-55° about.

75.10 - 80,40 — The sericitic and little bit chloritic and biotitic garnet gneissic mica schist with a phacoidal schistose, fluidial and eyed structure. The average gradient of this foliation is 55° - 60° about.

This borehole no. 94 G in Tverrfjellet mine on the level II was stopped on November 16th 1970 at 12.30 p.m. at 80,40 m.

(M. Motys).


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR. 106 G

Tverrfjellet gruve

FOLLDAL VERK A/S

Diamantborhull nr. 106 G.

Koordinater: X= + 5,4, Y= + 432,7, Z= 904,78

Fall: - 69° mot nord-vest.

Kort petrografisk beskrivelse.

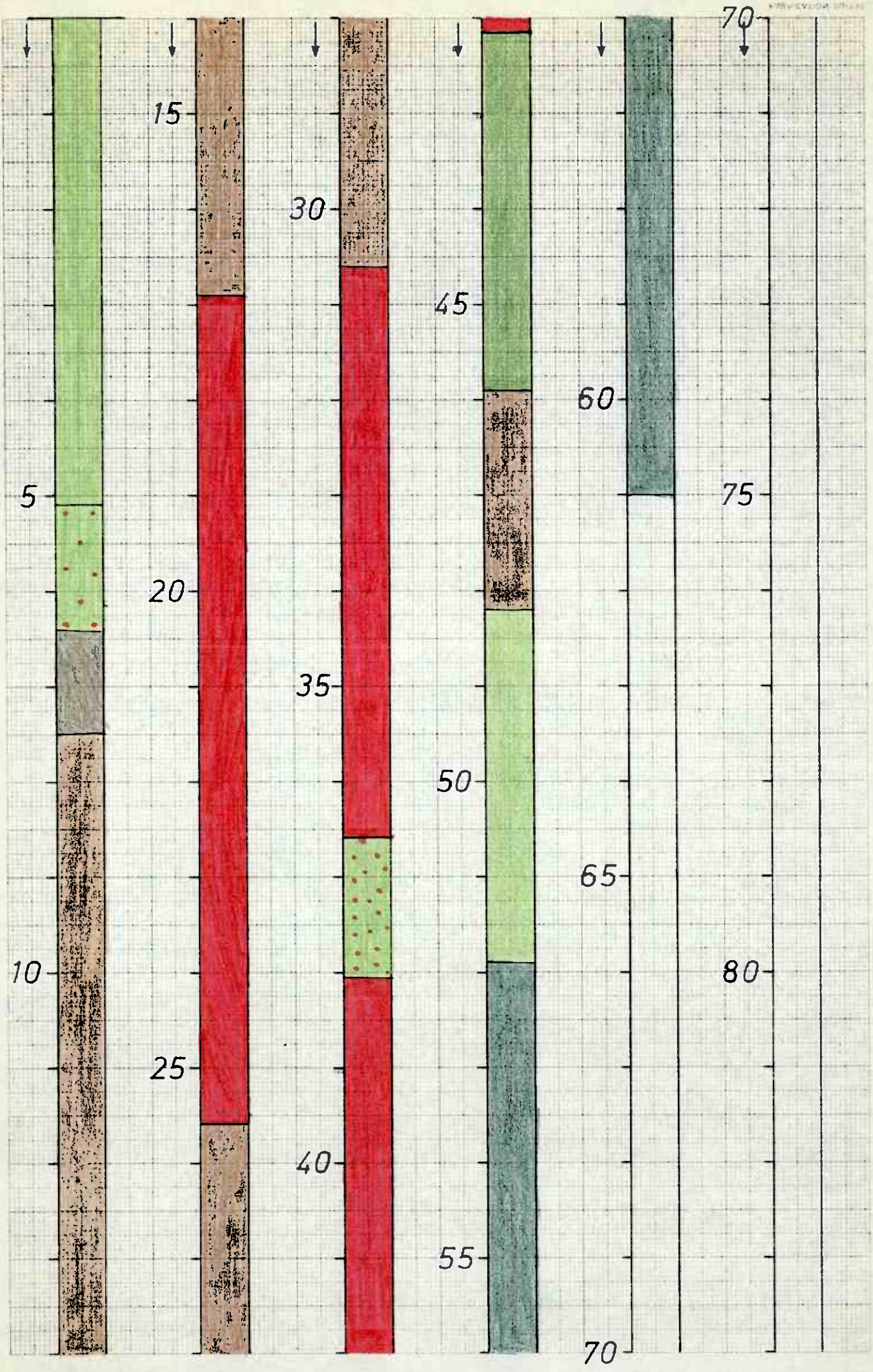
0,00 - 5,10	Klorittisk og biotittisk, kvartsittisk skifer eller på stedet mere gneisiskskifer med åre tekstur. På stedet finnes en veldig svak impregnering av magnetkis. Fall av foliasjon i borhullet er 15°- 20°.
5,10 - 6,40	Klorittisk, kvartsittisk skifer med litt biotitt på stedet og med veldig svak impregnasjon av svovelkis. Teksturet er stripe. Fall av foliasjon i borrhullet er 15°.
6,40 - 7,50	Feldspatisk, middels krystallisk amfibolitt med bånd eller massiv tekstur. På stedxt finnes lite porfyroblaster av dollomitt (ankeritt).
7,50 - 16,90	Tett, fin krystallisk amfibolitt med mange små årer av kvarts. Teksturett er bånd eller massiv. Bare på stedet finnes veldig svak impregnasjon av svovelkis mest.
16,90 - 25,60	Den sulfidisk malm med massiv tekstur og med kataklastisk struktur. Fall av hengfjell og liggfjell malmgrenser er 15° - 20° i borhullet. (Analyseresultater se tabell).
25,60 - 30,60	Tett, fin krystallisk amfibolitt det samme som mellom 7,50 - 16,90 m.
30,60 - 36,60	Sulfidisk malm det samme som mellom 16,90 - 25,60 m. Fall av hengfjell og liggfjell malmgrenser er 20° i borrhullet. (Analyseresultater se tabell).
36,60 - 38,05	Klorittisk og amfibolittisk, kvartsittisk grønnskifer med paralell stripeteksturet. Fall av foliasjon i borrhullet er 20°.
38,05 - 42,15	Den sulfidiske malm det samme som mellom 16,90 - 25,60. Fall av hengfjell og liggfjell grenser er ca. 30. (Analyseresultater se tabell).
42,15 - 45,90	Kvartsittisk, gneisisk, svak klorittisk og svak biotittisk skifer med mange noleporfyroblaster eller rørformedeporfyroblaster av amyfibollhornblende.) Den bergart har et paralellstripe tekstur. Fall av foliasjon i borrhullet er 35°.
45,90 - 48,20	Tett, fin krystallisk amfibolitt det samme som mellom 7,50 - 16,90 m.
48,20 - 51,90	Sterk kvartsittisk, klorittisk og litt biotittisk skifer med åre eller stripeteksturet. Fall av foliasjon i borrhullet er 35°.

51,90 - 61,00	Klorittisk, litt serissititisk og biotittisk granat gneisglimmerskifer, som har mest linse-striper teksturet. Fall av foliasjon i borrhullet er ca. 30°.

Borrhullet nr. 106 G var stoppet 10.2.1971, ca. kl. 13.30.

(Milos Motys)

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR. 108 G,

Tverrfjellet gruve.

Diamant borhull nr. 108 G, nivå III, vest, sone II.

Fall av hullet i begynnelse = horisontal (36 mm)

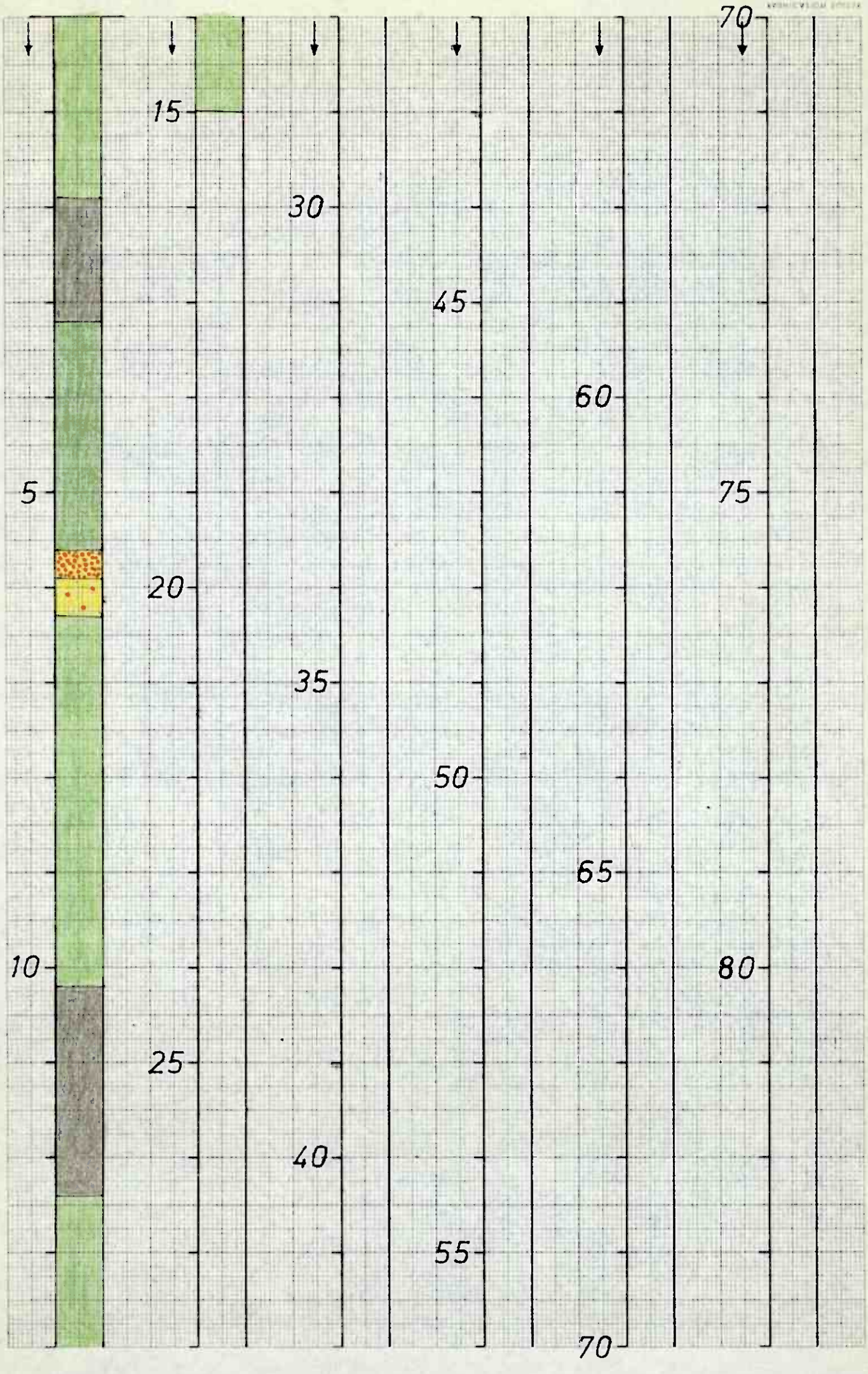
Koordinatene: X = -22,6, Y = +481,8, Z = +905,3

Kort petrografisk beskrivelse:

0,00 - 1,90	Kvartsrik, klorittisk gneisisk slireskifer.
1,90 - 3,20	Feltspatisk og på stedet karbonatisk (ankeritt-dolomitt) amfibolitt som er midlkrystallinsk med bånd teksturet.
3,20 - 5,60	Feltspatisk og litt karbonatisk, klorittisk og amfibolittisk gneisisk slireskifer.
5,60 - 5,90	Svak malmsulfidisk impregnasjon i metakvartsitt (mest bare svovelkis)
5,90 - 6,30	Grå og gråkvit metakvartsitt med massiv teksturet og bare på stedet finnes hypidiomorfiske korn av svovelkis.
6,30 - 10,20	Kvartsrik, litt klorittisk og serisittisk (muskovitt) gneisisk slireskifer.
10,20 - 12,40	Karbonatisk (dolomitt-ankeritt) og feltspatisk midlkrystallinsk og lite klorittisk og epidottisk amfibolitt.
12,40 - 15,00	Kvartsrik, klorittisk, amfibolittisk gneisisk slireskifer som har på stedet biotitt og muskovitt (serisitt) også.

Borhull nr. 108 G har stoppet på 15,00 m den 22.2.71, kl. 12.30.

M. Motys.


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR. 109 G,
Tverrfjellet gruve.

LLDAL VERK A/S

Diamant borhull nr. 109 G.

Tverrfjellet gruve, nivå I - vest, sone I

Fall av begynelse: -70°

Koordinater: X = -77,1, Y = +1020,0, Z = 1031,0

Kort petrografisk beskrivelse.

0,00 - 1,70 Klorittisk og biotittisk grønn glimmerskifer med paralell stripe teksturet. Fall av foliasjon i hullet er 25°.

1,70 - 2,85 Biotittisk og klorittisk gneis-skifer med stripe og linse-stripe teksturet. Biotitt mobilisasjon finnes mellom 2,60-2,85 m. Fall av foliasjon i hullet er ca 20°-25°.

2,85 - 13,45 Sulfidisk malm som er representert av sterk svovelkis impregnasjon i kvartsitt med litt kobberkis og sinkblende også. Teksturet er masio eller bare på stedet linse-stripe. Strukturet er mest kataklastisk (analyse resultater, se tabeller).

13,45 - 16,15 Biotittisk og kvartsittisk gneis eller gneis-skifer. På stedet finnes striper av sterk svovelkis impregnasjon og på stedet finnes også sterk mobilisasjon av biotitt. Mest man finner stripe og linse-stripe teksturet. Fall av foliasjon i hullet er ca 10° - 20°.

16,15 - 25,25 Sulfidisk malm det samme som mellom 2,85 - 13,45 m. (Analyse resultater, se tabeller).

25,25- 26,70 Keratofyrisk, gneisisk tektonisk (breksie) skifer med linser og flekker av klorittisk og mylonittisk stoffer. På stedet finnes svak men også sterk impregnasjon av svovelkis (veldig lite kobberkis eller magnetkis også). Teksturet er masio og linse-stripe. Fall av foliasjon i hullet er ca 15°-20°.

26,70-30,20 Sulfidisk malm det samme som mellom 2,85 - 13,45 m Mellom 26,70 - 27,90 m finnes striper av sterk magnetitt impregnering. (Analyse resultater, se tabeller)

30,20 - 31,60 Grå-kvitt metakvartsitt med svak eller på stedet sterk impregnasjon av svovelkis mest. Teksturet er masio og båndet.

31,60 - 34,85 Sulfidisk malm det samme som mellom 2,85 - 13,45 m. (Analyse resultater, se tabeller).

34,85 - 35,00 Mørk-grå kvartsittisk mylonitt.

35,00 - 35,50 Klorittisk, biotittisk gneis-granatglimmerskifer med linse-stripe teksturet. Fall av foliasjon i hullet er 55°-60°.

35,50 - 38,90 Sterk kvartsittisk gneis skifer med nole og røre porfyroblaster av hornblende. Teksturet er masio eller bånd.

38,90 - 41,10 Klorittisk, biotittisk gneis-granatglimmerskifer det samme mellom 35,00 - 35,50 m.
Fall av foliasjon i hullet er 60°.

Diamant borhullet nr. 109 G har stoppet i 41,10 m 4.3.71, kl. 13.30.

Milos Motys.

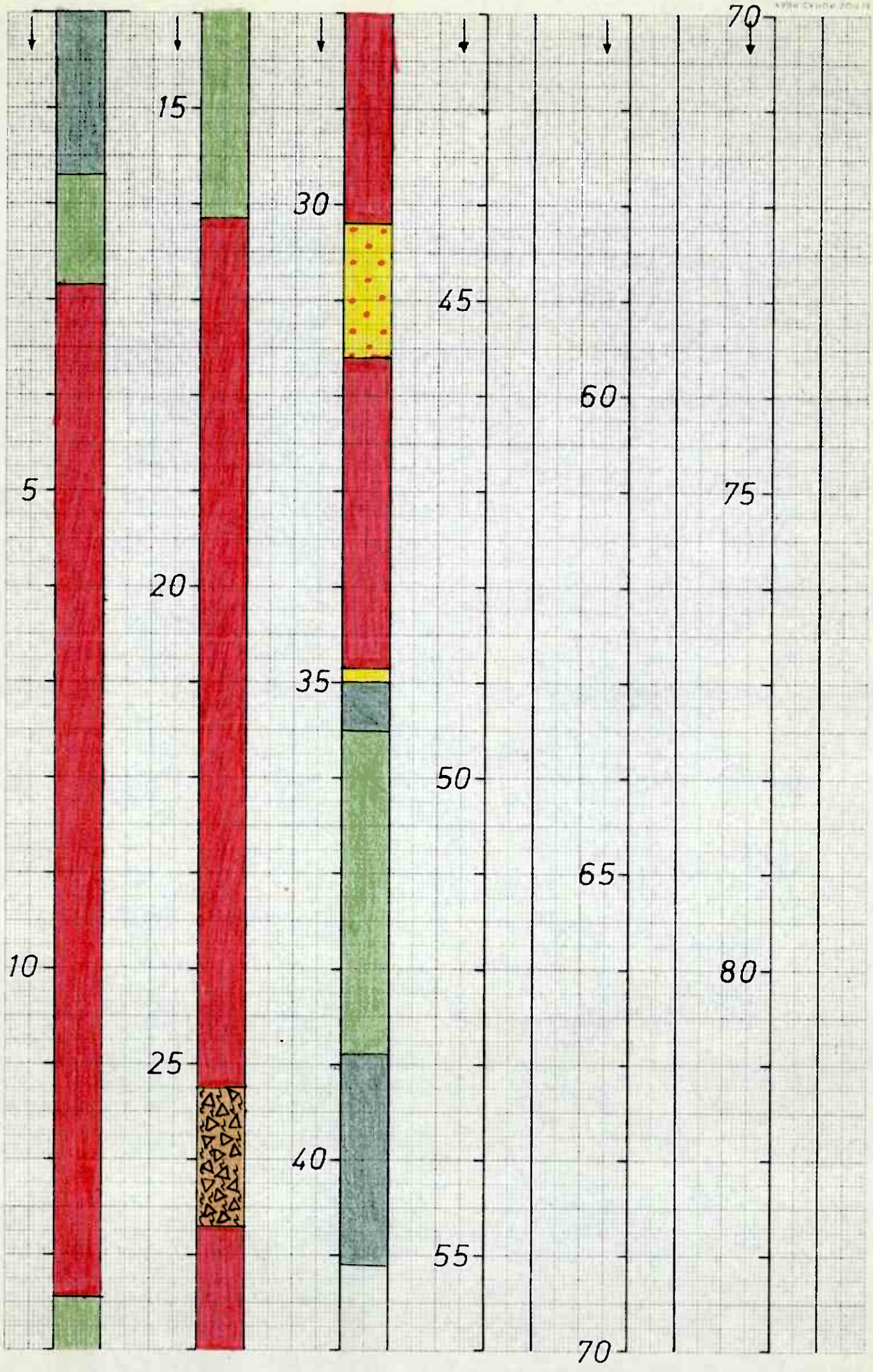
Gjennomsnitt av kjemiske analyser for : Diamantborhull nr. 109 G, på nivå I.-vest, sone I. 1

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	2,85-4,00	1,15	2,40	2,7600	0,50	0,5750	46,00	52,9000		
2	4,00-5,00	1,00	1,75	1,7500	0,35	0,3500	47,00	47,0000		
3	5,00-6,00	1,00	1,10	1,1000	0,40	0,4000	46,00	46,0000		
4	6,00-7,00	1,00	1,25	1,2500	1,00	1,0000	39,50	39,5000		
5	7,00-8,00	1,00	2,00	2,0000	0,70	0,7000	41,00	41,0000		
6	8,00-9,00	1,00	1,25	1,2500	0,50	0,5000	43,50	43,5000		
7	9,00-10,00	1,00	1,45	1,4500	0,95	0,9500	40,00	40,0000		
8	10,00-11,00	1,00	0,85	0,8500	0,55	0,5500	41,00	41,0000		
9	11,00-12,00	1,00	0,95	0,9500	0,60	0,6000	45,50	45,5000		
10	12,00-13,45	1,45	0,90	1,3050	0,40	0,5800	44,00	63,8000		
11	13,45-14,00	0,55	0,90	0,4950	0,45	0,2475	41,50	22,8250		
12	14,00-15,00	1,00	1,60	1,6000	0,55	0,5500	3,85	3,8500		
13	15,00-16,15	1,15	0,60	0,6900	0,20	0,2300	16,00	18,4000		
14	16,15-17,00	0,85	0,80	0,6800	0,85	0,7225	45,00	38,2500		
15	17,00-18,00	1,00	0,50	0,5000	1,20	1,2000	46,50	46,5000		
16	18,00-19,00	1,00	0,75	0,7500	0,80	0,8000	44,50	44,5000		

Gjennomsnitt av kjemiske analyser for: Diamantborhull nr. 109 G, på nivå I.-vest, sone I.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
17	19,00-20,00	1,00	0,70	0,7000	1,05	1,0500	45,00	45,0000		
18	20,00-21,00	1,00	0,75	0,7500	1,05	1,0500	40,50	40,5000		
19	21,00-22,00	1,00	0,50	0,5000	0,95	0,9500	44,00	44,0000		
20	22,00-23,00	1,00	1,10	1,1000	0,55	0,5500	41,25	41,2500		
21	23,00-24,00	1,00	1,80	1,8000	1,00	1,0000	42,00	42,0000		
22	24,00-25,25	1,25	3,50	4,3750	0,65	0,8125	39,00	48,7500		
23	25,25-26,00	0,75	3,50	2,6250	0,40	0,3000	23,00	17,2500		
24	26,00-26,70	0,70	2,75	1,9250	0,55	0,3850	21,00	14,7000		
25	26,70-28,00	1,30	4,00	5,2000	0,45	0,5850	32,50	42,2500		
26	28,00-29,00	1,00	2,25	2,2500	0,90	0,9000	41,50	41,5000		
27	29,00-30,20	1,20	2,50	3,0000	0,80	0,9600	33,00	39,6000		
28	30,20-31,60	1,40	2,15	3,0100	1,25	1,7500	37,00	51,8000		
29	31,60-33,00	1,40	1,65	2,3100	1,00	1,4000	44,75	62,6500		
30	33,00-34,00	1,00	1,55	1,5500	1,25	1,2500	44,00	44,0000		
31	34,00-34,85	0,85	1,10	0,9350	1,90	1,6150	44,75	38,0375		
Σ 1-31	2,85-34,85	32,00	1,61	51,4100	0,77	24,5125	38,99	1247,8125		

The petrografical profile of the borehole nr.



DIAMANT BOREHULL NR. 110 G,

Tverrfjellet gruve.

FOLLDAL VERK A/S

Diamant borhull nr. 110 G.

Fall av begynelse = -50°

Koordinater: X = -77,1, Y = +1020,0, Z = +1031,0

Kort petrografisk beskrivelse.

0,00 - 0,55	Kloritisk og biotittisk gneis skifter med paralell stripe teksturet. Fall av foliasjon i hullet er 40°-45°.
0,55 - 19,25	Sulfidisk malm som representerer sterk svovelkis impregnasjon i kvartsitt med lite gehalter av kobberkis og sinkblende. På stedet finnes linser og striper av kvarts eller kvartsitt uten impregnasjon. Teksturet er striper og masiv. Strukturet er mest kataklastisk.
19,25 - 20,90	Amfibolittisk, klorittisk gneis-skifer med bånd og stripe teksturet. Fall av foliasjon i hullet er 20°
20,90 - 23,00	Grå-kvitt metakvartsitt med masio teksturet og med flekker av klorittisk-mylonittisk stoffet på stedet. I 21,50 m finnes svak impregnasjon av $CuFeS_2$, FeS og FeS_2 (flekker).
23,00 - 25,40	Klorittisk og sterk kvartsittisk gneis-skifer med paralell stripe teksturet. På stedet finnes hypidiomorfisk eller allotriomorfisk porfyroblaster av magnetitt. Fall av foliasjon i hullet er ca 35°-40°.
25,40 - 26,75	Sterk impregnasjon av svovelkis mest med magnetkis også. Teksturet er linse-stripe og masio. Strukturet er mest kataklastisk. (Analyse resultat, se tabell).
26,75 - 29,15	Sterk kvartsittisk, lite biotittisk og lite klorittisk gneis eller gneis-skifer med bånd eller linse-stripe teksturet. På stedet finnes lite striper med svak impregnasjon av svovelkis og magnetkis. På stedet finnes hypidiomorfiske eller allotriomorfiske porfyroblaster av magnetitt. Mest mellom 26,80 - 27,50 m. Mellom 27,80-28,00m og mellom 28,25-28,95 m finnes to posisjoner av sterk impregnasjon av svovelkis og magnetkis (mest) i metakvartsittiske bergarter. Fall av foliasjon i hullet er 40° - 45°. (Analyse resultater, se tabeller).
29,15 - 30,35	Grå-kvitt metakvartsitt med bånd eller masio teksturet. På stedet finnes svak impregnasjon av magnetkis og svovelkis og veldig lite av cotterkis.

Mellom 29,50-29,90 m og mellom 30,10-30,30 m
er to posisjoner av sterk impregnasjon av magnetkis
og svovel (mest) som har breksietisk teksturet på
stedet. (Analyse resultater se tabeller).

30,35 - 35,30 Stor klorittisk og biotittisk gneis-skifer med linse-
stripe og stripe teksturet. Fall av foliasjon i
hullet er 45°-50°, men på stedet 10°-15°.
Mellom 30,55-30,65 m og mellom 31,30-31,45 m er sterk
impregnasjon av FeS_2 og lite $CuFeS_2$ og FeS i det samme
som bergartet, men med mylonitisk teksturet.
(Analyse resultater, se tabeller).

Diamant borhullet nr. 110 G har stoppet i 35,30 m 15.3.71 kl. 12.30.

Milos Motys.

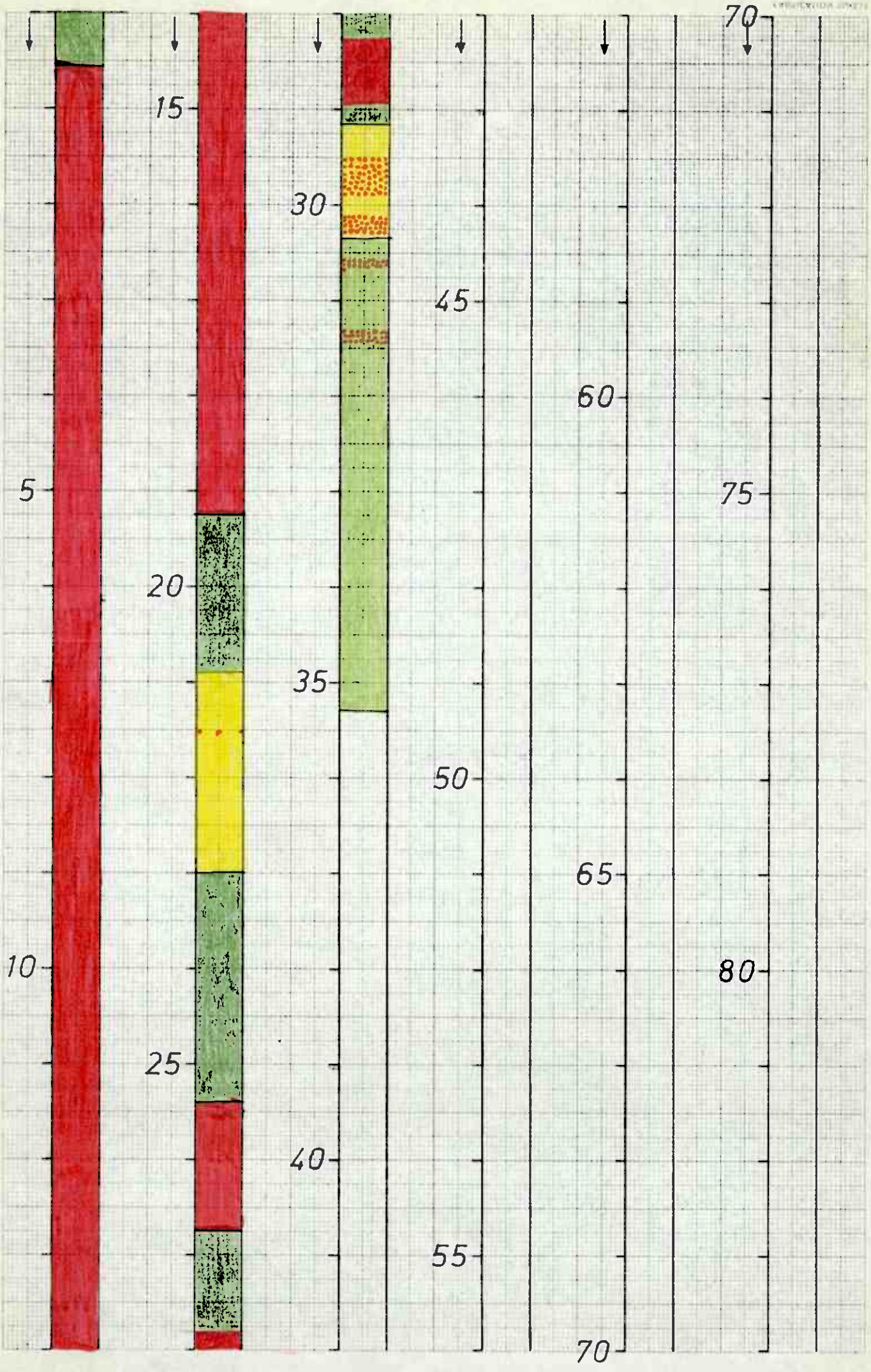
Gjennomsnitt av kjemiske analyser for : diamant borhull nr. 110 G, på nivå I - vest, sone I.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	0,55-2,00	1,45	1,50	2,18	0,50	0,73	44,00	63,80		
2	2,00-3,00	1,00	1,00	1,00	0,90	0,90	43,25	43,25		
3	3,00-4,00	1,00	1,20	1,20	1,20	1,20	39,50	39,50		
4	4,00-5,00	1,00	1,25	1,25	1,40	1,40	31,00	31,00		
5	5,00-6,00	1,10	1,10	1,10	0,85	0,85	32,00	32,00		
6	6,00-7,00	1,00	2,05	2,05	0,50	0,50	34,00	34,00		
7	7,00-8,00	1,00	1,70	1,70	0,40	0,40	31,25	31,25		
8	8,00-9,00	1,00	2,15	2,15	0,90	0,90	28,00	28,00		
9	9,00-10,00	1,00	3,75	3,75	0,80	0,80	25,00	25,00		
10	10,00-11,00	1,00	3,60	3,60	0,35	0,35	31,30	31,30		
11	11,00-12,00	1,00	1,10	1,10	1,35	1,35	28,75	28,75		
12	12,00-13,00	1,00	1,20	1,20	1,10	1,10	23,00	23,00		
13	13,00-14,00	1,00	0,60	0,60	1,55	1,55	38,00	38,00		
14	14,00-15,00	1,00	0,55	0,55	1,90	1,90	37,00	37,00		
15	15,00-16,00	1,00	0,25	0,25	2,45	2,45	42,00	42,00		
16	16,00-17,00	1,00	0,25	0,25	2,40	2,40	42,00	42,00		

Gjennomsnitt av kjemiske analyser for : diamant borhull nr. 110 G, på nivå I - vest, sone I.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
17	17,00-18,00	1,00	2,10	2,10	1,30	1,30	40,50	40,50		
18	18,00-19,25	1,25	2,30	2,88	0,70	0,88	36,00	45,00		
Σ 17-18	0,55-19,25	18,70	1,55	28,91	1,13	20,96	35,05	655,35		

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR. 111 G,
Tverrfjellet gruve.

DAL VERK A/S

Diamant borhull nr. 111 G, på nivå I - vest, sone I.

Koordinater: X = -94,8 Y = +1117,3 Z = +1031,1
Fall av begynelse av hullet = 0°

Kort petrografisk beskrivelse.

0,00 - 9,80 Klorittisk og biotittisk grønnskifer med mange små striper av kvarts eller kvartsitt. Teksturet er slire. På stedet finnes hypidiomorfiske korn av svovelkis eller magnetitt. Fall av foliasjon i hullet er til 4 m 50° men etterpå ca 30°. Mellom 4,70 - 4,85 m er posisjon av grå-kvitt kvartsitt med meget svak impregnasjon av svovelkis. Mellom 7,05 - 7,80 m finnes posisjon av metakvarsitt som har ikke så svak impregnasjon av magnetitt med mange granater (almandin - spesartin) som skaper flekker eller små linser. Teksturet er linse-stripe. På stedet finnes hypidiomorfiske korn av svovelkis.

9,80 - 10,70 Klorittisk, biotittisk og kvartsittisk glimmer skifer med mange små korn av granater. Teksturet er linse slire. Fall av foliasjon i hullet er 50°.

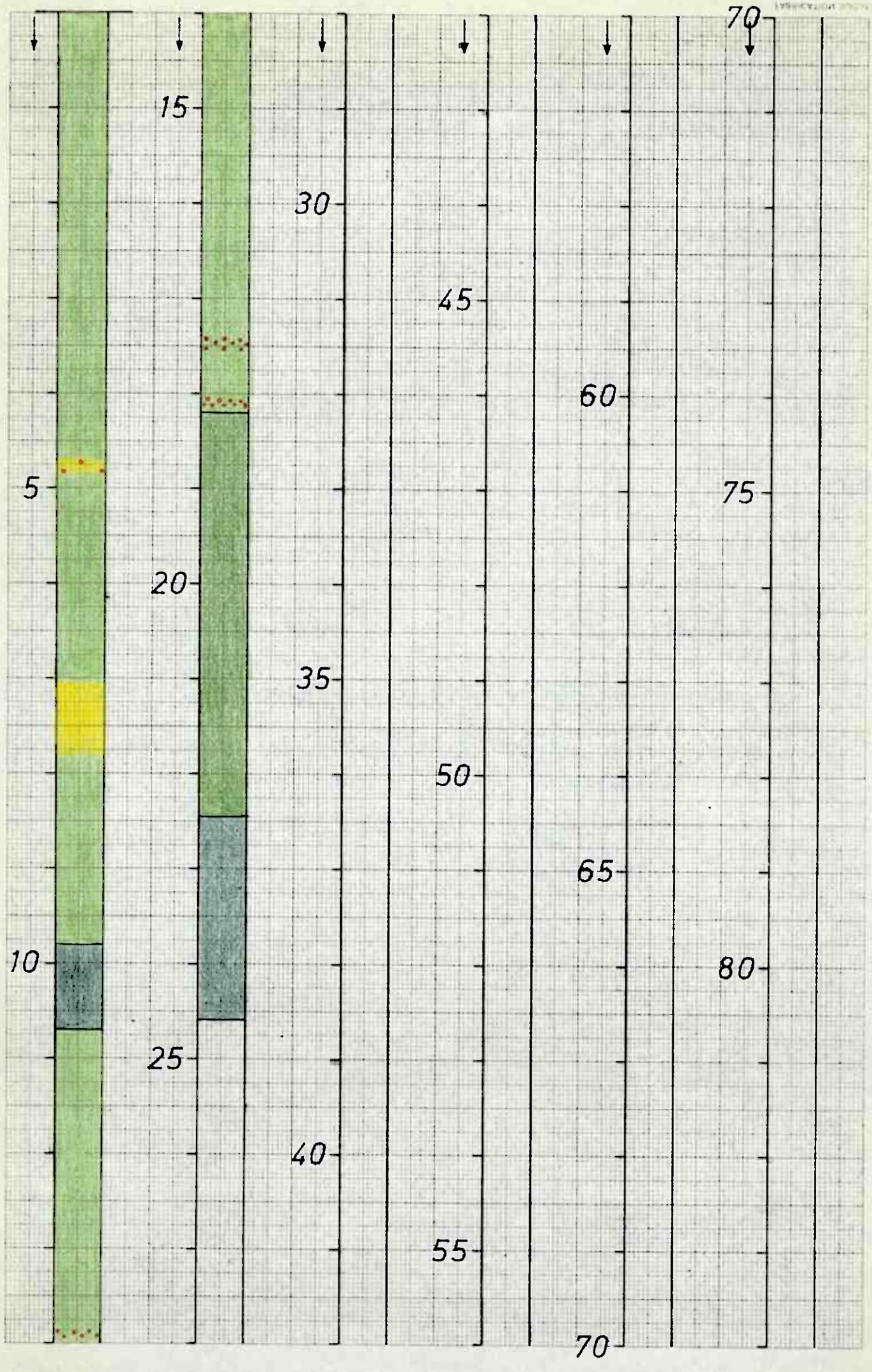
10,70 - 18,20 Klorittisk og sterk kvartsittisk skifer med slire teksturet. På stedet finnes små porfyroblaster av hornblende og på stedet finnes små korn av granater. (almandin - spesartin). Men bare på stedet finnes hypidiomorfiske korn av svovelkis eller magnetitt. Fall av foliasjon i hullet er 50°. Mellom 13,85-13,90 m, 17,40 - 17,55 m, 17,70 - 17,85 m og mellom 18,05-18,10 m finnes mere sterk impregnasjon av svovelkis med mere små korn av granater.

18,20 - 22,45 Sterk kvartsittisk og klorittisk gneisisk skifer med slire og linse slire teksturet. Fall av foliasjon i hullet er 60°-65°. Bare på stedet finnes små striper med svak impregnasjon av svovelkis og på stedet finnes små hypidiomorfiske eller allotriomorfiske korn av magnetitt.

22,45 - 24,60 Klorittisk og biotittisk granat - gneisglimmerskifer med linse-slire teksturet. Fall av foliasjon i hullet er 65°.

Borhull nr. 111 G har stoppet i 24,60 m 19.3.71 kl. 10.30.

Milos Motys.


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR. 113 G,
Tverrfjellet gruve.

Diamant borhull nr. 113 G.

Tverrfjellet gruve, nivå IV - vest.

Fall av begynelse: -45°

Koordinater: X = -40,65, Y = +512,45, Z = +847,80

Kort petrografisk beskrivelse.

0,00 - 13,20	Granat - biotitt - klorit kvartsittisk gneis-glimmerskifer eller gneisskifer. Fall av foliasjon i hullet er til 10 m 30° og videre ca 35° - 40°.
13,20 - 20,30	Kvartsrik gneisisk skifer med linse og stripe teksturet. Litt klorittisk og biotittisk også. Fall av foliasjon i hullet er mest 25° - 30° men mellom 15,50 - 16,20 m og mellom 18,50 - 19,00 m er 0°.
20,30 - 20,90	Klorittisk og biotittisk grønnskifer med linser og striper av kvartsittiske stoffer og med plagioklas og dolomittisk karbonater. På stedet finnes meget svak impregnasjon av svovelkis mest. Fall av foliasjon i hullet er ca 20° - 25°.
20,95 - 21,50	Meget sterk impregnasjon av svovelkis i kvartsittisk bergarten som har på stedet litt striper av den klorittiske og biotittiske grønnskifer.
21,50 - 22,70	Klorittisk, kvartsittisk og biotittisk grønn gneisisk skifer med linse-stripe teksturet og med svak impregnasjon av svovelkis mest (finnes magnetkis også). Fall av foliasjon i hullet er ca 20°.
22,70 - 26,00	Klorittisk og kvartsittisk grønn gneisisk skifer med biotitt på stedet også og med linse-stripe teksturet. På stedet finnes hypidiomorfiske korn av svovelkis. Fall av foliasjon i hullet er ca 20° - 25° men mellom 25,00 - 25,70 m er 0°.
26,00 - 27,40	Klorittisk og biotittisk fylonitt gneisskifer eller fylonittisk gneisskifer med svak impregnasjon av svovelkis mest (finnes meget lite FeS og $CuFeS_2$ også) Teksturet en fylonittisk og linse-stripe. Fall av foliasjon er ca Finnes ikke så sterk foldning på stedet.

27,40 - 33,35 Meget sterk impregnasjon av svovelkis i kvartsitt som har mange fine striper av magnetitt (mest mellom 27,45 - 28,45 m og mellom 28,90 - 29,80 m, 30,20 - 30,40 m, og mellom 31,60 - 32,20 m) Mellom 28,45 - 28,65 m finnes mange porfyroblaster av hornblende. Mellom 30,60 - 30,70 m og mellom 32,60 - 32,80 m finnes striper av klorittisk kvartsittisk grønn skifer.
Fall av striper (foliasjon) i hullet er ca 20° - 25° men på stedet også 30°. Nordlige malmgrense med klorittisk, kvartsittisk og biotittisk grønn gneisisk skifer er faller i 45° i hullet.

33,35 - 38,40 Svakere klorittisk gneisisk skifer med mange porfyroblaster av hornblende. På stedet finnes biotitt og hypidiomorfiske korn av svovelkis.
Teksturet er stripe, på stedet foldning.
Fall av foliasjon i hullet er

38,40 - 40,10 Klorittisk amfibolittskifer med albit-oligo-klas pofyroblaster og med dolomitt ankerittisk karbonater.
Teksturet er masio og linse.

40,10 - 44,50 Tett midle krystalinsk og fin krystalinsk feltspatisk amfibolit med mange striper og årer av kvarts.
Mellom 41,20 - 41,45m finnes mørk grå metakvartsitt med svak impregnasjon som ligger mellom 41,30 - 41,45 m. (mest svovelkis). Teksturet er mest masio.

Diamant borhullet nr. 113 G har stoppet i 44,50 m, 15.4.71, kl. 11.30.

Milos Motys.

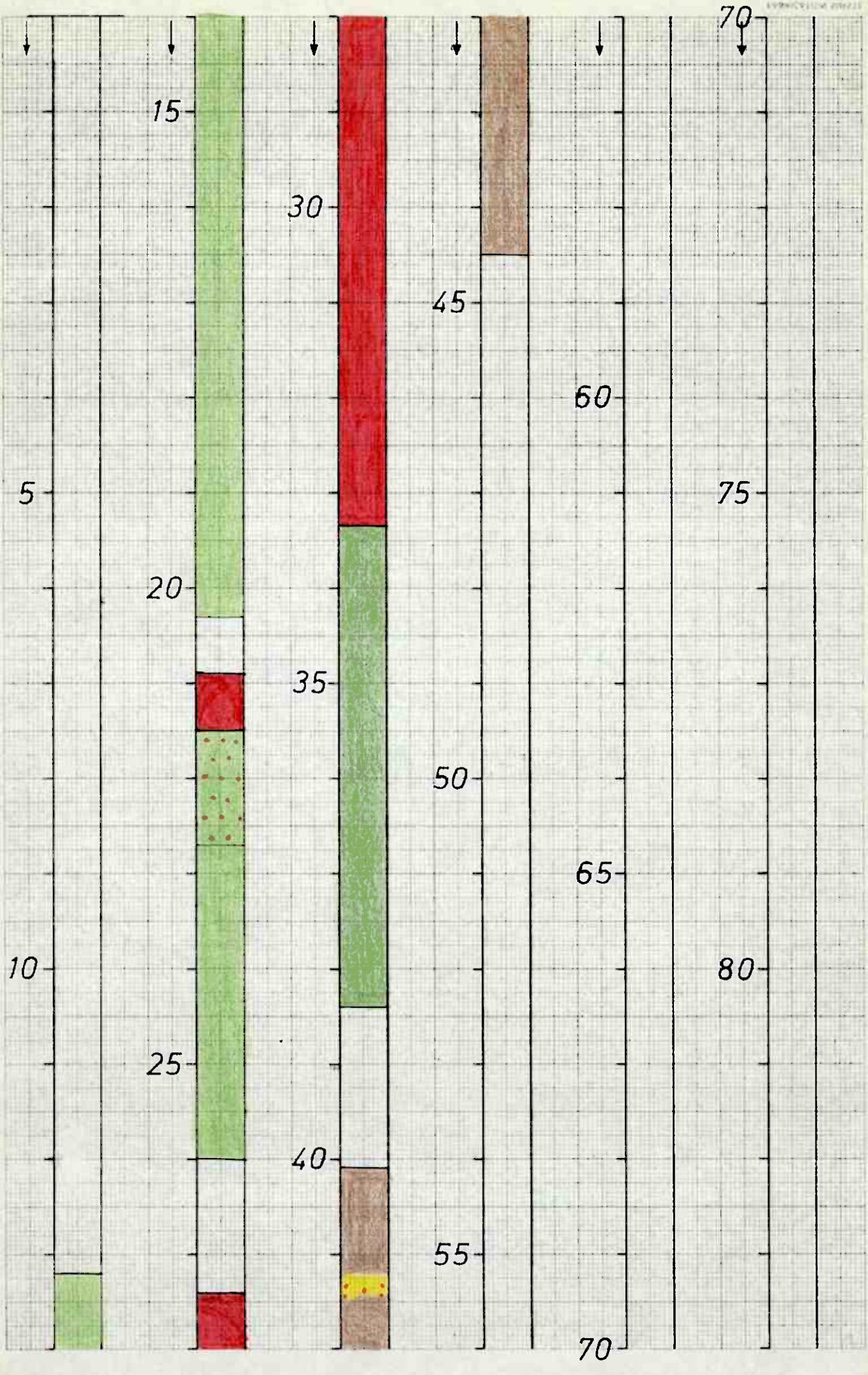
Gjennomsnitt av kjemiske analyser for: diamant borhull nr. 113 G, på nivå IV - vest, sone V 1

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	20,95-21,50	0,55	1,08	0,59	0,60	0,33	27,20	14,96	27,15	14,93
2	21,50-22,70	1,20	1,03	1,24	0,60	0,72	13,75	16,50	18,00	21,60
	sørlige sone									
1-2	20,95-22,70	1,75	1,05	1,83	0,60	1,05	17,97	31,46	20,87	36,53
	skifer med impreg.									
3	26,00-27,40	1,40	0,58	0,81	0,35	0,49	9,35	13,09	15,60	21,84
	nordlige sone									
4	27,40-28,45	1,05	1,18	1,24	0,15	0,16	11,70	12,29	46,20	48,51
5	28,45-28,90	0,45	1,35	0,60	0,20	0.09	19,50	8,76	28,00	12,60
6	28,90-29,80	0,90	1,83	1,65	0,15	0,14	18,30	16,47	42,35	38,12
7	29,80-31,00	1,20	1,85	2,22	0,50	0,60	33,15	39,78	39,75	47,70
8	31,00-32,00	1,00	0,71	0,71	0,50	0,50	30,60	30,60	42,35	42,35
9	32,00-33,35	1,35	1,21	1,63	1,00	1,35	36,00	48,60	35,00	47,25
	nordlig sone									
Σ 1-9	27,40-33,35	5,95	1,49	8,86	0,56	3,33	28,50	169,59	43,42	258,37

Gjennomsnitt av kjemiske analyser for : diamant borhull nr. 113 G, på nivå IV - vest, sone V

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	20,95-21,50	0,55	1,08	0,59	0,60	0,33	27,20	14,96	27,15	14,93
2	21,50-22,70	1,20	1,03	1,24	0,60	0,72	13,75	16,50	18,00	21,60
3a	22,70-26,00	3,30	0,02	0,07	0,10	0,33	5,40	17,82	8,60	28,38
3	26,00-27,40	1,40	0,58	0,81	0,35	0,49	9,35	13,09	15,60	21,84
4	27,40-28,45	1,05	1,18	1,24	0,15	0,16	11,70	12,29	46,20	48,51
5	28,45-28,90	0,45	1,35	0,60	0,20	0,09	19,50	8,76	28,00	12,60
6	28,90-29,80	0,90	1,83	1,65	0,15	0,14	18,30	16,47	42,35	38,12
7	29,80-31,00	1,20	1,85	2,22	0,50	0,60	33,15	39,78	39,75	47,70
8	31,00-32,00	1,00	0,71	0,71	0,50	0,50	30,60	30,60	42,35	42,35
9	32,00-33,35	1,35	1,21	1,63	1,00	1,35	36,00	48,60	35,00	47,25
	begge soner									
Σ 1-9	20,95-33,35	12,40	0,86	10,76	0,38	4,71	17,65	218,87	26,07	323,28

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR. 114G,
Tverrfjellet gruve.

FOLLDAL VERK A/S

Diamant borhull nr. 114 Q, på etg. IV - sone V.

Koordinater: X = -11,0, Y = +447,0 Z = +844,6

Fall av begynelse = 47° 40'

Kort petrografisk beskrivelse.

0,00 - 7,35 Kvartsrik, klorittisk og biotittisk svakere serisittisk, granat slire gneis glimmerskifer eller linse-slire gneis skifer.
Fall av foliasjon i hullet er 50°-55°.
Mellom 6,30-6,60 m ligger en mylonittisk og sektonisk sone.

7,35 - 8,30 Klorittisk og svakere biotittisk linse-slire gneisisk skifer med fall av foliasjon ca 50°.

8,30 - 9,25 Meget kvartsrik klorittisk og serisittisk gneisisk båndskifer med fall av foliasjon i hullet ca 45°-50°.

9,25 - 10,30 Feltspatisk og svakere karbonatisk (dolomitt-ankeritt) midlkrystalinsk epidotisk amfibolitt med bånd-teksturet.

10,30 - 23,95 Amfibolittisk og serisittisk keratofyr eller gneis-keratofyr skifer med mange porfyroblaster amfibol og med den massiv eller bånd teksturet.

23,95 - 26,60 Feltspatisk og svakere karbonatisk, epidottisk amfibolit det samme som mellom 9,25-10,30 m.

26,60 - 28,00 Feltspatisk amfibolit eller gneis skifer midlamfibolittisk og finkrystalinsk med stripe og slire teksturet.
Fall av foliasjon er ca 40°-50°.

28,00 - 36,65 Sterk sulfidisk impregnasjon i metakvartsitt. Mest svovelkis. På stedet finnes små striper av kvartsitt uten malm impregnasjon og striper av klorittisk gneis skifer.

36,65 - 36,90 Gråkrystalinsk feltspatisk amfibolit med striper av gneis skifer. På stedet finnes impregnasjon av kobberkis og magnetkis og svovelkis. Teksturet er slire og bånd.

36,90 - 40,15 Sterk impregnasjon av sulfider i gneis skifer, kvartsrik med mange striper av magnetitt. Teksturet er stripe og slire og bånd.
Fall av foliasjon er ca 53°-60°.

40,15 - 42,00 Sterk impregnasjon av malmsulfider i metakvartsitt (mest svovelkis) Teksturet er massiv og strukturet er kataklastisk. (Se analyseresultater av malm i tabeller).

42,00 - 47,90 Klorittisk og biotittisk gneis slireskifer med fall av foliasjon i hullet ca 45°-50°, men på stedet 20°-30° også og på ca 44,00 m bare 10°.

47,90 - 54,10 Feltspatisk og karbonatisk (dolomitt-ankeritt) finkrystalinsk og på stedet klorittisk og epidottisk midlkrystalinsk amfibolitt som har massiv eller bånd teksturet. Mellom 53,20-53,60 m ligger hvit sekretisk kvarts.

Diamant borhull nr. 114 G har stoppet på 54,10 m den 22.4.71, kl. 10.30.

M. Motys.

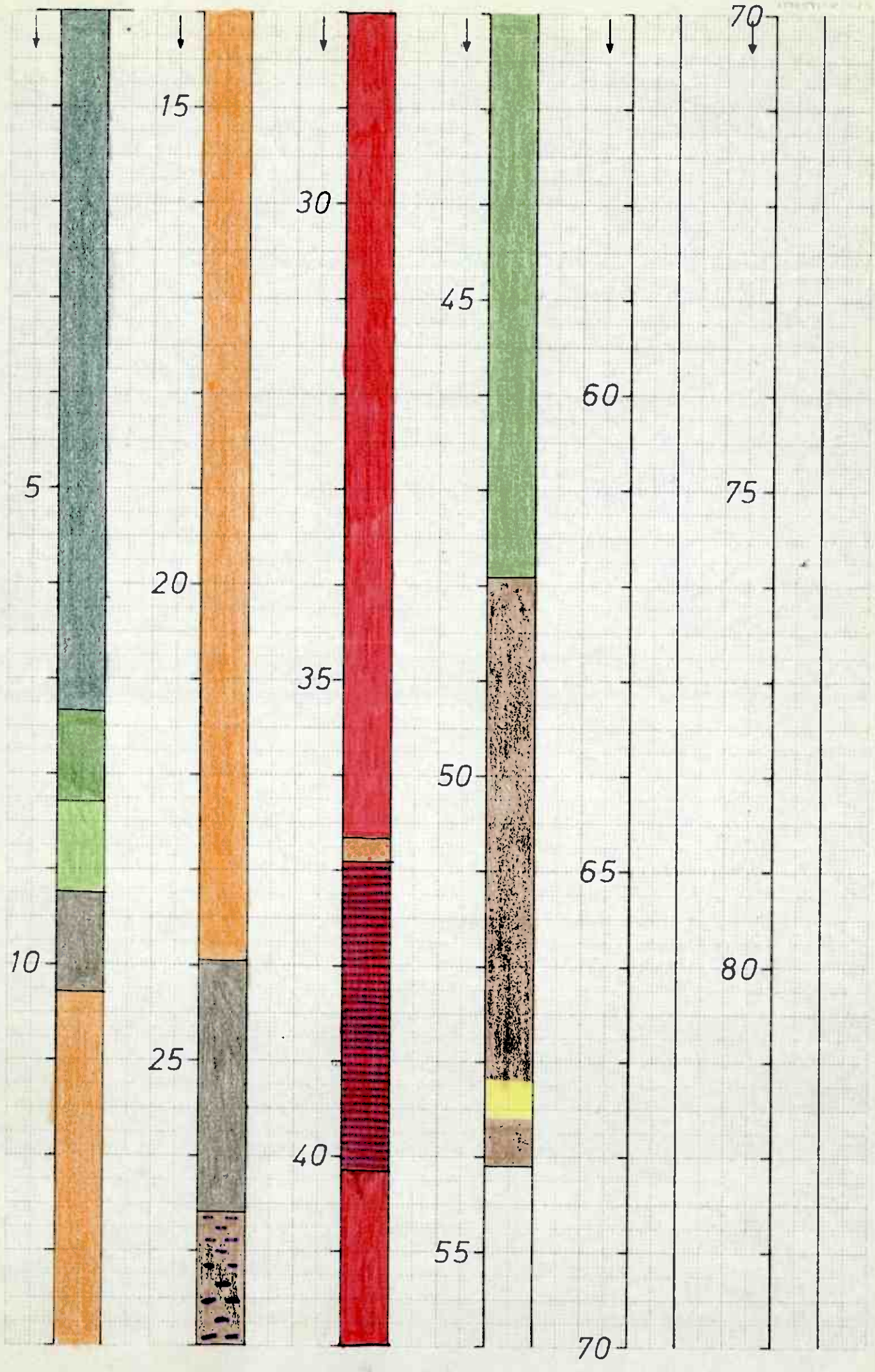
Gjennomsnitt av kjemiske analyser for: Diamant borhull nr. 114 G, på etg. IV - vest, sone V. 1

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	28,00-29,00	1,00	0,25	0,25	1,00	1,00	39,25	39,25		
2	29,00-30,00	1,00	0,37	0,37	1,30	1,30	40,25	40,25		
3	30,00-31,00	1,00	0,40	0,40	0,15	0,15	48,15	48,15		
4	31,00-32,00	1,00	0,60	0,60	0,65	0,65	43,50	43,50		
5	32,00-33,00	1,00	1,00	1,00	0,60	0,60	42,15	42,15		
6	33,00-34,00	1,00	0,55	0,55	0,15	0,15	47,80	47,80		
7	34,00-35,00	1,00	0,80	0,80	0,35	0,35	45,00	45,00		
8	35,00-36,00	1,00	1,05	1,05	1,30	1,30	41,00	41,00		
9	36,00-36,65	0,65	0,95	0,62	2,00	1,30	41,00	26,65		
Σ 1-9	28,00-36,65	8,65	0,65	5,64	0,79	6,80	43,21	373,75		

Gjennomsnitt av kjemiske analyser for: Diamant borhull nr. 114 G, på etg. IV - vest, sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
10	36,65-36,90	0,25	0,40	0,10	0,40	0,10	3,50	0,87		
11	36,90-38,00	1,10	1,35	1,49	0,15	0,17	16,65	18,32		
12	38,00-39,00	1,00	1,00	1,00	0,15	0,15	20,00	20,00		
13	39,00-40,15	1,15	0,70	0,81	0,15	0,17	14,00	16,10		
Σ 11-13	36,90-40,15	3,50	0,97	3,40	0,17	0,59	15,80	55,29		
14	40,15-41,00	0,85	2,30	1,96	0,80	0,68	37,80	32,13		
15	41,00-42,00	1,00	1,00	1,00	2,15	2,15	40,75	40,75		
Σ 14-15	40,15-42,00	1,85	1,60	2,96	1,52	2,83	39,39	72,88		
Σ 1-15	28,00-42,00	14,00	0,86	12,00	0,73	10,22	35,85	501,92		

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR. 115 G,

Tverrfjellet gruve.

FOLLDAL VERK A/S

Diamant borhull nr. 115 G.

Tverrfjellet gruve, på etg. IV - sone V.

Fall av begynelse: -63°06'

Koordinater: X = -10,8, Y = +446,9, Z = 844,6

Kort petrografisk beskrivelse.

0,00 - 14,50 Klorittisk, serisittisk og biotittisk granat gneis glimmerskifer med linse-stripe og slire teksturet. Fall av foliasjon i hullet er ca

14,50 - 21,30 Mylonittisk - breksil sone i klorittisk, sterk kvartsittisk gneisisk skifer. Teksturet er mylonittisk.

21,30 - 27,80 Kvartsrik gneis skifer med biotitt, muskoritt (serisitt) og litt kloritt og med lite granater bare på stedet. Teksturet er linse-stripe og slire. Fall av foliasjon i hullet er 20°.

27,80 - 31,20 Kvartsrik finkrystalinsk amfibolittisk gneis skifer med striper eller slirer av kvartsitt eller sekretisk kvarts. På stedet finnes hypidiomorfiske eller allotriomorfiske korn av FeS_2 og flekker av FeS. Teksturet er massiv og bånd. Bare på stedet finnes porfyroblaster av amfibolitt. Fall av foliasjon i hullet er 20°-25°.

31,20 - 35,50 Kvartsrik, litt klorittisk og litt serisittisk gneisisk skifer med slire teksturet. Fall av foliasjon i hullet er ca 20° - 30°.

35,50 - 37,60 Keratofyr med porfyroblaster av amfybol. Teksturet er massiv eller bånd.

37,60 - 37,75 Gråhvit kvartsitt. Mellom 37,70 - 37,75 m er klorittisk mylonittisk sone.

37,75 - 40,15 Sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis).

40,15 - 41,05 Gråkrystallinsk feltspatisk amfibolit med striper av metakvartsitt og med posisjoner av gneis skifer. På stedet finnes impregnasjon av kobberkis og magnetkis men svovelkis også.

41,05 - 41,50 Metakvartsitt med svak eller på stedet med litt mere sterk impregnasjon av malmsulfider (mest svovelkis). På stedet finnes kobberkis og striper av amfibolittisk gneis skifer med store porfyroblaster av amfibol.

41,50 - 42,05 Metakvartsitt som ikke har impregnasjon av sulf. eller veldig svak på stedet

42,05 - 42,40 Biotittisk, klorittisk og serisittisk fylonittisk gneis skifer med slire tekstureт.
Fall av foliasjon i hullet er 40°-45°. På stedet finnes svak impregnasjon av svovelkis (mest).

42,40 - 44,20 Kvartsrik gneisisk skifer med striper og slirer av magnetkis og på stedet med svak impregnasjon av svovelkis (magnetkis og kobberkis). Teksturet er slire og stripe.
Fall av foliasjon er i hullet 30°-40° men i 43,40-43,50 m 0°-10°.

44,20 - 44,60 Klorittisk, biotittisk (breksie) gneis skifer med porfyroblaster av amfibol og med svak impregnasjon av magnetkis og svovelkis på stedet (kobberkis finnes også, men bare veldig lite). Den bergart har breksil fylonittisk teksturet.

44,60 - 45,95 Klorittisk og biotittisk kvartsrik gneis skifer på stedet med porfyroblaster av amfibol og på stedet med striper og posisjoner av magnetitt. Men finnes også striper av sterk impregnasjon av malmsulfider (mest svovelkis). Teksturet er linsestripe.
Fall av foliasjon i hullet er 40°-45°.

45,95 - 46,50 Metakvartsitt som har bare på stedet litt korn av svovelkis og på stedet striper av klorittisk-biotittisk grønnskifer. Teksturet er massiv.

46,50 - 53,00 Meget sterk impregnasjon av malmsulfider (mest svovelkis) i metakvartsitt med striper og slirer av magnetitt bare på stedet (48,40-48,50 m, 48,75-50,00 m, 51,00-51,20 m og 51,80-52,60 m) Teksturet er massiv, men på stedet stripe og slire også.

53,00 - 56,10 Meget sterk impregnasjon av malmsulfider i metakvartsitt (mest svovelkis) med striper eller linser av kvartsitt (uten umpregnasjon) som finnes bare på stedet. Teksturet er massiv og strukturet er kataklastisk.

56,10 - 56,90 Kvartsrik amfibolittisk gneis skifer eller på stedet feltspatisk amfibolitt som er finkrystallinsk eller krystallinsk. Impregnasjon av malmsulfider finnes ikke eller meget svak. Teksturet er linse-stripe.
Fall av foliasjon i hullet er ca 50°.

56,90 - 57,75 Gråkvitt metakvartsitt som har bare på stedet (mellom 56,90 - 57,15 m) svak og meget svak impregnasjon av malmsulfider (mest svovelkis). Teksturet er massiv.

FOLLDAL VERK A/S

57,75 - 58,55 Kvartsrik, biotittisk og lett klorittisk og amfibolittisk gneis fylonit skifer med striper eller tinn posisjoner og linser av grå eller gråkvitt kvartsitt. Impregnasjon av malmsulfider (mest svovelkis) finnes ikke eller bare på stedet. Teksturet er linse-stripe eller mylonittisk.
Fall av foliasjon i hullet er ca 45°.

58,55 - 59,45 Sterk malmsulfidisk impregnasjon (mest svovelkis) i metakvartsitt eller i meget kvartsrik gneis skifer. Teksturet er massiv eller stripe-slire.

59,45 - 59,95 Biotittisk og serisittisk kvartsrik gneis fylonit og gneis skifer med fylonittisk og slire teksturet. Malmsulfidisk impregnasjon finnes ikke eller bare på stedet meget svak.
Fall av foliasjon i hullet er ca 45°-55°.

59,95 - 61,50 Sterk malmsulfidisk impregnasjon (mest svovelkis) i metakvartsitt med posisjoner og slirer eller linser av kvartsrik biotittisk, serisittisk og svak klorittisk gneis skifer På stedet finnes impregnasjon av kobberkis (meget smale linser eller flekker).

61,50 - 66,90 Kvartsrik biotittisk serisittisk og klorittisk gneis skifer med amfibolsporfyroblaster. På stedet finnes posisjoner av metakvartsitt (62,55-62,70 m) eller striper og linser eller posisjoner og linser av metakvartsitt som har svak eller litt rik malmsulfidisk impregnasjon (mest bare svovelkis), eksempel mellom 63,15-63,25 m og mellom 65,30-65,65 m.
Gjennomsnittsfall av foliasjon i hullet er ca 40°-50°.
Teksturet er slire og bånd.

66,90 - 69,25 Amfibolittisk gneis skifer eller på stedet feltspatisk finkrystallinsk eller midlkrystallinsk amfibolit med kloritt og litt biotitt på stedet. På stedet finnes også litt karbonater (dolomitt-anberitt).
Teksturet er linse-stripe, åre eller bånd også.
Fall av foliasjon i hullet er ca 50°.

Diamant borhull nr. 115 G har stoppet på 69,25 m den 30.4.1971, kl. 12.30.

M. Motys.

Gjennomsnitt av kjemiske analyser for : Diamant borhull nr. 115 G, på etg. IV - vest, sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	37,75-39,00	1,25	0,40	0,50	0,80	1,00	44,50	55,63		
2	39,00-40,15	1,15	1,35	1,55	1,60	1,84	44,50	51,18		
Σ 1-2	37,75-40,15	2,40	0,85	2,05	1,18	2,84	44,50	106,81		
3	40,15-41,50	1,35	5,00	6,75	1,20	1,62	16,50	22,28		
4	41,50-42,05	0,55	0,20	0,11	0,65	0,36	9,00	4,95		
5	42,05-42,40	0,35	0,47	0,16	0,50	0,18	12,00	4,20		
6	42,40-43,00	0,60	0,42	0,25	0,15	0,09	10,00	6,00		
7	43,00-44,20	1,20	0,60	0,72	0,15	0,18	12,25	14,70		
8	44,20-44,60	0,40	0,40	0,16	0,30	0,12	5,50	2,20		
9	44,60-44,90	0,30	0,50	0,15	0,15	0,05	9,50	2,85		
10	44,90-45,95	1,05	0,85	0,89	0,70	0,74	20,50	21,53		
11	45,95-46,50	0,55	0,15	0,08	0,20	0,11	2,00	1,10		
Σ 3-11	40,15-46,50	6,35	1,45	9,27	0,54	3,45	12,57	79,81		

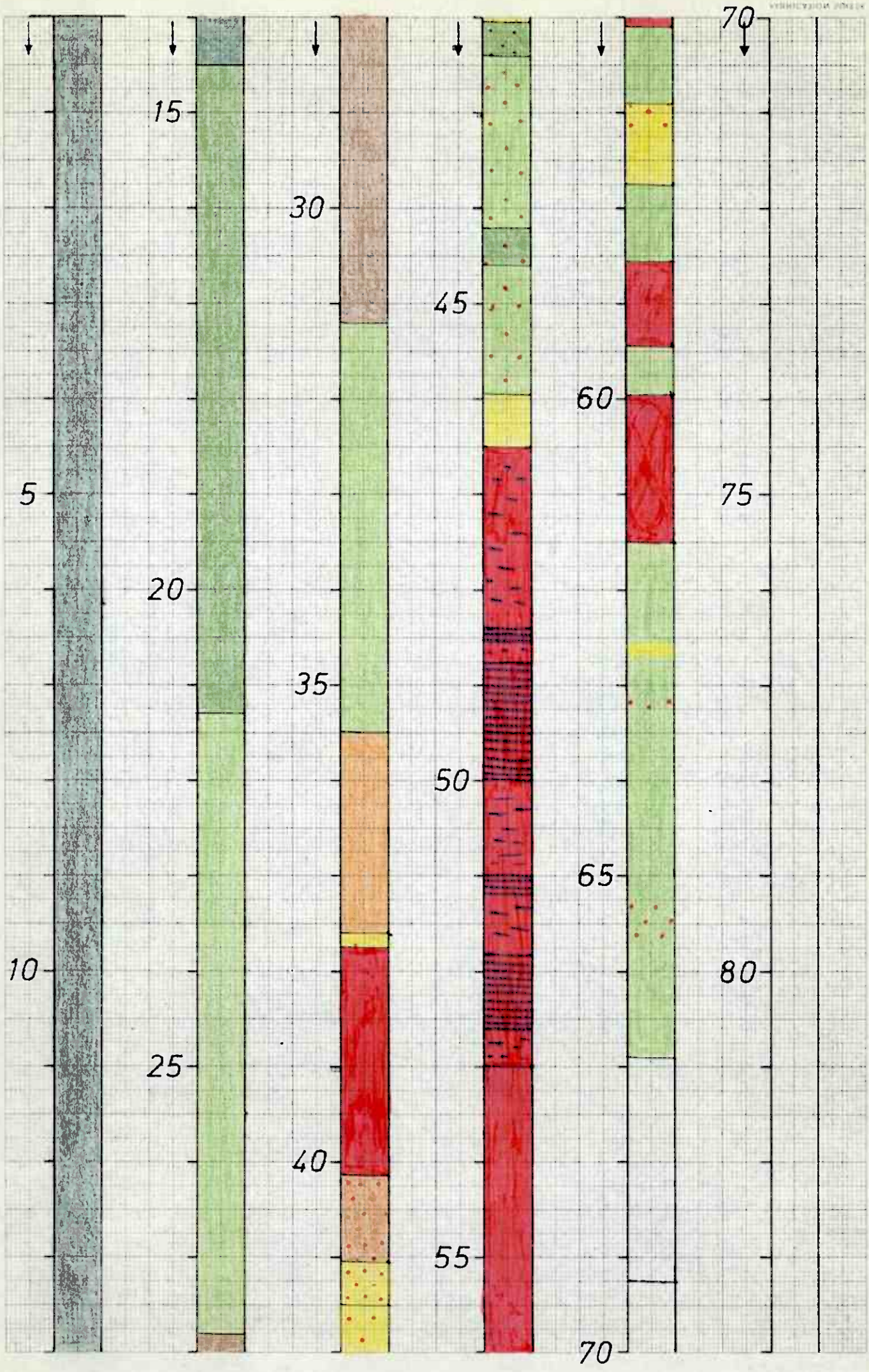
Gjennomsnitt av kjemiske analyser for: Diamant borhull nr. 115 G, på etg. IV - vest, sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
12	46,50-48,00	1,50	2,00	3,00	0,50	0,75	42,00	63,00		
13	48,00-49,00	1,00	3,25	3,25	0,50	0,50	28,00	28,00		
14	49,00-50,00	1,00	2,25	2,25	0,70	0,70	24,25	24,25		
15	50,00-51,00	1,00	1,65	1,65	1,65	1,65	29,00	29,00		
16	51,00-52,00	1,00	2,30	2,30	0,65	0,65	36,50	36,50		
17	52,00-53,00	1,00	1,65	1,65	1,35	1,35	35,00	35,00		
18	53,00-54,00	1,00	0,85	0,85	1,85	1,85	43,50	43,50		
19	54,00-55,00	1,00	0,70	0,70	2,25	2,25	39,00	39,00		
20	55,00-56,10	1,10	0,40	0,44	2,30	2,53	31,50	34,65		
Σ 12-20	46,50-56,10	9,60	1,68	16,09	1,27	12,83	34,68	332,90		
Σ 1-20	37,75-56,10	18,35	1,49	27,41	1,01	18,52	28,31	519,52		

Gjennomsnitt av kjemiske analyser for : Diamant borhull nr. 115 G, på nivå IV - vest, sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
21	56,10-56,90	0,80	0,70	0,56	0,15	0,12	9,00	7,20		
22	56,90-57,75	0,85	—	0,00	—	0,00	2,00	1,70		
23	57,75-58,55	0,80	0,50	0,40	0,45	0,36	3,00	2,40		
24	58,55-59,45	0,90	0,65	0,59	2,10	1,89	29,50	26,55		
25	59,45-59,95	0,50	0,05	0,03	0,30	0,15	2,75	1,38		
26	59,95-61,50	1,55	1,80	2,79	1,85	2,86	24,50	37,98		
Σ 21-26	56,10-61,50	5,40	0,81	4,37	1,00	5,38	14,30	77,21		
Σ 1-26	37,75-61,50	23,75	1,34	31,78	1,01	23,90	25,13	596,73		

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR 116 G,

Tverrfjellet gruve.

Diamant borhull nr. 116 G, på nivå IV - sone V.

Koordinater: X = -41,60 Y = +512,60 Z = +845,20
Fall av begynelse =

Kort petrografisk beskrivelse.

0,00 - 31,40 Klorittisk kvartsrik og svak biotittisk og serisittisk granat gneis glimmerskifer med linse-slire teksturet.
Fall av foliasjon i hullet er ca 25°-30°.

31,40 - 32,70 Tektonisk og mylonittisk sone (breksie type på stedet også) i klorittisk, kvartsrik granat gneis glimmerskifer.

32,70 - 34,60 Klorittisk, serisittisk og svak biotittisk kvartsrik gneis glimmerskifer med smale granater på stedet. Teksturet er øye-slire.
Fall av foliasjon i hullet er ca 30°.

34,60 - 38,45 Klorittisk kvartsrik gneis skifer med litt biotitt, serisitt og med linse-slire teksturet.
Fall av foliasjon i hullet er ca 20°-30°.

38,45 - 38,60 Fylonitt og fylonittisk breksie av en klorittisk kvartsrik gneis skifer med striper eller linser av kvarts. På stedet fins impregnasjon av svovelkis mest, men fins også litt linser eller flekker av magnetkis og kobberkis. Teksturet er mylonittisk.

38,60 - 38,95 Meget sterk og stor malmsulfidisk impregnasjon i stor kvartsittisk gneis skifer. Teksturet er massiv, bånd og stripe.

38,95 - 39,20 Gråhvitt metakvartsitt med striper av sterk kvartsittisk gneis skifer med svak og meget svak impregnasjon av svovelkis og litt magnetkis.

39,20 - 41,45 Klorittisk kvartsrik gneisisk skifer med biotitt og amfibol (porfyroblaster) på stedet. Teksturet er øye-stripe eller linse-stripe.
Rall av foliasjon i hullet er ca 30°-35°. Mellom 40,60 m og 41,00 m fins mylonittisk sone.

41,45 - 45,75 Meget kvartsrik serisittisk og klorittisk gneis skifer med linse stripe og slire teksturet.
Fall av foliasjon i hullet er ca 20°-25°, på stedet 30°-35°.

45,75 - 46,55 Meget sterk impregnasjon av malmsulfider (mest svovelkis) i metakvartsitt og kvartsrik gneis skifer. Teksturet er massiv, men på stedet fins striper, slire eller litt linser av kvartsitt kvartsgneis skifer uten malmsulfider's impregnasjon.

46,55 - 46,95 Kvartsrik muskovit-biotitt gneis eller gneis skifer med øye-stripe eller linse-slire teksturet. Fall av foliasjon i hullet er ca 0° men på stedet ca 10°-15° også.

46,95 - 48,65 Meget sterk impregnasjon av malmsulfider (mest svovelkis) i metakvartsitt. Teksturet er massiv og strukturet er kataklastisk. (analyseresultater, se i tabell)

48,65 - 51,60 Sterk kvartsittisk muskovittisk (serisitt) og litt klorittisk gneisisk skifer med slire og linse-slire teksturet. Fall av foliasjon i hullet er ca 25°-30°. Bare på stedet fins litt korn eller flekker av magnetkis, svovelkis (kobberkis).

51,60 - 52,80 Meget kvartsrik svak klorittisk og serisittisk gneis skifer med fuksitt (veldig lite) og med biotitt. På foliasjon'sflater fins flekker av magnetkis og svovelkis. Teksturet er slire og bånd. Fall av foliasjon i hullet er 25°.

52,80 - 53,25 Meget kvartsrik serisittisk gneis skifer med litt biotitt og med meget lite fuksitt. På foliasjon's flater fins flekker av magnetkis og svovelkis. Teksturet er bånd og slire.

53,25 - 53,60 Hvit kvarts med glimmer av muskonitt med ankeritt-dolomittisk karbonat og bare på stedet med amorfisk korn og flekker av magnetkis, svovelkis og meget lite med kobberkis.

53,60 - 55,15 Amfibolittisk gneis (? keratofyr) med serisitt (muskovitt) og med mye porfyroblaster av amfibol Teksturet er massiv og bånd. Bare på stedet fins litt flekker av magnetkis.

55,15 - 57,60 Meget kvartsrik serisittisk gneis eller gneis skifer, det samme som mellom 52,80 - 53,25 m. På stedet fins porfyoblaster av amfibol og på stedet fins slirer eller striper av meget sterk impregnasjon av magnetkis (mest) Eksempel mellom 55,15 - 55,20 m, 55,25 - 55,26 m og 55,60 - 55,65 m.
Fall av foliasjon i hullet er ca 25°-20°.

57,60 - 60,30 Serisittisk (muskovit) og svakere biotittisk båndgneis eller båndgneis skifer meget kvartsrik også. På stedet finnes fuksitt og litt allotriomorfiske og hypidiomorfiske korn av svovelkis og meget lite linser av magnetkis. (bergarten ser ut samme som etterpå hydrothermalkontakt metamorfert). Mellom 57,80-58,10 m finnes hvit kvarts. (hydrothermal ?) som har på begge grenser på stedet krystaller av karbonat (ankeritt-dolomitt) og på stedet finnes hypidiomorfiske og allotriomorfiske former av svovelkis og magnetkis mest (kobberkis meget lite?)

60,30 - 67,80 Klorittisk og biotittisk slire gneis skifer med fall av foliasjon i hullet ca 25°.

67,80 - 68,70 Kvartsrik sliregneis eller båndgneis, klorittisk, biotittisk og svakere serisittisk med flere striper av sterk og meget sterk impregnasjon av magnetkis og svovelkis (kobberkisflekker finnes bare på stedet). Fall av foliasjon i hullet er 25°-30°. Mellom 68,00-68,25 m finnes meget sterk impregnasjon (striper) av magnetkis med svovelkis og på stedet finnes allotriomorfiske former av kobberkis. Teksturet er kataklastisk fin og midlkrystallinsk.

68,70 - 69,60 Klorittisk og biotittisk sliregneisisk skifer eller sliregneis skifer med fall av foliasjon i hullet ca 30°-25°.

Borhull nr. 116 G har stoppet på 69,60 m den 6.5.1971, kl. 12.30.

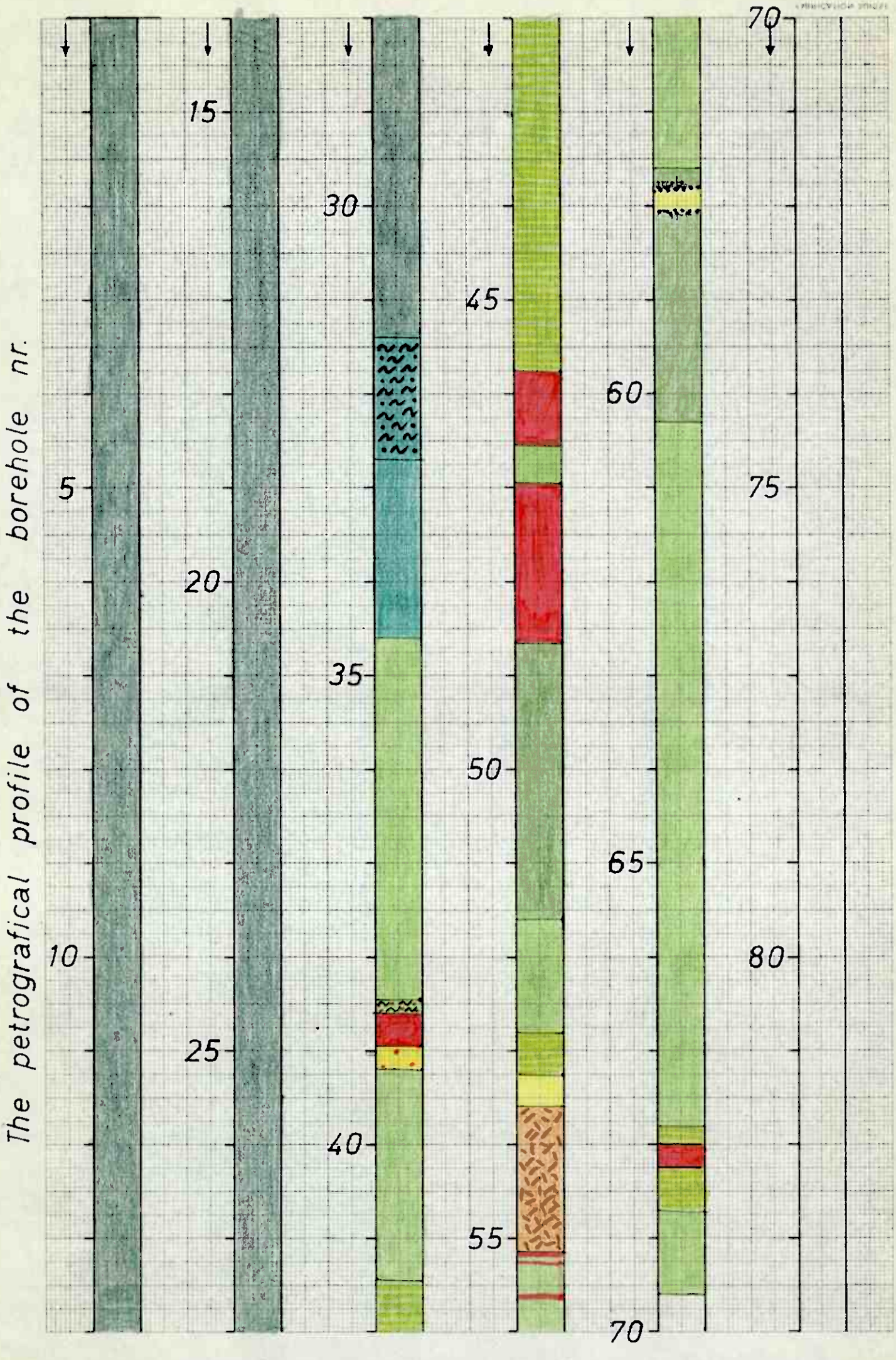
M. Motys.

Avviksmåling av hullet av Borhull 116 G:

i 0,00 - 68°06'
i 10,00- 69°12'
i 20,00- 70°54'
i 30,00- 72°24'
i 40,00- 73°18'
i 50,00- 74°00'
i 60,00- 74°30'
i 69,60- 74°48'

Gjennomsnitt av kjemiske analyser for : Diamant borhull nr. 116 G, på nivå IV - vest, sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
5	45,75-46,55	0,80	0,65	0,52	1,90	1,52	36,00	28,80		
6	46,55-46,95	0,40	0,30	0,12	0,35	0,14	2,50	1,00		
7	46,95-47,95	1,00	0,40	0,40	1,95	1,95	41,00	41,00		
8	47,95-48,65	0,70	0,40	0,28	1,10	0,77	44,00	30,80		
Σ 5-8	45,75-48,65	2,90	0,46	1,32	1,51	4,38	35,03	101,60		


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR 117 G.

Tverrfjellet gruve.

Diamant borhull nr. 117 G nivå I - vest, mellom sone I og V.

Fall av hullet i begynnelse = ± 0°

Koordinater : X = 44,6 Y = +766,6 Z = +1030,3

Kort petrografisk beskrivelse.

0,00 - 16,50 Den finkrystallinsk feltspatisk svakere klorittisk og epidottisk slire eller båndamfibolitt, eller båndamfibolittskifer, med mange striper og årer av den kvartsfeltspatisk, kvarts, eller kvarts-karbonatisk (dolomit-ankerit) stoffer.
Fall av foliasjon i hullet er ca 65°.

16,50 - 17,80 Grå og mørkegrå metakvartsitt som har massiv teksturet og som har bare på stedet meget lite flekker eller striper av klorittisk tøy.

17,80 - 21,55 Den feltspatisk midlkrystallinsk og finkrystallinsk amfibolitt og amfibolitt-gneis båndskifer.
Mellom 21,50-21,55 m er posisjon av den sterk klorittisk og amfibolittisk fylonitt.

21,55 - 22,25 Sterk impregnasjon av de malmsulfider i metakvartsitt. Teksturet er massiv og strukturet er mest kataklastisk.
Analyseresultater er:
Cu = 0,05 %, Zn = 0,00 %, S = 34,00 %.

22,25 - 31,60 Den klorittisk og på stedet feltspatisk, finkrystallinsk amfibolitt eller amfibolitt båndskifer som har på stedet porfyroblaster av amfibol.
Fall av foliasjon i hullet er ca 45°-50°.

31,60 - 40,20 Meget kvartsrik , lite klorittisk, serisittisk og karbonatisk (ddolomitt-ankeritt) slireskifer og linse-slireskifer. På stedet finnes biotitt og meget lite allotriomorfiske korn av svovelkis.
Fall av foliasjon i hullet er ca 45° og bergarten er foldet også.

40,20 - 41,60 Klorittisk og serisittisk og svakere karbonatisk gneis slireskifer. På stedet finnes lite biotitt også.
Fall av foliasjon i hullet er ca 45°.

41,60 - 47,70 Kvartsrik, klorittisk og amfibolittisk og epidottisk gneisisk slireskifer med lite biotitt også.
Fall av foliasjon i hullet er ca 40°.

47,70 - 49,70 Amfibolittisk, klorittisk mylonitt kvartsrik slireskifer med mørke mylonittiske striper.

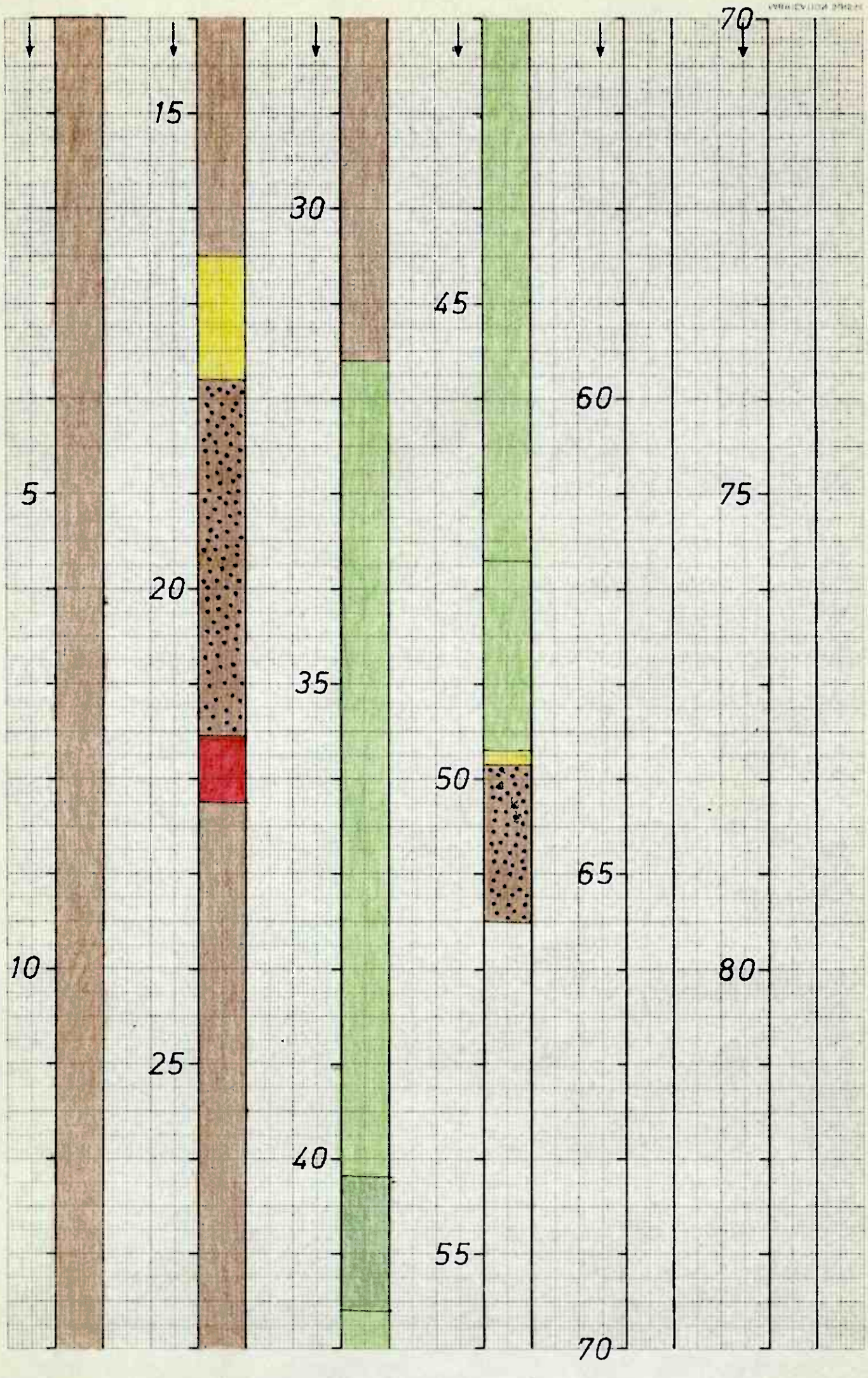
49,70 - 49,85 Gråhvitt metakvartsitt med flere striper av den klorittisk og lite amfibolittisk gneisisk skifer og med meget svak impregnasjon av svovelkis eller med striper av meget sterk impregnasjon av svovelkis.

49,85 - 51,50 Den midlkrystalinsk og finkrystalinsk feltspatisk amfibolitt som har massiv teksturet. På stedet finnes striper og smale linser av kvarts.

Diamant borhull nr. 117 G har stoppet på 51,50 m den 21.5.71, kl. 13.30.

M. Motys.

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR 118 G,

Tverrfjellet gruve.

Diamant borhull nr. 118 G, (36 mm), på nivå I - vest (mellom sone V og I).

Koordinater: X = -44,6 Y = +766,6 Z = +1029,8

Fall av begynnelse i hullet = -34°20'

Kort petrografisk beskrivelse.

0,00 - 4,10 Den finkrystalinske amfibolitt og amfibolittskifer med bånd og slire teksturet. Amfibolitt holder feltspat, epidott og meget lite kloritt. På stedet finnes lite hypidiomorfiske og allotriomorfiske korn av svovelkis. Fall av foliasjon i hullet er ca 55°.

4,10 - 9,00 Kloritt-amfibolitt og svakere biotittisk gneis slireskifer eller gneis båndskifer.
Fall av foliasjon i hullet er ca 55°.

9,00 - 11,70 Meget kvartsrik, klorittisk og lite amfibolittisk gneisisk båndskifer med massiv teksturet også.
Fall av foliasjon i hullet er ca 60°.

11,70 - 13,40 Den klorittisk og svakere amfibolittisk og epidottisk og biotittisk og kvarts meget rik gneisisk slire grønskifer. På stedet finnes allotriomorfiske og hypidiomorfiske korn av svovelkis.
Fall av foliasjon i hullet er ca 70°-75°.

13,40 - 13,70 Den gråhvite metakvartsitt med meget lite flekker og striper av klorittisk og amfibolitt-epidottisk stoffer. Teksturet er mest massiv. På stedet finnes amorfiske former av svovelkis og magnetkis. Men på stedet finnes også hypidiomorfiske korn av karbonat (dolomitt-ankeritt). 2. bergarten er mange sprekker.

13.70 - 16,90 Den finkrystallinske feltspatiske slireamfibolitt med mange fynne striper av kvartsitt.
Fall av foliasjon i hullet er ca 65°.

16,90 - 24,30 Den finkrystallinske amfibolitt slire skifer som er feltsparisk og litt klorittisk også.
Ca. fra 23,00 m til 24,30 m ligger fyllonittisk sone med mørke mylonitt striper.

24,30 - 27,10 Meget sterk impregnasjon av malmsulfider (mest svovelkis) i metakvartsitt. Teksturet er massiv og strukturet er kataklastisk. De analyseresultater anviser tabeller. Mellom 24,30-25,10 m er malmen meget tett (rikere også).

27,10 - 27,40 Den kvarts meget rik, klorittisk , svakere biotittisk gneisisk slireskifer som holder litt serisitt også. På stedet finnes striper eller hypidiomorfiske korn av svovelkis.
Fall av foliasjon i hullet er ca 40°-45°.

27,40 - 27,70 Meget sterk impregnasjon av sulfidmalmmineraler (mest svovelkis) i metakvartsitt det samme som mellom 24,30-27,10 m.

27,70 - 28,65 Kvarts meget rik, klorittisk, svakere biotittisk gneisisk slireskifer det samme som mellom 27,10-27,40 m. Fall av foliasjon i hullet er ca 50°.

28,65 - 28,75 Meget sterk impregnasjon av de malmsulfider, i metakvartsitt det samme som mellom 27,40-27,70 m.

28,75 - 28,95 Den meget kvartsrik klorittisk og litt serisittisk og biotittisk gneisisk slireskifer det samme som mellom 27,70-28,65 m. Teksturet er på stedet mylonittisk.

28,95 - 31,60 Meget sterk impregnasjon av de malmsulfider i metakvartsitt, det samme som mellom 24,30-27,10 m, Men mellom 30,95-31,10 m er flere striper med sterk impregnasjon av magnetitt. Mellom 31,10-31,60 m er malmen mere kvartsrik. Analyseresultater anviser tabeller.

31,60 - 40,20 Meget kvartsrik, klorittisk og litt karbonatiske (dolomitt-ankeritt) gneisisk slireskifer. På stedet finnes amorfiske former av svovelkis og magnetkis. Bergarten er foldet.
Fall av foliasjon i hullet er ca 50°-60°.

40,20 - 42,30 Kvartsrik, klorittisk og svakere biotittisk og serisittisk gneis slireskifer som har på stedet lite porfyroblaster av amfibol. På stedet finnes kvartsitt-årer og striper med en svak impregnasjon av de malmsulfider. (mest svovelkis)
Fall av foliasjon i hullet er ca 70°-75°.

42,30 - 42,90 Meget sterk impregnasjon av de malmsulfider i kvartsitt det samme som mellom 24,30-27,10 m.

42,90 - 43,20 Den gråhvit metakvartsitt med lite flekker eller striper av klorittisk stoffer og med karbonater (dolomitt-ankeritt) på stedet. På stedet finnes også de amorfiske former av svovelkis eller magnetkis.

43,20 - 43,55 Meget sterk impregnasjon av de malmsulfider i metakvartsitt det samme som mellom 24,30-27,10 m. Den liggfjellgrense har fall i hullet ca 55°.

43,55 - 46,60 Meget kvartsrik klorittisk og svakere biotittisk og serisittisk gneisisk slireskifer. På stedet finnes smal porfyroblaster av amfibol og amorfiske former av svovelkis og magnetkis. På stedet finnes også lysegrønn talk.
Fall av foliasjon i hullet er ca 60°.

46,60 - 47,00 Meget sterk impregnasjon av de malmsulfider i metakvartsitt (mest svovelkis) det samme som mellom 24,30-27,10 m.

47,00 - 47,25 Grå metakvartsitt med kloritt og med lite porfyroblaster av amfibol på stedet og med meget svak impregnasjon av svovelkis og magnetkis bare på stedet. I ivartsitt finnes striper og posisjoner av meget kvartsrik klorittisk og serisittisk gneisisk skifer.

47,25 - 48,55 Meget sterk impregnasjon av de malmsulfider (mest svovelkis) i metakvartsitt det samme som mellom 24,30-27,10 m men med flere striper og linser av den fylomittisk klorittisk meget kvartsrik slireskifer, eller av metakvartsitt som har mange mylonittiske striper også.

48,55 - 50,20 Meget kvartsrik klorittisk og meget lite amfibolittisk gneisisk slireskifer eller øyeslire og linse-slireskifer. Fall av foliasjon i hullet er ca 35°-40°.

50,20 - 51,00 Den biotittiske og litt serisittiske sliregneis eller gneis slire-skifer med karbonater (dolomitt-ankeritt) på stedet. Bergart er foldet på stedet.

51,00 - 53,00 Den kvartsrik amfibolittisk (finkrystallinsk) og klorittisk gneisisk slireskifer og linse-slireskifer. På stedet finnes de mørke mylonittiske striper. Fall av foliasjon i hullet er ca 65°.

53,00 - 54,20 Feltspatisk midlkrystalinsk eller på stedet gråkrystalinsk amfibolitt som er kvartsrik også. På stedet finnes hypidiomorfiske eller allotriomorfiske korn av svovelkis. Teksturet er bånd eller massiv.

54,20 - 61,30 Kvartsrik, klorittisk og svakere amfibolittisk gneisisk slireskifer. På stedet finnes allotriomorfiske korn av svovelkis. Fall av foliasjon i hullet er ca 65°.

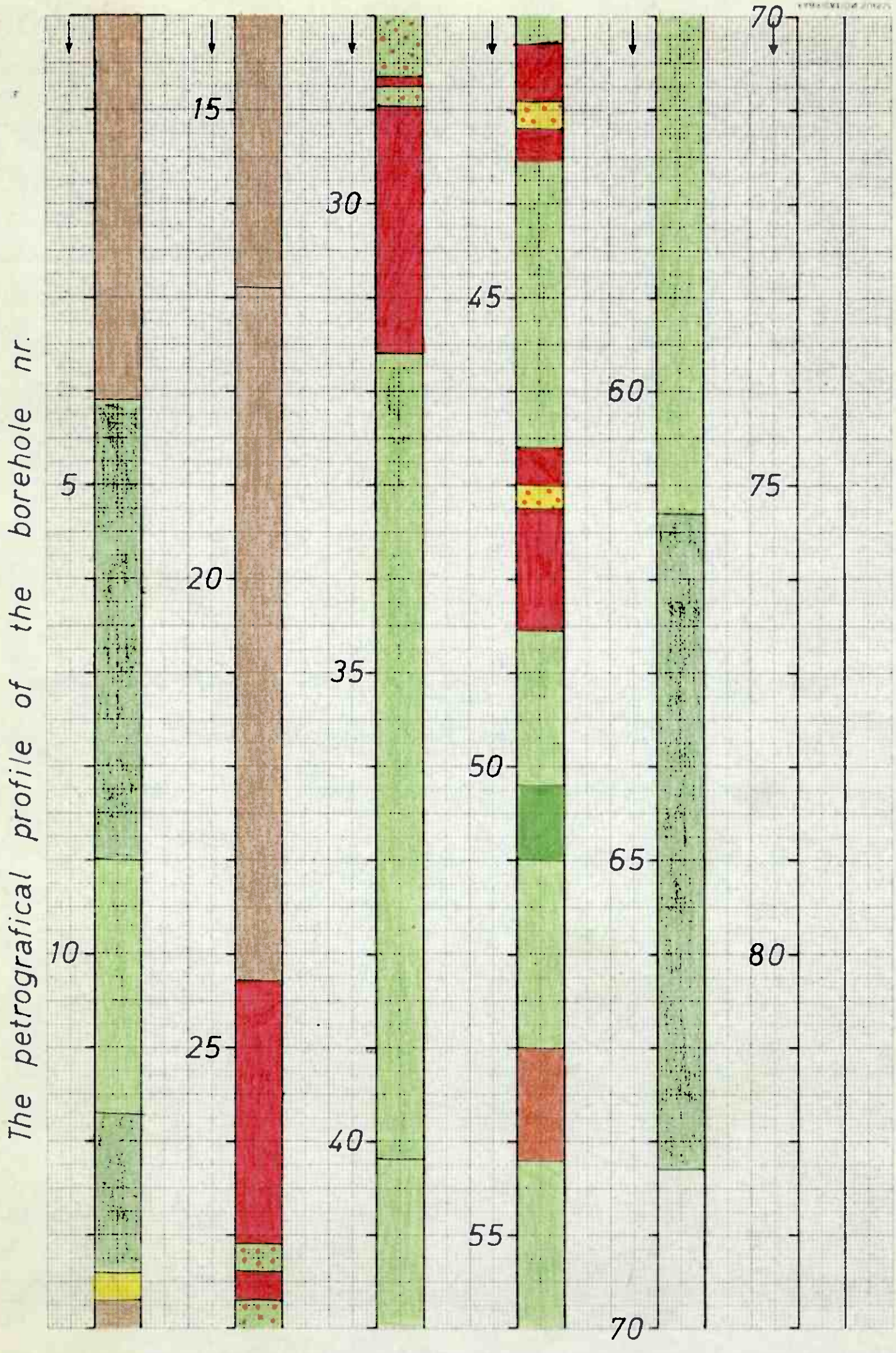
61,30 - 68,30 Feltspatisk og karbonatisk (dolomitt-ankeritt) amfibolitt eller amfibolitt båndskifer. På stedet finnes linser og striper av kvarts eller kvartsitt.

Diamant borhull har stoppet den 9.6.71 på 68,30 m, kl. 10.30.

M. Motys.

Gjennomsnitt av kjemiske analyser for: diamantborhull nr. 118 G, på etg. I - vest, mellom sone V og I.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	24,30-25,05	0,75	1,35	1,01	1,40	1,05	43,00	32,25		
2	25,05-25,95	0,90	1,65	1,49	1,45	1,31	46,00	41,40		
3	25,95-27,10	1,15	1,05	1,21	1,20	1,38	44,50	51,18		
Σ 1-3	24,30-27,10	2,80	1,33	3,71	1,34	3,74	44,58	124,93		
4	27,10-27,50	0,40	0,15	0,06	0,25	0,10	5,00	2,00		
5	27,50-27,70	0,20	1,50	0,30	1,10	0,22	35,50	7,10		
Σ 1-5	24,30-27,70	3,40	1,20	4,07	1,19	4,06	39,39	133,93		
6	27,70-28,90	1,20	0,10	0,12	0,20	0,24	4,00	4,80		
7	28,90-29,90	1,00	0,15	0,15	3,10	3,10	40,00	40,00		
8	29,90-30,95	1,05	0,50	0,53	1,70	1,79	38,50	40,43		
9	30,95-31,60	0,65	0,35	0,23	0,45	0,29	22,00	14,30		
Σ 7-9	28,90-31,60	2,70	0,34	0,91	1,92	5,18	35,09	94,73		
Σ 1-9	24,30-31,60	7,30	0,70	5,10	1,30	9,48	31,98	233,46		


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR 119 G,
Tverrfjellet, gruve.

Diamant borhull nr. 119 G (46 mm) på nivå III-vest, sone V.

Koordinater: X = +19,55 Y = +425,23 Z = +904,66
Fall av hullet i begynnelse = -58°

Kort petrografisk beskrivelse.

0,00 - 40,50 Den granatisk, gneisisk slireglimmerskifer med kloritt, biotitt og serisitt. Meget ofte finnes striper og linser av kvarts.
Fall av foliasjon i hullet er ca 45°.

40,50 - 44,30 Meget kvartsrik, svakere klorittisk og biotittisk og serisittisk gneis slireskifer med linse-slire teksturet. På stedet finnes små striper med impregnasjon av magnetkis og svakere svovelkis.
Fall av foliasjon i hullet er ca 35°-40°.

44,30 - 46,60 Feltspatisk og epidottisk finkrystalinsk slire eller stripe amfibolitt med mange striper og årer som er skapet ved kvarts og kvarts-feltspatt.
Fall av foliasjon i hullet er ca 65°-75°.

46,60 - 47,55 Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). På stedet ligger slirer av metakvartsitt uten impregnasjon.
Teksturet er massiv og strukturet er kataklastisk.
Resultatet av den kjemiske analyse er: Cu= 0,15 %, Zn= 0,50 %, S= 34,- %.

47,55 - 48,90 Feldspatisk og kvartsrik finkrystalinsk og midlkrystalinsk amfibolitt som på stedet flyter til amfibolittisk gneis slireskifer.
Fall av foliasjon i hullet er ca 10°-20°.

48,90 - 49,10 Feldspatisk og kvartsrik finkrystalinsk og midlkrystalinsk epidottisk slire amfibolitt eller amfibolittisk gneis slire og båndskifer som har på stedet store nåleporfyroblaster av amfibolitt.
Fall av foliasjon i hullet er ca 40°.

49,10 - 50,90 Meget kvartsrik serisittisk og lite klorittisk og svakere biotittisk gneis slireskifer. På stedet finnes små striper med meget svak impregnasjon av magnetkis (mest).
Fall av foliasjon i hullet er 20°-25°.

50,90 - 74,00 Den granatisk gneisisk serisittisk, klorittisk og biotittisk, kvartsrik linse-slire glimmerskifer.
Fall av foliasjon i hullet er ca 40°-45°.

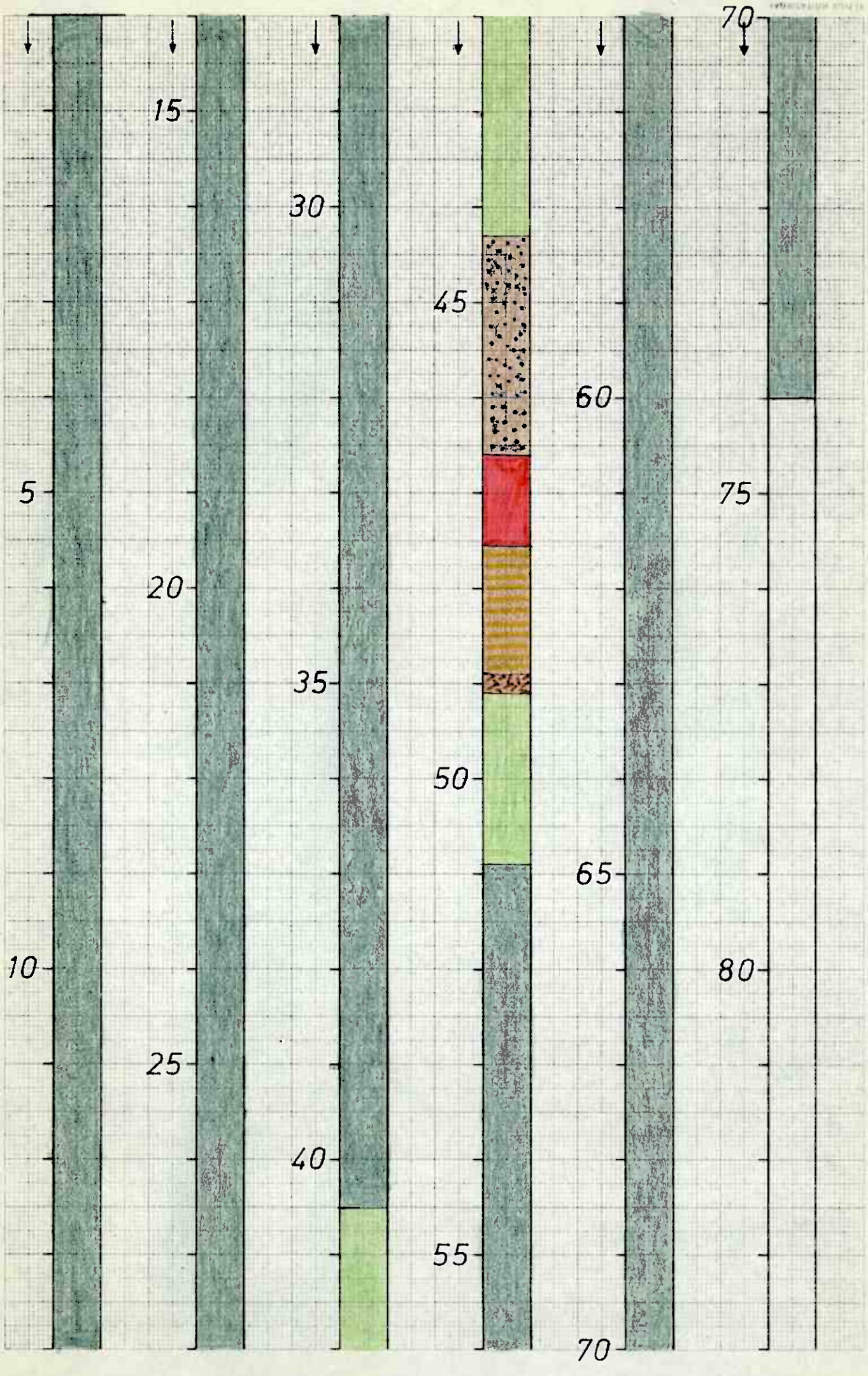
Diamant borhull nr. 119 G (46 mm) har stoppet på 74,00 m den 15 juni 1971 kl. 11.oo.

M. Motys.

Avviksmåling av hullet:

Borhull nr. 119. Kabelhull fra etg. III G.

0 m	1	57,9	57,7
10 m	2	57,9	57,6
20 m	3	56	55,9
30 m	4	54,8	54,8
40 m	5	54,1	54,3
50 m	6	54	53,7
60 m	7	53	52,9
62 m	8	52,5	52,5


The petrografical profile of the borehole nr.
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DIAMANT BORRHULL NR. 120 G.

Tverrfjellet gruve

Diamant borhull nr. 120 G.

på nivå 1 - vest, mellom sone 1 og V.

Tverrfjellet gruve.

Koordinater: X = -44,5 Y = +768,0 Z = +1025,0.

Fall av hullet i begynnelse = -30°, mot NV.

Kort petrografisk beskrivelse:

0,00 - 7,30	Tett finkrystallinsk amphibolitt med massiv eller bånd tekaturet. På stedet fins meget lite slirer og årer av kvarts.
7,30 - 11,80	Mellom-krystallinsk men også fin-krystallinsk feldspatisk amphbolitt med bånd teksturet.
11,80 - 13,50	Mellom- og fin-krystallinsk amphibolitisk og svakere biotittisk grønnslireskifer.
13,50 - 16,20	Klorittisk, svakere biotittisk sliregrønnglimmerskifer med striper og linser av karbonater (dolomittankeritt) eller kvarts.
16,20 - 17,80	Grå metakvartsitt med klorittisk og amfibolittisk substans og med meget svak impregnasjon av magnetkis og svovelkis bare på stedet. Teksturet er massivt.
17,80 - 19,30	Mellom-krystallinsk, feldspatisk og epidotisk massiv amfibolitt med mange tynne nåleporfyroblaster av amfibol.
19,30 - 20,40	Massiv grå metakvartsitt med en meget svak impregnasjon av svovelkis.
20,40 - 31,40	Amfibolittisk og klorittisk, svakere epidottisk og på stedet litt biotittisk grønn slire eller båndskifer. På stedet finnes flekker og meget lite linser som er skapt av kvarts eller dolomitt-ankerittisk karbonat. På stedet finnes også litt linser av svovelkis eller av magnetkis.
31,40 - 33,00	Grå-hvit metakvartsitt med linser og flekker av den svake impregnasjon som er skapt av svovelkis og magnetkis. På stedet finnes amorfiske korn av dolomitt-ankeritt og litt striper og slirer av den klorittamfibolittiske grunnmasse.
33,00 - 34,30	Sterk klorittisk grønn bånd eller slireskifer med lite biotitt og med smale porfyroblaster av karbonat (dolomitt-ankeritt) og med striper av kvarts. Bare på stedet finnes de hypidiomorfiske korn av svovelkis.
34,30 - 35,10	Kvartsrik finkrystallinsk feldspatisk amfibolitt med bånd og massiv teksturet. På stedet finnes hypidiomorfiske eller allotriomorfiske korn av svovelkis.
35,10 - 39,30	Sterk klorittisk og biotittisk grønn slireglimmerskifer med striper og linser av kvarts eller med litt flekker og små amorfiske korn av karbonat (dolomitt-ankeritt). På stedet finnes hypidiomorfiske og allotriomorfiske korn av svovelkis og små linser av magnetkis. På stedet skaper kvarts årer med ankeritt-kolomittiske karbonater.

39,30 - 39,65 Grå-hvit eller grå slite metakvartsitt som har mange striper av magnetitt og som er på stedet impregnert av malmsulfidene (mest svovelkis). Cu 0,05 %, Zn 0,10 %, S 6,00 %, Fe 21,00 %.

39,65 - 41,20 Sterk klorittisk og biotittisk grønn slireglimmerskifer, det samme som mellom 35,10 - 39,30 m.

41,20 - 50,10 Massiv og bånd grå eller grå-hvit metakvartsitt som har på stedet striper eller slirer av den klorittisk-epidotiske grunnmasse. På stedet finnes hypidiomorfiske eller allotriomorfiske korn av svovelkis eller magnetkis.

50,10 - 52,45 Meget sterk impregnasjon av de malmsulfider (mest svovelkis) i metakvartsitt. Teksturet er massivt og strukturet er kataklastisk. Cu 0,20 %, Zn 1,70 %, S 34,00 %, Fe 22,00 %.

52,45 - 53,50 Slire grå-hvit metakvartsitt med striper den klorittiske og epidotiske grunnmasse og med den meget svake impregnasjon av svovelkis og magnetkis som finnes bare på stedet i striper også. Cu 0,15 %, Zn 1,40 %, S 10,00 %, Fe 13,50 %.

53,50 - 55,80 Karbonatisk (dolomitt-ankeritt) og talk og klorittisk kvartsitt-slireskifer. På stedet finnes allotriomorfiske korn av svovelkis. Mellom 53,50 - 53,95 m er malmsulfidisk impregnasjon litt sterkere. Cu 0,20 %, Zn 1,40 %, S 29,00 %, Fe 24,50 %.

55,80 - 56,20 Meget sterk malmsulfidisk impregnasjon (mest svovelkis) i metakvartsitt. Teksturet er massiv og strukturet er kataklastisk. Cu 0,20 %, Zn 1,75 %, S 35,00 %, Fe 27,00 %.

56,20 - 58,40 Kvartsrik, karbonatisk (dolomitt-ankeritt), klorittisk grønn slireskifer med årer og striper av grå metakvartsitt. På stedet finnes allotriomorfiske korn av svovelkis.

58,40 - 59,80 Klorittisk og litt amfibolittisk og feldspattisk gneissisk slire-skifer. Bergarten er meget tektonisk bundet.

59,80 - 60,05 Epithermal kalkspatt med skalemoddriske krystallformer i goder. På stedet finnes svovelkis.

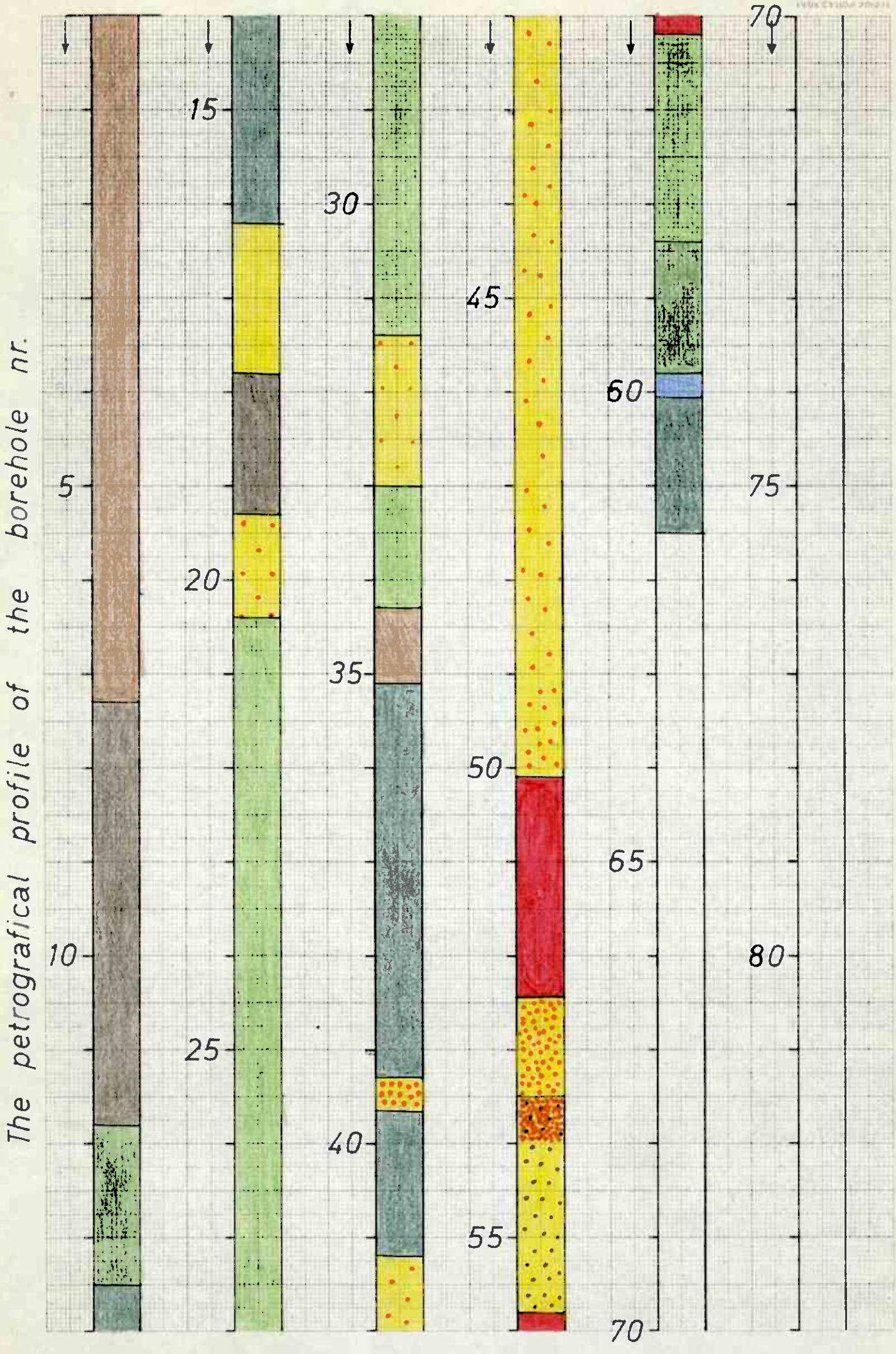
60,05 - 61,50 Sterk klorittisk og biotittisk grønn slireglimmerskifer med amorfiske korn av karbonat (ankeritt-dolomitt) og med striper av kvarts. På stedet finnes allotriomorfiske korn av svovelkis eller svak impregnasjon i striper.

Dette diamant borhull nr. 120 G er stoppet på 61,50 m den 8.7.71, kl. 11.30.

M. Motys.

Gjennomsnitt av kjemiske analyser for: diamantborhull nr. 120G, på etg. I vest, mellom sone I - V

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
2	50,10-52,45	2,35	0,20	0,4700	1,70	3,9950	34,00	79,9000	22,00	51,7000
3	52,45	1,05	0,15	0,1575	1,40	1,4700	10,00	10,5000	13,50	14,1750
4	53,50-53,95	0,45	0,20	0,0900	1,40	0,6300	29,00	13,0500	24,50	11,0250
5	53,95-55,80	1,85	0,07	0,1295	0,30	0,5550	4,00	7,4000	5,00	9,2500
6	55,80-56,20	0,40	0,20	0,0800	1,75	0,7000	35,00	14,0000	27,00	10,8000
M 2-6	50,10-56,20	6,10	0,15	0,9270	1,20	7,3500	20,47	124,8500	15,89	96,9500


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR. 121 G,

Tverrfjellet gruve.

Diamant borhull nr. 121 G (36 mm) på 2.borort over etg. IV - vest, sone V. Tverrfjellet gruve.

Koordinater: X = -34,0 Y = +439,6 Z = +856,2. 816.2

Fall av hullet i begynnelse = -32°.

Kort petrografisk beskrivelse.

0,00 - 5,60 Serisittisk og svakere klorittisk og biotittisk, kvartsrik gneisisk slireskifer med de nåleporfyroblaster av amfibol og med nokså svak impregnasjon av malmsulfider (FeS_2, FeS og $CuFeS_2$) Fall av foliasjon i hullet er ca 60°.

5,60 - 6,10 Meget sterk impregnasjon av malmsulfider (mest FeS_2) i metakvartsitt. Teksturet er massiv og strukturet er kataklastisk.

6,10 - 6,35 Klorittisk og svakere biotittisk og serisittisk kvartsrik gneisisk slireskifer med nåleporfyroblaster på stedet og med svak impregnasjon av malmsulfider (mest FeS_2 og lite FeS og $CuFeS_2$).

6,35 - 10,50 Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest FeS_2). Teksturet er massiv og strukturet er kataklastisk. Mellom 6,35-7,20 m og mellom 7,40-7,80 m finnes meget tett malmsulfidisk impregnasjon med høyere gehalter av FeS_2 og $CuFeS_2$. Mellom 9,50-10,00 m finnes flere homogenetiske striper av tett magnetitt med litt høyere gehalter av $CuFeS_2$.
Fall av Fe_3O_4 striper er ca 60° - 65°.

10,50 - 10,80 Klorittisk og meget lite serisittisk slire grønnskifer med linser og årer av kvarts eller kvartsitt og på stedet med meget svak impregnasjon av malmsulfider (mest FeS_2)
Fall av foliasjon i hullet er ca 55°-60°.

10,80 - 11,40 Meget sterk malmsulfidisk impregnasjon i metakvartsitt med massiv teksturet og kataklastisk strukturet.

11,40 - 14,30 Klorittisk og amfibolittisk gneisisk kvartsrik slireskifer, som er foldet på stedet med svak impregnasjon av malmsulfider (FeS_2, FeS og lite $CuFeS_2$) og med slirer av magnetitt som ligger på stedet.
Fall av foliasjon i hullet er ca 60°-65°.

14,30 - 14,90 Keratofyr og keratofyrisk gneis og gneis slireskifer med slire og bånd teksturet. På stedet finnes porfyroblaster av amfibol og hypidiomorfiske og allotriomorfiske korn av FeS_2. Fall av foliasjon i hullet er ca 60°-65°. På stedet finnes striper av klorittisk og biotittisk gneisisk slireskifer.

14,90 - 29,60 Meget sterk malmsulfidisk impregnasjon av (mest FeS_2) i metakvartsitt. Teksturet er massiv og strukturet er kataklastisk. Mellom 19,40-20,50 m og mellom 23,40-23,70 m finnes mange paralelle striper og slirer av magnetitt med litt høyere innhold av $CuFeS_2$. Mellom ca 26,00 m og 29,00 m finnes striper (0,2-0,5 cm tykkelse) av Zn(Fe)S.

29,60 - 31,00 Klorittisk og lite serisittisk kvartsrik slire grønnskifer med linser og årer av kvarts og med allotriomorfiske og hypidiomorfiske porfyroblaster av magnetitt. Fall av foliasjon i hullet er ca 40°-50°. På stedet er bergart sterk foldet.

31,00 - 33,70 Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest FeS2) Teksturet er massiv og strukturet er kataklastisk.

33,70 - 38,50 Klorittisk og serisittisk kvartsrik gneisisk slire og båndskifer. På stedet finnes lite porfyroblaster av amfibol. Fall av foliasjon i hullet er ca 70°-80°.

Diamant borhull nr. 121 G har stoppet på 38,50 m den 2.7.71, kl. 10.30.

M. Motys.

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 121G, på 2. borort over etg. IV, sone V 1)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	0,00-1,00	1,00	1,40	1,4000	0,10	0,1000	14,00	14,0000	23,00	23,0000
2	1,00-2,00	1,00	0,90	0,9000	0,10	0,1000	10,00	10,0000	19,75	19,7500
3	2,00-3,00	1,00	0,95	0,9500	0,10	0,1000	8,50	8,5000	20,00	20,0000
4	3,00-4,00	1,00	0,93	0,9300	0,25	0,2500	11,50	11,5000	21,00	21,0000
5	4,00-500	1,00	0,45	0,4500	0,20	0,2000	9,50	9,5000	22,50	22,5000
6	5,00-5,60	0,60	0,87	0,5220	0,30	0,1800	10,00	6,0000	21,20	12,7200
Σ 1-6	0,00-5,60	5,60	0,92	5,1520	0,17	0,9300	10,63	59,5000	21,24	118,9700
7	5,60-6,10	0,50	3,75	1,8750	0,90	0,4500	32,00	16,0000	33,00	16,5000
8	6,10-6,35	0,25	1,10	0,2750	0,30	0,0750	13,75	3,4375	30,50	7,6250
Σ 1-8	0,00-6,35	6,35	1,15	7,3020	0,23	1,4550	12,43	78,9375	22,53	143,0950

Gjennomsnitt av kjemiske analyser for: diamantborhull nr. 121G, på 2. borort over etg. IV, sone V. 2)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
9	6,35-7,20	0,85	1,50	1,2750	0,25	o,2125	32,50	27,6250	38,00	32,3000
10	7,20-8,20	1,00	1,45	1,4500	0,40	0,4000	40,50	40,5000	34,50	34,5000
11	8,20-9,50	1,30	1,20	1,5600	0,50	0,6500	38,25	49,7250	32,00	41,6000
12	9,50-10,00	0,50	1,05	0,5250	0,20	0,1000	22,00	11,0000	46,50	23,2500
13	10,00-10,50	0,50	2,10	1,0500	0,95	0,4750	38,00	19,0000	33,75	16,8750
M 9-13	6,35-10,50	4,15	1,41	5,8600	0,44	1,8375	35,63	147,8500	35,79	148,5250
14	10,50-10,80	0,30	0,35	0,1050	0,40	0,1200	7,00	2,1000	13,00	3,9000
15	10,80-11,40	0,60	0,50	0,3000	2,60	1,5600	39,50	23,7000	29,00	17,4000
M 9-15	6,35-11,40	5,05	1,24	6,2650	0,70	3,5175	34,39	173,6500	33,63	169,8250

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 121G, på 2.borort over etg. IV, sone V. 3)

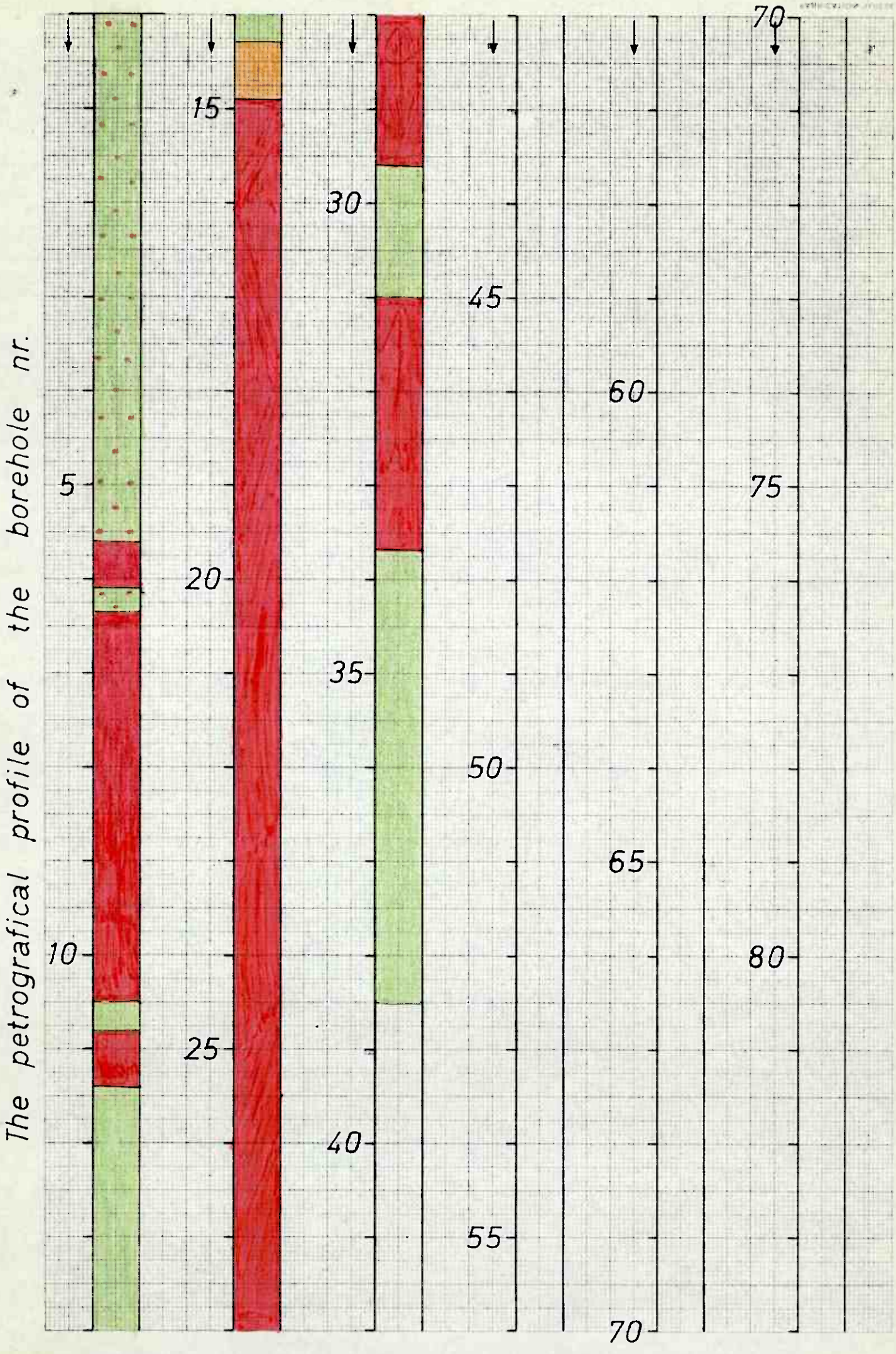
Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1-15	0,00-11,40	11,40	1,19	13,5670	0,44	4,9725	22,16	252,5875	27,45	312,9200
16	11,40-13,40	2,00	0,75	1,5000	0,55	1,1000	5,00	10,0000	14,00	28,0000
17	13,40-14,30	0,90	0,60	0,5400	0,10	0,0900	10,00	9,0000	29,00	26,1000
18	14,30-14,90	0,60	0,05	0,0300	0,10	0,0600	1,00	0,6000	2,50	1,5000
≤ 16-18	11,40-14,90	3,50	0,59	2,0700	0,36	1,2500	5,60	19,6000	15,89	55,6000
≤ 1-18	0,00-14,90	14,90	1,05	15,6370	0,42	6,2225	18,27	272,1975	24,73	368,5200

Gjennomsnitt av kjemiske analyser for diamantborhull nr. 121G, på 2. borort over etg. IV, sone V. 4)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
19	14,90-16,40	1,50	0,80	1,2000	2,60	3,9000	40,00	60,0000	30,00	45,0000
20	16,40-17,40	1,00	0,60	0,6000	1,70	1,7000	40,25	40,2500	30,00	30,0000
21	17,40-18,40	1,00	0,75	0,7500	2,10	2,1000	42,25	42,2500	32,50	32,5000
22	18,40-19,40	1,00	0,90	0,9000	1,85	1,8500	41,00	41,0000	33,00	33,0000
23	19,40-20,40	1,00	2,00	2,0000	1,05	1,0500	21,50	21,5000	37,50	37,5000
24	20,40-21,50	1,10	0,50	0,5500	2,50	2,7500	38,25	42,0750	30,00	33,0000
25	21,50-22,50	1,00	0,40	0,4000	2,90	2,9000	39,20	39,2000	31,00	31,0000
26	22,50-23,50	1,00	1,17	1,1799	2,15	2,1500	37,50	37,5000	29,50	29,5000
27	23,50-25,50	2,00	1,30	2,6000	2,90	5,8000	32,00	64,0000	31,00	62,0000
28	25,50-26,50	1,00	0,60	0,6000	3,20	3,2000	37,50	37,5000	29,75	29,7500
29	26,50-27,50	1,00	0,40	0,4000	4,50	4,5000	39,50	39,5000	30,75	30,7500
30	27,50-28,50	1,00	1,00	1,0000	3,00	3,0000	42,00	42,0000	32,50	32,5000
31	28,50-29,60	1,10	0,50	0,5500	2,30	2,5300	37,50	41,2500	29,50	32,4500
Σ 19-31	14,90-29,60	14,70	0,87	12,7200	2,55	37,4300	37,28	548,0250	31,22	458,9500

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 121G, på 2.borort over etg. IV, sone V. 5)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
32	29,60-31,00	1,40	0,10	0,1400	0,15	0,2100	2,00	2,8000	8,00	11,2000
33	31,00-32,00	1,00	0,25	0,2500	2,65	2,6500	41,00	41,0000	32,00	32,0000
34	32,00-33,00	1,00	0,25	0,2500	0,45	0,4500	46,00	46,0000	35,00	35,0000
35	33,00-33,70	0,70	0,30	0,2100	0,65	0,4550	45,00	31,5000	35,50	24,8500
W 33-35	31-00-33,70	2,70	0,26	0,7100	1,32	3,5550	43,89	118,5000	34,02	91,8500
W 1-31	0,00-29,60	29,60	0,96	28,3570	1,47	43,6525	27,71	820,2125	27,96	827,4700
W 1-35	0,00-33,70	33,70	0,87	29,2070	1,41	47,4175	27,94	941,5125	27,61	930,5200


The petrografical profile of the borehole nr.
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DIAMANT BORHULL NR. 122 G,

Tverrfjellet gruve.

Diamant borhull nr. 122 G (36 mm) på 2.borort over etg. IV sone V, Tverrfjellet gruve.

Koordinater: X = -33,7 Y = +438,2 Z = +856,2

Fall av hullet i begynnelse: $\pm$ 0°

Kort petrografisk beskrivelse:

0,00 - 1,00	Kvartsrik klorittisk og amfibolittisk grønn gneisisk slireskifer med de store nåleporfyroblaster av amfibol og med svak impregnasjon av malmsulfider (mest FeS_2).
1,00 - 1,75	Hvitgrå metakvartsitt med striper av klorittisk skifer og med slirer og linser av svak impregnasjon av malmsulfider (mest FeS_2).
1,75 - 9,25	Amfibolittisk, klorittisk gneisisk slire grønnskifer med de store nåleporfyroblaster av amfibol og med svak impregnasjon av malmsulfider (mest FeS_2, men FeS og $CuFeS_2$ også).
9,25 - 9,75	Gråkrystalinsk epidottisk og lite klorittisk amfibolitt som har på stedet striper av kvarts. På stedet skaper den malmsulfidiske impregnasjon (mest FeS_2) lite linser og striper.
9,75 - 15,00	Meget sterk malmsulfidisk impregnasjon i metakvartsitt med massiv teksturet og kataklastisk strukturet. Mellom 14,85-14,90 m er posisjon av kvartsrik biotitt og klorittisk gneis slireskifer.
15,00 - 16,65	Kvartsittisk slire eller gneisisk bånd og slireskifer med mange striper av magnetitt. Svovelkis og magnetkis og kobberkis finnes meget lite.
16,65 - 18,20	Meget sterk malmsulfidisk impregnasjon (mest FeS_2) med mange striper og impregnasjon av magnetitt og med den høyere innhold av kobberkis. Teksturet er massiv og strukturet er kataklastisk.
18,20 - 18,75	Kvarts meget rik gneisisk skifer med meget sterk impregnasjon av magnetitt (striper). Bergart har slireteksturet.
18,75 - 20,60	Meget sterk malmsulfidisk impregnasjon (mest FeS_2) i metakvartsitt. Teksturet er massiv og strukturet er kataklastisk.
20,60 - 25,10	Kvarts meget rik kloritt-serisittisk gneisisk bånd eller slireskifer.
25,10 - 27,50	Amfibolittisk gneis eller gneis båndskifer med mange nåleporfyroblaster av amfibol.

Diamant borhull nr. 122 G har stoppet på 27,50 m den 7.7.71. kl. 12.30.

M. Motys.

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 122G, på 2. borort over etg. IV, sone V 1)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	0,00-1,00	1,00	1,25	1,2500	0,15	0,1500	16,00	16,0000	23,00	23,0000
2	1,00-1,75	0,75	1,25	0,9375	0,10	0,0750	14,00	10,5000	16,50	12,3750
3	1,75-3,00	1,25	0,60	0,7500	0.10	0,1250	10,00	12,5000	19,00	23,7500
4	3,00-4,00	1,00	0,70	0,7000	0,10	0,1000	9,00	9,0000	20,00	20,0000
5	4,00-5,00	1,00	0,62	0,6200	0,10	0,1000	9,00	9,0000	20,50	20,5000
6	5,00-6,00	1,00	1,03	1,0300	0,15	0,1500	10,50	10,5000	18,50	18,5000
7	6,00-7,00	1,00	0,20	0,2000	0,10	0,1000	14,00	14,0000	16,50	16,5000
8	7,00-8,00	1,00	1,00	1,0000	0,10	0,1000	15,50	15,5000	19,00	19,0000
9	8,00-9,25	1,25	0,75	0,9375	0,30	0,3750	13,00	16,2500	23,00	28,7500
1-9	0,00-9,25	9,25	0,80	7,4250	0,14	1,2750	12,24	113,2500	19,72	182,3750
10	9,25-9,75	0,50	1,75	0,8750	1,00	0,5000	30,00	15,0000	33,00	16,5000
1-10	0,00-9,75	9,75	0,85	8,3000	0,18	1,7750	13,15	128,2500	20,40	198,8750

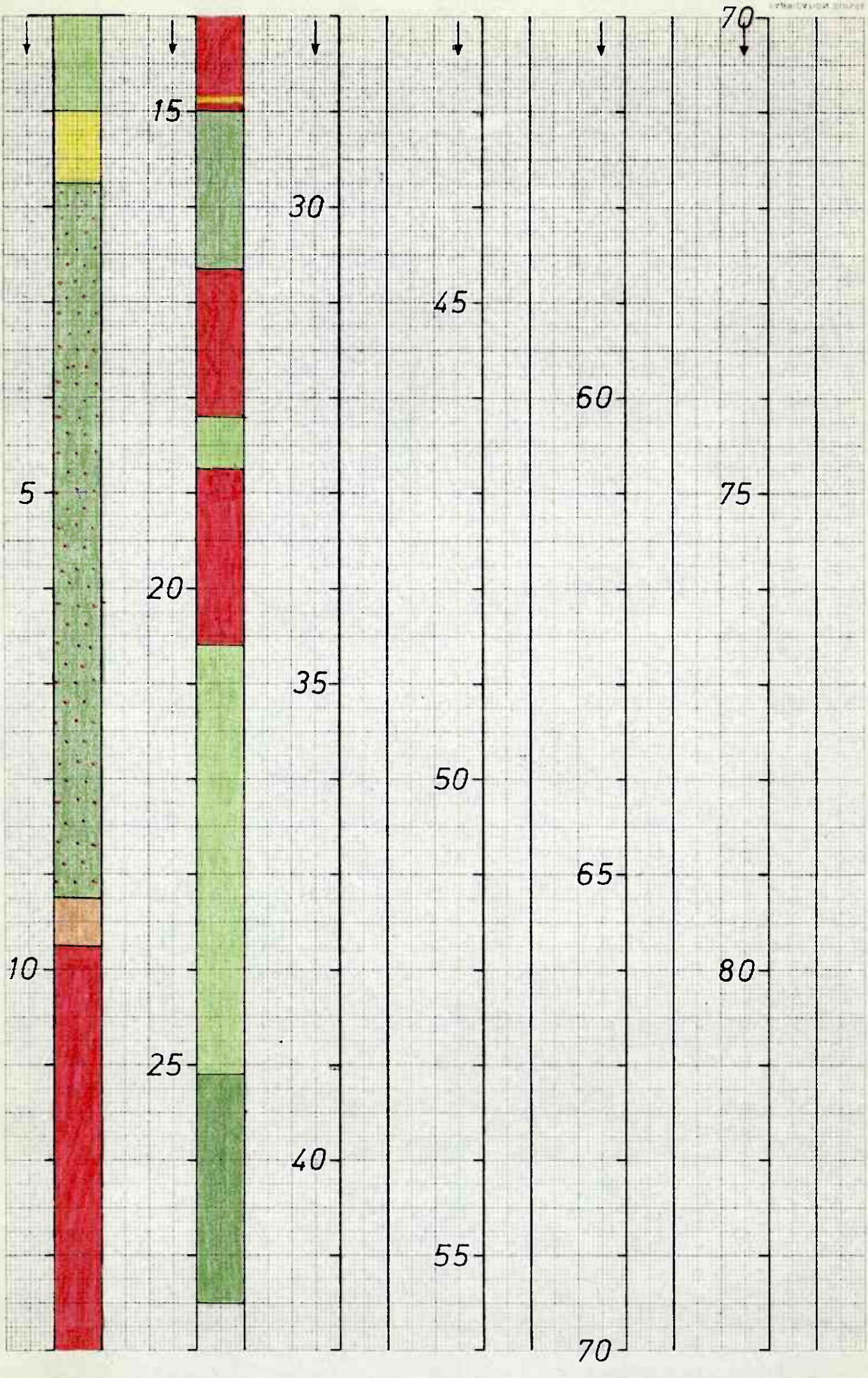
Gjennomsnitt av kjemiske analyser for: diamantborhull nr. 122G, på 2. borort over etg. IV, sone V. 2)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
11	9,75-11,00	1,25	1,10	1,3750	0,35	0,4375	41,00	51,2500	35,50	44,3750
12	11,00-12,00	1,00	1,03	1,0300	0,80	0,8000	43,50	43,5000	34,50	34,5000
13	12,00-13,00	1,00	1,50	1,5000	0,65	0,6500	44,00	44,0000	35,00	35,0000
14	13,00-14,00	1,00	0,60	0,6000	1,20	1,2000	44,00	44,0000	34,00	34,0000
15	14,00-15,00	1,00	1,35	1,3500	0,35	0,3500	44,00	44,0000	35,00	35,0000
11-15	9,75-15,00	5,25	1,12	5,8550	0,65	3,4375	43,19	226,7500	34,83	182,8750
16	15,00-16,65	1,65	0,35	0,5575	0,15	0,2475	3,00	4,9500	41,00	67,6500
17	16,65-18,20	1,55	2,50	3,8750	0,35	0,5425	32,00	49,6000	40,50	62,7750
18	18,20-18,75	0,55	1,10	0,6050	0,15	0,0825	4,50	2,4750	43,00	23,6500
16-18	15,00-18,75	3,75	1,35	5,0575	0,23	0,8725	15,21	57,0250	41,09	154,0750

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 122G, på 2. borort over etg. IV, sone V. 3)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
19	18,75-19,60	0,85	0,90	0,7650	1,25	1,0625	42,50	36,1250	34,50	29,3250
20	19,60-20,60	1,00	0,92	0,9200	1,10	1,1000	46,00	46,0000	35,00	35,0000
19-20	18,75-20,60	1,85	0,91	1,6850	1,17	2,1625	44,39	82,1250	34,77	64,3250
10-20	9,75-20,60	10,85	1,24	13,4725	0,64	6,9725	35,11	380,9000	38,50	417,7750
1-20	0,00-20,60	20,60	1,06	21,7725	0,42	8,7475	24,72	509,1500	29,93	616,6500

The petrografical profile of the borehole nr.



DIAMANT BORRHULL NR. 123 G.

Tverrfjellet gruve

FOLLDAL VERK A/S

Diamant borhull nr. 123 G.

på 1. borort over etg. IV - vest, sone V.

Tverrfjellet gruve.

Koordinater: x = -32,7
y = +439,6
z = +870,6

Fall av hullet i begynnelse = ±0°

Kort petrografisk beskrivelse.

0,00 - 1,80	Grå-hvit metakvartsitt med svak impregnasjon av svovelkis. På stedet finnes også sinkblende, magnetkis og kobberkis. Malmsulfidisk impregnasjon skaper striper eller slirer. Teksturet av metakvartsitt er masiv eller bånd.
1,80 - 2,10	Klorittisk og kvarts meget rik gneisisk båndskifer med striper av den svak malmsulfidisk impregnasjon (mest svovelkis, som skaper de hypidiomorfiske korner også). Fall av foliasjon i hullet er 65° - 70°.
2,10 - 5,00	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Teksturet er masiv eller bånd og strukturet er kataklastisk. På stedet fins tynne striper av den klorittisk og kvartsrik skifer. Noen allotriomorfiske korner av magnetitt finnes på stedet også. Fall av striper i hullet er ca 75°.
5,00 - 5,35	Klorittisk og biotittisk, kvarts meget rik slire gneis skifer som er foldet med allotriomorfiske korner av den dolomitt-ankerittisk mineral. På stedet bare finnes lite kobberkis (allotriomorfiske former). og hypidiomorfiske korner av svovelkis. Gjennomsnittlige fall av foliasjon i hullet er 50°-60°.
5,35 - 5,60	meget sterk malmsulfidisk impregnasjon i metakvartsitt (med svovelkis), det samme som mellom 2,0 - 5,00 m.
5,60 - 6,00	Klorittisk og biottisk kvartsrik gneisisk slireskifer med allotriomorfiske korner av den dolomitt-ankerittisk mineral på stedet. På stedet finnes også de hypidiomorfiske korner av svovelkis. Fall av foliasjon i hullet er ca. 60°.
6,00 - 7,75	Sterk malmsulfidisk impregnasjon i bånd og slire metakvartsitt som har på stedet striper av den klorittiske grunnmateriale og med mange striper av den finkrystallinske magnetitt. Teksturet er meget kataklastisk. I 6,00 m er stor konsentrasjon av amorfisk kobberkis.

7,75 - 10,20	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (meget svovelkis). Bare på stedet finnes smale striper av finkrystallinsk magnetitt. Teksturet er masiv og strukturet er kataklastisk.
10,20 - 10,50	Kvartsittisk skifer med mange striper av den finkrystallinske magnetitt og med meget lite hypidiomorfiske korner av svovelkis, som finnes bare på stedet. De striper faller i hullet ca. 75° - 80°.
10,50 - 18,00	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Mellom 10,50 - 13,00 m er malm meget tett. Teksturet er masiv og strukturet er kataklastisk. Mellom 17,60 - 17,90 m finnes rik konsentrasjon av sinkblende.
18,00 - 19,00	Klorittisk og lite biottisk, kvartsrik grønn gneisisk slireskifer som har på stedet smal allotriomorfiske korner av magnetitt. På stedet (mellom 18,60 - 18,90 m) finnes smale korn av granat. På stedet finnes svak impregnasjon av svovelkis, lite magnetkis, sinkblende og kobberkis også. Fall av foliasjon i hullet er ca. 50° - 55°.
19,00 - 20,70	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Teksturet er masiv og strukturet er kataklastisk.
20,70 - 22,70	Klorittisk og lite biottisk, kvarts meget rik grønn gneisisk slireskifer med striper av kvartsitt på stedet. På stedet finnes smale korn av granat og smale allotriomorfiske korn av magnetitt. Svak impregnasjon av malmsulfider (mest svovelkis) skaper på stedet striper og slirer. Fall av foliasjon i hullet er ca 60°, men bergarter er på stedet også foldet.
22,70 - 26,80	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis. Teksturet er masiv og nokså tett kataklastisk strukturet.
26,80 - 29,15	Fyllonittisk, klorittisk, kvartsrik gneisisk skifer med lite nåleporfiroblaster av amfibol. Teksturet er myllonitisk og bare på stedet bånd. Fall av foliasjon i hullet er 60° - 70°.

Diamantborhull nr. 123G har stoppet den 3. august 1971 kl. 12.30 på 29,15 m.

M. Motyz.

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 123G, på 1. borort over etg. IV, sone V. 1)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	0,00-1,00	1,00	1,30	1,3000	0,90	0,9000	22,00	22,0000	19,00	19,0000
2	1,00-1,80	0,80	1,00	0,8000	0,70	0,5600	25,50	20,4160	20,00	16,0000
1-2	0,00-1,80	1,80	1,17	2,1000	0,81	1,4600	23,56	42,4160	19,44	35,0000
3	1,80-2,10	0,30	1,35	0,4050	0,35	0,1050	16,50	4,9500	21,50	6,4500
1-3	0,00-2,10	2,10	1,19	2,5050	0,75	1,5650	22,56	47,3660	19,74	41,4500
4	2,10-3,00	0,90	1,40	1,2600	1,10	0,9900	35,00	31,5000	32,00	28,8000
5	3,00-4,00	1,00	0,75	0,7500	0,80	0,8000	45,50	45,5000	35,00	35,0000
6	4,00-5,00	1,00	1,10	1,1000	1,60	1,6000	43,25	43,2500	33,00	33,0000
4-6	2,10-5,00	2,90	1,07	3,1100	1,17	3,3900	41,47	120,2500	33,38	96,8000
1-6	0,00-5,00	5,00	1,12	5,6150	0,99	4,9550	33,52	167,6160	27,65	138,2500

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 123G, på 1. borort over etg. IV, sone V. 2)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
7	5,00-5,35	0,35	0,25	0,0875	0,30	0,1050	3,00	1,0500	5,00	1,7500
8	5,35-5,60	0,25	2,00	0,5000	0,25	0,0625	40,50	10,1250	34,25	8,5625
9	5,60-6,00	0,40	0,50	0,2000	0,20	0,0800	7,00	2,8000	16,50	6,6000
10	6,00-7,00	1,00	1,70	1,7000	0,20	0,2000	23,00	23,0000	39,00	39,0000
11	7,00-7,75	0,75	1,40	1,0500	0,30	0,2250	20,00	15,0000	38,00	28,5000
10-11	6,00-7,75	1,75	1,57	2,7500	0,24	0,4250	21,71	38,0000	38,57	67,5000
12	7,75-9,00	1,25	1,50	1,8750	1,30	1,6250	39,00	48,7500	34,00	42,5000
13	9,00-10,20	1,20	0,60	0,7200	1,70	2,0400	42,50	51,0000	32,00	38,4000
12-13	7,75-10,20	2,45	1,06	2,5950	1,50	3,6650	40,71	99,7500	33,02	80,9000
7-13	5,00-10,20	5,20	1,18	6,1325	0,83	4,3375	29,18	151,7250	31,79	165,3125

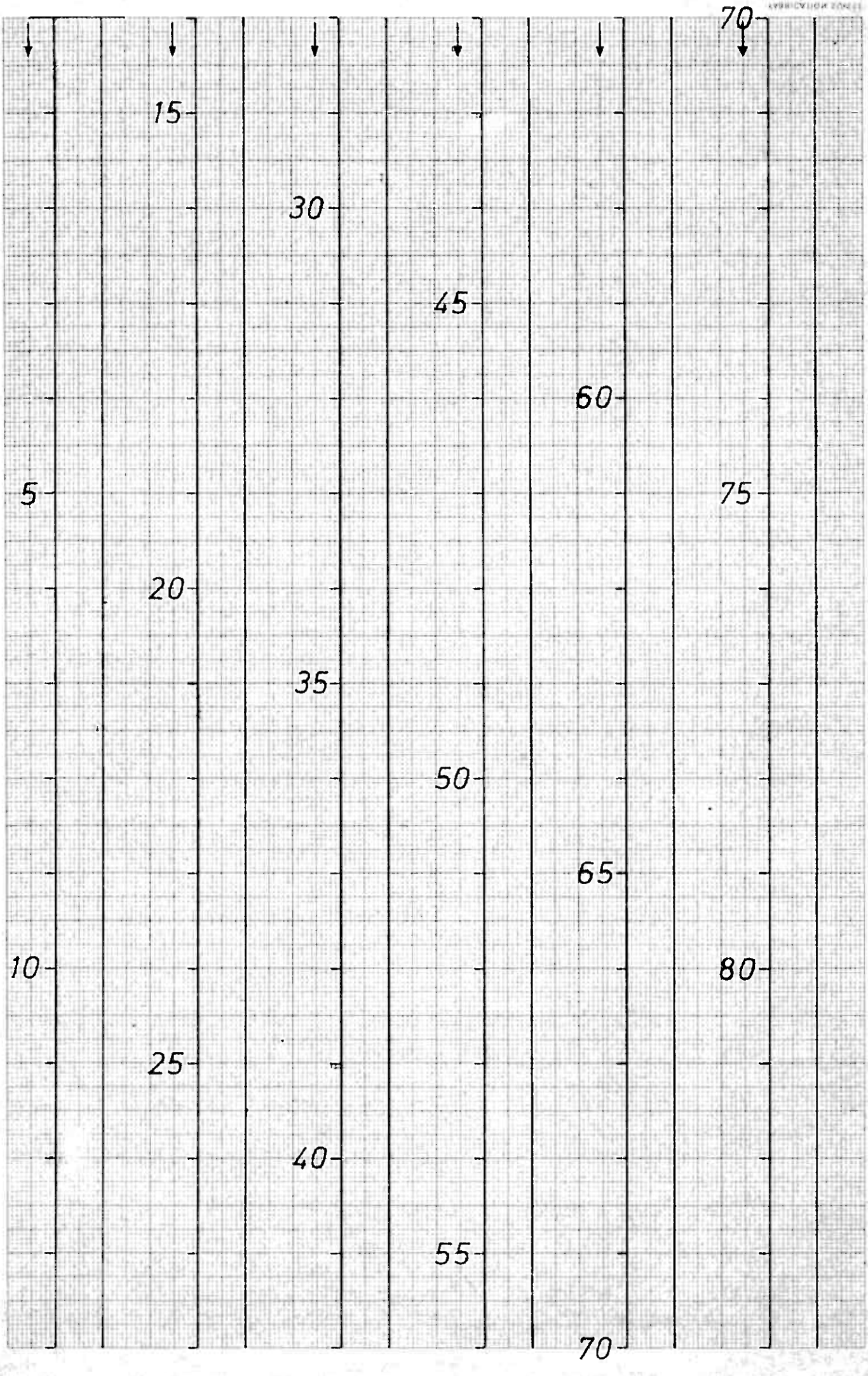
Gjennomsnitt av kjemiske analyser for: diamantborhull nr. 123G, på I. borort over etg. IV, sone V. 3)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
14	10,20-10,50	0,30	0,80	0,2400	0,15	0,0450	14,00	4,2000	41,00	12,3000
15	10,50-12,00	1,50	0,80	1,2000	0,90	1,3500	47,00	70,5000	36,50	54,7500
16	12,00-13,00	1,00	0,30	0,3000	2,60	2,6000	42,75	42,7500	33,00	33,0000
17	13,00-14,00	1,00	0,40	0,4000	2,40	2,4000	41,00	41,0000	30,50	30,5000
18	14,00-15,00	1,00	1,25	1,2500	2,10	2,1000	39,00	39,0000	31,75	31,7500
19	15,00-16,00	1,00	0,25	0,2500	2,30	2,3000	39,50	39,5000	29,50	29,5000
20	16,00-17,00	1,00	0,60	0,6000	2,65	2,6500	38,00	38,0000	30,00	30,0000
21	17,00-18,00	1,00	2,05	2,0500	3,25	3,2500	39,50	39,5000	31,75	31,7500
15-21	10,50-18,00	7,50	0,81	6,0500	2,22	16,6500	41,37	310,2500	32,17	241,2500
1-21	0,00-18,00	18,00	1,00	18,0375	1,44	25,9875	35,21	633,7910	30,95	557,1125

Gjennomsnitt av kjemiske analyser for: diamantborhull nr. 123G, på 1. borort over etg. IV, sone V. 4)

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
22	18,00-19,00	1,00	0,90	0,9000	0,25	0,2500	6,00	6,0000	12,00	12,0000
23	19.00-20,00	1,00	0,55	0,5500	2,20	2,2000	38,00	38,0000	30,50	30,5000
24	20,00-20,70	0,70	0,65	0,4550	2,00	1,4000	39,00	27,3000	32,00	22,4000
23-24	19,00-20,70	1,70	0,59	1,0050	2,12	3,6000	38,41	65,3000	31,12	52,9000
25	20,70-21,70	1,00	0,10	0,1000	0,20	0,2000	6,00	6,0000	13,00	13,0000
26	21,70-22,70	1,00	0,15	0,1500	0,10	0,1000	5,00	5,0000	12,50	12,5000
25-26	20,70-22,70	2,00	0,13	0,2500	0,15	0,3000	5,50	11,0000	12,75	25,5000
27	22,70-24,00	1,30	0,15	0.1950	2,50	3,2500	37,50	48,7500	28,00	36,4000
28	24,00-25,00	1,00	0,25	0,2500	0,65	0,6500	46,25	46,2500	34,50	34,5000
29	25,00-26,00	1,00	0,25	0,2500	0,60	0,6000	46,25	46,2500	35,50	35,5000
30	26,00-26,80	0,80	0,25	0,2000	0,65	0,5200	46,35	37,0800	35,50	28,4000
27-30	22,70-26,80	4,10	0,22	0,8950	1,22	5,0200	43,35	178,3300	32,88	134,8000
1-30	0,00-26,80	26,80	0,79	21,0875	1,31	35,1575	33,37	894,4210	29,19	782,3125

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR. 124 G.
Tverrfjellet gruve.

FOLLDAL VERK A/S

Diamantborhull nr. 124 G, Tverrfjellet gruve på nivå III - vest, sone V.

Koordianter: x = -21,8
y = +453,4
z = +906,8
Fall av hullet i begynnelse = ± 0°

Kort petrografisk beskrivelse.

0,00 - 0,25	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest FeS_2) Teksturet er massiv og struktur er kataklastisk. På stedet finnes linser og striper av kvarts.
0,25 - 0,70	Kvartsrik, kloritt-serisitt og svakere biotitt gneisisk slireskifer. Fall av foliasjon i hullet er ca. 25°.
0,70 - 1,30	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest FeS_2). Tekstur er massiv og struktur er kataklastisk. På malmgrense på 1,30 m finnes amorfiske former av kobberkis som ligger på stedet.
1,30 - 2,00	Kvartsrik klorittserisitt og svakere biotitt gneisisk slireskifer. På stedet finnes glimmer av lysgrønn talk og svak impregnasjon av svovelkis eller kobberkis. Fall av foliasjon i hullet er ca. 25 - 30°.
2.00 - 4,40	Sterk og meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest FeS_2). Tekstur er massiv og struktur er kataklastisk.
4,40 - 7,60	Kvartsrik, kloritt-serisitt gneisisk slireskifer som er sterkt foldet på stedet. Fall av foliasjon i hullet er ca. 25 - 30°. På stedet finnes tynne striper som holder den meget svak eller svak impregnasjon av malmsulfider (mest FeS_2).
7,60 - 8,60	Meget kvartsrik (fylonittisk) biotitt og svakere kloritt-slireskifer. Fall av foliasjon i hullet er ca. 50-60°.
8,60 - 9,40	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis) som holder på stedet striper som er skapt av den finkrystallinsk magnetitt. Tekstur er massiv og bånd, struktur er kataklastisk.
9,40 - 10,90	Sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis) som holder fine striper av finkrystallinsk magnetitt. Tekstur er stripe - slire og struktur er mest kataklastisk.

10,90 - 13,50 Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Teksturet er massiv og strukturet er kataklastisk. På stedet finnes striper eller linser av kvarts.

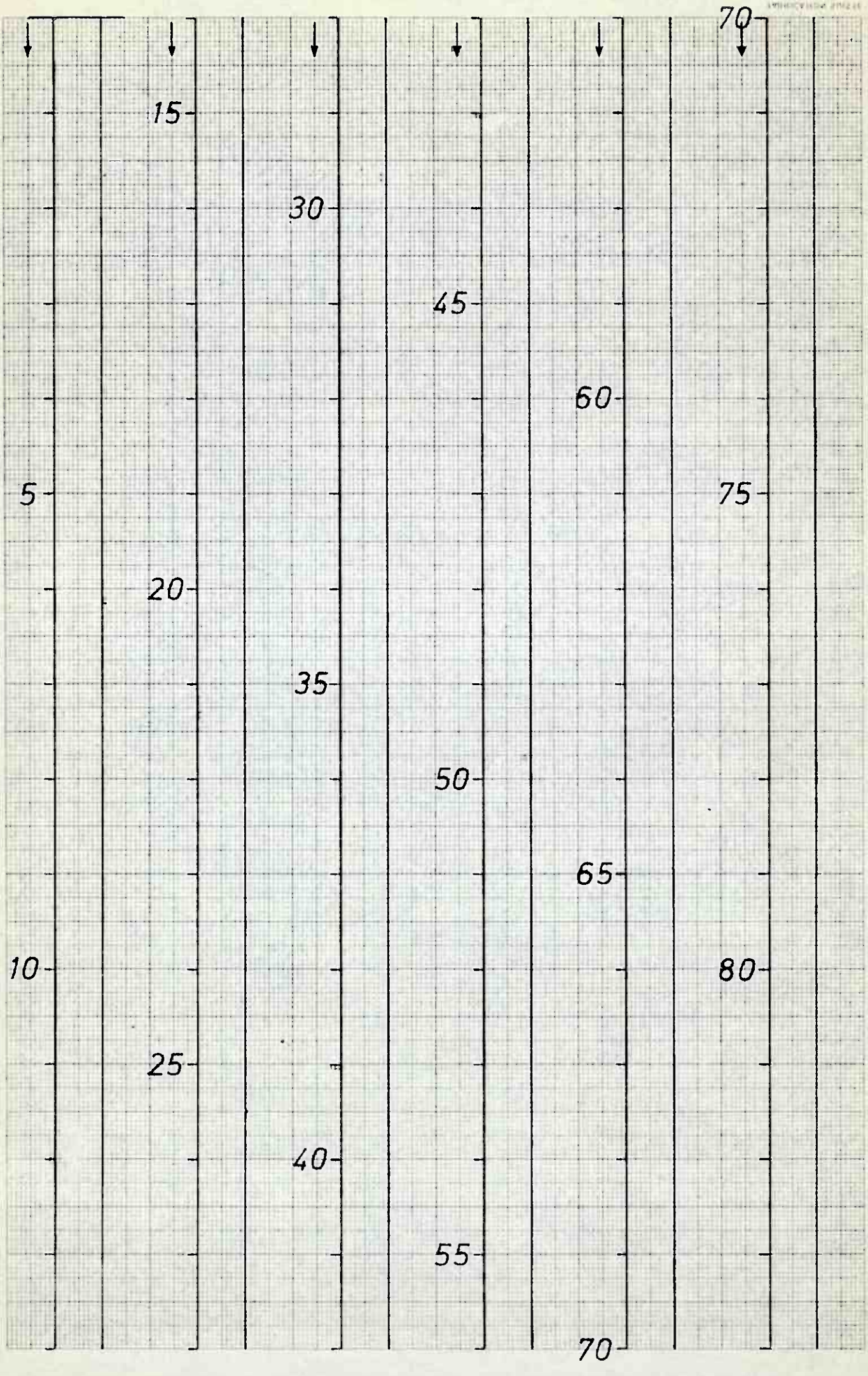
Diamantborhull nr. 124 G har stoppet på 13,50 m den 24.8.71 kl.10^{00}.

M. Motys

Gjennomsnitt av kjemiske analyser for : diamantborhull nr. 124 G, på etg. III, vest av sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	0,00-0,25	0,25	1,80	0,4500	2,00	0,5000	39,00	9,7500	29,50	7,3750
2	0,25-0,70	0,45	0,20	0,0900	0,55	0,2475	3,00	1,3500	5,00	2,2500
3	0,70-1,30	0,60	1,10	0,6600	1,95	1,1700	37,00	22,2000	27,50	16,5000
4	1,30-2,00	0,70	1,25	0,8750	0,65	0,4550	6,00	4,2000	5,00	3,5000
5	2,00-3,00	1,00	0,20	0,2000	2,40	2,4000	42,00	42.0000	29,50	29,5000
6	3,00-4,40	1,40	1,55	2,1700	1,60	2,2400	41,75	58,4500	30,00	42,0000
7	4,40-5,40	1,00	0,10	0,1000	0,20	0,2000	2,75	2,7500	4,00	4,0000
8	5,40-7,60	2,20	0,15	0,3300	0,25	0,5500	3,00	6,6000	6,00	13,2000
9	7,60-8,60	1,00	0,15	0,1500	0,15	0,1500	2,00	2,0000	3,00	3,0000
10	8,60-9,40	0,80	1,95	1,5600	0,80	0,6400	30,00	24,0000	40,00	32,0000
11	9,40-10,90	1,50	3,75	5,6250	0,40	0,6000	28,00	42,0000	41,50	62,2500
12	10,90-12,00	1,10	3,50	3,8500	0,50	0,5500	31,75	34,9250	32,50	35,7500
13	12,00-13,50	1,50	2,75	4,1250	0,25	0,3750	34,50	51,7500	31,50	47,2500
Σ 1-13	0,00-13,50	13,50	1,49	20,1850	0,75	10.0775	22,37	301.9750	22,12	298.5750

The petrografical profile of the borehole nr.



DIAMANT BORHULL NR. 125 G
Tverrfjellet gruve.

Diamantborhull nr. 125 G Tverrfjellet gruve på etg. III - vest av sone V.

Koordinater: x = -22,3
y = +454,6
z = +906,8

Fall av hullet i begynnelse = $\pm 0^{o}$

Kort petrografisk beskrivelse.

0,00 - 0,55	Meget kvartsrik serisiyy og bare svakere kloritt-biotittisk, gneisisk båndskifer med flere striper av den nokså svake malmsulfidisk impregnasjon (mest FeS_2). Fall av foliasjon i hullet er ca. 70°.
0,55 - 0,90	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Teksturet er massiv og struktur er kataklastisk.
0,90 - 2,70	Kloritt-serisitt, kvartsrik slire og linse-slire gneisisk skifer med den svak malmsulfidisk impreganasjon (mest FeS_2) og på stedet med de kvartsittiske striper som holder sterk eller meget sterk malmsulfidisk impregnasjon (mest FeS_2). Fall av foliasjon i hullet er ca. 65° - 70°.
2,70 - 3,20	Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis) med kataklastisk struktur og masiv tekstur.
3,20 - 3,75	Meget kvartsrik kloritt-talk gneisisk skifer eller kvartsittskifer med slireteksturet. Fall av foliasjon i hullet er ca. 45° - 50°. På stedet finnes hypidiomorfiske porfyroblaster av svovelkis eller lite amorfiske former av kobberkis.
3,75 - 6,00	Sterk eller meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Tekstur er masiv eller bånd og strukturet er mest kataklastisk. Denne malmposisjon holder mange striper av den finkrystallinske magnetitt og linser og striper av kvarts og kvartsrik kloritt-biotitt gneisisk slireskifer.
6.00 - 6,50	Kvartsik, kloritt-biotitt gneisisk grønn slireskifer som holder svak impregnasjon av FeS_2, FeS. De nåle porfyroblaster av amfibol finnes også på stedet. Fall av foliasjon i hullet er ca. 60°.

6,50 - 8,60	Sterk og meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest FeS_2). Teksturet er masiv og strukturet er kataklastisk. På stedet finnes striper eller linser av kvarts, kvartsitt som holder ingen malmsulfidisk mineralisasjon eller av kloritt-biotitt skifer.
8,60 - 11,70	Kvartsrik kloritt-biotitt gneisisk grønn slireskifer med striper eller linser av kvarts og kvartsitt, og med svak impregnasjon av de malmsulfider (mest FeS_2). Fall av foliasjon i hullet er ca. 75°. Mellom 8,90 - 9,10 m finnes hvit kvarts (hydrothermal?) som holder tynn plate av ilmenitt i smal sprekk.
11.70 - 14,00	Sterk, og fra 13,40 m meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Tekstur er masiv og struktur er kataklastisk. Mellom 13,40 - 14,00 m er malmen meget homogenetisk med striper som holder allotriomorfisk sinkblende.

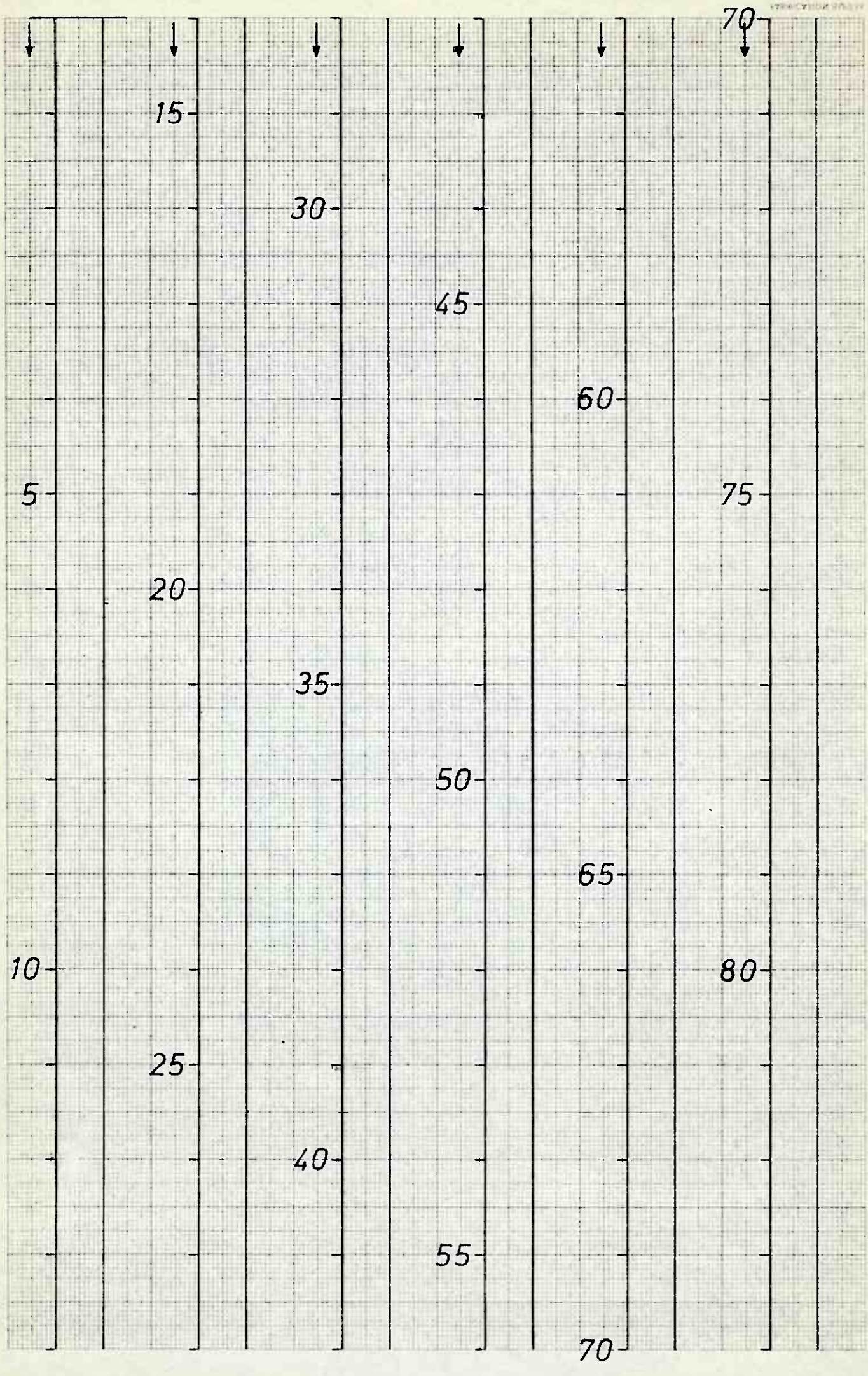
Diamantborhull nr. 125 G har stoppet på 14,00 m den 25.8.71, kl. $13^{\underline{00}}$.

M. Motys

Gjennomsnitt av kjemiske analyser for : diamantborhull prøver, bh.125 G, på etg. III - vest, sone V.

Nr.	meter	tykkelse m	Cu % a_1	$a_1 \cdot m$	Zn % a_2	$a_2 \cdot m$	S % a_3	$a_3 \cdot m$	Fe % a_4	$a_4 \cdot m$
1	0,00 - 0,55	0,55	0,40	0,3600	1,10	0,6050	10,00	5,5000	9,50	5,2250
2	0,55 - 0,90	0,35	0,90	0,3150	2,15	0,7525	39,50	13,8250	28,50	9,9750
3	0,90 - 2,70	1,80	0,25	0,4500	0,40	0,7200	9,50	17,1000	10,00	18,0000
4	2,70 - 3,20	0,50	1,25	0,6250	1,90	0,9500	36,00	18,0000	26,50	13,2500
5	3,20 - 3,75	0,55	0,30	0,1650	0,40	0,2200	4,00	2,2000	4,00	2,2000
6	3,75 - 5,00	1,25	1,85	2,3125	0,75	0,9375	25,00	31,2500	42,50	53.1250
7	5,00 - 6,00	1,00	0,75	0,7500	0,15	0,1500	26,50	26,5000	42,50	42.5000
8	6,00 - 6,50	0,50	0,95	0,4750	0,15	0,0750	11,00	5,5000	32,00	16,0000
9	6,50 - 7,50	1,00	1,40	1,4000	0,90	0,9000	33,50	33.5000	30,00	30,0000
10	7,50 - 8,60	1,10	1,00	1,1000	1,80	1,9800	35,50	39,0500	30,50	33,5500
11	8,60 - 10,00	1,40	1,10	1,5400	0,30	0,4200	7,00	9,8000	9,75	13,6500
12	10,00-11,70	1,70	1,35	2,2950	0,30	0,5100	10,50	17,8500	17,50	29,7500
13	11,70-13,40	1,70	0,65	1,1050	3,10	5,2700	38,50	65,4500	30,50	51,8500
14	13,40-14,00	0,60	0,65	0,3900	2,85	1,7100	43,50	26,1000	34,00	20,4000
Σ 1-14	0,00-14,00	14,00	0,95	13,2825	1,09	15,2000	22,26	311,6250	24,25	339,4750

The petrografical profile of the borehole nr.



Dbh 126 G

FOLLDAL VERK A/S

Diamantborhull nr. 126 G på nivå VII, malmsone V+IV.

(36 mm), horisontal

retningen: 156 ° (mot SØS)

koordinater av begynnelsen: X = -50,9 , Y = +342,6 , Z = +

Kort petrografisk beskrivelse:

0,00 - 1,15 Meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Tekstur er massiv og struktur er kataklastisk.

1,15 - 2,25 Svakere karbonatisk og lite feldspatisk amfibolitt-slireskifer med striper av kloritt-amfibolitt slire skifer og med striper av kvartsitt som finnes bare på stedet. Amfibolitt skifer holder også på stedet svak impregnasjon av malmsulfider (mest svovelkis).

2,25 - 14,10 Sterk og meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis)
Ca fra 12,00 m er malm litt rikere av kobberkisinnhold.
Tekstur er massiv og struktur er kataklastisk.

14,10 - 15,20 Svakere malmsulfidisk impregnasjon i magnetittisk metakvartsitt. Magnetitt (finkrystalinsk) skaper striper og tynne posisjoner. Teksturet er bånd eller slire og strukturet er mest kataklastisk. Fra malmsulfider finnes mest kobberkis, svovelkis og litt magnetkis også.
Gjennomsnitt av slire og bånd foliasjon er ca 60°.

15,20 - 15,55 Amfibolitt-kloritt-biotitt-kvartsittisk og litt karbonatisk fylonitt skifer som holder store porfyroblaster av amfibol og på stedet litt kobberkis og magnetkis og svovelkis (impregnasjon).

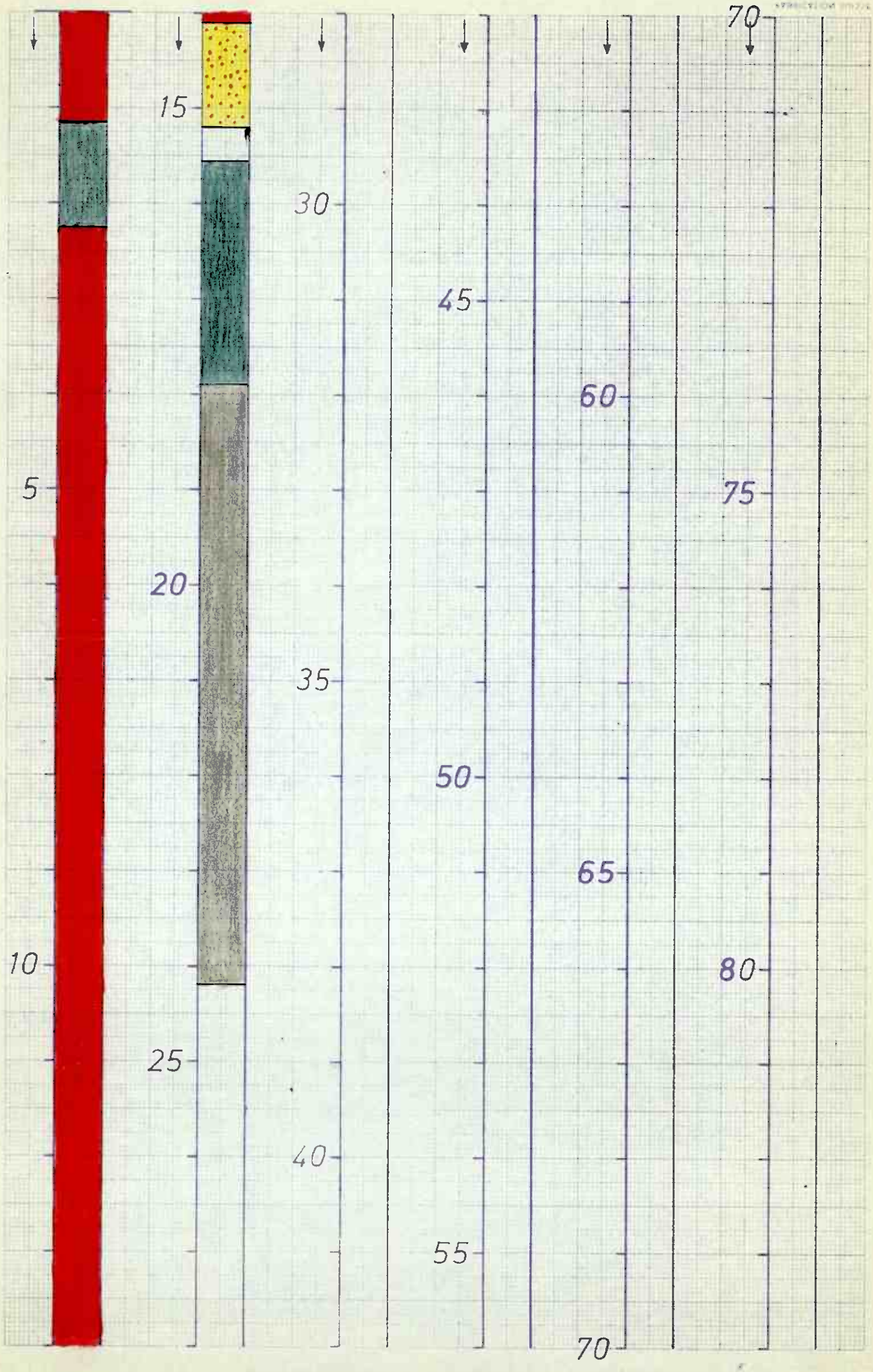
15,55 - 17,90 Amfibolitt - gneisisk båndskifer, som holder litt biotitt og kloritt også. Gjennomsnitt av fall av foliasjon i hullet er ca 40°-45°.

17,90 - 24,20 Svakere karbonatisk og kvartsittisk finkrystallinsk amfibolitt (bare på stedet litt mere mellomkrystallinsk).
Amfibolitt holder på stedet striper og årer av kvartsitt eller kvarts.

Diamant borhull nr. 126 G, på nivå VII har stoppet på 24,20 m den 15/11-71,kl.13.30

M. Motys.

The petrografical profile of the borehole nr. 1266.



Diamantborhull nr. 127 G på 1.borort over etg. III - vest, malmsone V.

(36 mm), ± 0° (horisontal).
retningen: 218°30' (mot SVS)

koordinater av begynnelsen: X = -52,9 , Y = +574,9 , Z = +929,2

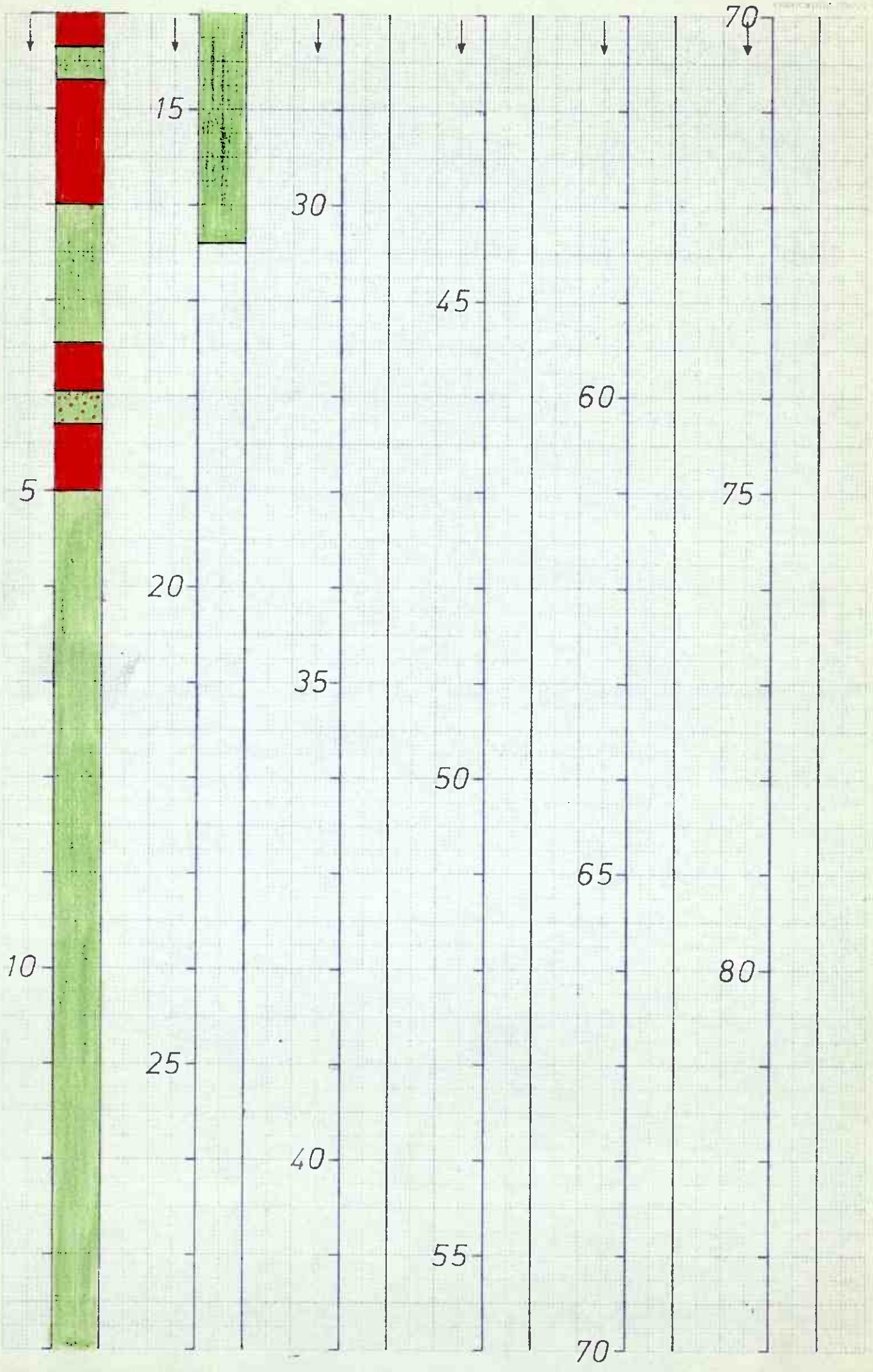
Kort petrografisk beskrivelse:

0,00 - 0,35	Sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Tekstur er massiv og struktur er kataklastisk. Analyse resultat: Cu = 0,20 %, Zn = 1,10 %, S = 30,50 %, Fe = 26,00 %
0,35 - 0,70	Kloritt-aktinolitt kvartsrik slireskifer som holder meget svak impregnasjon av malmsulfider bare på stedet og som holder på stedet smale hypidiomorfiske korn av magnetitt.
0,70 - 2,00	Malm - det samme som i posisjon mellom 0,00 - 0,35 m. Analyseresultat: Cu=0,12 %, Zn=1,15 %, S=36,50 %, Fe=28,00 %.
2,00 - 3,45	Kloritt-aktinolitt kvartsrik slireskifer det samme som i posisjon mellom 0,35 - 0,70 m.
3,45 - 3,95	Malm - det samme som i posisjoner mellom 0,00 - 0,35 m og 0,70 - 2,00 m. Analyseresultat: Cu = 0,35 %, Zn = 1,00 %, S = 34,00 %, Fe = 26,50 %.
3,95 - 4,30	Klorittisk, meget svakere biotittisk og aktinolittisk, kvartsrik slireskifer som holder svakere impregnasjon av malmsulfider (mest svovelkis) og av magnetitt også.
4,30 - 5,00	Sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis, men kobberkis litt rikere). På stedet finnes impregnasjon eller striper av finkornet magnetitt. Analyseresultater: Cu = 1,20 %, Zn = 0,35 %, S = 25,00 %, Fe = 22,00 %.
5,00 - 16,40	Klorittisk og meget svakere biotittisk og aktinolittisk kvartsrik slireskifer som holder på stedet de smale hypidiomorfiske korn av magnetitt. Mellom 9,60 - 11,80 m finnes posisjon sterkere aktinolittisk og amfibolittisk med mange porfyroblaster av granat.

Diamant borhull nr. 127 G har stoppet på 16,40 m den 22/11-71, kl. 7.00.

M. Motys.

The petrografical profile of the borehole nr. 127 G.



FOLLDAL VERK A/S

Diamant borhull nr. 128 G på 1.borort over etg. III - vest, malmsone V.

(36 mm), +20° opp over.

retningen: 218°30' (mot SVS)

koordinater av begynnelse: X = p52,9 , Y = +574,9 , Z = 929,8.

Kort petrografisk beskrivelse:

0,00 - 0,50 Klorittisk og aktinolittisk, kvartsrik slireskifer som holder den meget svak impregnasjon av malmsulfider bare på stedet.

0,50 - 0,80 Grå-hvit metakvartsitt som har massiv tekstur og som holder på stedet svak impregnasjon av malmsulfider (mest bare svovelkis).

0,80 - 2,10 Klorittisk og svakere aktinolittisk kvartsrik slireskifer som holder bare meget svak impregnasjon av malmsulfider (mest svovelkis). På stedet finnes de hypidiomorfiske korn av magnetitt.

2,10 - 2,45 Sterk impregnasjon av malmsulfider i metakvartsitt (mest svovelkis). Tekstur er massiv og struktur er kataklastisk. Analyseresultat: Cu = 0,10 %, Zn = 2,40 %, S = 39,50 % og Fe = 31,00 %.

2,45 - 3,75 Klorittisk og svakere aktinolittisk kvartsrik slireskifer som holder bare på stedet de små hypidiomorfiske korn av magnetitt.

3,75 - 4,30 Sterk og meget sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis, men kobberkis rikere). På stedet finnes striper av finkornet magnetitt. Analyseresultat: Cu = 2,40 %, Zn = 0,70 %, S = 38,00, Fe = 32,50 %.

4,30 - 6,30 Kloritt-aktinolitt, kvartsrik slireskifer som holder bare meget svak impregnasjon av malmsulfider.

6,30 - 7,40 Sterk impregnasjon av malmsulfider i metakvartsitt (mest svovelkis). Tekstur er massiv og struktur er kataklastisk. Analyseresultat: Cu = 0,50 %, Zn = 2,35 %, S = 39,25 %, Fe = 31,25 %.

7,40 - 7,65 Grå-hvit metakvartsitt med svakere impregnasjon av malmsulfider (kobberkis, magnetkis og litt svovelkis). Analyseresultat: Cu = 1,70 %, Zn = 0,65 %, S = 9,50 %, Fe = 8,50 %.

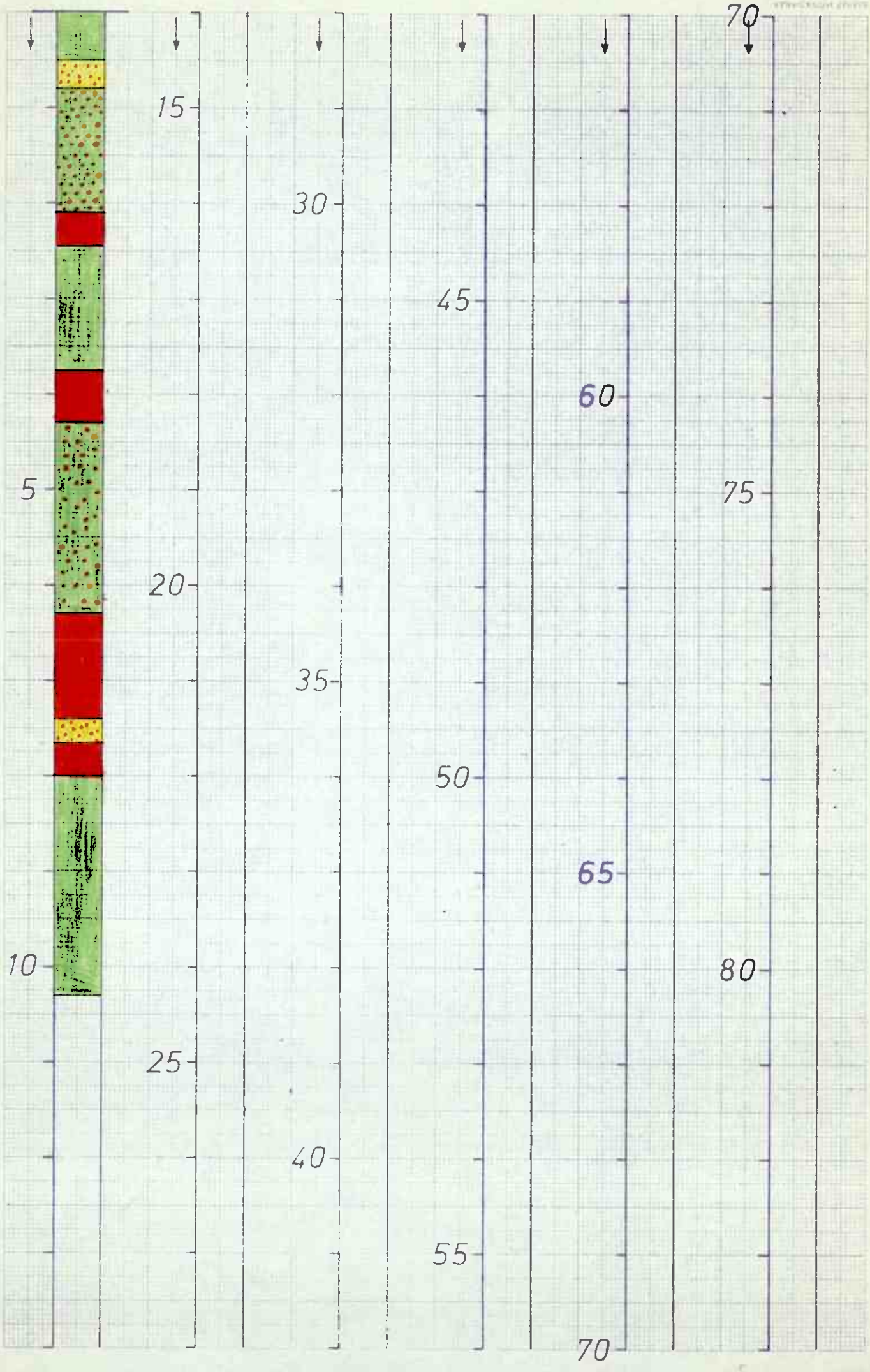
7,65 - 8,00 Sterk impregnasjon av malmsulfider i metakvartsitt (mest svovelkis, men kobberkis rikere også), med finkorn impregnert magnetitt som skaper også litt striper på stedet. Analyseresultat: Cu = 2,20 %, Zn = 1,05 %, S = 27,00 %, Fe = 27,50 %.

8,00 - 10,30 Klorittisk og meget svakere biotittisk og aktinolittisk kvartsrik slireskifer som holder på stedet korn av magnetitt.

Diamant borhull nr. 128 G har stoppet på 10,30 m, den 23/11-71 kl. 9.00.

M. Motys.

The petrografical profile of the borehole nr. /28 G.



Diamantborhull nr. 129 G på 1.borort over etg. III - vest, malmsone V.

(36 mm), horisontal

retningen: 14°30' (mot NØN)

koordinater av begynnelsen: X = -56,6 , Y = +572,5 , Z = +429,1

Kort petrografisk beskrivelse:

0,00 - 1,00 Kvartsrik klorittisk-biotittisk slireskifer med svakere malmsulfidisk impregnasjon (mest svovelkis men med ikke lite magnetkis og lite kobberkis).
Analyse resultater: Cu=1,30 %, Zn=0,70 %, S=18,00 %, Fe=23,00 %.

1,00 - 1,90 Sterk malmsulfidisk impregnasjon i sliremetakvartsitt som holder striper av finkorn magnetitt. Analyse resultater:
Cu=1,40 %, Zn=0,25 %, S=24,30 %, Fe=32,00 %.

1,90 - 3,00 Klorittisk, kvartsrik mylonittisk øye-slireskifer med svakere impregnasjon av magnetkis og mindre med svovelkis og kobberkis.
Analyse resultater: Cu=0,43 %, Zn=0,70 %, S=14,00 %, Fe=26,00 %.

3,00 - 7,60 Klorittisk og kvartsrik fylonitt eller klorittisk-fylonittisk kvartsrik linse-slireskifer. Bare på stedet finnes meget svak impregnasjon av magnetkis med lite svovelkis og kobberkis.

7,60 - 8,70 Klorittisk, kvartsrik slireskifer som holder bare på stedet svak og meget svak impregnasjon av magnetkis med mindre svovelkis og kobberkis.
Analyse resultater: Cu=0,65 %, Zn=0,35 %, S=7,00 %, Fe=16,00 %.

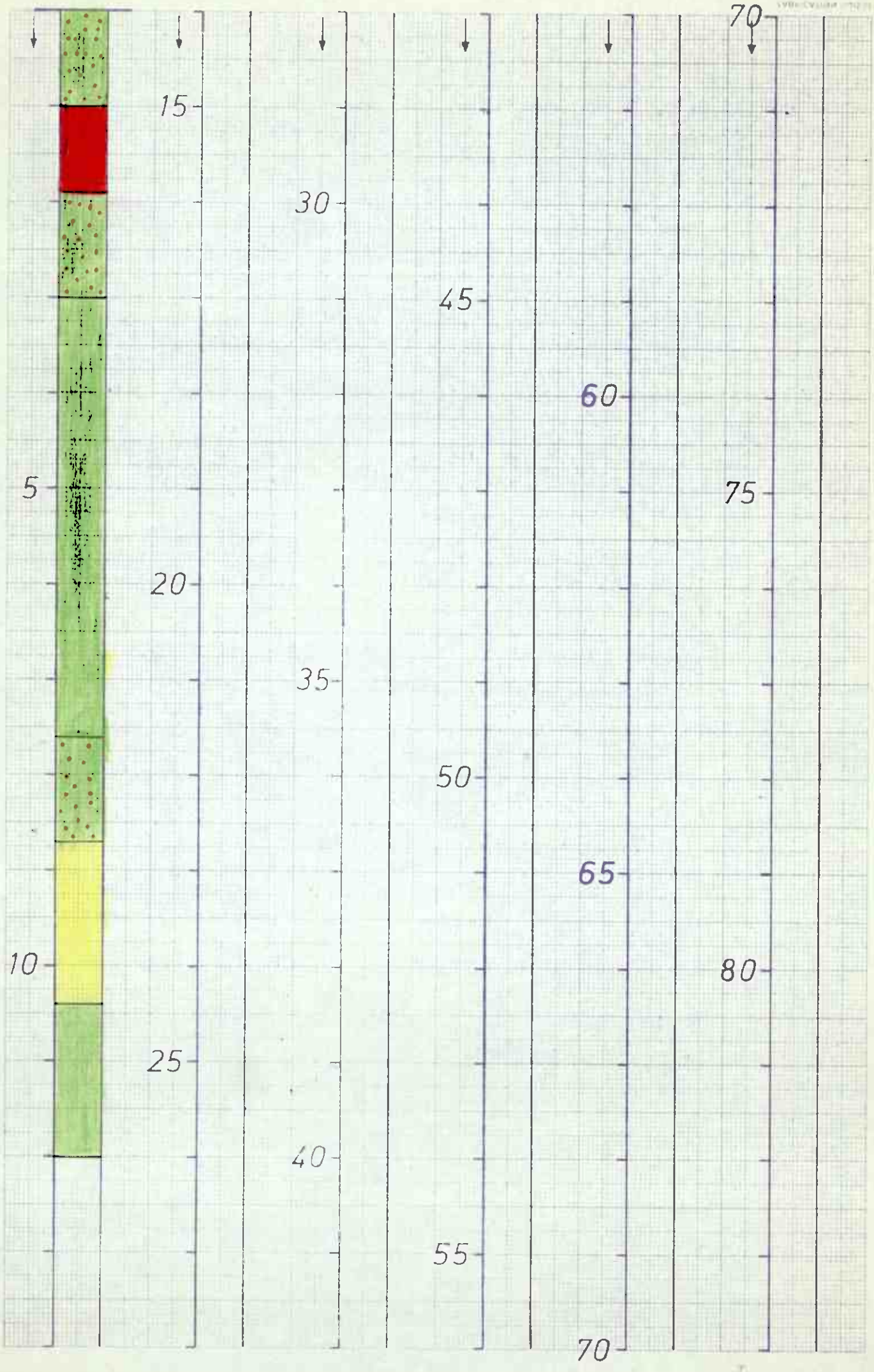
8,70 - 10,40 Kvartsbreksie som har på stedet sterk impregnasjon av magnetkis med mindre kobberkis og meget lite svovelkis.
Analyse resultater: Cu=1,00 %, Zn=0,90 %, S=17,75 %, Fe=26,50 %.

10,40-12,00 Kvartsrik, klorittisk og lite biotittisk slireskifer.

Diamantborhull nr. 129 G har stoppet den 24/11-71, kl. 13.00.

M. Motys.

The petrografical profile of the borehole nr. 129G.



Diamantborhull nr. 130 G på 1.borort over etg. III-vest, malmsone V.

(36 mm) + 20° (opp over)

retningen: 14°30' (mot NØN)

koordinater av begynnelse: X = -56,6 , Y = +572,5 , Z = +929,9

Kort petrografisk beskrivelse:

0,00 - 0,40 Sterkere klorittisk og biotittisk slireskifer med svakere og svak impregnasjon av malmsulfidèr og magnetitt svovelkis, men med ikke lite kobberkis og magnetkis også.
Analyse resultater: Cu = 1,15 %, Zn = 0,40 %, S = 16,00 % og Fe = 26,50 %.

0,40 - 4,10 Sterk malmsulfidisk impregnasjon i metakvartsitt (mest svovelkis). Tekstur er massiv og struktur er kataklastisk. Mellom ca 1,00 - 2,00 m finnes striper av magnetitt. Mellom 3,50 - 3,75 m er posisjon av metakvartsitt som holder striper av den klorittisk kvartsrik slireskifer, uten malmsulfidisk impregnasjon.
Analyse resultater:
0,40 - 1,00 Cu=0,58 %, Zn=0,85 %, S=35,50 %, Fe=30,00 %
1,00 - 2,00 Cu=1,20 %, Zn=1,25 %, S=34,00 %, Fe=31,50 %
2,00 - 3,00 Cu=0,95 %, Zn=0,95 %, S=38,50 %, Fe=32,50 %
3,00 - 4,00 Cu=0,85 %, Zn=1,10 %, S=29,50 %, Fe=30,00 %

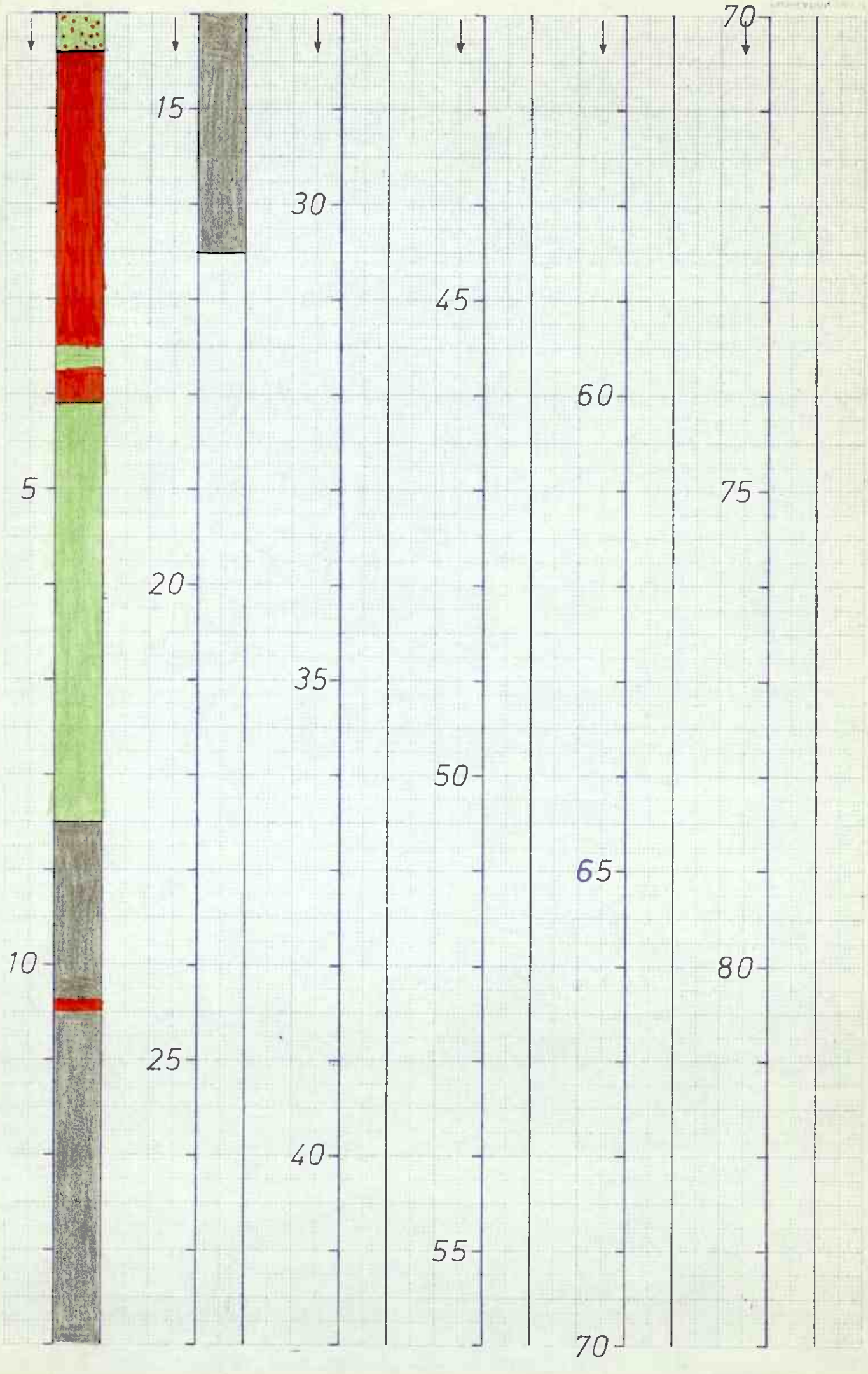
4,10 - 8,50 Karbonatisk (dolomitt), aktinolittisk og klorittisk gneis-båndskifer.

8,50 - 16,50 Kloritt-amfibolitt båndskifer eller finkrystallinsk klorittisk amfibolitt. Mellom 10,35-10,50 m finnes posisjon av metakvartsitt med sterk impregnasjon av magnetkis (mest).
Analyseresultat fra den posisjon: Cu=0,11 %, Zn=0,30 %, S=24,50 %, Fe=32,00 %.

Diamantborhull nr. 130 G har stoppet på 16,50 m den 25/11-71, kl. 13.20.

M. Motys.

The petrografical profile of the borehole nr. 1306



Diamantborhull nr. 134 G.

på 2. borort over etg. III - vest, malmsone V.

(36 mm), horisontal.

retningen: 189° (mot SVS, etter magnetisk asimutt).

koordinater av begynnelse: X = -57,00 Y = +644,80 Z = +947,81

Kort petrografisk beskrivelse:

0,00 - 0,30	Svakere malmsulfidisk impregnasjon (mest svovelkis) i kvartsrik kloritt-aktinolitt båndskifer med metakvartsitt's mellomlaget.
0,30 - 1,80	Meget svak malmsulfidisk impregnasjon i den kvartsrike klorittiske og svakere biotittiske slireskifer med noen nåler av aktinolitt som finnes på stedet.
1,80 - 3,00	Kvartsrik, kloritt-slireskifer som holder på stedet smal korn (hypidiomorfiske eller allotriomorfiske) av magnetitt.

Diamant borhull nr. 134 G har stoppet på 3,00 m den 8.12.71, kl. 14.00.

M. Motys.

The petrografical profile of the borehole nr. 134G.

