ORES.

V

Assays

50

ORES

Banner J.C. Spec. for zinc, qual. 10.
Button mine, manganese ore Rat.P.Jr. 10, 11 & 12, 38
Caldwell J.J. Iron Ore p.p. 6 and 7
Cason property, manganese ore Rat.P.Jr. 14, 15. 22
Brookville Mine, manganese ore Rat.P.Jr. 26
Brooks mine shaft 1, Manq. ore Rat.P.Jr. 46
Brooks Mine Shaft 2 Manq. ore Rat.P.Jr. 50
Dale, Geo. W., Star Copper lode Searcy county p. 1

Criswell place, manq. ore, Rat.P.Jr. 54

A
B
C
D

Fletcher, H. L. Copper Silver assay 8+9

Freeman, H. F., Iron ore p.p. 4 and 5

Grubb property, manganese ore, R. W. Jr. 42

Iron ore formerly Freeman p.p. 4 and 5
" " J.J. Caldwell, p.p. 6 and 7.

Manganese ores 10, 11, 12, 14, 15, 18, 19, 22, 26, 30, 34, 38, 42, 46, 50, 54
Martin, Wm property, manganese ore, R.A.P.P. 30.

Milligan property manganese ore R.A.P.P. 34, 38

Searcy county, Star Copper Lode, Gw. Dale, p. 1

Star Copper Lode Searcy County, Ark. (Gw. Dale Col.) p. 1

Coren prospects, manganese ore, Ralph Jr., 18

Zinc, basic carbonate JCB 10

Mn. Oxide for Dr. Penrose.

wt crue + Mn_3O_4 = 22.83490
wt crue = 19.17836
Mn_3O_4 = 3.65654

Dissolved in H.Cl

22.8349
wt crue after = 18.9164
Mn_3O_4 = 3.7185

Mn_3O_4

wt crue + Mn_3O_4 = 23.4048 gm
wt crue = 18.7147
wt Mn_3O_4 = 4.6901

Specimen from ~~24~~ Labelled 157

Star Copper Lode, Searcy County, Ark.
Section 6, 16 N., 16 W. Collected by Geo. W. Dale.

Two determinations of Copper.

I wt ore used = ~~1.0016 gm~~ 1.0037 gms. (lost)
II " " " = ~~2.0435~~ " } failed.

I. wt Pt. Cone + Cu = 17.41585
A " Pt Cone = 17.25220
" Cu = 0.16365

A. 17.41585
B. 17.3382
C. 17.3084

B = 17.3382
= 17.25~~45~~
.0837

C = 17.3084
= 17.2545
.0539

III wt ore used = 1.1431
IV wt ore used = 0.9124 } grams.

I D. wt Pt Cone + Copper = 17.27725
" Pt cone = 17.25520
.02205

D = 17.27725

E = 17.3264

E wt Pt C + Cu = 17.3264
" Pt C = 17.2534
.0730

Total wt Copper found in I = 0.3963 . ore used = 1.0037
Per cent of copper found = 39.48

V wt bot + ore ~~fght~~ = 11.3784
" " + ore ~~fght~~ = 11.1974
" ore used = .1810

wt Pt cone + Copper = 17.31280
" Pt cone = 17.25295
" Copper = .05985

3306 — a
657

b. wt Pt C + Cu = 17.2632
" Pt Cone = 17.2514
.0118

39.57 per cent. Copper.

April 15/89.

Tr. ab. No. 750

23

" Peter's Well. Section 26, 4 N., 11 W.
Said to yield gold"
Collected J.C. Branner.

Wt paper + ore = 4.3626 s
" paper = 0.34215
wt ore used = 4.02050 grams.

or
Wt ore little more than 0.1 AT
" " less than 0.15 AT } = 0.1 AT + 1.1+0.2 grams

Roasted and used following proportions:

4.0205 gram. ore
35 " test lead
10 " borax glass.

Scrification assay

Obtained small button silvery weighing less than .0002 grams. Treated with nitric acid a small bran speck remained undissolved.

Slight trace of Gold.

R.N. Brackett

4

Lab No. 171

Iron ore. Marked: "Specimen of iron ore furnished by A. F. Freeman, Postmaster Knoxville Johnson Co. Ark. (from land near J. J. Caldwell section 7 or 8, 10 N., 21 W."

Determinations of Iron, Phosphorus, and Sulphur.

Iron: [wt ore to be used = @ 2 grams.]

I. wt ore used = 2.0016 gm, dissolved, and solution diluted to 500 c.c. 100 cc titrated with potas. permanganate sol. gave 0.173614 gm Fe. x 5

100 c.c. req'd 19.3 c.c. $KMnO_4$. 1 c.c. $KMnO_4$ = .008998

.173614 x 5 = .868307 Fe or 43.38% —

For phosphoric acid, wt ore used = 5.0096 gm.

wt crucible ash + $Mg_2P_2O_7$ = 7.6 5 7100

" crucible + ash (.000851) = 7.625 1655

" $Mg_2P_2O_7$ = 0.031915

" P_2O_5 = 0.020414110 60

" P = 0.008919

P_2O_5 = 0.178 %

P = 0.178 %

For Sulphur, wt ore used = 10.0078 gm.

wt crucible ash + $BaSO_4$ = 8.110200

" crucible + ash (.000851) = 8.075785

" $BaSO_4$ = 0.034415

" S = 0.004726 5 5 6 6 1

S = 0.047 %

II. analysis. wt ore used = 2.0042 gm.

Iron ore - Alt - continued -

I analysis wt ore used = 2.0016 grams.
(a) 100 cc - by precipitation.

wt C. ash + Fe_2O_3 + Al_2O_3 = 7.02050
wt C + ash .000116 = 6.739216
wt Fe_2O_3 + Al_2O_3 = 0.28129

Percent Fe_2O_3
wt crue. ash + Fe_2O_3 =
wt C + ash =
wt Fe_2O_3 =

160 cc. after sep.
Percent Fe_2O_3 = 64.19%.
" Fe = 44.93%.

wt Fe_2O_3 + Crue + ash = 6.99630
" Crue + ash (.000116) = 6.739316
0.25698

Summary of Partial analysis of Iron ore (dry)

Iron	44.05%
Phosphorus	0.17
Sulphur	0.04

- Rutro Jpb. -

II analysis wt ore used = 2.0042 grams.
A. 250 cc sol. precipitation

wt crue. ash + Fe_2O_3 + Al_2O_3 = 16.08710
wt C. + ash .000116 = 15.402416
wt Fe_2O_3 + Al_2O_3 = 0.68469

wt C. ash + Fe_2O_3 = 8.710300
wt C + ash .000116 = 8.075816
wt Fe_2O_3 = .634484

Fe = 44.32%

B. 250 cc Sol. precipitation.

wt crue. ash + Fe_2O_3 + Al_2O_3 = 8.30290
wt C. + ash .000116 = 7.624816
wt Fe_2O_3 + Al_2O_3 = 0.67809

after separa. wt Fe_2O_3 + Crue + ash = 8.69950
Percent Fe_2O_3 = ~~43.87~~ " Crue + ash (.000116) = 8.075666
Percent Fe = 43.57% 0.62384

Mean of 4 determinations is 44.05% Fe.

6 Lab. No. 172

Iron ore from J. J. Caldwell, Clarksville,
"Same as in book 37, pg 63.

Heavy dark colored, brown to black; metallic lustre; powder brown; some hematite present; not sandy; apparently a pure ore.

For analysis, amt. used = 1.4325 gm.
Solution was 250 c.c.

percent Fe
53.53%

I

wt C. ash + Fe_2O_3 = 19.12090
wt C + ash 0.000116 = 18.682116
wt Fe_2O_3 (100 c.c.) 0.43879

wt Fe = 0.30715

100 c.c. s.c. II 250 c.c. Total sol.

wt Cucr. ash + Fe_2O_3 = 7.97370
" " + ash = 7.532785
0.44092

wt Fe = 0.308644.

Fe = 53.85%

53.85
53.53
2) 107.38
53.69

Mean of 2 determs Iron 53.69%

For phosphorus. wt used = 5.0299 gm.

For Sulphur. wt used = 10.0298 gm

insol matter in 1.4325 gm.
percent insol matter
9.78%

c. ash + insol matter = 7.78530
C + ash .000085 = 7.645085
Insol matter = 0.14022

Sulphur. ore used = 10.0298 gm.

Sulphur = 0.0085%

wt c. ash + $BaSO_4$ = 15.405470
wt C + ash .000085 = 15.399485
wt $BaSO_4$ = 0.00622

wt Sulphur = 0.000855 (42548)
(.00622 X .13734)

Summary of Partial analysis
of Iron ore from J. J. Caldwell
Clarksville, Ark.
Rec'd of Mr. A. Winslow —

Iron, metallic	53.69	per cent.
Insoluble matter (sand &c)	9.78	" "
Sulphur	0.008	" "
Phosphorus		

Bracketed and Smith
Analysts.

Lab. No 284. Qualitative test for Manganese, of ore labelled: "Notebook 46; pg 38. May 25, 1889.
S.E of section 30; 6 N; 11 W. On anticlinal ridge.
J.H. Means.

Found strong reaction for Manganese

Lab. No

308. Assay for Copper & Silver of Specimen marked ; "Sept. 23. 1889. S.W. ¼ of S.W. ¼, Section 30; 2N; 14W. Thos. & H.L. Fletcher's land collected by Thos. Fletcher."

I for analysis – Cu 5.0000 gm ore I

For assay in dry way for Silver:

Sept. 26. 1889. Weighed into Hessian crucibles.

Ore	0.3 A.T.
Litharge	60 grammes.
Soda (Bicarb)	20 "
Nitre (KNO_3)	8 "
Borax	15 "
Pwd. glass	5 "

Salt cover.

Two portions prepared and weighed into Hessian crucibles. No lead button was formed with these charges.

Sept 27. Weighed into 4 separate scorifiers 4 charges each as follows:

Ore	0.1 A.T.
Test lead	35 grammes.
Borax	1 "

For Examination for silver took 5.00 gram. Found no silver

I Cu 5. grams. wt Cone + Cu = wt Cone

II Cu 5. grams.

Percent Copper

(a) 26.32%

Cone + Cu = 17.7794

II.1 wt Cone = 17.2529

(a) Cu = 0.5265

R.N.B Note: make 5 grams up to 250 cc Take 100 c.c. for determination Cu II.1

wt Cone + Pt = 17.3128

(b) 3.00% Cu (b) wt Cone = 17.2528

0.0600

Total a+b = 29.32% Cu.

308. II 2. took 100cc from 250cc

Containing 5 grams ore; precip'd Cu & dissolved and made up to 200cc; took 100cc. of 200cc. for Cu:

(a) 29.50% Cu.

wt Cone + Cu = 17.5484
(a) wt Cone = 17.2534
wt Cu = .2950

b. wt Cu + Cone =
wt Cone = 17.2534
wt Cu =

Mean of two determinations
29.32
29.50 = 29.41 % Cu

Act 2 20/89

R A B & J.P.

Note 308. Specimen rather small (about size of U.S.A. Lab. interstand) powdered whole spec. mixed well & took out portion for analysis. R A B

Lab N° 310 — Qualitative test for Zinc of ore from Dr Brauer [C.] marked:

Found: a Bothryoidal dirty white heavy ore — Carbonate of Zinc.

Sept 30/89. RAB

Lab. No 299. Manganese Ore. marked:
" Notebook 72, pg 31. July 10. 1889.
Button Mine. 1m N.W. Simmons Mill.
No. 9. R. A. F. Penrose Jr.

Apparently chiefly pyrolusite.

1 = 9.4140
2 = 9.4140
3 =

Percent water
2.01%

for wata & loss. wt = 1.0122 gm
C. + O ff ht = 9.4344
after = 9.4140
water at 110°C = 0.0204

Percent loss BB
3.84%

C. + O of ignit = 9.4140
after = 9.3759
loss BB = 0.0381

~~for anal. I — Orude~~ ~~wt air dry = 5.0062 gm~~
wt dried at 110°C →

Note: apparently no effervescence.
Note dissolves in conc. HCl.

a Residue
b. Filtrate — made up to 250 cc
Took (1) 100 cc (2) 100 cc for Si O2, Fe, Mn, Ca, Mg, alk

299 (1) 100 cc. wt SiO_2 = 0.00462 gm

299 Residue from 5.0062 gm. wt Residue = 4.02132 gm
299 (2) 100 cc wt SiO_2 = 0.00332 gm

299. MnOre. II for P_2O_5.

wt air dry = 5.0230 gm

wt dry at 110°C = 4.9221 gm

wt $Mg_2P_2O_7$ = 0.00842 gm

wt P_2O_5 = 0.00538

Percent P_2O_5 0.10%

299. For analysis I. (Made up to 250 cc.) wt air dry = 5.0511 gm

" dries @ 110°C = 4.9495

wt residue = 4.55732 gm

92.07

fused with Alk Carb. In the HCl. sol of the fusion a yellow-brown precip. was formed on the crucible, insol in conc. HCl, but sol. in water + dilute HCl. The sol was colored a bright yellow, + in the conc. HCl sol some yellowish orange colored substance crystallized out.

wt SiO_2 from Residue I = 4.06302 gm

(Refused SiO_2 the fusion had a violet color

wt crue = 19.218016

299. Wt refused SiO_2 = 3.89189 gm

NB treated with HF – wt effect = 0.04964

SiO_2 = 3.84225 gm

77.62 percent SiO_2

Note – Sol. by treatment 299 with HCl. when conc. hot, brownish green – cold gives brownish Yellow

Note: 299 I Residue – fusin with Na_2CO_3 – K_2CO_3 – with water and HCl – gave brown deposit on pt. crue. – insol. in acid, but sol. in water – from tolerably weak acid sol. yellow to orange crystals separate. sol. in water – with H_2S a copious dark brown precipitate in acid solution – Supernatant liquid brown in color – passed gas a long time, the liquid clotted. Filtrate clear, but turned faint brown on boiling (some precip washed through). H_2S precip. brown – very dark brown – treated with HCl with (NH4)2S – most remained unattacked so it treated with conc. HNO_3 – which seemed to attack it considerably especially when warmed; the very dark brown substance entirely disappeared, – and dissolved completely – added water & heated – filtered – treated residue mostly filter paper with aqua regia.

299 I Residue after treating SiO_2 with H.F. wt residue = 0.01042 gm. (TiO_2(?) + SO_4)

Contained Sulphuric acid. SO_4 = 0.01755 "

Residue 0.01042 = $TiO(SO_4)_2$ probably

299. I R. wt CaO (with Mn?) = 0.021599 gm.

Mn_3O_4 = 0.18%

CaO = 0.24%

Mn_3O_4 = 0.000934

CaO = 0.01225

Percent MgO 299 I R. wt $Mg_2P_2O_7$ = 0.01529 gm

0.11% wt MgO = 0.00550

(Percent = 3.11% 299 I R. wt $Fe_2O_3 + Al_2O_3 + Mn_3O_4$ = 0.15402 gm.)

0.66% 299 I 100 cc. (1) wt CaO = 0.01317 grams

299 100 cc. I = wt $Mg_2P_2O_7$ = 0.04499

0.081% MgO = 0.01621

299 I 100 cc. Mn_3O_4 = 0.006423 3.wt% Mn_3O_4

299 I R Fe + al.

1.28% $Fe_2O_3 + Al_2O_3$ = 0.06377)

Made up to 200 cc. 50 cc. req'd 0.9 cc. $KMnO_4$

Fe = 0.022332 gm. = 0.45% Fe = 0.64% Fe_2O_3

$Fe_2O_3 + Al_2O_3$ = 1.28%

Fe_2O_3 = 0.64

Al_2O_3 = 0.64

299 I 100 cc. $Fe_2O_3 + Al_2O_3$ = 0.03992 gram.

Made up to 200 cc. 50 cc. req'd 0.75 cc $KMnO_4$

= .018603 Fe = 0.94% Fe = 1.34% Fe_2O_3.

in 100 cc.

= .024651 Fe

in 250 cc.

$Fe_2O_3 + Al_2O_3$ = 2.21

Fe_2O_3 = 1.34

Al_2O_3 = 0.87

299 I 100 cc. Manganese.

wt Mn_3O_4 =

64
87
1.51

1.34
64
1.98

299 R - 30 mm Mn. 100 cc / mm 500 cc (Exp. 58) 1,000 cc.

Mn_3O_4 = .00529 - Mn_3O_4 0.17%

$Fe_2O_3 + Al_2O_3$ = .0687 = 2.33%

299 alkalies (+ water)

For water wt air dry = 2.0002 grams

wt C + 299 bf ht. = 20.6709
wt C + 299 af ht = 20.6331
wt water = 0.0378

1.88%

For alkalies wt air dry = 2.0002
wt dried @ 110°-115°C = 1.9624

wt D + NaCl + KCl = 14.1846
wt D = 14.1647
wt NaCl + KCl = 0.0199
wt KCl = 0.0110
wt NaCl = 0.0089
wt K_2PtCl_6 = 0.0362
wt K Cl =

K_2O = .00694 = 0.35%
Na_2O = .0047 = 0.24%

299 R. 3 grams 100 cc. $Fe_2O_3 + Al_2O_3$ =
make up to 200 cc. 50 cc. 20% ekmnery = Fe = % Fe

Résumé of 299.

Silica	77.62	per cent.
Alumina	~~1.51~~ 9.56	
Ferric oxide	1.98	
Lime	0.90	" "
Magnesia	0.92	" "
Potash	0.38	" "
Soda	0.24	" "
Loss on ignition	3.84	" "
Manganese, red oxide	0.35 + 3.24 = 3.59 %	
* Phosphoric acid	0.10	" "

(92.13)

water @ 110°-115°C — 2.01 per cent.

* Phosphorus .004 per cent

NPV Note Make deletion of Total Manganese apace.

Lot. No. 300. Manganese Ore. Marked:

" Notebook 72, pg 43. July 11. 1889. (No 10)
Cason property, S.W., S.W., 34, 14 – 6. Independence Co.
"Button Ore" R.A.F. Penrose Jr. "

1=9.5737 2="""""
for water & loss BB. wt = 1.0072
Percent water 0.62%
C + O of Ft = 9.5800
after = 9.5737
water at 110°C = 0.0063

Percent Loss BB 2.190%
C + O of ignit = 9.5737
after = 9.5517
loss BB. 0.0220

for analysis I (Made up to 250 cc)
wt air dry = 5.0028 gm
wt dry at 110°C = 4.9718 gm

Note: Apparently slight effervescence – but no carb. Due to Cl
(In pressure bottle.)

For P_2O_5.
wt air dry = 5.0272 gm
wt dry at 110°C = 4.9961 gm OK

Percent Residue = 12.730%
300 Residue
wt = 0.63312 gm

fused Residue, reacts for Manganese.
Percent SiO_2 = 12.67%
wt SiO_2 from Residue = 0.62902 gm

300 P_2O_5
wt $Mg_2P_2O_7$ = 0.01099 gm
0.12% P_2O_5 OK
wt P_2O_5 = 0.0070

300 I R.
wt $Fe_2O_3 + Al_2O_3$ = 0.04102 gm
0.82 = Fe + Al
0.11 = Fe
0.71 = Al_2O_3
wt Fe_2O_3 = 0.00592
wt Al_2O_3 = 0.03510

0.10% 300 I R
wt CaO = 0.00519 gm

300 I R.
wt $Mg_2P_2O_7$ =
wt MgO =

300 I 100 cc (H) wt CaO = 0.07174 = 2.09 %

300 I 100 cc wt $Mg_2P_2O_7$ = 0.05449 grams
0.98 % wt MgO = 0.07963 "

300 100 cc $Fe_2O_3 + Al_2O_3 + Mn_3O_4$ = 0.24054
(confirm strong Mn reaction.)
Made up to 200 cc saturated 6 cc $KMnO_4$

$Fe_2O_3 + Al_2O_3$ = 0.23707 Fe = 7.48 % Fe = 10.69 % Fe_2O_3

$Fe_2O_3 + Al_2O_3 + Mn_3O_4$ = 12.09 %
Fe_2O_3 = 10.69
$Al_2O_3 + Mn_3O_4$ = 1.40
Mn_3O_4 = .74

wt Mn_3O_4 = 0.01482 = 0.74 % (in 250 cc)

300 100 cc wt Mn_3O_4 = 1.37709 = 69.24 %

300 For water track wt air dry = 2.0010
" d @ 110°-115°C = 1.9865

0.72 % wt water = 0.0145 gram

K_2O = .00372 = 0.18 %
Na_2O = .00254 = 0.12

wt NaCl + KCl = 0.0107
wt KCl = 0.0059
wt NaCl = 0.0048
wt H_2PtCl_6 = 0.0195
wt KCl =

Resume of 300.

Silica	12.67	per cent.
Alumina	1.37	
Ferric oxide	10.80	
Manganese oxide	69.98	
Lime	2.09	" "
Magnesia	0.98	" "
Potash	0.18	
Soda	0.12	
Loss on ignition	2.19	" "
* Phosphoric acid	0.14	" "
Total	100.52 (100.22).	

Water @ 110°-115°C — 0.62 per cent.

* Phosphorus 0.06 per cent.

Lab. No 301. Manganese Ore, marked:
"Note book 72 pg 51. July 13. 1889.
Wren property. N.E., N.E., 4, -14, -7.
No 11. R.A.F. Penrose Jr."

1 = 9.4638
2 = 9.4624
3 = 9.4619

Percent water 1.05% water

for water and Loss BB wt = 1.0502
C + O bf ht = 9.4730
after = 9.4619
water at 110°C = 0.0111

Percent Loss BB 4.03%

C+O of ignit = 9.4619
after = 9.4200
loss BB = 0.0419

for anal I {Made up to 250 c.c.} wt air dry = 5.0711
wt dry at 110°C = 5.0179 > wt [illegible]

B.B. no effervescence.

II For P_2O_5. wt air dry = 5.0220 gm
wt dry at 110°C = 4.9693 >
wt $Mg_2P_2O_7$ = 0.00869 gm
0.11 % P_2O_5 wt P_2O_5 -- = 0.0055 >

301 I (No reaction for Mn) Residue C. ash + R = 19.73950
c + ash = 19.214616
10.46 wt Residue = 0.52489

(Residue not perfectly fused.) wt SiO_2 = 0.31662 gm
Refused. wt Silica = 0.30602 gm >>
SiO_2 6.09% wt 2/3

4.25
4.12
Al_2O_3 = .13

301 I R. wt Fe_2O_3 + Al_2O_3 = 0.21339 gm
wt Fe_2O_3 = 0.20712
wt Al_2O_3 = 0.00627

.18% 301 I R wt CaO = 0.00909 gm.

.04% 301 I R. wt $Mg_2P_2O_7$ = 0.00619 gm
wt MgO = 0.00223 >

301 I 100 c.c. 31.85 / 29.65 / 2.20 $Fe_2O_3 + Al_2O_3 + Mn_3O_4$ (+ $BaCl_2$) = 0.6393 / 0.5952

301 I 100 c.c. Mn_3O_4 = 0.0340 / 1.13722 / 1.17122 (1.04813)
$BaSO_4$ =
Mg_2O_4 =

301 I 100 c.c. @ 0.17% CaO = 0.0032 gram.

0.60% $Mg_2P_2O_7$ = 0.03362 gram.
MgO = 0.01211

wt @ 110°-115°C. 1.9806
For water alkalies wt air dry = 2.0050
1.21% wt water = 0.0244
wt NaCl + KCl = 0.0175
K_2O = .00227 = 0.11% wt KCl = 0.0036
Na_2O = .00737 = 0.37" wt NaCl = 0.0139
wt K_2PtCl_6 = 0.0120 gram.
wt KCl = 0.003667

Resumé of 301.

Silica	6 09	per cent.
Alumina	2 33	" "
Ferric oxide	33 77	" "
Manganese, red oxide		
Lime	0.35	" "
Magnesia	0.64	" "
Potash	0.11	" "
Soda	0 37	" "
Loss on ignition	4 03	" "
Phosphoric acid	0 11	" "

4780 Sine Mon

water @ 110°-115°C. — 1.05 per cent.

301 Redetermination of Mn
wt air dry = 0.2094 Gram
wt dry @ 110°-115°C = 0.2069 "

wt Mn_2O_4 =

301 Mn HCl
wt air dry 0.5012
wt dry @ 110°-115°C = 0.4832

---

301 June 7/1890 For Mn — Treat with HCl Conc.
wt air dry = 2.0004
wt dry @ 110°-115°C = 1.9762

make filtrate up to 200 cc

Take 50 c.c. = wt Mn_2O_4 =
50 cc. = wt Mn_2O_4 =

Lab. No. 302, Manganese ore, marked;
" Note book 72, pg 43, July 11, 1889.
Caron property. S.W. SW. 34, — 14, 6. Independence Co.
No 12. R. A. F. Penrose Jr. "

1 = 9.5515
2 = 9.5482
3 = gained

Percent water 2.53%

for water and loss BB wt = 1.0011
Ct of bt = 9.5736
after = 9.5482
loss at 110° = 0.0254

Ct of bt = 9.5482
after = 9.5014
loss BB = 0.0468

4.79%

for analysis I (dissolved to 250 cc.)
wt air dry = 5.0342
wt dry at 110°C = 4.9069

NB no effervescence

For P_2O_5 ---
wt air dry = 5.0207 gm
wt dry at 110°C = 4.8937

0.5 gm

Percent P_2O_5 302. P_2O_5
1.53%
wt $Mg_2P_2O_7$ = 0.11719 gm
wt P_2O_5 = 0.07495 gm

After redissolving, reprecipitating 2

wt $Mg_2P_2O_7$ = 0.09189 gm
" " = 0.01042

302 I Residue
Ct ash + R = 20.65620
Ct ash = 19.21316
Residue = 1.44259

29.39

Alk Carb fusion reacts for Mn, & gives also a purplish color.

25.65%

I wt SiO_2 (from Residue) = 1.25902 gm

.06%

302 I R. CaO = 0.00319 gm.

.05%

302 I R. wt $Mg_2P_2O_7$ = 0.00717 gm
wt MgO = 0.00258

2.18%
.81
1.34
.67%

302 I R. wt $Fe_2O_3 + Al_2O_3$ = 0.10705 gm
Fe_2O_3 = 0.04152

302 I R. wt Mn_3O_4 = 0.03322 gm

302 I 100 cc. 9.94 . $Fe_2O_3 + al_2O_3 + Mn_3O_4 = 0.19529$ grms.

1.36 → $Mn_3O_4 = 0.02682$

$Fe_2O_3 al_2O_3$ 8.58 $Fe_2O_3 = .12047$ = .16847 6.13%

302 I 100 cc. 42.58 $Mn_3O_4 = 0.83579$

302 I 100 cc. 5.79 $CaO + Mn_3O_4 = 0.11384$ grms.

Mn_3O_4 = 5.07 $Mg_2P_2O_7$ = 0.08629 grams. $Mn_3O_4 = 0.01422$

1.58 MgO = 0.03

Wt d @ 110°-115°C. 1.9694

For water & alkalies wt air dry = 2.0247

2.73% wt water = 0.0553

wt NaCl + KCl = 0.0471

wt KCl = 0.0258

wt NaCl = 0.0213

wt K_2PtCl_6 = 0.0846 grams

wt KCl =

K_2O = .01630 = 0.82

Na_2O = .01130 = 0.57

Resumé of 302.

	Silica	25 65	per cent.
Mn_3O_4	Manganese, red oxide	48 08	" "
	Phosphoric acid	1 33	" "
	Alumina	3.79	" "
	Ferric oxide	6 97	" "
	Lime	5 13	" "
	Magnesia	1 61	" "
	Potash	0 82	" "
	Soda	0 57	" "
	Loss on ignition	4 79	" "

see next p. (24)

(93.36)

Water @ 110°-115°C — 2.53 per cent

Work for 302.

302 Redetermination of Total Manganese.

Wt air dry = 0.50055

Wt d. @ 110°/115°C = 0.48689

Wt $MnNH_4PO_4$ = 0.2341

= 48.08 %

Note: No Ba in this $MnNH_4PO_4$

Résumé of 302

Silica	2.65	percent
Alumina	3.79	" "
Ferric oxide	6.97	" "
Manganese oxide	48.08	" "
Lime	5.13	" "
Magnesia	1.61	" "
Potash	0.82	" "
Soda	0.57	" "
Phosphoric acid	1.33	" "
Sulphuric acid	none	" "
Loss on ignition.	4.79	" "
	98.74	
additional Loss on ignition see pg 25	1.07	
	99.81	Total

3 o 2 for K_2SO_4

wt air dry = 1.0085
wt dry @ 110°-115°C. =

3 o 2 Redetermination of water & loss BB

wt air dry = 1.0681
wt dry @ 110°-115°C = 1.0413

wt C + 3 o 2 before ht = 21.1686
wt C + 3 o 2 after ht. = 21.1418
wt water = 0.0268

2.509 %

wt C + 3 o 2 before ht BB = 21.1418
" + " after ht BB = 21.0703
wt loss BB = 0.0715

6.86 %

N.B. Fused considerably on ignition.

Lab. No. 303. Manganese ore, marked:
Note book 72, pg 61. July 13. 1889.

Brookville Mine — Drift 2. N.W., N.E., — 15 — 14 — 7.
No 13. R. A. F. Penrose Jr. "

For water
1 = 8.1688
2 = 8.1685

and loss BB. wt = 1.0035
Crt & wt ht = 8.2010
after = 8.1688
water at 110° C = 0.0322

9.80 %

Crt & wt ignit = 8.1688
after = 8.0736
loss BB = 0.0952

for analysis I Made up to 250 cc.

wt air dry = 5.0105 gm.
wt dry at 110° C = 4.8502

N.B. no effervescence.

For P_2O_5, I wt air dry = 5.0286
wt dry at 110° C = 4.8677

303 P_2O_5 I
0.0969 P_2O_5

wt $Mg_2P_2O_7$ = 0.00752 gm.
wt P_2O_5 = 0.0048

303. I

wt crucible + residue = 19.19190
crucible = 18.59778 5
wt Residue = 0.59412

Fused with Alk Carb. Reacts for Mn, & also gives a slight purple color.

10.26 % 303 I SiO_2 (from Residue = 0.49789 gm
303 I R. wt CaO = 0.00669 gm
0.13 %

303 I R. for magnesia

303 I R. wt $Fe_2O_3 + Al_2O_3$ = 0.07842 gm

303 I R Mn_3O_4 = 0.00592 — 0.12 %

23.06 %

303 I 100 c.c. $Fe_2O_3 + Al_2O_3 + Mn_3O_4 = 0.31439$

1.07 $Mn_3O_4 = 0.02089$

21.98 $Fe_2O_3 + Al_2O_3 = 0.42650$

16.43 $Fe_2O_3 = 0.31890$

5.55 Al_2O_3

303 I 100 c.c. $CaO = 0.00509$ grams. = 0.26%

$Mg_2P_2O_7 = 0.01459$ "

$MgO = 0.00525$ " = 0.27%

303 I 100 cc $Mn_3O_4 = 0.93957 = 48.32\%$

For water & alk. wt air dry = 2.0009

" dry @ 110-115°C = 1.9465

2.71 % wt water = 0.0544

wt NaCl + KCl = 0.0231 grm.

$K_2O = .00815 = 0.41\%$ wt KCl = 0.0129

$Na_2O = .00541 = 0.27\%$ wt NaCl = 0.0102

wt K_2PtCl_6 = 0.0423

wt KCl = 0.0129

Résumé of 303. dried @ 110-115°C.

Silica	10 26	per	cent
alumina & ferric oxide —	1 61 (R)	"	"
Alumina	5 55	"	"
Ferric oxide	16 43	"	"
Manganese, oxide	50 57 (R) + 18.32	"	"
Lime	0 39	"	"
Magnesia	0 27	"	"
Potash	0 41	"	"
Soda	0 27	"	"
Loss on ignition.	9 80	"	"
Phosphoric acid	0 09		
			95.59

Redstem Mn. Total

303. Redetermination total Mn
wt air dry = 0.5022
wt d @ 110°–115°C. = 0.4886
wt Mn_3O_4 =

303 Mn. – HCl sol.
wt air dry = 0.5018
wt d @ 110°–115°C = 0.4883

303 I 100 cc. (2nd) – Mn sol
~~(200 cc)~~ wt Mn_3O_4 =
~~Sp gr.~~ wt Mn_3

303
& water. Redeterm. loss on ignition
wt air dry = 1.5208
wt d @ 110°–115°C = 1.4783
wt C + 303 bf. ht. = 19.9725
wt C + 303 af. ht. = 19.9300
2.79% wt water = 0.0425
wt C + 303 bf ht B.B. = 19.9300
" + 303 af ht " = 19.7577
11.65% wt loss on ignition = 0.1723

R. N. B.

N.B. caked somewhat on ignition.

Resumé 303

Silica	10	26	per	cent.
Alumina	5	53	"	"
Ferric oxide	16	43	"	"
Manganese oxide	50	51	"	"
Lime	0	39	"	"
Magnesia	0	27	"	"
Potash	0	41	"	"
Soda	0	27	"	"
Phosphoric acid	0	09	"	"
Loss on ignition	11	65	"	"
Alumina & Ferric oxide	1	61		
	97	44		

OK Am Pp

1000
97.44
2.56

Lab No. 317. Manganese clay; marked: "
Notebook 72, pg 107. July 15. 1889.
Wm. Martin property, 5 mi. W. of Cushman.
No. 14. R. A. F. Penrose Jr. "

for water + loss BB
1 = 9.3568
2 = 9.3550
3 = 9.3518
4 = 9.3494
5 = 9.3494
7.60 water

wt = 1.0035 gm.
Crucible + ignit = 9.4257
after = 9.3494
water at 110°C = 0.0763

Crucible + ignit = 9.3494
after = 9.2617
loss BB = 0.0877
9.45

for analysis I / wt air dry = 5.0282 gm.
Made up to 250 cc. / wt dry at 110°C = 4.6461 "

NB No effervescence.

For P_2O_5. wt air dry = 5.0560 gm
wt dry at 110°C = 4.6718

317. P_2O_5 2.53%

wt $Mg_2P_2O_7$ = 0.18529
wt P_2O_5 = 0.11851

317 P_2O_5. wt $Mg_2P_2O_7$ (after resol = 0.17099 gm.
(remainder = 0.00229
wt $Mg_2P_2O_7$ = 0.17328

317. I Residue. Crucible + R = 21.87710
Crucible + ash = 20.18791 6
Residue = 1.68919
36.35%

Alk. Carb. fusion. No reaction for Mn., clear fusion.
Crucible + SiO_2 = 20.15270
Crucible + ash = 18.59348 5
SiO_2 = 1.55922
33.55

317. I R. wt CaO = 0.00569 gm.
0.12

317. I R. wt $Mg_2P_2O_7$ = 0.00922 gm
wt MgO = 0.00332
.07

317 Redeterm Mn

Wt air dry = 1.0000 gram

Wt @ 110°-118°C = 0.9567 "

Wt $Mn_2P_2O_7$ = .13389 = 14.45%

= .00444 = .47 "

14.92%

Examine 317 for H_2SO_4 redetermine Silica total by fusion.

For Silica & Sulphuric acid Wt air dry =

dry @ 110°-118°C = _____

Wt SiO_2 =

Wt $BaSO_4$ =

SO_3 = _____

317 I Incc Fe_2O_3 .0007

2.1

360

144

.001800

.03

4.6461) .180000

0.03% —

Résumé 317.

Silica	33	55	per cent.
Alumina	30	18	" "
Ferric oxide	1	95	" "
Manganese oxide	14	45	" "
Lime	3	89	" "
Magnesia	0	26	" "
Potash	0	96	" "
Soda	0	61	" "
Phosphoric acid	2	37	" "
Loss on ignition	9	45	" "
Total	97.	67	" "
manganese oxide		.47	" "
Total	98.	14	" "

P_2O_5 $98.\frac{16}{30} + .03 = 98.30\%$

May 24 1890.

317. Redetermination of water & Loss BB

wt air dry = 1.0179

wt @ 110°–115°C = .9448

wt C + 317 bf ht = 18.7784

wt C + 317 af ht = 18.6053

7.18% wt water = 0.0731

wt C + 317 bf ht B.B = 18.7053

wt C + 317 af ht B.B = 18.6040

10.72% wt loss B.B = 0.1013

accepting this Loss on ignition

Total above becomes 99.60

N.B. Ca retained very much on ignition

Lab. No. 318. Manganese & iron ore. Marked: "No 15.
Notebook 72, pg 37. July 10. 1889.
Milligan property, N.E., N.W., 6 — 14 — 6.
R. A. F. Penrose Jr."

1 = 10.7373
2 = 10.5355
3 = 10.5329
4 = 10.5326

for water and loss BB. wt = 2.0036
C + o of wt = 10.5762
after = 10.5326
water at 110°C = 0.0436

C + o of ignit = 10.5326
after = 10.3180
loss BB = 0.2146

for analysis wt air dry = 5.0251 gm.
wt dry at 110°C =

For P_2O_5. wt air dry = 5.0268 gm.
wt dry at 110°C =
No reaction for P_2O_5

Manganese & Iron ore.

Lab. No 319. Marked: "Notebook 72, pg 37. July 10. 1889.
Milligan property. NE, NW, 6 – 14 – 6.
No 16. R. A. F. Penrose Jr. "

For water and loss B B = 2.0464
1 = 9.4694
2 = 9.4693
c + o of ht = 9.4977
after = 9.4693
water at 110°C = 0.0284

c + o of ignit = 9.4698
after = 9.2430
loss B B = 0.2268

For analysis I wt air dry = 5.0197 gm.
wt dry at 110°C = »

For P_2O_5 II wt air dry = 5.0351 gm
wt dry at 110°C = »

No reaction for P_2O_5 –

N.B. will want to determine Rare in this

Lab. No 320. Manganese bearing (?) Sand, marked:
Note book 72, pg 45, July 13, 1887
Grubb property. S.E, N.E, 4 – 14 – 7.
No 17. R. A. F. Penrose Jr. "

1 = 10.4208
2 = 10.4204

for water and low BB wt = 2.0117
0.69% water
C + S light = 10.4343
after = 10.4204
Water at 110°C = 0.0139

C + S light = 10.4204
after = 10.3846
low BB = 0.0358

for ~~analysis~~ P_2O_5 wt air dry = 5.0336 gm
wt dry at 110°C = 4.9989

For analysis
I wt air dry = 5.0042
wt dry at 110°C = 4

320. P_2O_5. wt $Mg_2P_2O_7$ = 0.05469 gm
wt P_2O_5 = 0.03448

0.68% P_2O_5 redissolved $Mg_2P_2O_7$. wt $Mg_2P_2O_7$ = 0.00469 gm }
= then .52% P_2O_5 –

See Vol III p. 104-105

Lab. No. 321. Red Clay. marked "Note book 72, pg 61. July 13. 1889. No. 18.

Brooks Mine – shaft 1. S.W., S.E., – 10 – 14 – 7.
R. A. F. P. Jr.

For water & loss BB

wt = 1.0000 gm.
crc & ht = 8.7791 gm.
after = 8.7373
water at 110°C = 0.0418

Percent water 4.18%

Percent lost BB

crc & ignit = 8.7373
after = 8.6712
loss BB = 0.0661

For P_2O_5

wt air dry = 5.0363 gm
wt dry at 100°C =

321. P_2O_5.

wt $Mg_2P_2O_7$ = 0.01659 gm
wt P_2O_5 = 0.01061 gm

Lab. No. 322. Purple black manganese clay, marked: "
Notebook 72, pg 61, July 13, 1889.

No 19. Shaft 2, Brooks Mine,
N.W., N.E., 15 — 14 — 7. R.A.F. Penrose Jr."

For water & loss B.B. — wt air dry = 2.0040
wt dry @ 110° – 115° C = 1.9652

1.936% wt water @ 110° – 115° C. = .0388
8.07% wt loss B.B. = .1587

Bi_2O_3 fusion — wt D + KCl + NaCl =
wt D = _____
K_2O = wt KCl + NaCl =
Na_2O = wt KCl = _____
wt NaCl = _____
$wt\ K_2PtCl_6$ =
wt KCl = _____

For Phosphoric acid. wt air dry = 2.0008
wt dry @ 110°–115° C = 1.9622

wt $Mg_2P_2O_7$ = .02119
P_2O_5 0.68% P_2O_5 = .01345
P 0.29

For analysis wt air dry = 2.0000
wt dry @ 110° – 115° C = 1.9614

6.71% wt Residue = .1316 2
~~wt SiO_2~~
57.03% wt $Al_2O_3 + Fe_2O_3$ = 1.11869
51.39 wt Fe_2O_3 = 1.00810
5.64 Al_2O_3

0.5% wt CaO = .00992
0.32% wt $Mn_2P_2O_7$ = 0.01759
wt MgO = 0.00633

wt $Fe_2O_3 + Al_2O_3$ =
wt Fe_2O_3 =

B 22. I wt Mn_3O_4 = .34969 grms. 28.02(1)%

wt Mn_3O_4 =

Note made {[illegible] / Mn} {wt to cc —

4.82% Res wt SiO_2 = 0.09472 = Total SiO_2.
Res wt CaO = slight trace.
0.21% MgO (R) Res wt $Mg_2P_2O_7$ = .01189 ÷ MgO = .00428

R { 1.77%
.225
1.55% Al_2O_3

Res wt $Fe_2O_3 + Al_2O_3$ = .03473
Res wt Fe_2O_3 = .00443

For Alkalies wt air dry = 2.0210
wt @ 110°–115°C. = 1.9820
wt D + KCl + NaCl = 14.1823
wt D = 14.1630

K_2O = .00833 = 0.42% | wt KCl + NaCl = 0.0193
Na_2O = .00323 = 0.169% | wt KCl = 0.0132
wt NaCl = 0.0061
wt K_2PtCl_6 = 0.0433

Résumé of B22.

Silica	4 82	per cent.			4 82
Alumina	7 19	"	"		5 71
Ferric oxide	51 61	"	"		17 61
Manganese oxide (Red)	28 02	"	"		28 02
Lime	0 50	"	"		1 30
Magnesia	0 53	"	"		53
Potash	0.42	"	"		42
Soda	0 16	"	"		16
Phosphoric acid (P_2O_5)	0 68	"	"		68
Loss on ignition	8 07	"	"		807
					101.32

Water @ 110–115°C 1.93 per cent.

OK R.B.

Lot. No 323. Manganese-bearing sand (?) marked:
Notebook 72, pg 29. July 9. 1889
No 20. Criswell Place. N.E., N.E., 24-14-7.
R. A. F. Penrose Jr. "

58

299. Mn Ore. Qual. & Quant. Anal.

III for analysis wt air dry = 30.1187 gm
wt dry at 110°C = 29.5134 gm

Treated with conc. H Cl.

wt residue = 24.42201 gm

Note: Residue fused with Sodium & potassium Carbonates; silica separated as usual.

In Filtrate ppt Orange precipitate as before — passed H_2S thru hot sol. dark brown precip — and orange cryst precip not readily acted on by H_2S — warmed again & passed H_2S to saturation

Made up to 500 cc.

Redetermination of Total Manganese in 299.

wt air dry = 1.0010 grams
" @ 110°-115°C. = .9822

wt Mn_3O_4 = 0.10809 gram
= 11.00 per cent.

Note: no Barium in the Mn_3O_4, nor H_2S p.

Résumé of 299.

Silica	77.62	per cent.
Alumina	2.56	" "
Ferric oxide	1.98	" "
Manganese oxide	11.00	" "
Lime	0.90	" "
Magnesia	0.92	" "
Potash	0.38	" "
Soda	0.24	" "
Phosphoric acid	0.10	" "
Loss on ignition.	3.84	" "
Total	99.54	" "

H_2S ppt. ?

Jan. 27/1890

Ore – air examined for manganese
Marked: Note book 100, page 89
J. C. Branner.

No manganese! B.+S.