

DIAMANT BORHULL NR 163,  
*Grimsdalen.*

4423

THE BOREHOLE nr. 163 , Grimsdalen

- 0,00 - 18,50 The strongly chloritic, quartz, phyllitic mica schist, locally with some small scales of biotite, with a lot of little veins or schliers of quartz (mostly parallel with the total schistosity) and scarcely with some small spots of the some carbonates too. Scarcely are present some small, mostly hypidiomorphic or allotriomorphic grains of  $\text{FeS}_2$  oftenly. Locally is this rock more strong folded by the folds of the DM, CM and MM amplitude. The total structure of this rock is phacoidal and phacoidal schistose. The total average colour of this rock is bright green-gray or green-gray. The average gradient of this foliation is  $45^\circ$  about.  
Between 10,70-10,75m, 12,00-12,05m, 12,60-12,80m are present some positions of the quartz-mylonitic breccies.  
Between 13,20-13,30m, 14,20-14,40m, 16,85-17,00m are present some positions of white, perhaps hydrothermal quartz, but barren only.  
In 16,60-16,85m is present the position of the keratophyre with the small rodlike or acicular porphyroblasts of hornblende.
- 18,50 - 23,00 The motley serie of the keratophyre with a lot of rodlike and more acicular small porphyroblasts of hornblende, locally more scarcely with some grains of garnet too. From the other minerales are present not much chlorite, sericite and basement matter creat quartz and feldspar. The total structure is porphyroblastic only locally with the clear grain elongation (of hornblende porphyroblasts only). The total average colour of this rock white-gray and gray-white. The average gradient of this inclination of the hornblende grains elongation is  $55^\circ - 60^\circ$  round.  
Between 19,00-19,10m, 19,40-19,70m, 20,70-21,05m are present some positions of the coarse-grained and medium-grained amphibolitic greenstones with some infiltration of quartz and quartz-feldspar matter.  
Between 21,05-21,60m is present the position of the white quartz.
- 23,00 - 25,65 The strongly chloritic, quartz, phyllitic mica schist as well as in 0,00 - 18,50m. The average gradient of this foliation is  $60^\circ - 65^\circ$  about.
- 25,65 - 26,80 The keratophyre rock as well as in 18,50 - 23,00m. The average angle of dip of the amphibolitic grains elongation is  $45^\circ - 50^\circ$  about.
- 26,80 - 33,75 The strongly chloritic, quartz, phyllitic mica schist as well as in 0,00 - 18,50m. The average gradient of this foliation  $55^\circ$ , but locally  $15^\circ$  and  $35^\circ$  about too.
- 33,75 - 35,90 The keratophyre rock as well as in 18,50 - 23,00m. The average angle of the dip of the amphibolitic grains elongation is  $50^\circ - 55^\circ$  round.
- 35,90 - 39,60 The strongly chloritic, quartz, phyllitic mica schist as well as in 0,00 - 18,50m. The average gradient of this foliation is  $50^\circ$  about.
- 39,60 - 40,10 The keratophyre rock as well as in 18,50 - 23,00m. The average angle of the dip of the amphibolitic grains elongation is  $50^\circ$  about.
- 40,10 - 54,20 The amphibolitic and biotitic gneiss schist with a lot of grains of the garnet and with the strong infiltration of the quartz and quartz-feldspar matter. The chlorite, sericite and scarcely biotite, zoisite-epidote are present too. Locally are present some spots of the carbonates. The total structure is phacoidal, phacoidal-schistose and porphyroblastic too. The total grain elongation is clear enough. Locally is this rock folded too. The total colour of this rock is gray and little bit green-gray. The average gradient of this foliation (follow the total schistosity) is  $50^\circ - 60^\circ$  about.  
Between 44,10 - 44,30m, 46,60 - 46,75m, 48,20 - 48,40m and 50,00 - 50,30m are present some thin positons of the keratophyre as well as in 18,50 - 23,00m.



- 54,20 - 61,50 The strongly chloritic, quartz, phyllitic mica schist as well as in 0,00 - 18,50m. The average gradient of this foliation is  $55^{\circ}$  -  $65^{\circ}$  about.
- 61,50 - 74,65 The strongly chloritic, locally more quartz, garnet mica schist, scarcely with some small rodlike or acicular porphyroblasts of hornblende. In this rock are present a lot of mostly hypidiomorphic grains of garnet, a lot of schliers, irregular little intercalations and pellets of quartz and locally only are present some thin intercalations of the keratophyre rock (as well as in 18,50 - 23,00m). The total structure of this rock is mostly phacoidal or phacoidal schistose. Locally is this rock folded too. Some mineralisation of the sulphides is present very scarcely only (locally some small hypidiomorphic or allotriomorphic grains of  $\text{FeS}_2$  mostly). The total colour of this rock is green-gray and locally little bit more dark green-gray too. The average gradient of this foliation is  $50^{\circ}$  -  $60^{\circ}$ , but locally  $20^{\circ}$  and  $30^{\circ}$  about.
- 74,65 - 74,90 The position of the white quartz, barren only, locally with some inclusions of the strongly chloritic schists and locally with some spots of the carbonates.
- 74,90 - 74,95 The strongly chloritic and little bit biotitic quartz, mylonitic gneiss schist, with a lot of schliers and pellets of quartz and scarcely only with some small hypidiomorphic grains of  $\text{FeS}_2$  mostly. The total structure of this rock is phacoidal and phacoidal-schistose. The total colour of this rock is little bit dark gray or little bit dark green-gray. The average gradient of this foliation is  $30^{\circ}$  -  $40^{\circ}$  about.
- 74,95 - 76,90  
*1,95 m* The very strong impregnation of  $\text{FeS}_2$  mostly in the quartzite, with some poor microscopic mineralisation of  $\text{CuFeS}_2$ ,  $\text{ZnS}$  and  $\text{FeS}$  too. In 75,83 - 75,85 is present some intercalation of the strongly chloritic quartz phyllitic mica schist, with very poor impregnation of  $\text{FeS}_2$ . (the average gradient of some schistosity is  $30^{\circ}$  round).  
The result of the chemical analyse from this position is :  $\text{Cu} = 0,30\%$   
 $\text{Zn} = 3,40\%$  ,  $\text{S} = 37,95\%$ .
- 76,90 - 77,30 The strongly chloritic quartz schist, with a lot of schliers, pellets and spots of quartz and scarcely only of some carbonates too. Locally is present very poor and weak impregnation of  $\text{FeS}_2$  (the small hypidiomorphic and allotriomorphic grains of  $\text{FeS}_2$  mostly, but with some little microscopic irregular scales or xenomorphic grains of  $\text{CuFeS}_2$ ,  $\text{FeS}$  and  $\text{ZnS}$ ). The some biotite is few present too. Locally are present some irregular schliers and pellets (the thickness are maximally 1-1,5mm) of the old mylonitic matter (black-gray). The total colour of this rock is green-gray and little bit dark green-gray too. The average gradient of this foliation is  $30^{\circ}$  -  $35^{\circ}$  but  $40^{\circ}$  and  $45^{\circ}$  locally too. The phacoidal and phacoidal-schistose structure are present mostly in this rock. The result of the chemical analyse of this position between 76,90 - 77,30m is :  $\text{Cu} = 0,03\%$  ,  $\text{Zn} = 0,40\%$  ,  $\text{S} = 0,95\%$  .
- 77,30 - 77,60  
*0,30 m* The strong impregnation of  $\text{FeS}_2$  mostly in the gray and little bit dark gray quartzite with some more poor microscopic impregnation of  $\text{ZnS}$  (is present more often, from the other sulphides),  $\text{CuFeS}_2$  and scarcely  $\text{FeS}$ . Locally are present some very thin and irregular intercalations or schliers of the very strongly chloritic schists and quartz too. The average gradient of this not so clear foliation is  $45^{\circ}$  about. The result of the chemical analyse of this position between 77,30 - 77,60m is :  $\text{Cu} = 0,11\%$  ,  $\text{Zn} = 4,60\%$  and  $\text{S} = 30,50\%$ .



- 77,60 - 77,90 The chloritic, quartz, little bit more phyllitic mica schist, with some scales of the biotite and with some thin schliers, which are created by the biotite's scales. The some carbonates create a lot of small pellets and spots in this rock. Some impregnation of  $\text{FeS}_2$  mostly (some small hypidiomorphic and allotriomorphic grains) is present too, but very weak and poor only. From the other sulphides are present ZnS more and scarcely  $\text{CuFeS}_2$  and FeS and very scarce  $\text{FeO} + \text{Fe}_2\text{O}_3$  (these the other sulphides create mostly only the microscopic impregnation). The structure of this rock is phacoidal and phacoidal-schistose. The total colour of this rock is green-gray. The average gradient of this foliation is  $45^\circ$  about. Between 77,60 - 77,65m are present a lot of big rodlike and acicular porphyroblasts of the hornblende and this part is more chloritic too. The result of the chemical analyse of this position between 77,60 - 77,90m is : Cu = 0,09% , Zn = 1,20% , S = 4,10% .
- 77,90 - 78,05  
0,15 m The strong impregnation of  $\text{FeS}_2$  mostly in the gray quartzite as well as in 77,30 - 77,60m. The result of the chemical analyse of this position between 77,90 - 78,05m is : Cu = 0,10% , Zn = 4,30% and S = 28,60% .
- 78,05 - 78,90 The strongly chloritic, quartz, phyllitic mica schist, locally with some scales of the biotite and locally with some very thin schliers of the gray and black gray mylonitic matter. Some very poor and very weak impregnation of  $\text{FeS}_2$  mostly is present too (some little hypidiomorphic or allotriomorphic grains). The only some accessory microscopic impregnation create ZnS,  $\text{CuFeS}_2$  and FeS. The total structure of this rock is phacoidal and phacoidal-schistose too. The total colour of this rock is green-gray. The average gradient of this foliation is  $35^\circ - 45^\circ$  round. Between 78,20 - 78,45m and between 78,65 - 78,70m are present some positions of the white quartz and quartz breccia, but barren only. The result of the chemical analyse from this position between 78,05 - 78,90m is : Cu = 0,00% , Zn = 0,40% , S = 0,80% .
- 78,90 - 83,45  
4,55 m The very strong impregnation of  $\text{FeS}_2$  mostly in the gray quartzite with some little, irregular intercalations or schliers of the strongly chloritic schist and quartz too. Some microscopic impregnation create ZnS more and  $\text{CuFeS}_2$  and FeS. Locally are present some very thin schliers or pellets of quartz and of the strongly chloritic schists (the average thickness 1cm maximally). Especially between 82,60 - 82,75m are present four those schliers. The average gradient of this foliation is  $35^\circ$  about. The pyritic grains are hypidiomorphic or allotriomorphic and very scarce automorphic (youngest generation) and round them are present some irregular forms or allotriomorphic small grains (strongly deformed mostly) of ZnS and some irregular borders (edge) or the filling of joints in the pyritic minerals, which are created by the pyrrhotine and chalcopyrite. The result of the chemical analyse from this position between 78,90 - 83,45m is : Cu = 0,32% , Zn = 4,00% , S = 32,85% .
- 83,45 - 84,05 The strongly quartz, chloritic and biotitic little bit mylonitic and gneiss mica schist, with a lot of schliers and pellets and intercalations of quartz, with schliers, which are created by the small scales of biotite and with some very poor and weak impregnation of  $\text{FeS}_2$  mostly (the allotriomorphic grains, scarcely hypidiomorphic too). The total structure of this rock is phacoidal and phacoidal schistose, but locally pell-mell too. The total colour of this rock green-gray or little bit bright green-gray too. The average gradient of this foliation is  $30^\circ - 35^\circ$  round.



Between 83,90 - 83,95m is present the more strong impregnation of  $\text{FeS}_2$  mostly, with some little schliers of chlorite.

Between 83,95 - 84,00m is present the position of the barren white quartz.

The result of the chemical analyse from the position between 83,45 - 84,05m is :  $\text{Cu} = 0,08\%$  ,  $\text{Zn} = 1,20\%$  ,  $\text{S} = 6,80\%$  .

84,05 - 84,45

*0,40 m*

The very strong impregnation of  $\text{FeS}_2$  mostly in the quartzite, with some irregular intercalations or little schliers of the chloritic matter (between 84,12-84,15m and 84,32-84,36m). Some mostly microscopic impregnation of  $\text{ZnS}$ ,  $\text{FeS}$  and  $\text{CuFeS}_2$  is present too. The small grains of  $\text{FeS}_2$  are mostly allotriomorphic and hypidiomorphic. The other sulphides ( $\text{FeS}$ ,  $\text{ZnS}$  and  $\text{CuFeS}_2$ ) creat only the irregular microscopic (allotriomorphic) forms round the pyritic grains (on the borders of them) or the filling of the some little joints in the pyritic grains.

The result of the chemical analyse from this position between 84,05 - 84,45m is :  $\text{Cu} = 0,24\%$  ,  $\text{Zn} = 4,00\%$  ,  $\text{S} = 31,90\%$  .

84,45 - 85,40

The quartzite, strongly chloritic and garnet micaschist, locally little bit more gneissic-mica schist, with some small scales of the biotite locally too and in the parts with more strongly infiltration of the quartz and quartz feldspar matter, with some small rodlike or acicular porphyroblasts of the hornblende. The total average structure of this rock is parallel schistose, phacoidal schistose and locally phacoidal only. Locally is present some folding too. The total colour of this rock is green-gray and bright green-gray. The average gradient of this foliation is  $35^\circ$  -  $40^\circ$  round. Some impregnation of the ore sulphides minerales is scarce only.

The result of the chemical analyse from this position between 84,45 - 85,40m is :  $\text{Cu} = 0,00\%$  ,  $\text{Zn} = 0,20\%$  ,  $\text{S} = 1,35\%$  .

85,40 - 86,15

*0,95 m*

The very strong impregnation of  $\text{FeS}_2$  mostly in the gray quartzite as well as in 84,05 - 84,45m.

Between 85,70 - 85,80m is present some barren quartz breccie with some small inclusions of the chloritic matter.

The result of the chemical analyse from this position between 85,40 - 86,15 m is :  $\text{Cu} = 0,22\%$  ,  $\text{Zn} = 4,00\%$  and  $\text{S} = 33,00\%$  .

86,15 - 87,05

The quartzite, strongly chloritic and garnet mica schist as well as in 84,45 - 85,40m. The average gradient of this foliation is  $35^\circ$  round.

The result of the chemical analyse from this position between 86,15 - 87,05m is :  $\text{Cu} = 0,05\%$  ,  $\text{Zn} = 0,30\%$  ,  $\text{S} = 3,15\%$  .

87,05 - 88,45

*1,40 m*

The very strong impregnation of  $\text{FeS}_2$  mostly in the gray quartzite with some little irregular intercalations or little schliers of the chloritic matter or of the hornblende acicular or rodlike porphyroblasts too and with some mostly microscopic impregnation of  $\text{ZnS}$  (more),  $\text{CuFeS}_2$  and of  $\text{FeS}$ , but more fewly.

The pyrite creat in this ore position mostly hypidiomorphic and scarcely allotriomorphic or very scarce idiomorphic grains, mostly stil deformed enough and with a lot of joints, which are oftenly filled by the chalcopyrite, fewly sphalerite and scarcely by pyrrhotine. The chalcopyrite and sphalerite, which are present more and scarcely pyrrhotine too creat some borders (edge) round the pyrite's grains too and creat some little allotriomorphic forms in the basement, more quartzite matter (the view to the figures I., II., III. on the pages 6., 7., 8.).

The result of the chemical analyse from this ore position between 87,05 - 88,45m is :  $\text{Cu} = 0,43\%$  ,  $\text{Zn} = 3,50\%$  ,  $\text{S} = 32,60\%$  .



- 88,45 - 88,70 The strongly chloritic and little bit biotitic, little bit mylonitic mica schist, partly more phyllitic mica schist, with a lot of schliers and pellets or little irregular intercalations of quartz and locally with some small spots or pellets of some carbonates (dolomite, ankerite ?). The total structure of this rock is phacoidal and phacoidal scistose. The total colour of this rock is green-gray. Locally is present some very poor impregnation of  $\text{FeS}_2$  mostly, but also with some mostly microscopic poor impregnation of  $\text{ZnS}$  and more scarcely of  $\text{CuFeS}_2$  and  $\text{FeS}$ . The average gradient of this foliation is  $30^\circ$  about. The result of the chemical analyse from this rock position between 88,45 - 88,70m is :  $\text{Cu} = 0,24\%$  ,  $\text{Zn} = 1,70\%$  and  $\text{S} = 10,70\%$  .
- 88,70 - 88,83  
*0,13m* The strong impregnation of  $\text{FeS}_2$  in the quartzite as well as in 84,05 - 84,45m. The result of the chemical analyse from this ore position between 88,70 - 88,83m is :  $\text{Cu} = 0,62\%$  ,  $\text{Zn} = 1,55\%$  ,  $\text{S} = 28,60\%$  .
- 88,83 - 89,65 The strongly chloritic and little bit biotitic, little bit mylonitic quartz mica schist as well as in 88,45 - 88,70m. Between 89,42 - 89,46m is present the strong impregnation of  $\text{FeS}_2$  mostly, as well as in 84,05 - 84,45m. The average gradient of this foliation is  $40^\circ$  or  $45^\circ$  round. The result of the chemical analyse from this rock position between 88,83 - 89,65m is :  $\text{Cu} = 0,38\%$  ,  $\text{Zn} = 0,60\%$  and  $\text{S} = 20,35\%$  .
- 89,65 - 90,00  
*0,35m* The very strong impregnation of  $\text{FeS}_2$  mostly in the gray quartzite as well as in 84,05 - 84,45m. The result of the chemical analyse from this ore position between 89,65 - 90,00m is :  $\text{Cu} = 0,47\%$  ,  $\text{Zn} = 1,80\%$  and  $\text{S} = 35,75\%$  .
- 90,00 - 93,30 The strongly chloritic, locally more quartz, garnet mica schist as well as in 61,50 - 74,65m, but locally with more small pellets or spots of the carbonates and locally with some impregnation of  $\text{FeS}_2$  mostly, but in the total very weak and poor only. The average gradient of this foliation is  $60^\circ$  -  $65^\circ$  round. The result of the chemical analyse from this rock position between 90,00 - 91,15m is :  $\text{Cu} = 0,07\%$  ,  $\text{Zn} = 0,40\%$  and  $\text{S} = 4,70\%$  .
- 93,30 - 96,20 The chloritic and sericitic, strongly quartz schist (the tuffite of keratophyre ?), locally with some pellets or irregular forms (lenticles) of the garnet and with some albite or oligoclase. The structure of this rock is thin parallel banded mostly. The total colour of this rock is bright green-gray or bright gray-green too. The some mineralisation of the ore sulphides isn't present mostly or is very scarce only. The average gradient of this foliation is  $60^\circ$  -  $65^\circ$  about.
- 96,20 - 97,65 The strongly quartz keratophyre rock, with a lot of schliers, pellets or irregular intercalations of the chloritic schists or chloritic matter, locally, scarce only with some small acicular or rodlike porphyroblasts of hornblende and oftenly with big, mostly allotriomorphic grains (the average size is  $\frac{1}{2}$  - 2 cm or more). The structure of this rock is phacoidal and locally pell-mell too. The total colour of this rock is very bright green-gray. Some ore sulphides mineralisation is present very scarce only or more isn't present. The average gradient of this foliation is  $50^\circ$  -  $60^\circ$  round. This rock commemorate more the metamorphic tuffitic material of keratophyre.

This borehole was finished at 97,65m.

On the outcrop near (NE) this borehole : The chloritic, little biotitic greenschists with SS = 70/20NW, 85/45NW, 105/55NE, 95/45NE, 85/50NW, 90/50N, 95/55NE, 110/50NE.  
b = 30/50 and 330/35

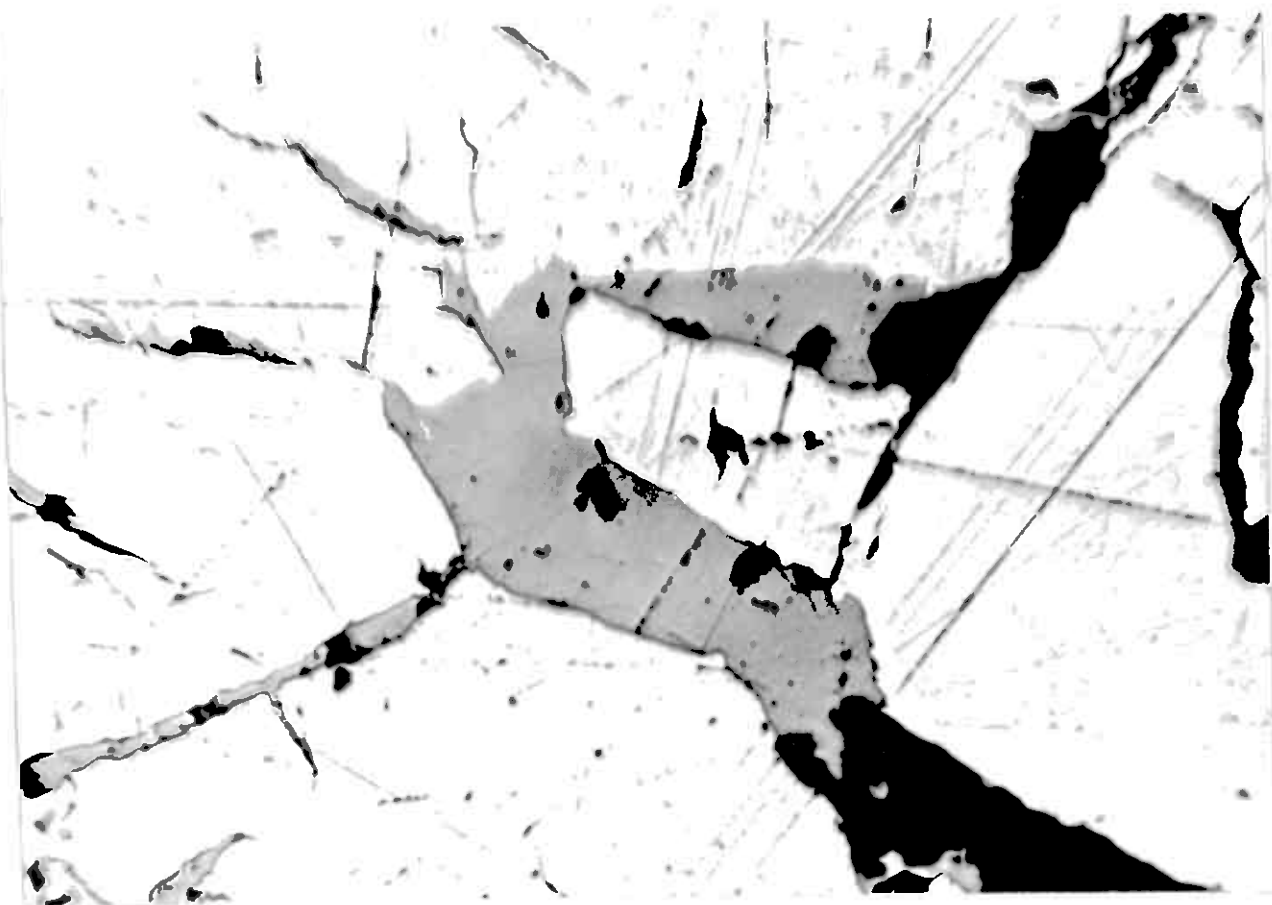
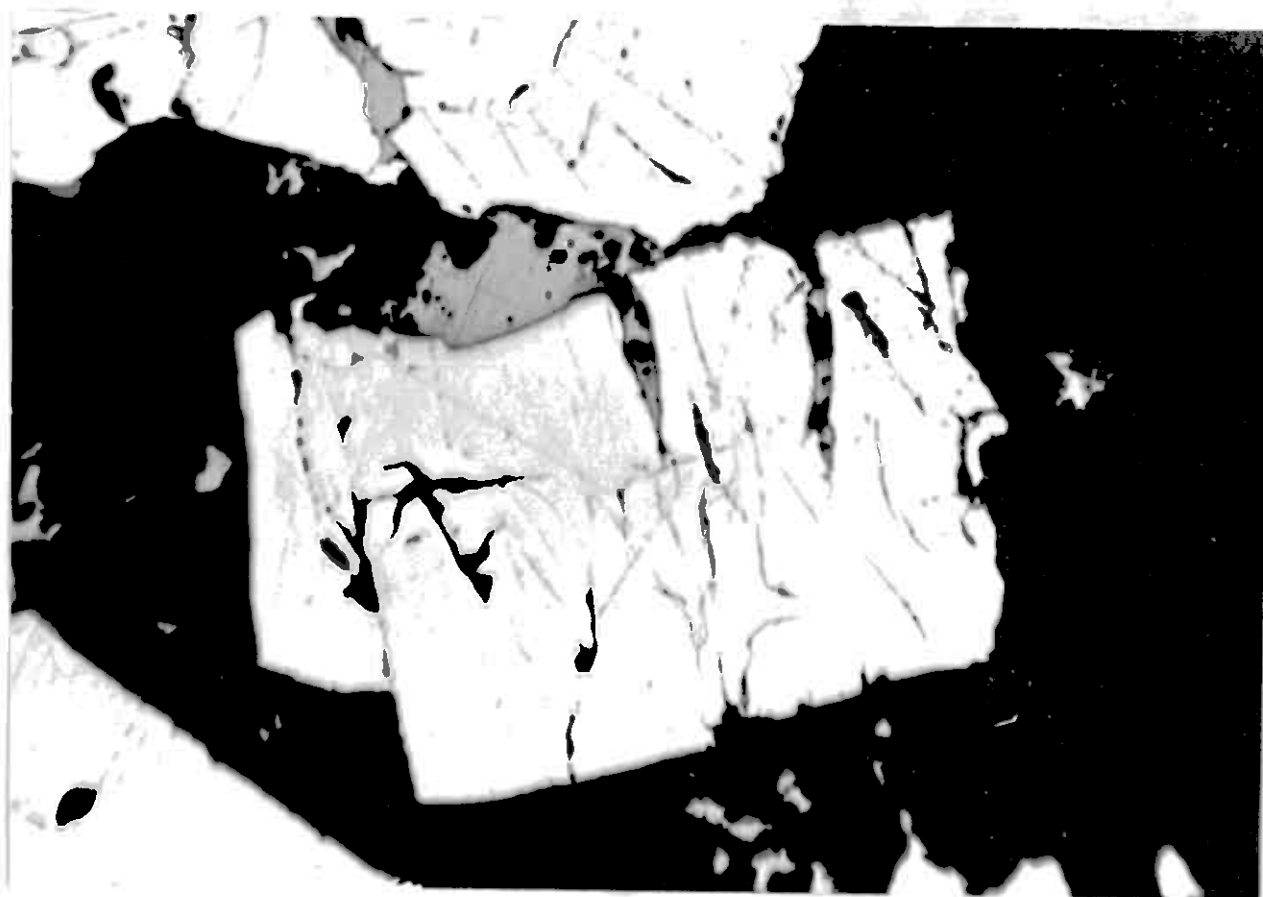


Figure I. Photograph of the detail from the polish section from the ore position from the borehole nr.163., Grimsdalen, from 88,00 m.

The magnification of this picture = 150 : 1

The legende of this picture :

- a) the joints in the minerales = the black lines
- b) the gaps in the plate of this polish section = the black spots
- c) the quartz = black gray and black
- d) the pyrite = white
- e) the chalcopyrite = gray or bright gray



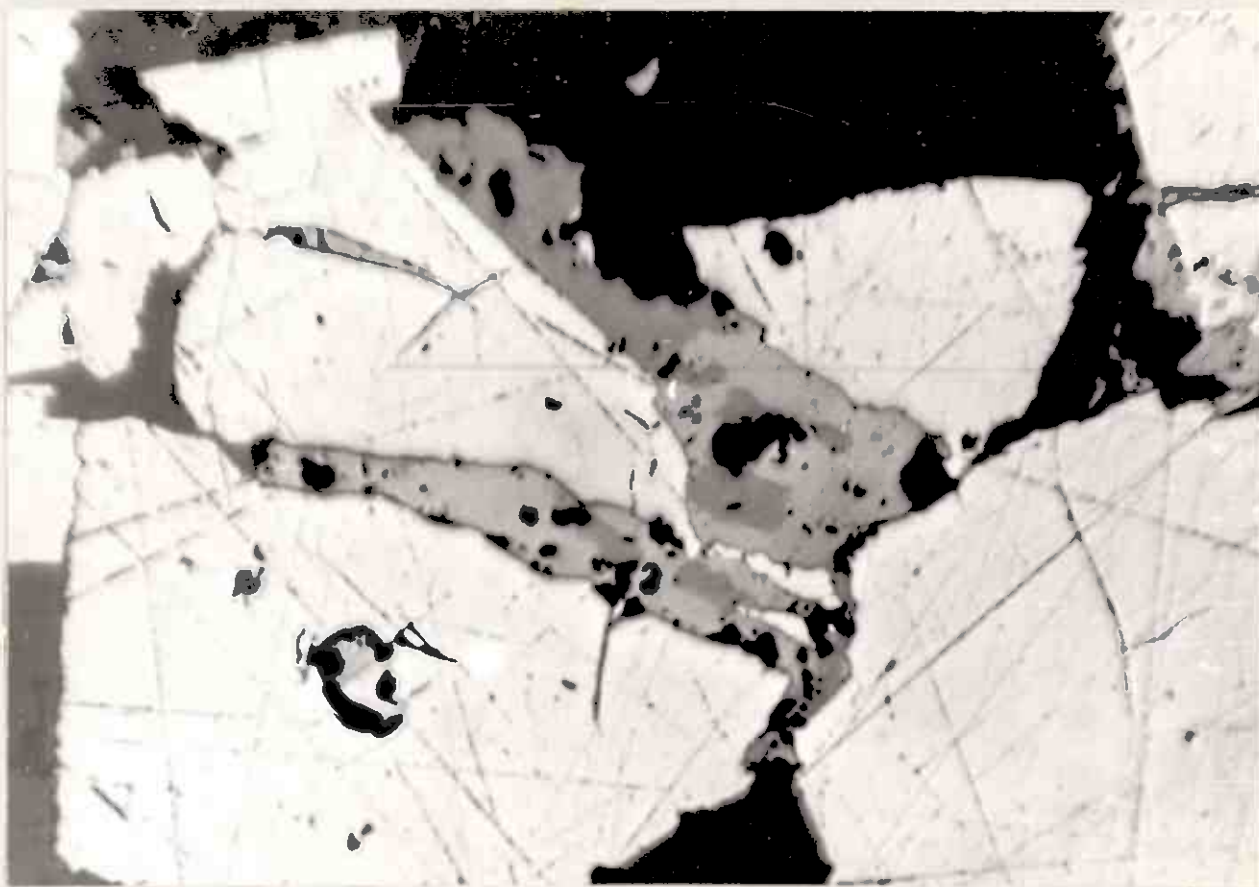
**Figure II.** Photograph of the detail from the polish section from the ore position from the borehole nr.163., Grimsdalen, from 88,00 m.

The magnification of this picture = 141 : 1

The legende of this picture :

- a) the joints in the minerales = the black lines
- b) the gaps in the plate of this polish section = the black spots
- c) the quartz = black gray or dark gray
- d) the pyrite = white
- e) the chalcopyrite = gray or bright gray





**Figure III.** Photograph of the detail from the polish section from the ore position from the borehole nr.163., Grimsdalen, from 88,00 m.

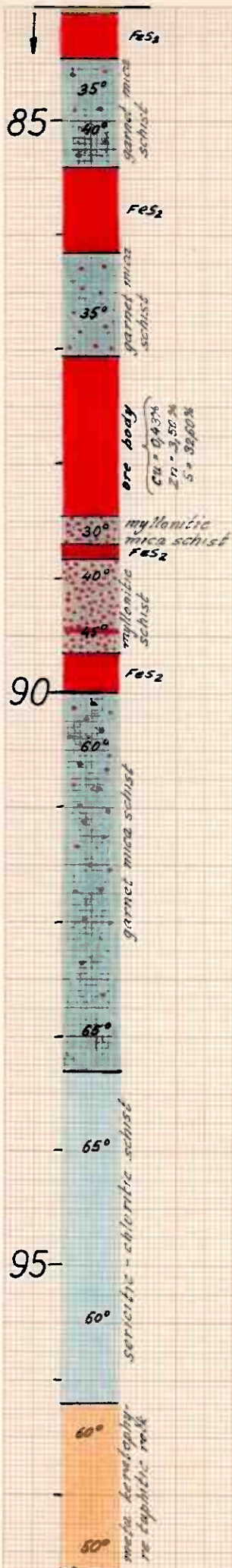
The magnification of this picture = 145 : 1

The legende of this picture :

- a) the joints in the minerales = the black lines
- b) the gaps in the plate of this polish section =  
= the black spots
- c) the quartz = black gray or dark gray
- d) the pyrite = little bit gray white
- e) the chalkopyrite = little bit bright gray
- the sphalerite = gray







2.

This borehole was finished at 97,65m.



