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SKOROVAS.

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SKOROVAS.

The object of this report is to furnish a statement regarding the Skorovas pyrites, and to make a summing up of the work done in this field up to the present day. I give this statement in order to give a view in big lines on this matter, and also my opinion of the deposit.

History.

The Skorovas is covered by great masses of gossan which naturally was rather conspicuous and aroused justified interest. It is reported that some of the inhabitants of the district, who where interested in the field, paid the expenses for having some work done. This work however, was not very important, and was done principally in the field which is now called "Gaplegruben".

In the litterature about the year of 1870 there is by K. Hauan mentioned "Olivinrock" in the "Grøndalsfjeldet" (mountain) by the Skorovas river, Grøndalen, Grong, but, what is quite remarkable, nothing is mentioned about the gossan.

In the year of 1904 Mr. H.O. Hagen, government inspector of mines, mentions a pyrites deposit at "Skorovand" in Harran, which, although it may be quite big, is situated too far from the sea to be of any value for development. It was quite natural that there as time passed were taken a few claims and that these gradually were gathered by a group which in due time handed the claims over to the Elektrokemisk.

It was first in the summer of 1913 that this company started investigations, which were continued until the European war made it impossible to continue, that is until the end of the year 1916.

Geographical location.

The northern Trondhjems amt (county) in the municipality of Grong at $64^{\circ}30'8''$ north latitude and about $30^{\circ}40'6''$ east longitude.

The distance from the south-east end of the Tunnsjø,

air-line, is about 5.5 Km. The height above the sealevel is about 650 m.

The situation of the deposit.

On the north-east side of the Southern "Gründalsfjeld" a mountain brook runs down to the so-called Skorovaslakee, and in the bottom of the valley as well as on both sides the deposit is situated in a height of about 150 m. above the lakes. The principal deposit, as it is known now, extends into and under the "Gründalsfjeld".

Climate and vegetation.

The mine itself is situated on the bare mountain and is exposed to all kinds of weather. The snow conditions are very annoying, as the snow does not smelt during the whole year in the upper part of the little valley, but there might, of course, be summers where the snow smelts partly. A little forest of pine-trees grows at the foot of the mountain and around the lakes, and pine-trees can also be found in the territory around "Tunnsjøen" from where we have hitherto and also in the future will receive timber for buildings and the necessary timber for the mines.

Roads, Transportation conditions and Telephone.

The easiest way to the deposit in the summer is from the station at Strömsund by the inland railway in Sweden, and thereafter by steamer through Strömsvattndal to Gedde and Skogen on the border between Norway and Sweden. The sea-journey between Strömsund and the Norwegian border is 15 miles. From Skogen is now a quite good driveway, 6 km., which the company has repaired as far as up to the Tunnsjø Chapel, whereafter there is a 22 Km. long journey by motor-boat across the Tunnsjø to Stalåvik.

From this place there is the usual transport-road, built by the company up to Kleven (the Company's building site

at Skorovaslake) about 4.1/2 Km., thereafter the road is bad all the way up to the mines, about 2.1/2 Km. However, since the Gjersvik mine has finished the road across "Steinfjeldet", this way can be travelled in the summer, preferable by automobile, all the way up from Sem to Snaasen or from Namsos to Gjersvik. The distance is:

From Namsos to Gjersvik 149 Km.

From Sem to Snaasen 135 Km.

Added to this latter distance is also the distance across the "Snaasenvand", which is about 55 Km. to Sunnan railroad-station. From Gjersvik the journey is continued by motor-boat to Limingviken across Limingen, 23 Km., whereafter again a transport-road, built by the Grong Mines, leads over the mountain down to "Solbergstøteren" and further to Tunnstjø Chapel a distance of about 7 Km.

In the winter the traveller must go from Namsos through Namdalen to Grong and further to Beakkaheimen from where a very bad road leads up through Grøndalen past Lillefjeldgaarden to Kleva, about 21 Km. The road through Grøndalen can only be travelled with horses during the winter. It is thus seen that the means of transit are not as good as they could be wished to be, and are therefore the matter which ought to be taken up first. As you will know the development up here is dependant on the "Noralands" railroad.

The distance from the mining-field down through Grøndalen to Grøndalselv (river) is for an aereal rope-way about 20 Km., and thereafter 86.3 Km. railroad-line down to Namsos. The total distance from Skorovas to Namsos is 106.3 Km.

If however Stenkjær is chosen as shipping port, the railway-line will be 42 Km. longer.

As at any rate the field must have a connection, it would be best to go to work at once and build a road up through Grøndalen, and not only be thinking of building an aereal rope-way. The road must in the first place be built in such a way

that it later on can be used as a ore railway. The starting point ought to be at Fjerdingen, and with good curves and ascentconditions the length of the road all the way to Skorovasvand (The Dead Sea) would be about 26 Km. If this line is chosen there would also be the advantage of saving about 7 Km. of transport by the Nordlands-railroad.

Regarding Telephone.

Last winter the inhabitants of "Staldvikgaardene" (farms) established a telephone-connection with the local telephone-network around Tunnasjøen. As the company previously had stuck a line Staldvik-Kleve-Skorovas, it was made possible by the aid of the local line to get connection with the Governments telephonenumber over Ejeraviken.

Geological survey.

Fields of basic eruptives appears to a great extent in the northern part of Grong. These eruptives have played a big part ^{in the origin} of the pyrites and indicate that there is a very extensive pyrites district. In geological respect the district belongs to the well-known "Tondhjemfelt", which is characterized by its regional metamorphical schists.

Here is likewise encountered 2 groups of sulphidic deposits following the gabbro, namely the usual pyrites deposits which are the main deposits and a nickel pyrrhotite deposit. As an example of the later type is "Lillefjellklumpen" at Staldviken, which contains about 3% nickel with considerable amounts of copper and traceable platinum. This is only mentioned because the Elektrokemisk also owns this deposit.

At Skorovas there is partly a fine-grained grey and light-green almost compact gabbro, and partly more or less thin lamellar and lenticular structure schists-green schists - which can be characterized as pressed basic eruptives. The pyrites is met with as a rule in the schistic rocks and just below the above-lying compact rock, but it can also to this kind of rock. On account of the regional metamorphic there is little left of the original mineral combinations, and there

is therefore at the present day only a greatly altered gabbro in evidence.

In the hanging wall and foot wall the rock is always very schistic almost chloritic and at times quite loose, which might influence a future mining.

Parts of clean slates can also appear quite local inside of the pure pyrites mass. It is especially in the hanging wall that there has been encountered pyrites impregnations. In the foot wall, however, the pyrites impregnation is only trifling and usually hard slates, and in a couple of diamond bore-holes jaspis.

As a result of detailed studies the opinion is that Skorovas belongs to the type "syngenetic deposit" lying inside of the gabbro and bound to this kind of rock.

The occurrence of the pyrites.

On account of the opinion formed regarding the origin of the pyrites it is also found that the pyrites appears irregularly lenticular, but with fairly even limitations to the sides in the striking direction, almost east-west and considerable marked extension in direction in length along the fall likewise almost north-south with a flat incline about 15-20°.

The gossan or Iron Cap.

Even though the Skorovas-rock consists of a compact hard gabbro, which protects the underlying soft pyrites-containing schist and pyrites, it is cut through by the before mentioned small brook, and the soft parts as well as the pyrites are partly erased, partly showing remnants consisting of very big-iron-cap-formations in the big basin or valley on both sides of the little brook.

That the formation of Gossan is quite big, will easily be seen from the fact that an ore-area of 120.000 m² where the pyrites appear on the surface at various places, contains 27.000 m² strong gossan, while the rest, 93.000 m² for the most part consists of gossan, earth and schistic gab-

...more gossan than in any

hitherto known deposit in Norway, and although one might like to see that there is a big amount of gossan, it can also be a great hindrance, as it makes the investigations considerably more difficult.

At places, where it has been proved that the pyrites exist the width of the gossan has been estimated to 3 to 4 M. and more, and in some places we have not yet succeeded in getting through the gossan, which is thus quite thick even if it is rather porous and of small weight per M³. In other places the iron have been dissolved, and have later on deposited itself as a thin cover surrounding the outcrop of the pyrites.

Furthermore can be mentioned that iron-containing solutions have run down the mountain to the nearest lake, and this is the reason why people jocularly have called the lake "The Dead Sea".

It is proved by experience that such large iron-cap-formations always appears in connection with pyrites of considerable width and flat dip, and this proves that the Skorovas is not alone a very thick but also an extensive pyrites deposit.

The pyrites deposit.

Regarding the mine itself and the further report with regard to the occurrence of the pyrites, I beg to refer to enclosed maps and detailed longitudinal- and cross sections, which gives a very distinct and clear account of the pyrites.

The work done.

A. Mining Work.

The first prospecting work naturally consisted in removing the overburden and exposing the pyrites, and this work was kept on the whole time. The mining work was started at "Gamlogruben", where there was made a cutting with a length of about 15 M., and thereafter there was made an adit of about 98 M. due southwards. The first 17 M. of the adit was driven in pure pyrites, later on followed by small stripes of pyrites. As far as about 25 M. in the adit a drift about 13 M. long was driven, due south-west. This was mostly

driven in pyrites. Since the old times there has been sunk a shaft from the surface, and this shaft communicated with the adit. The width of the pyrites is here about 7 M. Just at present we do not know whether this work will furnish any further information with regard to the amount of pyrites or not, as it is done in the hanging wall and thus near the outcrop of the pyrites. Without stating the exact amount, however, so much can be said, that there must be a considerable amount of pyrites.

"Nygruben" adit No. 1.

About 20 M. above the bottom of the valley a 20 M. long cutting is started. This cutting is now entirely timbered. The first meters consisted only of gossan, whereafter the pyrites appeared, and the drift was then continued with an adit about 58 M. due west. The first 22 M. of the adit were driven in pyrites, thereafter follows a small schistic layer appears again 9,5 M. pyrites ^e whereafter again appears a schist party with a width of about 6 M. Hereafter is again about 18,5 M. of pyrites. Standing in the breast is still pure pyrites.

The adit is thus driven in pure pyrites in a length of 50 M. and the total width of the slates is about 8 M. The dip of the schists is about $40 - 50^{\circ}$ due south-east.

At a drifting of about 22 M. and where the first layers of schist are encountered, there is made a drift about 52,4 M. long due south. The first 33 M. runs in a straight line and in pure pyrites with the exception of the first 20 M. of the adit, where there is barren rock in the bottom and about in the middle of the west side of the adit and a little less in the east side. The schists disappears more and more and at last it sticks entirely in the bottom of the adit. On account of the schists on the east side, the adit is turned almost at a straight angle due west. The pyrites is followed in a length of 6 M. on the north side, whereafter it is diminished and does not appear at all on the west side. The explanation of this phenomenon will be seen on the profile E-F where

it is seen that the drift in the beginning has followed the same layers of schists, as those encountered in the adit, and which at last appears in the hanging wall of the pyrites.

In the adit at about 25 M.'s drifting there is a shaft driven in pure pyrites at a length of 10 M. up to the gossan on the surface.

"Nygruben" adit No. 2.

About 13 M. above the level of the "Nygruben" adit, and at about 27 M.'s straight-angled distance from the adit, is driven a cutting about 22 M. At the end of this cutting there is driven a short adit, 5.3 M. long. The whole cutting is driven in pyrites. In the adit, however, barren rock is encountered in the roof, and slates are standing in the breast. A trial hole in the breast, about 3 M. long, shows only slates.

The costean at "Nygruben".

About 15 M. north of adit No. 2. a cut is made due east-west. It is 47 M. long and of a couple of meters width the whole length exposing pyrites. There has been put 3 bore-holes - 6 M. deep - one at each end and one in the middle of the costean. They are all driven entirely in pyrites.

The ground at "Nygruben", the adit and the costean are covered by gravel and gossan, and great blocks of stone have slid down from the above-lying mountains, making it impossible to state the exact hanging wall of the pyrites, as it has been erased here.

When looking at the map it will be seen that the width of the pyrites is very big here, that is, 20 to 30 M., but has in reality been much larger, as the erased parts must be added. The experience gained by the work done here is that the pyrites continue as well due north as west, and that there is a considerable extension of the pyrites in those directions.

"Haugkisen."

This is situated north of diamond drill-hole N. and

consists mostly of a thick iron-cap. In this iron cap 2 cuttings have been made due east-west. These cuttings have exposed gossan and some pyrites. At the same time there has been drifted several bore-holes by hand. These bore-holes are driven in pure pyrites for about 3 - 5 M. calculated from the lower side of the iron cap. There has not been enough work done, however, to be able to make an estimate of the pyrites, but so much can be said that there must be pyrites here. It may also be possible that the original pyrites has been crased and that only the gossan is left with a little pyrites on the bottom. This latter I am inclined to believe.

The "Dalbunden" pyrites and the pyrites on the surface.
(best pyrites).

Among the first works, which was done was the work done in order to remove the gossan by putting down bore-holes and making cuttings. This work, however, has only proved the existence of pyrites, which later on has been ascertained by diamond drill-holes.

B. Diamond drilling.

Drilling has been done:

in 1913	from 12th November	to 18th December	
" 1914	" June	" 6th August,	and was stopped on account of the war.
" 1916	" 15th July	" the last days of September,	when it was cancelled on account of scarcity of water and early frost.

All in all 20 bore-holes have been put down with an entire length of 1761.99 M. of which 203.96 M. have been drilled in pyrites and rich pyrites impregnations.

In the years of 1913 and 1914 there was put down about 11 bore-holes around the north and north-west side of "Gamlegruben". Those bore-holes are indicated on the map as No. 1, 2 etc. up to 11. With the exception of bore-hole No. 10, which is vertical, all the bore-holes are under an angle of 70° due west. This was done because at that time there was a different opinion of the pyrites than later on. The amount of meters drilled was 842.77 M. of meters drilled

was 842.77 M. of which 60.65 M. were driven in pure pyrites and rich pyrites impregnations.

Even if several of the bore-holes showed a poor result, they have later on been of great importance for the estimation and understanding of the pyrites.

In the year of 1916 there was put down 9 bore-holes mentioned as No. G, H, etc. up to I. The entire length driven was 912.22 M. of which 142.54 M. were driven in pyrites and rich pyrites impregnations.

On account of the experience gained by this years work, and on account of the favourable observations which could be made on the surface, as the snow was almost melted, the bore-holes were as much as possible driven in 2 parallel lines according to the supposed axle-direction of the pyrites line. Owing to the difficulties of the ground one of the lines of bore-holes could, however, not be kept in a straight line. Confer the following drawing up on the map:

The Eastern line:

Bore-hole No.	N	to bore-hole No.	11		65	Meters
"	"	11	"	"	9	 30 -"
"	"	9	"	"	8	 30 -"
"	"	8	"	"	G	 50 -"
"	"	G	"	"	H	 40 -"
"	"	H	"	"	K	 58 -"
"	"	K	"	"	M	 70 -"
"	"	N	"	"	M	 343 Meters

The Western line:

"Nygruben" shaft	to bore-hole	No.	1		114	Meters
Bore-hole	1	"	"	"	L	 45 -"
"	L	"	"	"	O	 100 -"
"Nygruben" shaft	"	"	"	"	O	 259 Meters

Distance between the bore-lines:

from "Nygruben" shaft	to diamond drill-hole	8	:	90	Meters
"	Bore-hole	1	to the eastern line		55 -"
"	"	L	"	"	 70 -"
"	"	O	"	"	 85 -"

The cross sections.

The mutual distance between diamond drill-holes F, L and

K is 91 and 76 M. respectively.

The mutual distance between diamond drill-holes no. 6, 1, 7 and 8 and the "Nygruben" shaft is 28, 35³⁰_Λ and 90 M. respectively.

The width, length and breadth of the various pyrites bodies.

It has now been proved that the main deposit consists of a dominant continuous pyrites mass, which extends in to the "Nygruben" parts and the surrounding north and west, the bottom of the valley, around bore-holes No. 11, 9, 8, 7 and 1 and further downwards in a southern direction through the 2 parallel bore-series. Along the strike this pyrites mass is known from the bottom of the valley to "Nygruben" in a length of about 240 M. and according to cross sections P, L, K the horizontal distance between the outer-points is 170 M. Before the pyrites pinches out, it is at least 200 M. It will thus be seen that the limitations due to east-west is rather uneven, and that the length at last along the fall in the dipping direction is about 350 M.

The width of this pyrites mass can also be seen from the profiles, and it is evident that it must be quite considerable, in some places very likely more than 20 M. and in other places at least 30 M. The pyrites has the biggest width at the southern borehole O. (Pyrites-zone = 63.64 M. vol. percent pyrites 70.4%)

When studying the longitudinal profile G.G. one gets the impression that the pyrites is decreasing in depth along the fall in the dipping direction, but this is not so, as this profile goes through the pyrites where it pinches out in the striking direction due east, which can plainly be seen on the cross sections.

When looking at the longitudinal profile P.P. the pyrites is continuous without any narrowing or decreasing

in the width. On the contrary the bore-hole O. mentioned above shows the biggest width in the field. This should indicate that the pyrites does not end here but continue. At least one has a right to understand it in that way. It is therefore likely that we can count on a further length of pyrites in this direction. And this opinion is entirely justified according to the experience gained from other pyrites deposits in this country. The largest extension and horizontal length of the deposits are usually along the incline of the pyrites lenses. On this occasion it can be said that the pyrites axis-direction falls together with a line through bore-hole O. in between the bore-holes P. and K. and the "Nygruben" adit. The direction is about north-south. When taking the cross sections one will see that the pyrites again is continuous as far as the bottom of the pyrites is concerned, but has a turn upwards and look like half-ellipticals in its form.

The cross section A... shows that the pyrites in the bore-holes No. 1 and 7 splits into branches, and we now find ourselves in the pinch of the pyrites due east in the striking direction. Due west, however, we have on the contrary not yet reached as far ahead with the "Nygruben" adit, and it is very likely that there still are a good many meters in drifting and the limit for the pinching of the pyrites has not yet been reached or proved.

Another pyrites-zone comes into evidence around the diamond-drill holes 1, 7 and 10. This zone is situated above the main pyrites, and is probably a branch of same or perhaps a mass lying by itself, and which is connected with the pyrites of the "Gamlegruben". This pyrites-mass is considerable, but we have not yet got an exact figure

regarding same.

The 3rd pyrites body is the "Haugkisen", which, however, likewise cannot be considered of the same reason as mentioned above.

As the pyrites now have been discussed above, I will in this connection draw your attention to the slip which is also shown on the map. It is known in a length of 2-3 Km. in a north-south direction, and consists of a cave in the field with a breadth of about 3-7 M. This cave is totally filled with loose stones and blocks to a depth of 5 M. and more, and a bottom has not yet been proved. It cannot be said that it is a fault as such has not been encountered in the field hitherto. In the "Nygruben" parts in both adits have, however, been observed great polished surfaces.

Calculation of the quantities.

In the column "Diamond-drillings" has before been mentioned the drillings, and the result of these drillings is at hand in details by the mining-engineer Chr. Horneman, and are tabularly and graphically arranged by him. These details, however, have not been taken in here, as it would be too elaborate for this statement. For more detailed studies I, therefore, beg to refer to the work by Chr. Horneman.

In this report I shall only mention the bore-holes which were used when calculating the pyrites quantities, and which are arranged tabularly below.

Bore-hole no.	Gross amount of the pyr.	Schist in the pyrites	= Percent	Pure pyrites = percent.
I	6,0 m.	0,0 m.	0 %	6,0 m. 100 %
VII	3,3 "	0,5 "	15 "	2,8 " 85 "
VII	13,8 "	1,0 "	7 "	12,8 " 93 "
VIII	14,5 "	0,5 "	3 "	14,0 " 97 "
IX	9,2 "	0,0 "	0 "	9,2 " 100 "
X	7,4 "	0,6 "	8 "	6,8 " 92 "
XI	4,5 "	0,0 "	0 "	4,5 " 100 "
G	8,0 "	0,0 "	0 "	8,0 " 100 "
H	17,2 "	1,1 "	6 "	16,1 " 94 "
I	7,5 "	0,2 "	3 "	7,3 " 97 "
K	4,9 "	0,8 "	16 "	4,1 " 84 "
L	18,2 "	0,0 "	0 "	18,2 " 100 "
M	3,6 "	1,0 "	28 "	2,6 " 72 "
O	31,8 "	2,2 "	7 "	29,6 " 93 "
O	11,0 "	1,4 "	13 "	9,6 " 87 "
P	2,4 "	0,0 "	0 "	2,4 " 100 "
Average	163,3 m.	9,8 m.	6 %	154,0 m. 94 %

A calculation of the quantity might be made now, as we have the bore-holes put down on the situation-plan, and have also the excellently made profiles at disposal. According to experience the probable occurrence of the pyrites has been calculated, and thereafter the field has been divided into a whole lot of parcels (see the drawing). Every parcel is calculated by itself according to as many certain figures and statements as there are at hand.

Of the pyrites only the pure pyrites have been counted.

The length along the strike is known to a certainty in 2 complete profiles A-A and D-D, and we have a partly knowledge of the 3 others due to the investigations of same. In these latter, however, we have not gone further then so far that we are enable to calculate to a certainty that there are 4. M. pyrites before the pyrites pinches out.

For the profile A-E it has been thought likely that there due west is a similar pyrites-mass as there is east of the same bore-hole. It is also thought likely that in parcels B-B and C-C the pyrites-mass west of bore-hole G and I is a little less then in the complete parcels A-A and D-D and, this opinion seems to be fully justified.

From the above it will be understood that it has been possible to calculate the length along the strikes, and thus the stated figures can be relied upon to a certainty.

From the figures thus arrived at the average width of each parcel has been calculated.

Along the dip the calculation has been done in such a way that the investigated part has been divided into distances which have been found suitable according to the calculated lengths along the strike and the average widths.

In order to get a general view of the matter the above mentioned figures have been arranged in a table below:

Location	distance along the dip M	the length along the strike M	ore-area M ²	average width	Pyrites in M ³
At bore-hole	30 m.	80 m.	2400	4,0 m	10.000 m ³
Parcel A-A	60 "	220 "	13200	15,2 "	200.000 "
" B-B	40 "	175 "	7000	7,0 "	49.000 "
" C-C	60 "	170 "	10200	8,2 "	84.000 "
" D-D	70 "	150 "	10500	11,0 "	115.000 "
" E-E	100 "	130 "	13000	16,8 "	218.000 "
" F-F	50 "	60 "	3000	6,8 "	20.000 "
"Gamlegruben"	60 "	25 "	1500	3,0 "	4.500 "
			60800	In all:	700.500 m ³

From the above table it will be seen that at present there can be calculated with a pyrites area of 60.800 M² inside of the investigated part, which gives a pyrites-mass of about

$$\underline{700.500 \text{ M}^3}$$

When adding all the areas and calculating the distance along the dip = 360 M. the result is a length along the strike = 170 M. and an average width for the whole known pyrites-mass = 11.52 M.

In this statement is also included the pyrites-mass at "Gamlegruben" as well as the cubi-mass situated under the parcel E-E, but no other pyrites-mass in the field.

According to the bore-holes and what hitherto have been seen of the pyrites during the investigations, we think that there can be calculated with 4,5 tons pyrites per M³. In that case the Skorevas deposit contains:

$$\underline{700.500 \text{ M}^3 \times 4,5 \text{ tons} = 3.150.000 \text{ tons pyrites,}}$$

which I, according to the prevailing instructions in "The Institution of Mining Metallurgy", London, which I, as a member, must follow, will call "Probable ore".

Contrary to this calculation I have had another calculation made, where the actual investigated and known pyrites-mass only is calculated inside of the territory, where there has been

drilled through the deposit by diamond-drill-holes, and where same have been developed by the aid of adit and shaft as far as "Nygruben" is concerned, but not as far as concerns the "Gamlegruben".

At every vertical meter there has been laid a curve through the actually measured width, and the figures thus arrived at have been measured with a planimetre.

This calculation will then show an ore-area of:
39210 M² and with the respective corresponding width a cubic-mass of
405,266 M³.

As an average width of pyrites is stated 10.30 M. which is evident from the table below:

A r e a :				C u b i c m a s s :			
Entire area	:	39 210 m ²	:	Curve 0- 1	:	39.070 m ³	:
Curve 1	:	38 930 "	:	" 1 - 2	:	37.515 "	:
" 2	:	36 100 "	:	" 2 - 3	:	34.658 "	:
" 3	:	33 215 "	:	" 3 - 4	:	32.083 "	:
" 4	:	30 950 "	:	" 4-5	:	29.755 "	:
" 5	:	28 560 "	:	" 5 - 6	:	27.288 "	:
" 6	:	26 015 "	:	" 6 - 7	:	24.638 "	:
" 7	:	23 260 "	:	" 7 - 8	:	21.805 "	:
" 8	:	20 350 "	:	" 8 - 9	:	19.058 "	:
" 9	:	17 760 "	:	" 9 - 10	:	16.555 "	:
" 10	:	15 350 "	:	" 10 - 11	:	14.375 "	:
" 11	:	13 400 "	:	" 11 - 12	:	12 523 "	:
" 12	:	11 645 "	:	" 12 - 13	:	10 868 "	:
" 13	:	10 090 "	:	" 13 - 14	:	9 405 "	:
" 14	:	8 720 "	:	" 14 - 15	:	8 155 "	:
" 15	:	7 585 "	:	" 15 - 16	:	7 195 "	:
" 16	:	6 805 "	:	" 16 - 17	:	6 473 "	:
" 17	:	6 140 "	:	" 17 - 18	:	5 878 "	:
" 18	:	5 615 "	:	" 18 - 19	:	5 360 "	:
" 19	:	5 105 "	:	" 19 - 20	:	4 848 "	:
" 20	:	4 590 "	:	" 20 - 21	:	4 365 "	:
" 21	:	4 140 "	:	" 21 - 22	:	3 915 "	:
" 22	:	3 690 "	:	" 22 - 23	:	3 488 "	:
" 23	:	3 285 "	:	" 23 - 24	:	3 110 "	:
" 24	:	2 935 "	:	" 24 - 25	:	2 750 "	:
" 25	:	2 565 "	:	" 25 - 26	:	2 400 "	:
" 26	:	2 235 "	:	" 26 - 27	:	2 063 "	:
" 27	:	1 890 "	:	" 27 - 28	:	1 750 "	:
" 28	:	1 610 "	:	" 28 - 29	:	1 470 "	:
" 29	:	1 380 "	:	" 29 - 30	:	1 205 "	:
" 30	:	1 080 "	:	" 30 - 31	:	960 "	:
" 31	:	840 "	:	" 31 - 32	:	748 "	:
" 32	:	655 "	:	" 32 - 33	:	568 "	:
" 33	:	480 "	:	" 33 - 34	:	408 "	:
" 34	:	335 "	:	" 34 - 35	:	283 "	:
" 35	:	230 "	:	" 35 - 36	:	180 "	:
" 36	:	130 "	:	" 36 - 37	:	98 "	:
" 37	:	65 "	:	" 37 - 38	:	45 "	:
" 38	:	25 "	:	" 38 - 39	:	14 "	:
" 39	:	3 "	:				

If the cubic mass is fixed to 4,5 tons pyrites per M³ the result is

1.822.000 tons pyrites,

which I - in accordance with the above mentioned - will call "visible ore". To calculate the deposit in this way with the term "visible ore" is allowed and acknowledged according to the above mentioned instructions from "The Institution of Mining Metallurgy", wherefore I also have taken the liberty to do so .

Whether the one or other alternative is used when calculating the pyrites the result will in all circumstances be that the diamond drillings during the year of 1916 actually have proved that the Skorovas is a very big deposit, which surely must be counted as one of the biggest known entire pyrites-mass in this country.

As the diamond drill-holes according to my opinion as yet only have proved a good start of about 360 M. along the fall, which, as far as can be judged, are only a small part of the great field, and we furthermore expect with the aid of more diamond drill-holes outside of the indicated slip to encounter isolated perhaps large connected pyrites-lumps , as for instance has been the case in the "Gamlegruben", I do not find it exaggerated to say that the Skorovas contains many more million tons pyrites than hitherto have been proved.

The contents of the pyrites.

Mining engineer Chr. Horneman has done a very creditable sampletaking, and I have taken the liberty in the following to quote the result of the diamond drilling and his report.- I likewise quote his calculation of the quality of the ore:

Table over the result of the analysis of the diamond cordarills.

The analysis are done by the French Mining Division 1917

Place of drilline.	Pyrites zone	from	to	Diff.	content Cu.	Fe.	total.	Remarks.
I. The east bore row.								
Bh. No. 10-11.	Without pyrites only small impr.							
Bh. No. 11.	Only 1 pyr. zone -7.68 M. of which vol. per- cent pyrites 100% (gossan pyrites	0.00 5.00	5.00 7.68	5.00 2.68				Only the foot-wall left here. Rest wea- thered away and erased.
Bh. No. 9.	Only 1 pyr. zone -9.20 M. of which vol. per- cent pyrites 100% (gossan pyrites	0.00 2.42	2.42 11.62	2.42 9.20		42.53	10.22	-"
Bh. No. 8.	Only 1 pyr. zone -9.83 M. of which vol. per. pyr. 98.4% (gossan pyrites pyrites schist pyrites	0.00 3.97 6.85 12.38 12.56	3.97 6.85 12.38 12.56 13.80	3.97 2.88 5.53 0.18 1.24		44.75	8.10	A good deal of pyrites have now been wea- thered away and erased.
Bh. No. 6.	In all 3 pyri- tes zones, 1 im- pregn. zone. Zone I - 1.40 M. of which vol. per. pyr. - 100% (pyrites	6.60	8.00	1.40	2.02	49.20	3.64	
	Zone II - 1.61 M. of which vol. per. pyr. - 95% (pyrites	17.65	19.26	1.61		49.98	4.44	
	Zone III - 7.96 M. vol. per. pyrites 100% (pyrites pyrites	23.09 23.20	23.20 31.06	0.11 7.86		32.89 45.32	12.10 5.64	
	Impregnation Pyrites	31.46	32.02	0.56		32.58	17.15	
Bh. No. 5.	In all 2 pyrites zone, 1 impr. zo- ne. Zone I - 0.71 M. of which vol. per. pyrites 100% (pyrites	29.10	29.81	0.71	4.08	49.65	1.80	
	Pyrites impregn. Zone II - 17.41 M. of which vol. per. pyr. 93/6% (pyrit. schist pyrites pyrites	31.16 35.06 38.00 38.72 51.62	33.78 38.00 38.72 51.63 52.21	2.62 2.94 0.72 12.91 0.58		25.33 50.40 49.80 40.70	65.65 3.54 4.46 7.12	
	Pyrites impregna- tion	52.21	52.27	0.06	0.60	20.74	15.05	

Place of drilling		From	To	Diff.	Content		
					%Cu	%S	%total
	Pyrites zone.-						
Bh.No.	In all 2 pyrites zone	38,89	39,66	0,77	1,20	37,50	21,02
K.	Zone I-0,77 M. Vol pot.						
	pyrites - 100% (pyrites						
Yz	Zone II-5,07 M. (pyrites	79,95	80,50	0,55	0,56	37,94	24,60
	Vol.pot.pyrites (schist	80,50	80,80	0,30			
	87,3% (pyrites	80,80	81,23	0,43	0,88	35,30	13,82
	(pyrites	81,23	82,33	1,10			
	(schist	82,33	82,43	0,10			
	(pyrites	82,43	83,48	1,05	1,38	41,85	11,58
	(schist	83,48	83,72	0,24			
	(pyrites	83,72	84,41	0,69			
	(pyrites	84,41	84,76	0,35	0,50	37,30	11,60
	Pyrites impregnation	84,76	85,02	0,26	1,38	30,95	28,28
Bh.No.	In all 3 pyrites zones						
M.	several small pyrites						
	stripes. Zone I-0,86 M.						
	of which vol.pct. pyr.						
	100% (pyrites	71,59	72,45	0,86	0,24	42,40	13,88
	Zone II-1,72 M. of which						
	vol.pct.pyr.100%(pyrites	73,50	73,87	0,37	0,84	41,30	3,20
	(pyrites	74,78	75,22	0,44	1,48	47,50	3,30
	(pyrites	73,87	74,78	0,91	2,30	45,57	4,22
	Zone III-0,41 M. of						
	which vol.pct.pyrites						
	- 100% (pyrites	103,09	103,49	0,41	2,52	41,56	7,86
The west	In all 2 pyrites zone						
bore							
row.							
Bh.No.	Zone I-2,06 M. of which						
I.	vol.pct.pyr.-92,5%						
	(Pyrites	60,24	60,46	0,22			
	(schist	60,46	60,61	0,15	0,45	42,91	16,72
	(Pyrites	60,61	62,30	1,69			
	Zone II-9,41 M. of						
	which vol.pct.pyrites						
	-95,1% (Pyrites	64,32	68,90	4,57	0,57	42,41	11,34
	(Pyrites	68,90	71,20	2,30	1,15	48,60	3,96
	(Pyrites	71,20	71,84	0,64	0,72	36,37	25,58
	(Schist	71,84	72,20	0,36			
	(pyrites	72,20	73,74	1,54	0,72	34,83	32,02
Bh.No.							
L.	Only 1 pyrites zone						
	(pyrites	73,61	74,35	0,74	3,15	49,05	3,18
	(pyrites	74,35	75,10	0,75	0,64	38,32	15,60
	(schist	75,10	75,65	0,55			
	Pyrites zone- 18, 26 M.						
	(pyrites	75,65	76,23	0,58	1,26	42,44	7,94
	(pyrites	76,23	79,88	3,65	4,90	44,42	4,74
	of which vol.pct.(pyrite	79,88	80,41	0,53	3,26	44,50	6,42
	Pyr.-96,9% (pyrites	80,41	83,11	2,70	4,30	46,70	3,92
	(pyrites	83,11	86,05	2,94	0,86	43,40	10,46
	(pyrites	86,05	88,86	2,81	0,68	45,75	4,66
	(pyrites	88,86	91,87	3,01	0,82	38,50	11,12
Bh.nr.	Only 1 pyrites zone(or						
O.	3 nearlying (pyrites	58,56	60,26	1,70	0,70	40,66	14,48
	(pyrites	60,26	60,41	0,15	0,96	29,81	21,52
	((pyrites	60,41	62,17	1,76	1,26	41,31	11,14

Name of : Billing	Pyrites zone	From	To	Diff.	Content		No. of	Rem.
					%Cu	%S		
Bh.no.0.	Pyrites zone -							
	63.64 M. of which:							
	vol.pet.pyr.-							
	70.47 - (Schist	62.17	62.73	0.56				
	(Pyrites impreg	62.73	63.12	0.39	0.50	25.10	19.95	
	(Schist	63.12	63.80	0.68				
	Pyrites impregna-							
	tion	63.80	63.99	0.19				
	(Schist	63.99	68.01	4.02				
	Pyrites impregn.	68.01	70.30	2.29	0.765	23.65	32.85	
	(Pyrites	70.30	97.35	27.05	0.64	51.06	2.52	
	(Schist	97.35	98.72	1.37				
	(Pyrites	98.72	99.22	0.50	2.84	46.37	7.38	
	(Skiftar	99.22	100.47	1.25				
	(Pyrites	100.47	102.05	1.58		48.73	4.50	
	(schist	102.05	111.24	9.19				
	(Pyrites	111.24	113.52	2.28	0.64	43.40	6.44	
	(schist	113.52	114.90	1.38				
	(pyrites	114.90	120.45	5.55	0.73	42.55	12.50	
	(pyrites	120.45	122.20	1.75	0.51	36.16	16.14	
Striking								
profile O.M.	See above.							
Profile	In all 2 pyrites							
P-L-K	zone. Zone I-2.40							
	M.vol.pet.pyrites							
	-100% (Pyrites	110.70	113.10	2.40	1.26	43.68	5.96	
	Zone (Pyrites	116.34	116.65	0.31		40.77	8.28	
	II (Pyr.impregn	116.65	116.87	0.22		16.78	37.30	
	(Pyrites	116.87	117.60	0.73	0.90	39.78	17.16	
	-126							
	m.Vol.pet.-100%							
Bh.no.I	See above							
Bh.no.K	" "							
Profile C-								
10	See above							
Bh.no.G.								
Bh.nr.10	In all 2 pyri-							
	tes zone.							
Bh.nr.10	(gossan	0.00	2.40	2.40				A good
	Zone I-3.10m. of							deal of
	which vol.pet.							the pyr.
	pyrites - 95.1%							are now
	(Pyrites	2.40	5.50	3.10	1.68	43.37	7.62	vitrified
	(Pyrites	17.65	18.50	0.85	-	42.50	9.48	and era-
	Zone II-7.4m.							sed.
	(Schist	18.50	19.05	0.55				
	Vol.pet.pyr.90.9%							
	(Pyrites	19.05	23.51	4.46	-	42.26	7.22	
	(Pyrites	23.51	25.05	1.54		37.75	11.96	
Profiles	Without pyrites							
Bh. 6.	only small							
Mygruben	impregnation							
Bh.no.6								
Bh.no.1	Only 1 pyr.zone							
	(pyrites	4.55	8.65	4.10	0.40	46.38	5.62	
	Pyr.zone - 6.05m.							
	of which vol.pet.							
	pyr.-100% (pyrites	8.65	8.95	0.28	0.94	31.58	20.02	
	(pyrites	8.95	10.60	1.67	2.26	45.27	7.08	

Place of Drilling	Pyrites zone	From	To	Diff.	Content		Unsul.	Rem.
					Cu.	%S.		
Sh.no.7	In all 2 pyrites							
	zone (Pyrites impreg	0,00	1,30	1,30	-	30,23	23,72	
	Zone I-3, 24m.							
	(pyrites	1,30	2,30	1,00		45,34	10,44	
	(Schist	2,30	2,70	0,40				
	Of which vol.pot.							
	pyr.-87,6%(pyrites	2,70	3,00	0,30		39,56	13,46	
	(pyrites impregn	3,00	3,24	0,24		10,30	49,36	
	(pyrites impregn	12,30	13,16	0,86		30,96	18,64	
	(pyrites	13,16	13,28	0,12				
	Zone II-13,79 m.							
	(schist	13,28	13,40	0,12				
	(pyrites	13,40	15,88	2,48		48,57	4,61	
	of which vol.pot.							
	pyr.-91,5% (Schist	15,88	16,26	0,38				
	Pyrites	16,26	17,00	0,74				
	(Pyrites	17,00	17,13	0,13				
	(Schist	17,13	17,29	0,16		41,23	9,60	
	(Pyrites	17,29	18,38	1,09				
	(Pyrites	18,38	19,14	0,76				
	(Schist	19,14	19,65	0,51		47,41	4,50	
	(Pyrites	19,65	20,44	0,79				
	(Pyrites	20,44	21,44	1,00		42,88	7,92	
	(Pyrites	21,44	23,03	1,59		47,55	4,14	
	(Pyrites	23,03	26,09	3,06		39,45	12,62	
Sh.no.8.	See above. The							
	east bore-row.							
Nygruben	See the table							

Remarks.

The samples which have not been assayed for copper holds only traces or very little content of copper.

Calculation of the quality of the ore.

The calculation of the quality of the ore refers to the above analysis and the gross quantity of the pyrites.

The diamond drilling is in the first place done in order to investigate the occurrence of the pyrites and the extension of the Skorovas deposit, and there is not enough bore-holes to enable us to state exactly the composition of the pyrites.

The calculation below will, however, give an idea of the quality of the pyrites to be counted with at Skorovas.

1. From the result of the borings the following can be stated (only the main pyrites is counted here.)-

Bh. No.	Meters: pure pyrites in the	Meters: schist: pyrites in the	Pyrites between 45% S. content : Cu	Pyrites between 45-40% S. content : Cu	Pyrites between 40-35% S. content : Cu	Pyrites under 35% S. content : Cu
1.	6,05	0,00	4,10	0,40	46,88	0,28
7.	12,62	1,17	6,53		48,0	2,22
8.	9,65	0,18			41,2	3,87
9.	9,20	0,00			42,35	
10.	6,73	0,67			5,21	42,3
G.	7,97	0,00	7,86		45,22	0,11
H.	18,94	2,37	15,48	0,93	50,0	0,58
J.	8,85	0,56	2,20	1,15	48,6	4,47
K.	4,43	0,64				2,84
L.	17,71	0,55	7,62	4,4	45,6	3,52
M.	1,72	0,00	0,91	2,50	45,57	0,37
O.	38,92	1,38	27,05	0,64	51,06	7,83
P.	2,40	0,00				2,40
F.	145,19	7,52	76,67		48,39	22,013

Thus in an entire bore-length of 145,19 + 7,52 = 152,71 M. only a trifle of 7,5 M. schists): about only 5 vol-percent schists. Of the pyrites 86,1% is sorted-ore, and 13,9% dressing-ore, or 52% is high-percents sorted-ore with 46,50% S. 34% is sorted-ore with 42-43% S., and 14% is dressing- ore. With the exception that a pyrites rich in copper occurs at Bh.M.L., and that there is copper-containing pyrites at Ho.H and at the outskirts of the pyritesbody at Bh.M.L. and 1, the coppercontent is low about 0,6% Cu.

II. There is added to each bore-hole the approximate cubic-mass of pyrites, which it proportionally represents inside of each section. According to the results of the analysis the following groups are obtained:

Parcel	No.	M ³ pyrites	M ³ pyrites between 50-45% S.	M ³ pyrites between 45-40% S.	M ³ pyrites under 40% S.	(Dressing - goods.)
			% Cu. : % S.	% Cu. : % S.		% Cu. : % S.
A - A	1	11.000	67,7% - 7.447	0,40 : 46,88		4,7 % - 517.-
ca. 200.000			27,6% - 3.036	2,26 : 45,27		0,94 : 31,5
M ³ pyrites	7	26.700	48,7% - 13.002	48,0 : 14,3% - 3.818,1	42,0 : 37,0 - 9.879.-	37,4
	8	62.000		100 % - 62.000.-	41,2	
Nygruben		100.300	ca. 100% - 100-300	0,2 : 50,8		
B-B M ³ pyr.	10	4.700			77,5% - 3.642,5	42,3 : 22,5% - 1.057,5
ca. 49.000	0	25.000	98% - 24.500	45,3		2% - 500
Nygruben		19.300	ca. 100% - 19.300	0,2 : 50,8		37,7 : 32,6
C - C	H.	31.500	95% - 29.925	0,9 : 50,0	3,4 % - 1.071	1,8 : 40,7 : 1,6% - 504
ca. 84.000						0,1 : 24,7
M ³ pyrites	J.	26.700	25,6% - 6835,2	1,15 : 48,6	51,0% - 13.617	0,57 : 42,4 : 23,4% - 6.247,8
						0,7 : 35,3
The part west of Nygruben 25.800.- Probably mostly sorted-ore.						
D-D	K.	15.000			48,5% - 7.275	1,38 : 41,85 : 51,5% - 7.725
115.000						0,8 : 35,4
M ³	L.	85.000	43,0% - 36.550	4,4 : 45,6	19,8% - 16.830	0,9 : 43,2 : 21,4% - 18.190
			15,8% - 13.430	0,63 : 45,75		0,7 : 38,4
	P.	15.000			ca. 100% - 15.000	1,26 : 43,68
E - E	O.	218.000	92% - 200,560	0,64 : 51,06		8% - 17.440
238.000						0,76 : 23,65
M ³ pyrites		20.000			81,7% - 16.340	0,7 : 42,5 : 18,3% - 3.660
						0,51 : 36,16
Gamlegruben		4.500	ca. 100% - 4500	0,40 : 51,32		
(690.500)	(690,5)	459.386,1			139.593,6	65.720,3
664.700	664.700					

Thus 90% are sorted-ore and 10% are dressing-ore, or 69% are high-percents sorted-ore with 50-45% S. and of this again the most part of the pyrites-mass contains 47-51% S.

21% are sorted-ore with 42-43% S. and

10% are dressing-ore with 35% S.

An average sample of the corodrills according to the cubicmass above added to each bore-hole gives us a result the following analysis:

S.	46.40
Cu.	0.98
Zn.	0.89
As.	0.04
Fe.	40.35
Al ₂ O ₃ .	1.52
SiO ₂ .	4.63
CaO.	1.08
MgO.	1.22

98.21 + CO₂ and alkalies.

In the analysis the pyrites from "Nygruben" and "Gamlegruben" have not been reckoned with. All the pyrites which holds above 40% S. are included.

The ore is as a rule dense, that is, very finegrained and firm.

Very seldom, and only when it is mixed with querts, the ore is hard.

The pyrites at "Nygruben" and "Gamlegruben" are best known. It is here exceptionally rich and pure with 50% S. and more.

The copper-content is very low and amounts to about 0.3%. Likewise the zinc-content is very low varying from nothing to about 0.3%.

The pyrites is practically free from arsenic and selenium. The part of high percentage ore in depth, judged by the corodrills, seems to be of the same quality as the pyrites at "Nygruben" and "Gamlegruben", but the copper-content seems as a rule to be higher. The average will here be about 0.6% Cu. for the sorted-ore.

Ore rich in copper occurs at bore-hole No.1.

The figures 36,550 M³ are very uncertain, but the adjoining bore-holes I.P. and K indicates that there at No.1. must be a considerable amount of export-pyrites rich in copper.

The copper-containing pyrites will according to the content make itself known by a stronger and a faint green colour, and can easily be sorted from the copper-free ore, or the ore with a low

copper-content.

The embedment schistic layers, which only makes about 5 vol. percent, are as a rule found in comparatively thick layers, and can easily be sorted out.

In the high-percents pyrites the lead minerals cannot be seen with the bare eye. In the low grade pyrites can only be seen quartz and chlorit. Pyrrhotite cannot be seen nor zincblend.

Some of the pyrites-zones have a greyish shade, which might be due to comparatively strong concentration of zincblend.-

Analysis.

In the course of time there have been taken samples as the work advanced, and the analysis shows that the results were strikingly similar.

A series of such samples were taken by Mr. Stark together with the undersigned, and the samples are tabularly arranged on the attached table.

For the sake of control we have also had some complete analysis of the pyrites from "Hygruben" done by some well-known analysis-firms, and the results are given below in order to prove the constant composition of the pyrites:

1) Analysis done by Mr. Geo. Kudd Thompson, Newport 7/6.1915:

Iron	44.8000	} = Total Iron 45.35 %
Peroxide of iron	0.6400	
Sulphur	51.3200	
Silica	1.5000	
Lime	1.0000	
Magnesia	0.47000	
Copper	0.2880	
Phosphoric Acid	0.0090	= Phosphorus 0.004 %
Arsenic	0.0050	
Selenium	0.0079	
Titanic Acid	0.0170	
Nickel, Cobalt, Mink,)		none
Baryte, Chromium)		
Lead traces,		less than 0.005 %
Free carbon		none
Carbonic Acid		Trace
	<u>100.0569</u>	

Mineral dried at 100° C.

2) Analysis done by Messrs. Edward Riley & Harbord, London, 21/5.1915:

Sample first dried at 100° C.

Sulphur	50, 73 %
Sulphuric Acid	0, 60
Sulphate of Baryta	Traces
Iron	44, 36
Protoxide of Iron	0, 54
Peroxide of Iron	0, 91
Arsenic	0, 042
Copper	0, 30
Nickel	0, 08
Lead	Traces
Zinc	Traces
Silica	1, 25 %
Alumina	0, 45
Oxide of Manganese	Nil
Lime	0, 12
Magnesia	0, 30
Phosphoric Acid	0, 014
Selenium	Nil x)
Carbon Dioxide	Traces
Combined Water	0, 40
	<u>100, 096</u>
Equal to total Sulphur	50, 97 %
" " total Iron	45, 42 "
" " Phosphorus	0, 006 %

x)

Selenium could not be proved. In a sample sent later on Messrs. Edward Riley & Harbord found 0.0022% Se.

3) Analysis done by Messrs. Sulman & Riccard, London, 27/5.1915.

Insolubles	1,30 %
Sulphur (unoxidised)	51,00 %
Iron	45,50 %
Lime	0,12 %
Copper	0,30 %
Phosphorus (as P_2O_5)	0,056 %
Sulphur Trioxide (SO_3)	0,48 %
Oxygen, water and loss	1,244 %
Arsenic (by March test)	Trace.
Antimony, Tellurium	Nil.
Selenium	Nil.
Bismuth	Nil
Fluorine	Nil
	<u>100.000 %</u>

Note: 1,05 % of the iron was present in oxidised form, probably as basic sulphate.

The total sulphur was 51,19 %; i.e. inclusive of SO_3 .

Some water was still detected after drying at $100^{\circ}C$. for four hours.

4) Analysis done by Den Kong. Tekn. Högskola, Stockholm, 19/4 1915:

Dry sample:

Sulphur	51.4%
Iron	45.7%
Copper	0.51%
Zinc	0.07%
Silicic acid	1.3
Arsenic	0.005%
Selenium	0.005%

Result of assays from sampling, by Mr. A. Stark and H.H. Smith.

Gamlegruben

	%S.	%Cu	%As	%Unsat
1. In the adit 5. m. in from the beginning of the adit width of pyrites - 2.50 m.	51.96	0.36		1.94
2. From the adit 10 m. further in and from both sides in the adit and up through shaft till the hanging wall. width. - 5.30 m. The pyrites is partly exposed for very long time.	51.36	0.47	0.012	2.40
3. From the crosscut to the right and for half its length about 6 m.	51.27	0.42		2.22

A mixture of these 3 samples contains

%S. %Cu %Zn %As %Fe %SiO₂
51.32 0.40 0.26 0.012 45.35 1.95

plus a little oxygen as sulphaten and a trifle:
Al₂O₃, CaO and H₂O.

Nygruben

4. From the beginning of the adit at each meter on the left side and for a length of 10 meters. Width is unknown. A trifle of schist has reduced the contents in the assay.	48.20	0.68		4.96
5. From the same side as previous sample and at each half meter and 10 m. further in. Width unknown.	50.40	0.23	0.015	2.76
6. Between the two schistbands for 6 m. length and at each half meter. Width unknown	50.66	0.66		3.10
7. From the second band of schist and until the end of the adit for 13.5 m. length and at each meter half meter. Width unknown.	51.70	trace		1.80
8. From drift along the dip on the left side at each half meter and for 10 m. length from the beginning of the drift.	51.60	0.05		1.72
9. From the same drift on the western side and 10 m. further in and at each half meter.	51.76	trace		1.32
10. From the same drift in the same way and further 10 m. (length) in.	51.60	0.28	0.018	2.00
11. The same drift along the dip continued on the left side and at each half meter and 10 m. length.	50.36	trace		3.64
12. Samples taken from the dumps	50.88		0.028	2.40
13. From several places of the pyrites in the western part where it is exposed to the surface at the place "dalbunden". The pyrites is very much decomposed.	49.95	trace		11.84

Survey.

has for some time past been ensured by a whole lot of ^{The mining field} prospects, claims and renewal of rights (first), and in order to make these claims clear there was held a survey on the 26th of August 1914. By this survey the field was allotted claim on "Gamlegruben" and claim on "Nygruben" according to paragraph 23, litr. a in the law regarding mining.

As we through the work done and from the maps got a clearer view of the matter there was sent in an application for a new survey to be held as a continuance of the old one. This survey was held on the 8th of August 1917, and the field was then as on the previous survey allotted claim III as a direct continuance of the previous survey II. At the same time there has been taken a new claim where the claimer makes reservation to be allotted a claim which is to be known as survey IV as a continuance on survey III, whereby the field is ensured. We have thus 4 connected claims staked in the striking direction. The boundaries of these claims are marked by "Fierungsbolter". Likewise the other boundaries are marked with ironbolts in the mountain. (See details regarding this on the enclosed map.)

With regard to these surveys, especially the second survey. I am not of the same opinion as the government inspector of mines as far as regards the occurrence of the pyrites. I am still of the opinion that the field only is covered by 2 claims, which are laid in an east-west direction & along the strike starting at "Gamle- and "Nygruben".

At the last survey there was made an addition, which I consider to be of the greatest importance for the Skorovas, and which I cannot emphasize strongly enough, namely that we have permission to drive a main adit from a point at the upper Skorovasvand (lake) to the ore lenses in the deposit, thus outside of the claims, according to par. 40 in the law regarding mining.

As a further ensurance for the field there have been taken claims on the bore-holes M.O. and P. as well as claims in the south part of the field and down by Skorovasvand (lake). In addition

to this there is also some prospecting done around the field. The deposits are thus completely ensured.

Waterpower, roads, lots etc.

In order to ensure power there have this summer been made investigations regarding waterpower, which has been contracted this month, and it is supposed that there can be obtained 600 HP. from Ingulsvand (See special contract of June 19th 1918). Further power can probably be obtained from the Staldvikriver and the Gröndalsriver. This matter is being investigated just at present.

Sites for buildings must be procured from "Kjärbruket" and negotiations must be taken up regarding this matter. Likewise there must be procured cultivable land from the pasture of the Staldviken property.

The company has hitherto only owned a small stripe of land, 70 M., from the shore at Tunsjön between the road made by us and a small brook which runs down to the sea. This stripe of land and the ground where the road is laid, we have obtained free of charge from Per Staldvik (Special contract).

The question regarding the drinking-water^{has} been solved in these days by proposing that there shall be made dams with pipes up by the Skorovasklumpen and by leading the pipes down to the contemplated buildings at Skorovasvand.

Sundries.

In the course of the latter years there has naturally been done some work. Of houses, however, only the most necessary such as barracks at the mine, stables and black-smiths-shop have been built. At "Kleva" there has likewise been built a barrack with storage house for materials. At Staldviken we have built barracks and stables. On the water we have a motor boat.

Burning of the ore.

In the year of 1915 there was done a small trial mining at "Eyguben" in order to see how the pyrites would act when being burnt. This pyrites was then sent through Strömsvettadal to various suppliers in Sweden for trial burning. The results of these trials were splendid, and the general opinion was that the

pyrites was the very best that hitherto had been tested. Official proof of this is found in the statements below, which shows a result that is selfexplanatory.

.....

Statements from Swedish consumers regarding the roasting of the

pyrites.

From Hissmofors A/B., Krokom, 27/1.16.

According to your request we hereby beg to inform you that the pyrites, which we received from the Skorovas Mines for trialburning in the Herreshoffs furnaces have shown good qualities and is one of the best we have hitherto used. According to analysis from "Statens Kemiske Station" of the 22nd inst. the residues contains only 0.88% Sulphur. I must be noted, however, that the pyrites have been fineground here.

From Öhrvikens Aktiebolag, Öhrviken 29/9. 1915.

In reply to your favour of the 23rd inst. we beg to inform you that we have now roasted the 42 tons Skorovas pyrites received from you, and have found it to be very satisfactory. We are of the opinion, however, that it would have been better, if the pyrites had been less fine-ground.

6

From Ströms Bruks Aktiebolag, Strömsbruk, 23/10.1915.

In reply to your favour of the 13th inst. we beg to inform you that the result of the roasting of the pyrites was very satisfactory, but as the size of the lumps were about 25 mm. the roasting could not be so through as it should have been.

From Trävarablaget Svartvik, Svartvik per Sundsvall, 29/11.1915.

With reference to your favour of the 9th inst. We beg to inform you that we have now roasted the pyrites from the Skorovas Mines received from you. It can easily be roasted in our furnace, and we have had no trouble with the roasting of same.

From Mackmyra Sulfit Aktiebolag, Mackmyra 16/10.15.

Regarding the test made by us of about 50 tons pyrites from Skorovas we beg to inform you that we are quite satisfied with the result. The pyrites is easily burned and The roasting is done without difficulties as far as we can see. It would be preferable to have the pyrites more coarse-ground and with less content of fine dust.

From Korsnäs Sauerbrunn Aktiebolag, Bonhus, 20/11.15.

In reply to your favour of the 19th inst. we beg to inform you that the result of the test of the sample of Skorovas pyrites is very satisfactory. We regret that we cannot give you further details regarding the roasting etc. as the sample was rather small, but the pyrites seems to be of a very good quality.

Resume.

We know from the geology that big eruptives as a rule carries with them great masses of pyrites, and as the eruptives here in the northern Grong, especially around Skorovas, are very big, we can probably take it for granted that this is the case here.

We know further from experience that only great masses of pyrites carries large formations of gossan, which likewise proves to be the case with Skorovas.

Furthermore can be mentioned the phenomenon "Secondary enrichment". By this is understood enrichment and settlement of rich copper-ore, copper-pyrites, variegated copper-bornite as thin flakes, thin loads, which goes through the pyrites-mass in the upper horizon just beneath the iron-cap. Such "secondary enrichment" is especially known from the Spanish pyrites deposits Rio Tinto, Tharsis and others. At Skorovas it has also at "Hygruben" locally made itself known, and was thus a further proof of the great masses of pyrites. From our own country we know that great pyrites deposits have their main lineal extension along the dip, and this is now satisfactorily proved by Skorovas.

When looking at these facts it can easily be said that the Skorovas really is a very big deposit, and according to my opinion it is the largest hitherto known deposit in Norway, when it is considered as a single deposit consisting only of sulphuric pyrites with a high content of Sulphur.

With regard to the content of the pyrites we have here in Norway only one type which can be compared with the Skorovas, namely the Bessmo-type, but this is also inferior to the Skorovas. In this connection I wish to draw attention to the exceptionally high percent of ore which according to previous specification can be stated at 95 to 97%. I am quite convinced, however, that a future mining will not give such glorious results.

In order to be certain about the pyrites we have had it burned, and have then found that it is of the best, which hitherto have been found in Norway. In all statements it is agreed that the pyrites is the best that could be wished for. The pyrites is also

practically speaking free from arsenic and selenium, and carries only minimum amounts of copper and zinc, and has a very rich and valuable "purple ore".

I will not mention here the cost of mining, as this will be a capital by itself, and such as the the times are now and will be after the war, this can only be stated quite illusory. So much can be said, however, that the pyrites can be delivered cheap loco the mine, as it will partly be mined in big quantities in open cast and under-ground it will be procured by the aid of tunnels. Likewise the market-price of the pyrites now and in the future can only be stated approximately.

When comparing the above mentioned momentums I think it is no exaggeration on my side to say that already now we have a proof for my assertion that Skorevas hitherto has shown "visible-ore" to the amount of 1.800.000 tons, which very likely only is a small beginning of many more millions, which the future work will prove.

Christiania, July 18th 1918.

(sign.) H.H.Smith.