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January 2, 1938.

Mr. Earl K. Nixon,
Director State Dept.of Geology & Mineral Industries
704 Lewis Bldg., Portland, Oregon.

Dear Mr. Nixon:

During your visit here we discussed shortly "black sands". I came across some data on concentrations on Crescent City beach sands which may interest you.

I do not know who made these tests and when they were made, but I presume it was during the war.

About 13 years ago I made myself a hundred tests with the same material using a self constructed small laboratory magnetic seperator using 4 different magnetic forces and I came to the following conclusions:

Gravity separation is of no advantage.

Multiple magnetic separation alone is sufficient. In using screening first (40, 60, 80, 100 and 200 mesh screens were used by me) I found that all gold and platinum contained in my sample went thru 80 mesh and 90% of all the gold and platinum thru 100 mesh and that it would be an advantage, if gold and platinum is to be recovered to screen first and separate the gold and platinum from the finer screens only.

Platinum was attracted with 5 amp.

Practically all kernels above 40 mesh were attracted with the weakest magentic force.

The finer the grains the less was attracted by weak magnetic forces, proving that the natural desintegration is evidently more pronounced on chromite than on magetite, but on the other hand the coarser grains were not uniform minerals. After regrinding a further separation could be made.

The magnetic portion contained gold which could not be mechanically separated nor extracted by cyanide.

The dry magnetic separation had however great defects. The board formed of the magnetized portion to be carried away by the cross belts acted as a kind of broom and carried with it a certain amount of the minerals mechanically not belonging to the magnetic portion at this point.

I think wet magnetic separation as developed by Krupps and used as I understand with advantage in Brazil and Carolina mainly for the recovery of thorium and mesothorium seems to me the best solution.

In connection with this the following may interest you as you are interested in the Esterly Mine.

On the paintings found in Egyptian tombs during the last 20 years a peculiar purple color was used being composed of a mixture evidently of gold and iron oxide and containing from 20 to 30% metallic gold.

This so called purple gold was later on found first in Carolina black sands and is highly magnetic.

When I read this I had in my possession a sample of black sands from the Esterly mine which I understand was treated before with quicksilver in barrels and all free gold removed.

I was curious to see if this black sand contained also such purple gold and I separated with a hand magnet all magnetic portion and out of this I separated again some purple kernels which I thought were hematite.

These kernels present a very fine purple color when ground and from these small amount of material I made an assay (weight perhaps two to three grams) and got the largest gold beat I ever made in an assay, and I came to the conclusion that we may have here also this purple gold in some of our black sands. At that time I was not interest at all in the gold as such. My curiosity was influenced by my memory on similar work done during my student time when I worked on some face paints used by Egyptian ladies and taken from a tomb and which contained pentasulphide of antimony now called golden sulphide of antimony and used for making red rubber goods.

Very sincerely yours,

(signed) Geo. Schumacher

Encl. Tabulation of concentrate tests on black sands.

Geo. Schumacher   Beagle, Oregon.

The following tabulations are the final best results obtained by gravity and magnetic separation of chromite from the Crescent City beach sand.

TABLE I.

Table Concentration

Item	Weight in pounds	% by weight	Assay % Cr_2O_3	Weight of Cr_2O_3	% of Cr_2O_3 content of crude ore thus represented
Crude Ore	200	100	15.3	30.6	100
Conc.	100	50	22.76	22.8	74.5
Mid.	35.76	17.9	20.	7.2	23.5
Tail	64.25	32.1	1.54	1.0	3.2
Error by difference	0.	0.	--	.4	1.2
Total	200	100		30.6	100.

TABLE II

Magnetic Separation on Above Table Concentrates.

Item	Weight in pounds	% by weight	Assay % Cr_2O_3	Weight of Cr_2O_3 contained	% of Cr_2O_3 content of table concentrates
Table Conc.	90	100.	22.76	20.48	100.
M1' (Magnetite)	27	30.	7.24	1.95	9.5
M2' (Middling)	19.3	21.3	15.18	2.93	14.3
$M2^2$ (Chrome)	39.3	43.6	38.88	15.27	74.5
NM^2 (Tail)	4.3	4.7	4.0	.17	.8
Error	.1	.4		.16	.9
Total	90.0	100.0		20.48	100.0

Magnetic Concentration on Crude Sand

Item	Weight in pounds	% by weight	Assay % Cr_2O_3	Weight of Cr_2O_3	% of Cr_2O_3 content of original crude sand thus represented
Crude Sand	50	100	15.3	7.65	100.
M1'	8.1	16.2	8.02	.65	8.4
M2'	8.4	16.8	15.13	1.27	16.5
$M2^3$	15.3	30.5	33.52	5.13	67.0
NM^2	11.2	22.4			
NM^3	7.0	14.1	3.44	.24	3.1
Error	0.0	0.0		.36	5.0
Total	50.0	100.0		7.65	100.0

ANALYSIS ON ABOVE PRODUCTS OF TABLE II FOR $Si\ O_2$, Fe, $Ti\ O_2$.

Al_2O_3 and MgO as follows:

TABLE III

Product	$Si\ O_2$	Fe	TiO_2	Mg O
$M2^2$ (chrome)	10.23	29.56	5.85	4.41
M2' (middling)	6.92	37.54	27.05	2.23
M1' (magnetite)	3.42	58.38	9;70	4.45

No Al_2O_3 was reported.

TABLE IV.

Magnetic Separation on Table Middlings from Table I.

Item	Weight in pounds	% by weight	Assay % Cr_2O_3	Weight of Cr_2O_3	% of Cr_2O_3 Content of original mid.
Table mid.	25	100	20.0	5.00	100.
M1'	1.6	6.4	16.76	.3	6.0
M2'	4.3	17.2	21.1	.9	18.0
$M2^2$	3.1	12.4	27.28	.85	17.0
$M2^3$	8.0	32.0	33.6	2.69	53.8
NM^3	7.6	30.3	4.62	.35	7.0
Error	.4	1.7			1.8
Total	25.0	100.0		5.00	100.0