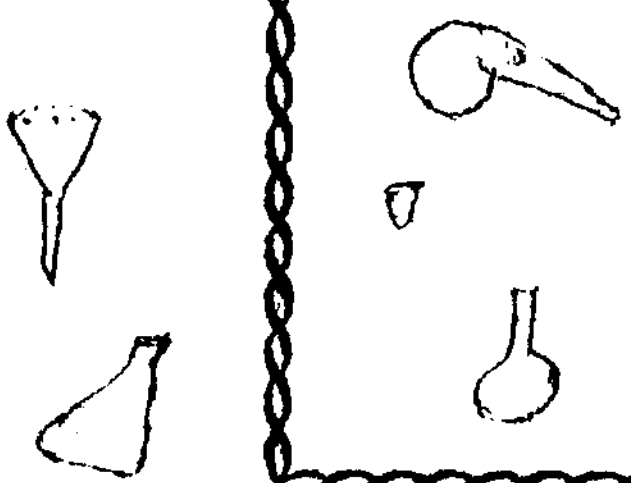
ROCKS.

Miscellaneous



ROCKS

Akron, Ohio. shale pp 23-25

Akron Ohio Clay 29

Typical Blue Syenite, Fourche quarry (No. 30) Fig 6

Arkansas, black 68; Gray 70.

Barytes, stinking, 22.

Blue City Novaculite 50

Brunner C. Shales 26, 34, 37.

Brunner C. LR slate 32

Burnes, big quarry Novaculite 52

Clay Pottery, Akron Ohio 29

Chert Tertiary 66

Brunner C. analyses for 72, 74, 76, 78

A B C D E F G H I K L M N O P Q R S T U V W Y Z

Eleolite Syenite, No. Magnet Cove fig 11.
Fourchebioge, Syenite, 6
Fernando 76

Griswold L.S.; Novaculites # 6, 48, 50, 52, 54, 58, 64, 66, 68, 70

Gypsum Bluff, specimen from R.T. Hill, 22.

Hopkins J.C. slate 39

E F G H I K L M N O P Q R S T U V W Y Z

A Kaolinite, South of Hot Spring Sp. 21. 44

Little Rock slate 32

Manganese ore 29
Melanite (31 41

Nigger Hill shale (No 110) p. 26

Novaculites, 1, 9, 46, 48, 50, 52, 54, 58, 64, 68
Novaculite, red, Hot Springs. pg 1.
" , white, " " pg 9. 80
Peridotite, Pike County 3
Picrite Porphyry. Pike County pg. 3, 4, 5.
Pike County, Peridotite 3
Pisolite pg 22.
Phonolite(?) Magnet Cove. 17

Quarry Mt. Novaculite 46

N O P Q R S T U V W Y Z

Rapta 78
Rapta Cricel 74

Reef rock 72

Rockport, Novaculite, 70

Round Mt Shale J.C.B Lab No 268. page 34.
" " " " Lab No 270 page 37.
Eleolite Syenite, Diamond Je quarry. pg 11

Shale, Akron Ohio pp. 22-25
Syenite, blue, No 30. South of Fourche bridge, in quarry, pg 6.
Shale, Nigger Hill, (No 110) p. 26
Syenite gray (decomp to blue) 15, 60
Syenites, 6, 15, 17
Slate ZR. 39
Ten mile quarry, Novaculite 54, 58

R S T U V W Y Z

Washita, mottled 64
Washita, white 58
Washita, black 54
Washita, hard 52
Washita, fine 48

Winslow A, Bayles 22

Zinc, examination Substances for 43

V
W
Y
Z

Lab. No. 100

Red Noraculite, Hot Springs.

wt crue + N = 16.0768 gm.
wt C = 15.0704 "

wt air dry norac = 1.0064 gm

1st	= 16.0767 gm
2	= 16.0763 "
3	=
4	=

wt C + N ff 1st = 16.0768 "
after 1st = 16.0763 "
water lost, 110°-15°C = 0.0005

wt Noraculite dried 110°-15°C = 1.0059 gm

water = ~~0.04~~ 0.04%

wtd @ 110°-115°C - 1.0475

wt C + N = 16.1190 gm
wt C = 15.0711
wt N. Norac = 1.0479 gm

Fused with Alk. Carbonates.

Silica:
99.931% SiO_2

wt crue + ff ppt + SiO_2 = 16.11 69
wt crucible = 15.0696
" SiO_2 + ff ppt = 1.047300
" ff ppt = 0.000116
wt SiO_2 = 1.047184

Alumina and Ferric oxide:
1.29%
~~1.348%~~

wt crue. ash $Fe_2O_3 + Al_2O_3$ = 15.45116
wt crue ash = 15.43757
wt $Fe_2O_3 + Al_2O_3$ = 0.01353
" Fe_2O_3 = 0.00632
" Al_2O_3 = 0.00721

percent Fe_2O_3
0.603

percent Al_2O_3
0.688

wt C. ash + Fe_2O_3 = 15.06780
wt C + ash = 15.061485
wt Fe_2O_3 = 0.00632

percent CaO
0.692

wt C. ash + CaO = 6.75064
wt C + ash = 6.74388
wt CaO = 0.00726 gm

percent MgO
0.179

wt C. ash + $Mg_2P_2O_7$ = 15.06800
wt C + ash = 15.06278
wt $Mg_2P_2O_7$ = 0.00522
wt MgO = 0.00188 gm

Lab No. 100

Red Novaculite, Hot Spgs.
Bi_2O_3 fusion for Alkalies.

wt K_2O = .002538+
" Na_2O = .004208+

wt c+r = 16.6514
wt c = 15.0628
wt Novac. = 1.5886 gm.

K_2O = .159 %
Na_2O = .264 %

wt d + KCl + NaCl = 14.19200
wt d = 14.18005
wt KCl + NaCl = 0.01195
" KCl = 0.004018
" NaCl = 0.007932

wt d.nuc + K_2PtCl_6 = 22.42540
wt d.nuc = 22.41225
wt K_2PtCl_6 = 0.01315
wt KCl = .004018+

Summary.

Silica	99.931	%
Ferric oxide	0.603	"
Alumina	0.688	"
Lime	0.692	"
Magnesia	0.179	"
Potash	0.159	"
Soda	0.264	"
	102.516	

102.51
H2
102.09

9993
57
H2

Lab No. 101

Pike County Peridotite. (No 35) I

Specific Gravity (in water, with Pt. wire) = 2.728 Sp. Gr.

wt crue + 35 = 16.42185 gm
wt crue = 15.47930 "
air dry wt 35 = 0.94255 "

water = 1.95 % wt water lost at 110°C = 0.0184 gm

Fused with Alkali carbonates.

SiO_2 = 40.95 % wt Silica = 0.38605 gm

wt = 22.00715
2 = 22.0068
22.0036
22.0032

wt c + CaO = 22.0032 gm
wt crue = 21.96073 "
wt CaO (35) = 0.03579 "

CaO = 3.81 %

wt c + $Mg_2P_2O_7$ = 22.57955 gm
wt c crue = 22.03680 "
wt $Mg_2P_2O_7$ 0.54275 "

MgO = 20.75 % wt MgO = 0.19558 gm

Fe_2O_3 = 11.04 % wt Fe_2O_3 = 0.10408 gm

Al_2O_3 = 8.18 (?) wt Al_2O_3 = 0.07719 gm
contained a trace of Iron

Al_2O_3 = another wt of Al_2O_3 = 0.0791 gm

No 35. II wt 35 = 0.7636 gm

Silica + (TiO_2) = 40.17 % wt Silica (+ TiO_2) = 0.3068 gm

wt Silica (free from TiO_2) = 0.2935 gm
wt TiO_2 = 0.0133 "

$Fe_2O_3 + Al_2O_3$ = 12.13 % wt $Fe_2O_3 + Al_2O_3$ = 0.09261 gm
CaO = 3.95 % wt CaO = 0.03015 gm

wt $Mg_2P_2O_7$ = 0.5533 gm
MgO = 26.11 % wt MgO = 0.19938 gm

4

Lab No. 101.

Pike County Peridotite.

Alkalies, by J. Lawrence Smith's method.

wt 35 = 1.1835 gm

$CaCO_3$ 10 gm.
NH_4Cl 1.2 gm

wt d + Alk Cl = 14.2815 gm.
wt dish = 14.2202 "
wt KCl + NaCl = 0.0613 "

KCl + NaCl = 0.06130 gm
KCl = 0.04387 "
NaCl = 0.01743 gm

wt ppte + K_2PtCl_6 = 21.85110
wt ppte = 21.70735
wt K_2PtCl_6 = 0.14375 gm
wt KCl = 0.04387 gm

K_2O = 0.03033 gm
Na_2O = 0.009239 gm

K_2O = 2.562 %
Na_2O = 0.78 %
Alk Oxides = 3.34

Redetermination of $Fe_2O_3 + Al_2O_3$ in 35. III

wt. 35 = 0.55182 gm.

$Fe_2O_3 + Al_2O_3$ = 17.89 %

wt $Fe_2O_3 + Al_2O_3$ = 0.09875 gm

17.89
11.04
6.85 = Al_2O_3

8.18
6.85
1.33 = TiO_2 (?)

wt $Mg_2P_2O_7$ = 0.4069 gm

MgO = 26.57 %

TITANIUM in 35.

~~wt 35 = 2.0354 gm~~

wt 35 = 1.03655

TiO_2 = 0.8966 %

wt TiO_2 = 0.009294 gm

CO_2 .

0.137 %

II = 0.145
IV = 0.129
21.274
.137 %

Ferrous Iron = 1.55 % = 1.990 % FeO.

Pike County Peridotite. Lab No. 101

Loss on ignition.

wt c + f = 16.4500
wt f = 15.4405

air dry wt peridotite = 1.0095

wt c + f. after Bl. 10 min. = 16.4500
after Bl. 10 min. = 16.3495
wt lost Bl. 10 min. = 0.1005

percent lost Bl. 10 m
9.95 %

Total loss Bl. --- =	9.95 %
(110°C) water & CO_2 -- =	2.10 "
Organic matter & water (Chemically Combined) =	7.85 %

Summary of Analyses.

water at 110°C --- =	1.95 %
Silica (free from TiO_2) (SiO_2) --- =	39.67 "
Ferric oxide (Fe_2O_3) --- =	8.83 "
Ferrous oxide (FeO) --- =	1.99 "
Alumina (Al_2O_3) --- =	6.85 "
Lime -- (CaO) --- =	3.88 "
Magnesia (MgO) --- =	26.34 "
Potassium oxide (K_2O) --- =	2.56 "
Sodium oxide (Na_2O) --- =	0.78 "
Titanium oxide (TiO_2) --- =	0.89 "
Carbonic acid (CO_2) --- =	0.14 "
	93.88 "
Organic matter & water lost at red heat 10 min =	7.85 "
Total --- =	101.73 %

6 Blue Syenite - 1st south of Franchi Gridley in quarry

No. 30. (Lab. No 102)

FeO

I. wt bot + No 30 bef. = 10.7895
" " + " " af = 8.8010
" 30 used = 1.9885

no effervescence with the SO4 Cu

II. wt bot + No 30 bef = 8.8010
" " + " " af = 6.6911
" 30 used = 2.1099

P_2O_5

wt paper + 30 = 10.8279
" paper = 0.8198
of 30 used 10.0081

FeO A.S. $KMnO_4$.

wt oxalic acid used = 0.80785 grams.
Dissolved in 200 cc measuring flask.
50 cc ox. ac. solution = 19.95 cc $KMnO_4$ (2 determ).
200 cc ox. ac. sol. = 0.80785 grams Cryst. oxal. acid.
50 cc ox. ac. solution = 0.201962 grs. Cryst. Oxalic acid.

$$= \frac{0.201962 \times 8}{9} = Fe$$

$= .17952222$ Fe in grams.

∴ 19.95 cc $KMnO_4$ = " " "
1 cc $KMnO_4$ = 0.008998 grams Fe.

I req. 1.32 cc $KMnO_4$
$.008998 \times 1.32 = .01187736$ Fe

$$\frac{.01187736 \times 71.84}{55.88} = FeO = .01526967 \text{ grams.}$$

$$\frac{.01526967 \times 100}{1.9885} = \text{per cent } FeO = 0.76\%$$

Blue Syenite (continued) (Contains Manganese)

[Lab No 102

FeO.

II req^{d} 1.36 cc KMnO$_4$

.00898 × 1.36 = .012223728 Fe in grams.

$\frac{.012223728 \times 71.84}{55.87}$ = FeO = 0.01573239 grams.

$\frac{.01573239 \times 100}{2.1099}$ = per cent. FeO = 0.74 %.

For SiO$_2$, Fe, Al, Mn, Ca & Mg.

wt Blue Syenite = 2.0162 gm. { fused with Na_2CO_3 + K_2CO_3 }

(One SiO$_2$ determ^{n} has TiO$_2$)

SiO$_2$ (+TiO$_2$)

60.5336 %

wt conc + fp + SiO$_2$	= 16.651200
" crucible	= 15.430600
" fp + SiO$_2$	= 1.220600
" fp	= 0.000116
" wt SiO$_2$ (+TiO$_2$)	= 1.220484

Percent SiO$_2$ free from TiO$_2$

60.2281 %

wt C. ash .000116 .000085 SiO$_2$	= 16.644400
wt C + ash (.000116, .000085)	= 15.430086
wt SiO$_2$	= 1.21432

Phosphoric acid (P$_2$O$_5$).

air dry Syenite - has 0.072 % P$_2$O$_5$

wt conc + fp + Resp. Mg	= 15.43096
" conc	= 15.42281
" $Mg_2P_2O_7$ + fp	= 0.011500
" fp	= 0.000116
" $Mg_2P_2O_7$	= 0.011384
wt P$_2$O$_5$	= .007281661 76

Method II For Fe$_2$O$_3$ &c.

wt conc + No. 30	= 17.4683
" conc	= 15.4269
" Blue Syenite used	= 2.0414

Percent SiO$_2$ (with a little Fe (+TiO$_2$+P$_2$O$_5$))

61.2040 %

wt C. ash + SiO$_2$	= 16.293700
wt C + ash .000085	= 15.044185
wt SiO$_2$	= 1.24952

Percent SiO$_2$ (free from TiO$_2$ (+Fe))

60.037 %

wt C. ash + SiO$_2$	= 16.26905
wt C + ash (3 × 0.000085)	= 15.043455
wt SiO$_2$	= 1.22560

Fe$_2$O$_3$ + Al$_2$O$_3$

25.61 % (air dry).

wt conc. (fp) + Fe$_2$O$_3$, Al$_2$O$_3$	= 15.56610
wt conc + 2 fp	= 15.04327
wt Fe$_2$O$_3$ & Al$_2$O$_3$	= 0.522283

Fe$_2$O$_3$ = 4.85 % 5/0

Al$_2$O$_3$ = 20.76

wt C. ash + Fe$_2$O$_3$	= 15.138709
wt C + ash 0.000085	= 15.039588
wt Fe$_2$O$_3$	= 0.09912

8 Blue Syenite 30 - contin. Lab No 702

Wt crue + pp. + CaO = 15.466150
" crue + pp. .000085 = 15.412485
0.053665

CaO. 2.62 %

Wt crue + $Mg_2P_2O_7$ + pp = 15.458500
" crue + pp. .000085 = 15.412785
= 0.045715
" $Mg_2P_2O_7$ = .016439
" MgO = .016439

MgO. 0.806% MgO

Resume:

Silica	60.03	per cent.	
Ferric oxide	4.01	" "	2.61
Ferrous oxide	0.75	" "	
Alumina	20.76	" "	
Lime	2.62	" "	
Magnesia	0.80	" "	
Phosphoric acid	0.07	" "	
Potash	5.48	" "	
Soda	5.96	" "	
Manganese	trace		
Total	= 100.48 %		

Blue Syenite (30) for water + loss on ignition.

Percent water 0.06%

wt used = 2.0000 gm.
wt C + Sub. ht = 10.0755
after ht. 1 hr 110°C = 10.0743
water lost at 110°C = 0.0012

Percent lost on ignition.

0.53 %

wt C + S. ignit = 10.0743
after " = 10.0636
loss on ignition = 0.0107

100.48
.53
.06
101.07

Lab No 103

acidity = 1.7237 gm
d. @ 110°+115°C = 1.7236

White Novaculite, Hot Springs.

wt C + W.N = 17.1697
wt C = 15.4460
wt W.N = 1.7237 gm

Water lost at 110°C
0.002 %

wt C + W.N. bef ht = 17.16970
after ht = 17.16965
wt water, 110°C = 0.00005

Loss on ignition
0.06 %

wt C + W.N. bef ignit = 17.16965
after " = 17.16855
loss on ignition = 0.00110

Fused with $K_2CO_3 + Na_2CO_3$.

Silica
99.965 %

wt C. SiO_2, + f.f.p. = 17.17040
wt crue = 15.44706
wt SiO_2 + f.f.p. = 1.723340
wt f.f.p. = 0.000232
wt SiO_2 = 1.723108

$Fe_2O_3 + Al_2O_3$
0.266 %

wt C. bef + p + $Fe_2O_3 + Al_2O_3$ = 15.077455
wt C + ppt p 0.000085 = 15.072835
wt $Fe_2O_3 + Al_2O_3$ = 0.004615

CaO
0.129 %

wt C. ash 0.000085 + CaO = 15.449520
wt C + ash = 15.447285
wt CaO = 0.002235

Slight trace of Magnesia.

Bi2O3 Fusion for Alkalies.

Alkalies
K_2O = 0.199 %
Na_2O = 0.546 %

wt W.N. used = 2.16275 gm.
wt d. KCl + NaCl = 15.8219
wt d = 15.7928
wt KCl + NaCl = 0.0291

wt crue + K_2PtCl_6 = 21.67250
wt crue = 21.65035
wt K_2PtCl_6 = 0.02215
wt KCl = 0.00676.
wt NaCl = 0.02234

K_2O = 0.004306 gm
Na_2O = 0.01183 "

Water - - = 0.002 %
loss on ignition - - = 0.06 "
SiO_2 - - - = 99.96 "
$Fe_2O_3 + Al_2O_3$ - - = 0.26 "
CaO - - - = 0.12
K_2O - - - = 0.19
Na_2O - - = 0.54
total = 101.13 %

Teale N° 103. Resumé.
Analysis of spec. d @ 110°–115°C.

Silica	99.45	per cent.
Alumina } Ferric oxide }	0.26	" "
~~Alumina~~		
Lime	0.12	" "
Magnesia	Very slight trace.	" "
Potash	0.19	" "
Soda	0.54	" "
Loss on ignition	0.06	" "
	100.62	

Lab. No. 1024

No. 53 ◇10 Elaolite Syenite. (Contains Manganese).

Silica &c.

wt cruc + ◇10 = 16.334 20
" cruc = 15.056 75
air dry " ◇10 used = 1.277 25

wt cruc + ppt + SiO_2 = 16.106400
" cruc + ppt = 15.424876
" SiO_2 = 0.681884

SiO_2
53.38% SiO_2

wt cruc + ppt (Fe_2Al_2)O_3 = 15.745300
" cruc + ppt 0.000085 = 15.423585
" $Fe_2O_3 + Al_2O_3$ = 0.321915

Fe_2O_3 and Al_2O_3
25.20% of air dry ◇10 R.N.B.

Al_2O_3 = 20.22% (air dry subst.)
Fe_2O_3 = 2.74% (air dry subst.)

wt cruc + ppt + Fe_2O_3 = 15.482900
" cruc + ppt .000085 = 15.419285
" Fe_2O_3 = 0.063615
" Al_2O_3 = 0.258300

wt Fe_2O_3 (less FeO 1.99%) = .0286231

CaO
10 wt = 15.4574
2° " = "

3.29% CaO (air dry).

wt cruc + ppt + CaO = 15.457400
" " + " .00085 = 15.415285
" CaO = 0.042115

MgO 0.29%

wt cruc + $Mg_2P_2O_7$ = 15.425700
" cruc + .000085 = 15.415185
" $Mg_2P_2O_7$ = 0.010515

wt MgO = .0037891

Ferrous Iron. (I) wt paper + ◇10 = 2.3437
" paper = 0.3436
" ◇10 used = 2.0001

II wt paper + ◇10 = 2.3456
" paper = .3446
" ◇10 used = 2.0010

Effervescence on addition of conc. H_2SO_4

Alkalies. Bi_2O_3 fusion. wt cruc + ◇11 = 15.7775
" Empty cruc = 0.6650
◇11 Chloride = 0.9257

Alkalies.
Bi_2O_3 fusion.

wt c. + C.S. = 16.3886
wt C = 15.4261
wt C.S = 0.9625 gm.

Ferrous Iron I (above) req. 3.5 cc $KMnO_4$
= .008998 × 3.5 = .0314930 grams Fe = .040478 gram. FeO
$\frac{.040478 \times 100}{2.0001}$ = 2.02 per cent FeO.

Ferrous Iron III. wt used = 1.9248 gm.

Lab N° 104

No 53. Eleolite syenite ◇ 50. for Sulphur.

wt E. Syenite used = 5.0148 gm

FeO. II req'd 3.4 cc $KMnO_4$.

.008998 × 3.4 = .030593 gm Fe.

.030593 × 71.84 / 55.85 = .039333 gm FeO

.03933 × 100 / 2.001 = 1.96% FeO

FeO III req'd 2.9 cc $KMnO_4$. .008998 × 2.9 = .0260942 Fe

.0260942 × 71.84 / 55.85 = .033574 gms FeO

.03357 × 100 / 1.9248 = 1.74% FeO

Have then I FeO — 2.02 %
II FeO — 1.96 %
III FeO — 1.74 %

3) 5.72

1.9066 or % mean

mean of 3 determs 1.91%
" of I + II 1.99%

Sulphur in ◇ 50

0.9 or % Sulphur

wt $BaSO_4$ + ppt + crucible 22.2557
wt crucible = 21.9069
wt $BaSO_4$ + ppt = 0.3488
wt ppt = 0.000085
" $BaSO_4$ = 0.34872
wt S = .04789204

Alkalies wt ◇ 50 = 0.9625 gm.

wt K_2O = .0598 grams.
" Na_2O = .0760 "

K_2O = 6.21 %
Na_2O = 7.89 %

wt dish + KCl + NaCl = 16.0296
wt dish = 15.7916
wt KCl + NaCl = 0.23800

wt KCl = 0.09469
wt NaCl = 0.14331

wt crucible + K_2PtCl_6 = 22.4122 ✓
wt crucible = 22.1024 ✓
wt K_2PtCl_6 = 0.3098 ✓
wt KCl = .09469

(.30985 × .3058)

---

wt crucible + ◇ 50 = 16.1233
" crucible = 15.4120
" ◇ 50 = 0.7113

H_2O @ 110°-115°
1st wt = 16.1226
2nd "
3rd "

.098 % water @ 110°-115°

(50)

Wt before heating = 16.1226
Wt. after " = 16.0988
" Lost = 0.0238

1° = 16.0988
2° = Ditto.

3.34% Lost on ignition.—

~~Summary~~ (50) 53 — Elvolite Syenite.

Silica	(SiO_2)	53.38 %
Ferric oxide	(Fe_2O_3)	1.56 "
Ferrous oxide	(FeO)	1.99 "
Alumina	(Al_2O_3)	20.22 "
Lime	(CaO)	3.29 "
Magnesia	(MgO)	0.29 "
Potash	(K_2O)	6.21 "
Soda	(Na_2O)	7.89 "
Pyrites	(FeS_2)	1.77 " 96.60
Water @ 110°-115° C		0.09 "
Loss on ignition		3.34
Total		100.03

Analyses by
Bracket and Smith
March 21/89

(.09469 x .6318) = K_2O = .0598
(.14331 x 0.5306) = Na_2O = .0760

OK.

Lab. No 105

Gray Syenite. Fourche Quarry. No 31.

For water & loss on ignition, wt c + 31 = 10.0741
wt c = 8.0743
wt 31 = 1.9998 gm

1 = 10.0716
2 = 10.0716
3 =
4 =

Percent water 0.12

wt c + 31 bf ht = 10.0741
after ht 1 hr 110°C = 10.0716
wt water at 110°C = 0.0025

Percent lost on ignition 0.855%

wt C + 31 bf ignit = 10.0716
after = 10.0545
loss on ignition = 0.0171

For analysis: For SiO_2, Fe, Al, Ca + Mg.
wt 31 used = 1.5246 gm

Percent SiO_2
1 wt = 16.3354
2° 16.3342
3° 16.3336
SiO_2 = 60.68%

wt c. ash + SiO_2 = 16.333300
wt c + ash = 15.408135
wt SiO_2 = .925165
Silica = 60.68% (wiley)

1 wt = 15.3928
15.3923
15.3913

wt c. ash + Fe_2O_3 + Al_2O_3 = 15.393300
wt c + ash = 15.038135
wt Fe_2O_3 + Al_2O_3 = 0.355165

Fe_2O_3 = 4.38%
Al_2O_3 = 18.77%

wt C + ash + Fe_2O_3 = 15.474900
wt C + ash = 15.407985
wt Fe_2O_3 = 0.066915
wt Al_2O_3 = 0.28625

1 =
2 =
3 =

Percent CaO 27.19% (wiley)

wt C + ash + CaO = 15.450300
wt C + ash = 15.408835
wt CaO = 0.041465

Percent MgO 0.93%

wt C. ash + $Mg_2P_2O_7$ = 21.28854
wt C + ash = 21.2748
wt $Mg_2P_2O_7$ = 0.0397
wt MgO = .014306

Gray Syenite. Lab No 100

No 31. Fusion for alkalies
~~Wt Blue Sy~~

wt Gray Syenite = 0.7142 gm.

wt KCl + NaCl = .11560
" KCl = .06474
" NaCl = .05086

wt dish + alk. chl. = 15.9472
" dish = 15.7912
" alk chl. = 0.11560
wt K_2PtCl_6 + Gooch = 22.33180
" Gooch = 22.11995
" K_2PtCl_6 = 0.21185

K_2O = 5.72 %
Na_2O 3.76 "

(.06474 X .6318) wt K_2O = 0.0409
(.05086 X .5306) " Na_2O = 0.0269

Ferrous iron.
I wt 31 used = 2.00055
II wt. 31 used = 1.88640

1 c.c. $KMnO_4$ = .008998 Fe

I. .008998 x 0.8 (c.c. $KMnO_4$ req^d) = .0071984 Fe

$\frac{.0071984 \times 71.84}{55.88}$ = .009254 FeO

$\frac{.009254 \times 100}{2.00055}$ = 0.46 % FeO

II .008998 x .75 = .0066485 Fe

$\frac{.0066485 \times 71.84}{55.88}$ = .008547 FeO

$\frac{.008547 \times 100}{1.88640}$ = 0.45 % FeO

Gray Syenite (31) for H_3PO_4. (P_2O_5) lost.
(April 5/89 RWB)
wt 31 used = ~~5.00725~~ grams.
wt of Gray Syenite used = 5.0286 grams.

not reached for

Lab No 105

Resumé of Gray Syenite No. 31.

Silica	60.	68	per cent.
Alumina	18.	77	" "
Ferric oxide	3.	40	" "
Ferrous oxide	.	45	" "
Lime	2.	71	" "
Magnesia	0.	93	" "
Potash	5.	72	" "
Soda	3.	76	" "
Water	0.	12	" "
Loss on ignition	0.	80	" "
	97.	39	

Data No. 106

No. 65 Magnet Cove

Ferrous determ. I wt 65 used = 2.0047 gm.
II " 65 used = 2.0025 "

I required 1.3 c.c. $KMnO_4$ 1 c.c. $KMnO_4$ = 0.008998 Fe

$0.008998 \times 1.3 = .011694$ Fe

$\frac{0.011694 \times 71.84}{55.88} = FeO = 0.01502$

$\frac{.01502 \times 100}{2.004} = 0.74$ per cent. FeO

II req° 1.12 c.c. $KMnO_4$. $.008998 \times 1.12 = 0.010077$ Fe

$\frac{.010077 \times 71.84}{55.88} = FeO = .01295$

$\frac{.01295 \times 100}{2.0025} = 0.64$ per cent. FeO

N.B. The second (II) determination the more correct - (R.T.S. [Amer. 1889 (A.J.S.)])

Alkalies. No 65, Magnet Cove.

Bi_2O_3 fusion } wt 65 used = 1.0002 gm

wt dish + alk. Cl = 14.44920
wt dish = 14.18015
wt KCl + NaCl = 0.26905

KCl + NaCl = .26905
KCl = .10761
NaCl = .16144

wt Platic + K_2PtCl_6 = 22.11995
" dish = 21.76780
" K_2PtCl_6 = .35215

K_2O = 6.79%
Na_2O = 8.56%

$(.10761 \times .6318) = K_2O = 0.06798$
$(.16144 \times .5306) = Na_2O = 0.08566$

$(.35215 \times .3056) = KCl = 0.10761$

Lab No. 106.

No. 65 Magnet Cove (Phonolite?)

Fusion with $Na_2CO_3 + K_2CO_3$
for Fe, al, Ca, mg:
Wt. 65 used (air dry) = 1.15624 grams.
showed presence of strong trace of manganese —

Silica (SiO_2)
54.0487%

wt Cruc + ash + Silica = 16.03390
" Cruc + ash = 15.408885
" Silica = 0.62502

Iron oxide and alumina:
$Fe_2O_3 + Al_2O_3$ =
25.6459%

wt Cruc + ash + Fe_2O_3 + Al_2O_3 = 15.70530
" Cruc + ash (.00055) = 15.406735
0.29657

Percent Al_2O_3
20.27%

wt C. ash + Fe_2O_3 = 15.46875
wt Cruc + ash = 15.406585
wt Fe_2O_3 ---- = 0.06217

Percent Fe_2O_3
4.665%

Percent FeO
0.64%

CaO (Lime)

1 = 15.4383
2 = 15.4384
3 =

(CaO = 27.5%)

wt Cruc + ash + CaO = 15.43830
" Cruc + ash (.00055) = 15.406485
0.03182

Percent MgO.
0.165%

wt C. ash + $Mg_2P_2O_7$ = 6.74450
wt C + ash = 6.739185
wt $Mg_2P_2O_7$ = 0.00532
wt MgO = 0.001917 gm.

For water + loss on ignition. wt 65 = 2.00000 gm

1 = 10.0709
2 =
percent water at 110°C
0.19%

wt C + 65 bf ht = 10.0747 gm
after ht = 10.0709
water lost 1 hr 110°C = 0.0038

Percent lost on ignition
1.74%

wt C + 65 bf ignit = 10.0709
after = 10.0360
loss BB = 0.0349

Dak. No 106

Resumé of C.S:

Silica	54.04	per cent.
Ferric oxide	4.66	" "
Ferrous oxide	0.64	" "
Alumina	20.27	" "
Lime	2.75	" "
Magnesia	0.16	" "
Potash	6.79	" "
Soda	8.56	" "
Water @ 110°-115° C	0.19	" "
Loss on ignition	1.74	" "
	99.80	

qq.bt

Manganese Strong trace.

Lab No. 107

Kaolinite(?), 14 miles south of Hot Springs. (No. 17).

wt Kaolinite used	= 0.6495 gm.
wt water + loss on ignition	= 0.1226 "
percent " " " "	18.87 %
wt SiO_2	= 0.2995 gm.
percent SiO_2	= 46.112 %
wt Al_2O_3	= 0.21362 gm
percent Al_2O_3	32.889 %

Water and loss on ignition	= 18.87 %
SiO_2	= 46.11 "
Al_2O_3	= 32.88 "
Fe	= trace "
total	= 97.86 %

(Assuming 15.90 (see 107 II) to be the loss on ignition)

18.87
15.90
% 2.97 = water at 110°C.

0.6303 = wt 107 dry at ~~[illegible]~~ air dry.

47.51 %	= percent SiO_2 in air dry 107.
33.89 "	= " " Al_2O_3+(Fe) " " " "
15.90 "	= " " H_2O " " " "
97.30 %	= 107 Kaolinite calculated air dry, subtracting 2.97% water.

See Fig 44+45 Kaolinite. 107.

Lab No. 159

Qualitative analysis for Mr. A. Winslow. Specimen marked (3).
~~Specific gravity high.~~

Substance, when struck or powdered gave strong odor of H_2S. Did not effervesce with cold or hot acids. ($HCl + HNO_3$). Heated alone ~~of~~ on platinum foil become lighter colored, and sunk on cooling. Heated in closed tube gives off water, and a gas blackening lead paper. Gives no coating on coal with Na_2CO_3.

Fused portion with alkali carbonates, washed well with water, and found H_2SO_4 in filtrate.

Dissolved residue in HCl, found small quantity of iron, and large quantity of Barium. Decided Barium flame color. Slight reaction for calcium.

Mineral is Chiefly Barium sulphate,
with H_2S, and a little iron and calcium.
Stinking barytes.

R. T. Hill, specimen from Gypsum Bluff. west end.
Lab No. 158

Anhydrite chiefly,
Calcite, considerable,
Celestite, considerable.

R. N. B.

Pisolite for Dr. Branner.
Lab No. 160
Chiefly silicate of Alumina,
~~with~~ with some iron,
and a trace of manganese

Lab No 109) "Akron, Ohio, over Coal ~~no 1~~ — Lower pipe clay shale
Collected by E.W. Claypole"

For water and loss on ignition. wt used = 2.0000 gm.

1 = 8.7086	wt cruc + shale bf ht	= 8.7436 gm
2 = 8.7085	after ht	= 8.7085
3 =	wt water lost at 110°C	= 0.0351
percent water 1.25%		

percent lost on ignition (dry at 110°C) 7.93%	wt C + shale bf ignit	= 8.7085
	after	= 8.6526
	wt loss on ignition	= 0.1559

Bi_2O_3 fusion for alkalies. wt used = 1.0044 gm
wt dried at 110°C = 0.99185 "

wt K_2O = 0.01777 gm	wt D + Alk. Cl	= 14.2372
wt Na_2O = 0.01600 "	wt D	= 14.1789
percent K_2O = 1.79%	wt Alk Cl	= 0.05830
" " Na_2O = 1.60%	wt. KCl	= 0.02814
	wt NaCl	= 0.03016

wt cruc + K_2PtCl_6 = 21.8989
" cruc = 21.8068
0.0921

Lab. No. 109

Shale,

Alk. Carb. fusion

percent SiO_2
60.052%

wt shale used = 1.5355 gm. (air dry
" " dried at 110°C = 1.51632 gm)))

wt cruc ash + SiO_2 = 16.31750
wt C + ash .000116 = 15.406916
wt SiO_2 = 0.91059

Al_2O_3 = (dried @ 110°) = 20.00%
Fe_2O_3 = (" ") = 6.82 "

wt C. ash + Fe_2O_3 + Al_2O_3 = 15.80890
wt C + ash .000116 = 15.402116
wt Fe_2O_3 + Al_2O_3 = 0.40679

wt C. ash + Fe_2O_3 = 8.179480
wt C + ash = 8.076016
wt Fe_2O_3 .103434

1 =
2 =
3 =

wt C. ash + CaO =
wt C + ash =
wt CaO

wt C. ash + $Mg_2P_2O_7$ =
wt C + ash =
wt $Mg_2P_2O_7$ =
wt MgO =

For Sulphur. wt shale used = 5.0018 gm.

Sulphur 1.95% per cent.

wt cruc + $BaSO_4$ = 8.329500
wt cruc + ash = 7.624866
wt $BaSO_4$ = .704634
wt S = .096774433358

For ferrous iron I. wt used = 2.0700 (air dry)

" " " II " " 2.0488 (air dry)

Fuse in closed tube with Conc. H_2SO_4 — absorb sulphur dioxide — titrate @ 55° KMnO4.

Lab. No 109

Shale, Fusion with $Na_2CO_3 + K_2CO_3$.

wt shale used = 1.5022 gm (air dry)

" " dried 110°C = 1.48343 gm

For Mg air Ca

1 = 15.4140
2 = 15.4140
CaO + (Al_2O_3)
0.9990 %

.47 Al_2O_3
.52 = CaO

wt C. ash + CaO = 15.41400
wt C + ash .000085 = 15.399185
wt CaO = 0.01482

wt C. ash + Al_2O_3 (from CaO) = 7.54050
wt C + ash .000085 = 7.533485
wt Al_2O_3 = 0.00702

wt C. ash + $Mg_2P_2O_7$ = 7.64500
wt C + ash .000185 = 7.626085
wt $Mg_2P_2O_7$ = 0.01892
wt MgO = .006818 grams

$MgO = 0.45\%$

Summary Akron Shale, Ohio

Dried @ 110°-115° C.

Silica	60.05	Per cent.
Alumina	20.00	" "
Ferric oxide	6.82	" "
Lime	0.52	" "
Magnesia	0.45	" "
Potash	1.79	" "
Soda	1.60	" "
Loss on ignition	7.93	" "
Sulphur	1.95	" "
Total	101.11	Per cent.
1/2 Sulphur =	00.97	
Corrected for 1/2 Sulphur =	100.14 %	

wt air dry sand in an dry Kali
from 25 grams = 7.28 grams
= 29.12 %

Lab No 110

I Shale. Friable light yellow. Label: "Note book 14. Pg 74. May 11. 1889. About 800 ft south of Rifle pits on t of Nigger Hill, on road south from Fort Smith. About 12 ft exposed, x base not seen. J C Branner."

For water + loss B/B. wt used = 2.0000 gm

1 = 9.4695	
2 = 9.4666 (?)	
3 = 9.4670	
	percent water 3.37%

C + c bf ht = 9.5345 gm
after = 9.4670
water lost at 110°C = 0.0675

Loss B/B 6.87% (See 110-15)

NB. on fusion slight reaction for Manganese.

C + c bf ignit = 9.4670
after = 9.3341
Loss B/B = 0.1329

(Alkalies) Bi_2O_3 fusion. wt used = 1.0460 gm air dry.
= 1.0108 gm dry at 110° C

KCl + NaCl = 0.05465 gm	
KCl = 0.03489 "	
NaCl = 0.01976 gm.	

D + Alk Cl = 14.23085
Dish = 14.17620
KCl + NaCl = 0.05465
KCl =

0.02204 gm K_2O
0.01487 gm Na_2O

C. + K_2PtCl_6 = 21.8037
crue = 21.6895
K_2PtCl_6 = 0.1142
KCl = 0.03389 gm

K_2O = 2.18%
Na_2O = 1.03%

Fusion for analysis with Alk Carbonates. wt used = 1.0388 gm. air dry.
dry at 110° C = 1.0038 dry at 110° C

SiO_2 58.43%

C + ash + SiO_2 = 19.25730
C + ash .000085 = 18.67068
SiO_2 = 0.58662

Fe_2O_3 and Al_2O_3 30.71% +.15 30.86

wt crue ash + Fe_2O_3 & Al_2O_3 = 18.97970
" crue ash = 18.67093
" Fe_2O_3 + Al_2O_3 = 0.30877

Fe_2O_3 = 8.21% +.15 = 8.36

Al_2O_3 = 22.50%

C + ash + Fe_2O_3 = 19.45640
C + ash .000085 = 19.37398
Fe_2O_3 = 0.08242

to subtract from CaO Fe_2O_3 20.15% { c+ash+Fe_2O_3 = 7.78050 ; c+ash = 7.778985 ; Fe_2O_3 = 0.00152 ✓

Percent CaO 0.32%

c+ash+CaO(+Al+Fe?) = 15.39685
c+ash .000085 = 15.391685
CaO (?) = 0.00482
(Fe_2O_3) = 0.00152
CaO = 0.00330

Percent MgO 1.14%

c+ash+$Mg_2P_2O_7$ = 15.42380
c+ash .000085 = 15.391885
$Mg_2P_2O_7$ = 0.03192
MgO = 0.01150

Resume': dried @ 110°-115°C.

Silica (Combined) Total	=	58.43 per cent.
Alumina		22.50 " "
Ferric acide		8.36 " "
Lime		0.32 " "
Magnesia		1.14 " "
Loss miquition		6.87 " "
Potash		2.15 " "
Soda		1.03 " "
		100.83

For sulphur, air dry = 1.0333 gm.
dry at 110°C = 0.9985 "

Percent Sulphur 0.16% { c.ash+BaSO4 = 6.76710 ; c+ash.00007 = 6.75507 ; BaSO4 = 0.01203 ; S = 0.00165 gm

110. 25 grams air dry
of air dry sand in air dry shale = 6.43 grams. = 25.72%

Notebook on clays

II Gray clay. Label: "Notebook 14. Pg 78.
Fort Smith, May 11. 1889. Harding & Boncher's quarry
1½ miles south of Ft. Smith on M. P. Ry. clay overlies
quarry. About 6 ft thick in all. J. C. Branner."
B.

for water + loss BB. wt used = 2.0041 gm
C+C of lt = 9.7835
after =
water lost at 110°C =

Bi_2O_3 fusion for alkalies. wt used = 1.0050 gm. air dry

n.B. on fusion no reaction for Manganese

Label?

fusion with Alk. carbonates. wt used = 1.0026 gm air dry

n.B. Via book on clays. p. 52!

"Potters clay from over Coal 4. four miles from Akron Ohio. collected by

E. W. Claypole, Akron Ohio.

Shaly, gray, slate colored.

for water & loss B.B. 1 = 9.7777, 2 = 9.7576 percent water 1.10%

wt used =	2.0000	
C+C & ht =	9.7797	
after =	9.7576	
	0.0221	

Loss B.B. 1.11%

C+C & ignit =	9.7576
after =	9.6505
loss BB =	0.1071

Bi_2O_3 fusion for Alkalies

wt air dry =	1.0121	air dry
dried at 110°C =	1.0010	dried @ 110°-115°C

wt. %

K_2O = .0061 = .61%

Na_2O = .0155 = 1.55%

D + Alk. Cl =	14.2152
D =	14.1762
KCl + NaCl =	0.0390
KCl =	0.0097
	0.0293
wt conc. + K_2PtCl_6 =	22.4729
" conc. =	22.4409
" K_2PtCl_6 =	.0320
" KCl =	0.0097

Alk Carbonate fusion

wt air dry =	1.0128 air dry.
dried at 110°C =	1.0017

for Sulphur. air dry = 1.0139

1.0028 dry at 110°C

C. ash + SiO_2 =	19.40340
C ash .00116 =	18.66441 6
SiO_2 ... =	0.73899

93.77%

~~Test No. 26~~

~~Slate Quarried: May 26 1899. The Railway cut at S. end of the upper bridge Little Rock. @ 6' below surface. Calc. J.C. Boyum~~

~~For Water & Loss on ignition: wt used = air dry~~

~~Water~~

wt crucible + Slate bfht =
" " + " afht =
" lost water @ 110°-115°C =

~~Loss on ignition.~~

wt crucible + Slate bfht =
" " + " afht =
" lost on ignition =

for Sulphur. 1.0139 gm air dry.
dry at 110°C = 1.0028 "

Percent Sulphur
0.17%

c. ash + $BaSO_4$ = 6.75506
crucible = 6.74207
$BaSO_4$ = 0.01293
S = 0.00177 gm

$Fe_2O_3 + Al_2O_3$ = 19.28

Fe_2O_3 = 1.88

Al_2O_3 = 17.40

crucible ash + Fe_2O_3 + Al_2O_3 = 18.85540
crucible + 2 ft. .000116 = 18.66219
$Fe_2O_3 + Al_2O_3$ = 0.19321

wt crucible ash + Fe_2O_3 = 7.21610
" crucible ash = 7.19717
" Fe_2O_3 = 0.01893

CaO.

0.44 %

wt crucible ash + CaO = 18.66670
" crucible ash = 18.66166
" CaO = .00494

MgO.

0.31%

wt crucible ash + $Mg_2P_2O_7$ = 7.609650
" crucible ash = 7.600983
" $Mg_2P_2O_7$ = .008667
" MgO = 0.00312

Ohio Potters clay - Akron. 25 gm. Sand

Crucible + sand = 21.37140
Crucible = 19.81597
Sand = 1.55543

Table no 264.
Potters Clay / Ohio. Akron. Ext. Clay / 06

Resumé of 264:

Silica combined	67 48	per cent.
Sand (free, some mica flakes)	6 29	" "
Alumina	17 40	" "
Ferric oxide	1 88	" "
Lime	0 49	" "
Magnesia	0 31	" "
Potash	0 61	" "
Soda	1 53	" "
Loss on ignition	5 41	" "
Sulphur	0 17	" "
	101 59	" "
Correcting for ½ S	0.08	
	101.51	

Teak No. 265

Slate Little Rock. : Marked : "May 26.1889. The Railway Cut at S End of the upper bridge, Little Rock @ 6' below surface. Ed. J. C. Branner."

1 = 9.7574
2 = 9.7529
3 = 9.7524

Water and loss on ignition — wt used = 1.9993 air dry

Percent water

1.30%

wt crucible + Slate bfht = 9.7785
" crucible " aft ht = 9.7524
" lost = 0.0261

Percent Loss BB

5.23

wt crucible + slate bfht = 9.7524
" " + " aft ht = 9.6490
loss on ignition = 0.1034

For SiO_2 &c. wt used = 1.0506 air dry
" " = 1.0370 Dried @ 110°-115°.

For Sulphur fusion. air dry = 2.0025 gm
— — — — — dry at 110°C = 1.9765

Iron and Alumina

$Fe_2O_3 . Al_2O_3$ = 32.91 percent.
Fe_2O_3 = 9.52%
Al_2O_3 = 23.39%

wt crucible ash. $Fe_2O_3 . Al_2O_3$ = 19.70350
" Crucible ash = 19.362165
" $Fe_2O_3 . Al_2O_3$ = .34134
wt Fe_2O_3 + Crucible ash = 19.46070
" Crucible ash = 19.361985
" Fe_2O_3 = 0.09872

Silica

(75.59) = 75.59%

wt crucible ash + SiO_2 = 19.24590
" Crucible ash = 18.661985
" SiO_2 = .58392

Lime.

0.36 % CaO.

wt crucible + ash + CaO = 18.66565
" Crucible ash = 18.661885
" CaO = 0.00377

Magnesia.

% MgO

1.49%

wt crucible ash + $Mg_2P_2O_7$ = 15.41580
" Crucible ash = 15.372685
" $Mg_2P_2O_7$ = 0.04312
" MgO = 0.01553

reduced for alkalies (Bi_2O_3 process)
= 1.0734 air dry
= 1.0595 dries (@ 110°–111° C.

wt Dish + alk Cl.	= 14.25455
" Dish	= 14.17635
" Na Cl + K Cl	= 0.07820
" K Cl	= 0.0229
" Na Cl	= 0.05553
wt K_2PtCl_6 + Cmc	= 22.5482
" Cmc	= 22.4729
" K_2PtCl_6	= 0.07553
" K Cl	= 0.0229

$Na_2O = 0.02934 = 2.76\%$
$K_2O = 0.01441 = 1.36\%$

Sulphur.

0.14%

wt Cmc. ash + $BaSO_4$	= 15.39320
" Cmc. ash	= 15.37252
" $BaSO_4$	= .02068
" Sulphur	= .00839

Resume:

Silica	56.30	per cent	
Alumina	23.39	" "	} 32.91
Ferric oxide	9.52		
Lime	0.36	" "	
Magnesia	0.49		
Potash	1.36		
Soda	2.76		
Sulphur	0.14	" "	
Loss on ignition	5.23		
	100.55		
Correcting for ½ Sulphur	0.07		
	100.48		

Lab No. 268. Shale, dark gray. (Round Mt)
Marked: "Note book 9 C; pg 58 // May 22, 1889.
Shale above the 8" coal, section 6; 5N; 10W.
J. C. Branner.

for r. water & loss B13.

c + s = 10.6155
c = 8.6155
Shale = 2.0000

1 = 10.5805
2 = 10.5805

percent water
1.75%

c + s of Lt = 10.6155
after = 10.5805
water = 0.0350

percent loss B13
7.69%

c + s Lignit = 10.5805
after = 10.4293
loss B13 = 0.1512

Bi_2O_3 fusion for Alkalies. wt air dry = 1.0072
dried at 110°C = 0.9896 >

D + AlkCl = 15.8325
D = 15.7898
KCl + NaCl = 0.0427
KCl = 0.0326
NaCl = 0.0101

K_2O = 0.0205 gm
Na_2O = 0.0053 gm

K_2O = 2.07%
Na_2O = 0.53%

crue + K_2PtCl_6 = 22.3561
crue = 22.2490
K_2PtCl_6 = 0.1069
KCl = 0.0326

Alk. Carb. fusion; wt air dry = 1.0010 gm.
dried at 110°C = 0.9835

Percent SiO_2
57.12

c. ash + SiO_2 = 15.92980
c + ash .000085 = 15.367985
SiO_2 = 0.56182

Percent $Fe_2O_3 + Al_2O_3$
32.53%

c+ash+Fe+Al = 19.66970
c+ash .00085 = 19.34958 5
$Fe_2O_3 + Al_2O_3$ = 0.32012

Fe_2O_3 = 8.21

c.ash + Fe_2O_3 = 15.44880
c+ash = 15.36798 5
Fe_2O_3 = 0.08082

Al_2O_3 = 24.32 (24.33)

Percent CaO
0.72%

c. ash + CaO = 15.37530
c+ash = 15.36818 5
CaO = 0.00712

Percent MgO
1.74%

c.ash + $Mg_2P_2O_7$ = 19.39750
c+ash = 19.34978 5
$Mg_2P_2O_7$ = 0.04772
MgO = 0.01719

Sulphur fusion. wt 268 air dry = 1.0005 gm
dried at 110° C = 0.9830

Percent Sulphur
0.22

c + $BaSO_4$ = 22.6339
c = 22.6181
$BaSO_4$ = 0.0158
S = .0021 60

Resume. No 268. Analysis of shale dried at 110° C.

Silica	=	57.12 per cent
Ferric oxide	=	8.21 " "
Alumina	=	24.32 " " (24.33)
Lime	=	0.72 " "
Magnesia	=	1.74 " "
Potash	=	2.07 " " (2.08)
Soda	=	0.53 " "
Loss on ignition	=	7.58 " "
Sulphur	=	0.22 " "
		102.51 % (102.53)

Percent water lost at 110° C = 1.75%

air dry card in air dry spec (25 grams)
= 6.37 grams = 25.48%
Sand extremely fine & dark colored

Lab № 268. Reduction of alkalies.

For water wt air dry = 0.58615

wt + 268 bfh = 8.7344

" " aftr = 8.7256

wt water = 0.0088

1.50 %

For alk. wt air dry = 0.6277 gram

wt d. @ 100°-115° C = 0.6183 "

wt K + Na Cl + KCl = 14.2043

wt K = 14.1650

0.03930

wt KCl + NaCl =

wt KCl = 0.0235

wt NaCl = 0.0158

K_2O = .0148 = 2.39 %

Na_2O = .0083 = 1.34 %

wt K_2PtCl_6 = 0.1772

wt KCl = 0.0235

Round wt

Lab. No. 270. Dark Gray Shale or Slate.
Marked: " Note book 9. Pg 58. May 22. 1889.
S.W. 1/4 of section 6; 5N; 10W. South line of the south side. The shale under the 8" bed of coal
J.C. Brammer.

for water & loss BB.

1 = 9.6015
2 = 9.5989
3 = 9.59

Percent water
1.36%

c + Shale = 9.6259
c = 7.6259
Shale = 2.0000

c + Shale = 9.6259
after = 9.5987
water = 0.0272

Percent loss BB
6.01%

of ignit = 9.5987
after = 9.4800
loss BB 0.1187

Bi_2O_3 fusion for Alkalies

wt air dry = 1.0173 gm
wt dry at 110°C = 1.0035

K_2O = 0.0157 gm
Na_2O = 0.0081 gm

K_2O = 1.56%
Na_2O = 0.80%

D + KCl + NaCl = 15.8293
D = 15.7889
KCl + NaCl = 0.0404
KCl = 0.0250
NaCl = 0.0154

cruc + K_2PtCl_6 = 22.4386
cruc = 22.3565
K_2PtCl_6 = 0.0821
KCl = 0.0250

Alk. Carbon fusion

wt air dry = 1.0341 gm
dry at 110°C = 1.0201

reads for Mn.
percent SiO_2
64.04

c. ash + SiO_2 = 19.30920
c + ash .00085 = 18.65585
SiO_2 = 0.65332

Percent $Fe_2O_3 + Al_2O_3$
26.56

c. ash + Fe + Al = 18.92680
c + ash = 18.655785
$Fe_2O_3 + Al_2O_3$ = 0.27102

Percent Fe_2O_3 5.01%

Percent Al_2O_3 21.55%

c. ash + Fe_2O_3 = 15.50000
c + ash .000085 = 15.4488855
Fe_2O_3 = 0.05112

Percent CaO 0.59%

c. ash + CaO = 15.38150
c + ash = 15.375385
CaO = 0.00612

Percent MgO 0.96

c. ash + $Mg_2P_2O_7$ = 19.42500
c + ash = 19.397585
$Mg_2P_2O_7$ = 0.02742
MgO = 0.00987

---

270. Sulphur fusion. wt air dry = 0.9955 gm
dried at 100°C =

Percent Sulphur.

crue + $BaSO_4$ = 22.6443
crue = 22.6339
$BaSO_4$ = 0.0104
S =

Resume 270. Analysis of shale dried at 110° C.

Silica	64.04	percent
Ferric oxide	5.01	" "
Alumina	21.55	" "
Lime	0.59	" "
Magnesia	0.96	" "
Potash	1.56	" "
Soda	0.80	" "
Loss on ignition	5.94	" "
Sulphur	0.14	" "
Total =	100.59	%

Wt air dry sand in 25 grams air dry shale = 10.45 grms
Per cent air dry sand = 41.80 %

284

Lab. No ~~285~~. Qualitative test of mud ore for Manganese, (reel book on ores), for J.H. Meeks.

found strong reaction for Manganese.

Lab. No. 285. Qualitative anal of a black slate for ~~for~~ marked: "Note book 66 fig 2, 4. Independence Co. Seats 18, 19 tc; 13 N. 5 W. S of Moorefields. Over 60 ft thick. On exposure changes to loose black shale, and finally to loamy black ~~shale~~ soil. T.C. Hopkins." "

On ignition the rocks gives strong smell and fumes of hydrocarbons (petroleum). Reacts for Sulphur.

No manganese found in it.

For water + loss BB

1 = 10.1042
2 = 10.1029
3 = 10.1029

0.51% Percent water

wt	=	1.4957 gm
C + 8 of wt	=	10.1106
after	=	10.1029
water at 1100C	=	0.0077

Loss BB 13.38%

C + 8 of ignit	=	10.1029
after	=	9.9038
loss BB	=	0.1991

Treated with (cold) dilute acid for $CaCO_3$ ($MgCO_3$) for partial anal. 1.2038 gm air dry. dry at 1100C = 1.1977 gm. >>

Percent Insolin HCl 57.31%

C-ash + Insol matter	=	20.03000
C + ash	=	19.343585
matter insol in HCl	=	0.68642

Percent $Fe_2O_3 + Al_2O_3$ 4.30%

Percent Al_2O_3 2.72%

Percent Fe_2O_3

C-ash + $Fe_2O_3 + Al_2O_3$	=	19.39420
C + ash	=	19.342685
$Fe_2O_3 + Al_2O_3$	=	0.05152

percent $CaCO_3$ = 32.30%
percent CaO = 18.09%

C-ash + CaO	=	18.86550
C + ash	=	18.648816
CaO	=	0.21669

$CaCO_3$ 0.3869

percent $MgCO_3$ = 1.47%
percent MgO

C-ash + $Mg_2P_2O_7$	=	8.44570
C + ash	=	8.422316
$Mg_2P_2O_7$	=	0.02339
MgO	=	0.00842

40 Lab. No. 285.

Percent $FeCO_3$
2.62%

Percent Fe_2O_3
1.58%

C. ash + Fe_2O_3 = 15.41860
C + ash = 15.399585

Fe_2O_3 = 0.01902

Fe = 0.013349 gm

$FeCO_3$ = 0.03145

Lab. No 290. Black crystalline substance resembling melanite,

for analysis: wt = 0.5075 gm.
treated with hot conc. HCl.

Percent SiO_2
30.427%

c. ash + SiO_2 = 18.80120
c + ash = 18.646785
SiO_2 = 0.15442

(No reaction for Manganese)

c. ash + Fe_2O_3 = 7.55570
c + ash = 7.197185
Fe_2O_3 = 0.35852

70.64% Fe_2O_3 ($+Al_2O_3$)

c. ash + CaO = 19.35880
c + ash = 19.34121
CaO = 0.01759

3.466% CaO.

Rezumé:

SiO_2	30.42	%
Fe_2O_3 (Al_2O_3)	70 64	"
CaO	3 46	"
	104.52	

Rough analysis gave this result

R. R.

or Iron as FeO

SiO_2	30.42
FeO	63.57
	3.46
	97.45

N.B.
Fayalite
Fe_2SiO_4
or $2FeO.SiO_2$
has $2FeO$ = 70.07%
SiO_2 = 29.93

Lab. No. 290.

500cc.

I for analysis wt air dry = 2.0063 gm
wt dry at 110°C = 2.0059 gm >

II for water, + Bi_2O_3 fusion, wt = 1.0000 gm
1 = 20.7425
2 =
3 =
percent water 0.025%
C+M of Lt = 20.2430
after = 20.2425
water at 110°C = 0.0005

N. B. Treated with strong HCl I mostly dissolves then gelatinizes.

290. For FeO Ia wt air dry = 0.5019 gm
wt dry at 110°C = >

290 For FeO II b wt air dry = 0.5005 gm
wt dry at 110°C = >

For Bi_2O_3 fusion for Alkalies wt air dry = 1.0000 gm
wt dry at 110°C = 0.9995 gm.

D + KCl + NaCl =
D =
KCl + NaCl =
KCl =
NaCl =
crue + K_2PtCl_6 =
crue =
K_2PtCl_6 =

290 I Percent Residue 26.15%

Residue I. crash + R = 19.12130
crash = 18.59658 5
Residue = 0.52472

290. 200cc. wt SiO_2 = 0.00372 gm
Fe_2O_3 = 0.31174
290 100cc (1) wt $Fe_2O_3 + Al_2O_3$ = 0.31179 gm

290. R. wt SiO_2 = 0.50952 gm

Percent SiO_2 25.40% 1.46 = 25.86

Lab No. 306

Pinkish substance to be examined for zinc. — Found to be essentially Carbonate of lime.

Treated with HCl dil.

a. Solution contained:
Fe Considerable
Al —
Ca — large quantity
Mg — Considerable.

---

290 Continued.

78.21%

290 100cc (2) wt Fe+Al = 0.31379 gm.

290R

290.R. wt CaO = 0.00169 gm

290. R. wt $Fe_2O_3 + Al_2O_3$ = 0.00992 gm
wt Fe_2O_3 = 0.00592
Al_2O_3 = 0.00400

Resume 290.

Silica	25 86	25.86
Alumina	0 00	
Ferric oxide	77 71	FeO 69.93
Lime	3 46	
Magnesia		
Ca		0.64
		3.46
		94.10

FeO. SiO_2
10 : 4
5 : 2

5 FeO . 2 SiO_2

290 100 cc (2) wt CaO = 0.00709 gm

290 100cc (2) wt $Mg_2P_2O_7$ = 0.01049 gm.
wt MgO =

290 R. wt $Mg_2P_2O_7$ = 0.00932 gm.

Sec fg 21.

Lab. No 107. Kaolinite (?) 14 miles South of Hot Springs. (N017).

for water, loss BB, + Bi_2O_3 fusion for Alkalies } wt = 2.0127 gm air dry
wt = dry at 110°C

1 = 22.0376	C + K of wt	= 22.2022
2 = 22.0289	after	= 22.0255
3 = 22.0275		0.1767
4 = 22.0255	Percent water at 1100C	
5 = 22.0268	8.779 %	

C + K of ignit = 22.0255
after = 21.8830
0.1425

{1 = 21.8834, 2 = 21.8830, 3 = 21.8830} Percent loss BB { air dry

7.080% loss BB

Total = 15.859% = water + loss

Bi_2O_3 fusion

wt = 2.0127 gm air dry
1.8336

D + Alkcl = 14.2811
D = 14.1698
KCl + NaCl = 0.1113
KCl =
NaCl =

0.1113 gm KCl + NaCl was dissolved in water + the sol made upto 50 cc.

10 cc was taken for analysis

D + Alkcl = 14.1918
D = 14.1692
0.0221
KCl + NaCl = 0.0016
KCl
NaCl 0.0205

cwc + K_2PtCl_6 = 22.8539
cwc = 22.8484
K_2PtCl_6 = 0.0055
KCl = 0.0016

K_2O = .0016 × 5 = .008 = 0.24%
Na_2O = .0205 × 5 = .1025 = 2.68%

Resume of 110° - 115°C

Silica	52	72	
Alumina	36	60	rates
Ferric oxide		25	Al_2O_3 . SiO_2 . H_2O
Lime		45	.35 .87 .43
Magnesia		51	or roughly
Potash		26	1 : 8 : 4
Soda	2	83	1 : 2 : 1
Loss on ignition	7	76	$Al_2O_3 . 2SiO_2 . H_2O$

107. Kaolinite.

Alk. Carb. fusion

wt air dry = 0.5771 gm
wt dry at 110°C = 0.5260

Percent SiO_2 48.106 %

c. ash + SiO_2 = 18.587570
c ash = 18.598085
0.27762

Note: Ber. 19, 483 R (IV vol. my Ber.)
Alex. Georgeu: Kaolin at 120° approaches composition $2SiO_2, Al_2O_3, 2H_2O$ (RNB.

Percent Fe + Al
~~23.361 %~~
33.625
0.228 = Fe_2O_3 %
33.397 = Al_2O_3 %

c. ash + Fe + Al = 7.779390
c ash = 7.601370
$Fe_2O_3 + Al_2O_3$ = 0.19253
$+Al_2O_3$ = 0.00152
$Fe_2O_3 + Al_2O_3$ = 0.19405 gm
wt Fe_2O_3 = 0.00132
wt Al_2O_3 = 0.19273

Percent CaO
0.415 %

c. ash + CaO = 7.782100
c + ash = 7.779701
CaO = 0.00024

Percent MgO
0.473 %

c ash + $Mg_2P_2O_7$ = 7.608700
c ash = 7.601116
$Mg_2P_2O_7$ = 0.00759
MgO = 0.00273

Resume 107.

Silica	48.10	$SiO_2 : Al_2O_3 : Na_2O$
Alumina	33.39	.802 : .32 : .032
Ferric oxide	0.22	or in whole numbers
Lime	0.741	8 : 3 : 1 : 9
Magnesia	0.47	
Potash	0.24	
Soda	2.68	
	85.51	$HNa_2O, 3Al_2O_3, 8SiO_2, 9H_2O$
Loss on ignition	15.85	
	101.36	

Lab. No. 353. Rather soft gray graphite marked:
" Note book 80, pg 46. Aug 19. 1884

Western end of Quarry Mt. Hot Springs. up from Happy Hollow.
(No 1) " " " " L.S. Griswold. "

For Bi_2O_3 Fusion, + Water + loss on ignition. wt = 2.0000 gm.

(20.5715 / 20.5715) Percent water. Crt + g ½ht = 20.5743
0.14% after = 20.5715
water at 110°C = 0.0028

Percent loss BB. Crt + g ½ignit = 20.5715 "
3.46% after = 20.5022 "
loss BB = 0.0693

Bi_2O_3 fusion. wt air dry = 2.0000 gm
wt dry at 110°C = 1.9972 "

D + Alk Cl = 14.1806
D = 14.1689
KCl + NaCl = 0.0117
KCl = 0.0042
NaCl = 0.0075

K_2O = .0026 = 0.13% (OK)
Na_2O = .0039 = 0.19

Crucr + K_2PtCl_6 = 23.0267
Crucr = 23.0129
K_2PtCl_6 = 0.0138
KCl = 0.00421

Alk. Carb fusion I. wt air dry = 1.0508
wt dry at 110°C = 1.0494

Percent SiO_2 = 97.24% wt SiO_2 = 1.02042 gm.

Percent $Fe_2O_3 + Al_2O_3$ = 2.07% wt $Fe_2O_3 + Al_2O_3$ = 0.02182 gm
" Fe_2O_3 = 0.33% wt Fe_2O_3 = 0.00352
" Al_2O_3 = 1.74% wt Al_2O_3 = 0.01830

17 → wt CaO = 0.00179 gm.
22 → wt $Mg_2P_2O_7$ = 0.00659 gm.

353 II

wt = 0.5091 gm air dry.
wt = 0.5084 dry at 110°C

Percent Loss BB
0.90%

crt + wt of ignit = 19.6874
crt = 19.6821
= 0.0053

water + loss BB
96.44%

wt SiO_2 = 0.49032 gm

Resumé of 353.

Silica	96.44	per cent.
Alumina	1.74	" "
Ferric oxide	0.33	" "
Lime	0.17	" "
Magnesia	0.22	" "
Potash	0.13	" "
Soda	0.19	" "
Loss on ignition	0.90	" "
Total	100.12%	(99.80)

Lab. No. 354. "Note book 80, pg 6. Aug 12, 1889
Sutton's quarry No. 6. Fine Washita (Anal 2)
N.E. quarter, Sec 24, 2S, 19W. "
L. S. Griswold. "

for water & loss BB.

20.5708	wt	= 2.0000 gm.
20.5708	C + wt light	= 20.5733
	after	= 20.5708
Percent water	water at 110°C	= 0.0025
0.125%		

Percent loss BB	C + wt ignit	= 20.5708
0.14%	after	= 20.5679
	loss on ignit	= 0.0028

~~Alkali Carb. fusion~~ Bi_2O_3 fusion wt air dry = 2.0000 gm.
for Alkalies wt dry at 110°C = 1.9975 "

K_2O = 0.0032 = 0.16%
Na_2O = 0.0020 = 0.10%

D + Alkal = 15.7967
D = 15.7877
KCl + NaCl = 0.0090
KCl = 0.0051
NaCl = 0.0039

cwc + K_2PtCl_6 = 23.0436
cwc = 23.0267
K_2PtCl_6 = 0.0169
KCl = 0.0051

Alkali Carb. fusion. wt air dry = 2.0176 gm
wt dry at 110°C = 2.0152 "

SiO_2 = 99.49%

wt SiO_2 = 2.00512 gm.

Fe + Al = 0.19 %
Fe_2O_3 = 0.06 "
Al_2O_3 = 0.13 %

wt $Fe_2O_3 + Al_2O_3$ = 0.00392 gm
wt Fe_2O_3 = 0.00122
wt Al_2O_3 = 0.00270

CaO = 0.04%

wt CaO = 0.00099 gm.

wt $Mg_2P_2O_7$ = 0.00492 gm
wt MgO =

Resumé of 354.

Silica	99 ~~49~~	
Alumina	18	OK
Ferric oxide	06	
Lime	04	B+S
Magnesia	08	
Potash	16	OK
Soda	10	
Loss in ignition	14	
	100 20	99.94
		26
		100.20

Siliceous Shale.

Lab. No. 355. Novaculite (?) marked: "Notebook 81, pg 20. Sept. 11. 1889. S.E. quarter, Sec 29, 2S, 21W. Just S.E. of Beal. —— —— (anal. 3) No. 213 Section across the stratification. Return this stone. L.S. Griswold."

Water. loss of Bi_2O_3 fusion. wt = 2.0000 gm.

21.1823 / 21.1820 Percent water 0.175%

crs & lit = 21.1855
after = 21.1849
water at 100°C = 0.0036

Percent loss B.B. 0.73%

crs & ignit = 21.1820
after = 21.1673
loss B.B = 0.0147

Bi_2O_3 fusion. wt air dry = 2.0000 gm
wt dry at 110°C = 1.9965 "

wt Na_2O = 0.00535 gm.
wt K_2O = 0.00802 "

Percent Na_2O = 0.26%
Percent K_2O = 0.40%
Alkalies = 0.66%

D + Alk Cl = 14.1909
D = 14.1681
KCl + NaCl = 0.0228
KCl = 0.0127
NaCl = 0.0101

crue + K_2PtCl_6 = 23.0853
crue = 22.0436
K_2PtCl_6 = 0.0417

Alkali Carb. fusion. wt air dry = 1.0397 gm.
wt dry at 110°C = 1.0380

Percent SiO_2 94.64%

wt SiO_2 = 0.98242 gm.

Percent
Fe + Al 4.19%
Fe_2O_3 1.48 "
Al_2O_3 2.71%

wt $Fe_2O_3 + Al_2O_3$ = 0.04353 gm.
wt Fe_2O_3 = 0.01542
wt Al_2O_3 = 0.02811

.17 wt CaO = 0.0179 gm.

.43 wt $Mg_2P_2O_7$ = 0.01242 gm.

MgO = 0.00475

355. II Alk. Carb fusion } wt air dry = 0.5375 gm
wt dry at 110°C = 0.5366 gm

Percent SiO_2

93.48%
93.83%

wt SiO_2 = 0.50162 gm
wt Fe_2O_3 with this } = 0.00192

Resumé of 355

Silica	93.48	per cent
Alumina	2.71	" "
Ferric oxide	1.48	" "
Lime	0.17	" "
Magnesia	0.43	"
Potash	0.40	"
Soda	0.26	"
Loss on ignition	.73	" "
Total	99.66%	99.00
Silica went this —	.35	
	100.01	

Lab No. 356. Hard Washita: "Note book 80. pg 90. Aug 27, 1889. SW 1/4 of NE 1/4, Sec 8, 25, 18W. Barnes' big quarry. (bed 4). L. S. Griswold."

20.5720
20.5720

for water loss (+ Bi_2O_3) 2.0000 gm

Percent water 0.085%

C + W bf ht = 20.5737 "
after = 20.5720
water at 110°C = 0.0017

Percent loss BB 0.085%

C + W bf ht = 20.5720
after = 20.5703
loss BB = 0.0017

Bi_2O_3 fusion . wt air dry = 2.0000 gm
wt dry at 110°C = 1.9983 "

K_2O = 0.0026 gm
Na_2O = 0.0027 gm

K_2O = 0.13%
Na_2O = 0.13%

Dish + KCl = 14.1778
Dish = 14.1684
KCl + NaCl = 0.0094
KCl = 0.0042
NaCl = 0.0052

Crucible + K_2PtCl_6 = 23.1727
Crucible = 23.1589
K_2PtCl_6 = 0.0138

Alk. Carb fusion . wt air dry = 1.9657 "
wt dry at 110°C = 1.9641 "

Percent SiO_2 99.06%

wt SiO_2 = 1.96602
after washing, SiO_2 = 1.94572

36
.06
30

wt Fe_2Al = 0.00722 gm.
wt Fe_2O_3 = 0.00122
wt Al_2O_3 = 0.00600

.09

wt CaO = 0.00182 gm.

Percent MgO = 0.13%

wt $Mg_2P_2O_7$ = 0.00712
wt MgO = 0.00256

Resumé 356.

Silica	99.06
Alumina	0.30
Ferric oxide	0.06
Lime	0.09
Magnesia	0.15
Potash	0.13
Soda	0.13
Loss on ignition	06
	99.98

OK

B & S

99.60

99 72/100

Lab. No. 357. Red clay; "Note book 80, pg 90.
Aug 27. 1889. S.W¼, N.E.¼, Sec 8, 25, 18 W.
Barnes' big quarry. (Anal 5). L. S. Griswold"

20.1540
20.1540

for water + loss. wt air dry = 1.0000 gm
Percent water
3.09%
crc + crf wt = 20.1849
after = 20.1540
water at 110°C = 0.0309

Percent loss B.B.
8.33% 7.30
crc + ff ignit = 20.1540
after = 20.0732
loss B.B = 0.0808

Bi_2O_3 fusion. wt air dry = 1.0000
wt dry at 110°C = .9691

K_2O = 0.0141 = 1.45%
Na_2O = .0090 = 0.93

crc + KCl = 15.8272
crc = 15.7877
KCl = 0.0395

crc + K_2PtCl_6 = 23.1589
crc = 23.0853
K_2PtCl_6 = 0.0736
KCl = 0.0224

Alk. Carb-fusion. wt air dry = 1.0044 gm
wt dry at 110°C = 0.9734

Percent SiO_2
59.31%
wt SiO_2 = 0.57742 gm.

$Fe_2O_3 + Al_2O_3$ = 29.53 | wt $Fe_2O_3 + Al_2O_3$ = 0.28753 gm
Fe_2O_3 = 6.11% | wt Fe_2O_3 = 0.05952
Al_2O_3 = 23.42% | wt Al_2O_3 = 0.22801 gm.

0.62 $CaO + Al_2O_3$ 0.62%
.31 Al_2O_3
.31 CaO
0.71

wt CaO = 0.00613 gm
(residue) Al_2O_3 = 0.00302
CaO = 0.00311

wt $Mg_2P_2O_7$ = 0.01932 gm

100.88
.31
100.57

Resumé of 357.

Silica	67	31	per cent.
Alumina	23	73	
Ferric oxide	6	11	
Lime		31	
Magnesia		71	
Potash	1	45	
Soda		93	
Loss on ignition	7	30	
	99.	85	
Loss on ignition	1	03	
	100.	88	per cent.

Lab. No. 358. Black Washita stone. "Notebook 81, pg 56.
Sept. 20. 1889. S.E. of S.W., Sect 26, 2S, 18W.
Ten mile quarry. (trial 6) L. S. Griswold."

22.1650 For water + loss BB. + Bi_2O_3 fusion. wt = 2.0000 gm
22.1650 Percent water
0.09%

C. + w ff ht = 22.1668
after = 22.1650
water at 110°C = 0.0018

Percent loss BB
(This burns white)
0.60

C. + w ff ignit = 22.1650
after = 22.1530
loss BB = 0.0120

Bi_2O_3 fusion

wt = 2.0000 air dry
wt dry at 110°C = 1.9982 gm

wt D + Alk Cl = 15.7953
wt D = 15.7878
Alk Cl = 0.0075

K_2O = 0.0020 gm
Na_2O = 0.0022 "

K_2O = 0.11%
Na_2O = 0.10%

Cmet K_2PtCl_6 = 23.1838
cmc = 23.1727
K_2PtCl_6 = 0.0111
KCl = 0.0033 gm
NaCl = 0.0042

Alk. Carb. fusion.
Percent SiO_2
99.45%

wt air dry = 2.0027 gm
wt dry at 110°C = 2.0009 "
wt SiO_2 = 1.98992 "

.26%
.03
.23
.08
.08

wt Fe + Al = 0.00533
wt Fe_2O_3 = 0.00072
wt Al_2O_3 = 0.00461

wt CaO = 0.00172 gm.
wt $Mg_2P_2O_7$ = 0.00482 gm.

358. Alk. Carb. fusion. II 1st acidity = 0.5211 gm
dry at 110°C = 0.5207

Percent SiO_2 = 99.27% wt SiO_2 = 0.51692 gm

Resumé of 358

Silica	99	45	99.27
Alumina		23	.23
Ferric oxide		03	.03
Lime		08	.08 (OK)
Magnesia		08	.08 (308)
Potash			.10
Soda			.11
Loss on ignition		.60	6
			100.59

Total 100.47

Lab-No. 359. White Washita stone. "Notebook 81. Pg 56.
Sept. 20. 1889. S.E. of SW. Sect 26, 2S, 18W.
Ten mile quarry. (Anal 7. same tray with anal 6.)
For water, loss BB, & Bi_2O_3 fusion. L. S. Griswold."

20.0982
20.0982 Percent water
0.09%

wt = 2.0000 gm
C + W of wt = 20.1000 gm
after = 20.0982
water at 110°C = 0.0018

Percent loss BB.

0.22%

C + W of wt = 20.0982
after = 20.0938
loss BB = 0.0044

Bi_2O_3 fusion.

K_2O = 0.0029 gm
Na_2O = 0.0049 "

K_2O = 0.14%
Na_2O = 0.24%

wt air dry = 2.0000 gm
wt dry at 110°C = 1.9982

D + slk Cl = 14.1818
D = 14.1677
KCl + NaCl = 0.0141
KCl = 0.0047
NaCl = 0.0094

emc + K_2PtCl_6 = 23.3125
emcl = 23.2971
K_2PtCl_6 = 0.0154

Alkali Carb. fusion.

wt air dry = 1.9342
wt dry at 110°C = 1.9325

Percent SiO_2
99.84%
99.12% rewashed.

wt SiO_2 = 1.92942 gm
wt SiO_2 = 1.91552 "

K_2O 0.50%
Fe_2O_3 0.62
Al_2O_3 0.48

wt Fe_2O_3 + Al_2O_3 = 0.00982 gm
wt Fe_2O_3 = 0.00042
wt Al_2O_3 = 0.00940

0.12 % wt CaO = 0.00242 gm

Present MgO
0.06 % wt $Mg_2P_2O_7$ = 0.00382 gm
wt MgO = 0.00137

Kerner.

Resume 359

Silica	99	82	99.12 %
Alumina			0.48 "
Ferric oxide			0.02 "
Lime		12	0.12 "
Magnesia			0.06 "
Potash			0.14 "
Soda			0.24 "
Loss on ignition		22	0.22 "
Total			100.40

Lab. No. 369. Gray Syenite, rather fine grained, marked:
" Jan. 1890. E½ of N.E.¼ of Section 28,
1N, 12W., land of John S. Braddock.
The gray syenite at the base of Ellis Mt. Tube sent
for crush test." Brought in the laboratory by Dr.
J.C. Branner.

Lab. No. 370. Mottled Washita stone, marked:
" Notebook 81, pg 42. Sept. 18. 1887.
East central part of sect. 12, T 2 S, R 18 W.
South side of the ridge. (trail 8)
L. S. Griswold."

for Water loss & Bi_2O_3 fusion
20.0955
20.0952
Percent water
0.09%

wt = 2.0000 gm
crc & ft = 20.0970
after = 20.0952
loss BB = 0.0018

0.11%

crc & ft & ignit = 20.0952
after = 20.0929
loss BB = 0.0023

K_2O = 0.00252 grams
Na_2O = 0.00392 "

K_2O = 0.12%
Na_2O = 0.19%

D + Alk Cl = 14.1785
D = 14.1671
KCl + NaCl = 0.0114
KCl = 0.0040
NaCl = 0.0074

crc + K_2PtCl_6 = 23.3256
crc = 23.3123
K_2PtCl_6 = 0.0133

Alkali Carb fusion.

wt air dry = 2.0173 gm
wt dry at 110°C = 2.0155

ft-h (.000116.)

wt SiO_2 = 2.01639 gm
99.30 rewashed. wt SiO_2 = 2.00150 gm

0.29
.10 Fe_2O_3
.19 Al_2O_3

wt Fe + Al = 0.00592 gm
wt Fe = 0.00212
0.00380
wt Al_2O_3 =

.07% 370. wt CaO = 0.00152 gm

wt $Mg_2P_2O_7$ = 0.00562

0.10% wt MgO = 0.00202

Resumé of 370

Silica	99	30	per cent.
Alumina		19	" "
Ferric oxide		10	" "
Lime		07	" "
Magnesia		10	" "
Potash		12	" "
Soda		19	" "
Loss on ignition	0	11	" "
Total	100	18	

OK

BOS

Lab. No. 371. Tertiary chert flinty & apparently crystallized. None but the flinty stone used in the sample.
" Note book 81, pg 74 E. Sept 28, 1889.
S.W 1/4, Section 17, 4S, 18W. (Anal 9.
L. S. Griswold."

---

for watr loss BB & Bi_2O_3 fusion. wt = 2.0000 gm

20.7048
20.7038 Percent watr
0.35%

crt + bft = 20.7108
after = 20.7038
watr at 110°C = 0.0070

Percent loss BB
0.95%

crt + bft ignit = 20.7038
after = 20.6847
loss BB = 0.0191

Bi_2O_3 fusn

wt B + Alk Chl. = 14.1873
wt B = 14.1676
wt NaCl + KCl = 0.0197
wt KCl = 0.0066
wt NaCl = 0.0131

K_2O = 0.0041
Na_2O = 0.0069

wt K_2PtCl_6 + cmc = 23.3475
wt cmc = 23.3256
wt K_2PtCl_6 = 0.0219
wt KCl = 0.0066

K_2O = 0.20%
Na_2O = 0.34%

Alkali Carb fusion. wt air dry = 2.0049 gm.
wt dry at 110°C = 1.9979 "

(Not a good fusion. refuse this SiO_2) wt SiO_2 = 1.96019 gm
SiO_2 97.38%. after refusn wt SiO_2 = 1.9456

Percent. 0.88%
.41
.47

wt Fe_2O_3 + Al_2O_3 = 0.01762
wt Fe_2O_3 = 0.00832

wt CaO = 0.01039 grams. Per cent. 0.51%

wt $Mg_2P_2O_7$ = 0.00692 grams.
0.13% wt MgO = 0.00249 "

Resume of 371

Silica	97	38	per cent
Alumina	00	47	" "
Ferric oxide	0	41	" "
Lime	0	51	" "
Magnesia	0	13	" "
Potash	0	20	" "
Soda	0	34	" "
Loss on ignition	0	90	" "
	100	39	

99.72
.54
100.26

(ok) BOL

Lab. No. 373. Black Arkansas stone (novaculite)
" Notebook 81, pg 50. Sept 20. 1889

S.W. of S.E., Section 30, 2S, 18W. (tract 10)
L. S. Griswold."

for water & loss B.B.
22.1643 gains
0.02% Water

wt = 2.0000
Crucible + wt = 22.1643
after = 22.1639
water at 110°C = .0004

Crucible + ignit = 22.1639
after = 22.1621
loss B.B = 0.0018

0.09%

Fe_2O_3 from
Percents
K_2O = 0.0022 = 0.11%
Na_2O = 0.0033 = 0.16

wt D + HCl + Chl = 15.7972
wt Dish = 15.7872
wt KCl + NaCl = 0.0100
wt KCl = 0.0036
wt NaCl = 0.0064

wt K_2PtCl_6 + Cruc = 23.3594
wt Cruc = 23.3475
wt K_2PtCl_6 = 0.0119
wt KCl = 0.00363

Alk. Carb. fusion

wt = 2.0000 gm acidy
wt dried at 110°C = 1.9996

(wt ff. .000085)

99.36% wt SiO_2 = 1.99632 grms
wt SiO_2 after crush = 1.98683

Percents
0.30%
0.17
0.13

wt Fe_2O_3 & Al_2O_3 = 0.00602 grms.
wt Fe_2O_3 = 0.00342 "
wt Al_2O_3 = ———

wt CaO = 0.00282 Per cent. = 0.14

wt $Mg_2P_2O_7$ = 0.00267 grams.

Per Cent. = 0.074% wt MgO = 0.00096

Resume of 373.

Silica	99	36	per cent	
Alumina	"	13	"	"
Ferric oxide	"	17	"	"
Lime	"	14	"	"
Magnesia	"	04	"	"
Potash	"	11	"	"
Soda	"	16	"	"
Loss on ignition	"	09	"	"
Total	100	20		

OK BOL

Feb 5/890

Lab. No. 374. Gray Arkansas stone (Nomenclde)
" Note book 80, fg 6. Aug 11. 1889.

Ledge in the River off Rockport saw-mill.
Sect. 16, 4 S, 17 W. (Trial 11) L. S. Griswold."

For Water & hor. B.B.

wt = 2.0000
wt calc. + As. bflt = 20.7094 grams
" " + " aflt = 20.7079
wt water = 0.0015

0.075%

wt calc + As. bflt HBB = 20.7079
" " + " aflt bf BB = 20.7054
0.12% wt lost on ignition = 0.0025

Bi_2O_3 fusn.

K_2O = 0.00157 = 0.07%
Na_2O = 0.00313 = 0.15%

wt KCl + NaCl = 0.00845
wt KCl = 0.00250
wt NaCl = 0.00595

wt K_2PtCl_6 = 0.0082
wt KCl = 0.0025

Alk. Calb fusn

wt = 2.0051 grams air dry
wt = 2.0037 " dry @ 110°-115°C.
(.000085)
wt SiO_2 = 2.00492 grams
Percent 99.47 wt SiO_2 = 1.99323 " after reaching.

Percent
0.29%
0.12 "
0.17 "

wt $Fe_2O_3 + Al_2O_3$ = 0.00588
wt Fe_2O_3 = 0.00257
wt Al_2O_3 =

0.09%. wt CaO = 0.00192 gram.

wt $Mg_2P_2O_7$ = 0.00332
0.05% wt MgO = 0.00119

Resumé of 374:

Silica	99 47	per cent
Alumina	0 17	" "
Ferric oxide	0 12	" "
Lime	0 09	" "
Magnesia	0 05	" "
Potash	0 07	" "
Soda	0 16	" "
Loss on ignition	0 12	" "
Total	100 24	

99.59
.24
99.83
.09
99.97
.22
100.19
.05

Feb 6/89. 17m.

Analyses for Dr Branner

Lab. No 375 Reef rock Complete analysis.

For Complete analysis — wt air dry = 1.0003 grams.
Treat with Conc. HCl — wt d. @ 110°-115°C = 0.9990 "

Percent. 64.06% — wt Residue insol. in conc HCl = 0.64002
R 63.52% — wt SiO_2 R = 0.63462
1.39%
0.15
0.24 — wt $Fe_2O_3 + Al_2O_3$ R. = 0.00392 grams
wt Fe_2O_3 R = 0.00152 "
wt Al_2O_3 R = 0.00240

Faint trace — wt Ca O R =
Percent 0.18% — wt MgO = .00180 — wt $Mg_2P_2O_7$ R = 0.00502 "

Sol. HCl 0.36% — wt $Fe_2O_3 + Al_2O_3$ = 0.00362 grams
0.21 — wt Fe_2O_3 = 0.00212 "
0.15 — wt Al_2O_3 =

Percent CaO = 16.61% — wt CaO = 0.1660 grams

wt $Mg_2P_2O_7$ = 0.06574
Percent MgO = 2.37% — wt Mg O = 0.02369

Note: Residue insol. in HCl appeared to be chiefly white sand. R no 8)

For P_2O_5 — wt air dry = 1.0013 grams
Traces of Phosphoric acid! — wt d. @ 110°-115°C =
Qualitative gave very little. =

Lab no 376 - coating Crown on 375.
Effervesced strongly with dil HCl
HCl sol.:
Same proportion.
Ca " "
Mg
alk.
Residue.
Silica small proportion.

Phosphoric acid - reacts somewhat stronger than in 375.

R. N. B.

For water, loss B.B. & alk wt air dry = 2.0003 grms.
wt d. @ 100°-115°C = 1.9977

water
0.13%

wt c + 3N bfht = 20.7102 grms.
wt c + 3N afht = 20.70745
wt lost - water = 0.00275

Loss B.B.
16.03%

wt c + 3N & ht BB = 20.70745
wt c 3N afht BB = 20.3871
wt loss B.B. = 0.3203

Bi_2O_3 from.

wt KCl + NaCl = 0.0177
wt KCl = 0.0068
wt NaCl = 0.0109

K_2O = 0.00429 = 0.21%
Na_2O = 0.00578 = 0.28%

wt K_2PtCl_6 = 0.0224
wt KCl = 0.0068

Resume of B.J.S.

Phosp. acid. [illegible] per cent

Silica	63	52	per cent.
Alumina		39	" "
Ferric oxide		36	" "
Lime	16	61	" " (OK)
Magnesia	2	55	" "
~~Potash~~		21	" " (P ~~K~~)
Soda		28	" "
Loss on ignition	16	03	" " (R on B)
Total	99	95	per cent.

Soluble matter	35	94
Insoluble matter	64	06
Total	100	00

In Conc. HCl per cent.

Dr Branner.

Lab No 377 "Cenice Rap No 70" Jc13

For water, loss B.B., & Alk.

wt air dry = 2.0000 gm.
" d. @ 110°-115° = 1.9712 "

1.44 %

wt C + 377 bf ht = 20.7090 grms
" C + 377 af ht = 20.6802 "
wt lost - water = 0.0288 "

wt C + 377 bf ht BB = 20.6802 "
" C + 377 af ht BB = 20.0547 "
" lost B.B. = 0.6255 "

31.73 %

Bi_2O_3 fusn.

wt KCl + NaCl = 0.0220 "
wt KCl = 0.0040
wt NaCl = 0.0180

$K_2O = 0.00252 = 0.12\%$
$Na_2O = 0.00955 = 0.48$ "

wt K_2PtCl_6 = 0.0132 "
wt KCl = 0.00403 "

For P_2O_5

Percent P_2O_5 = 8.41 %

wt air dry = 1.0005 grams
" d. @ 110°-115°C = 0.9861 "
wt $Mg_2P_2O_7$ = 0.12979 "
wt P_2O_5 = 0.08301 "

For Complete analysis.
(Treated with Conc HNO_3.)

wt air dry = 1.0000 } use
" d @ 100°-105°C = 0.9856 } 5 gr Sr.

Percent 4.06 %
1.77 % R
2.28 % R
1.91 R
0.37 R
Al_2O_3 = R
CaO 0.18 % R
MgO 0.13 % → R

wt Residue = 0.040005 grams
wt SiO_2 = 0.01747 "
wt $Fe_2O_3 + Al_2O_3$ = 0.02252 "
wt Fe_2O_3 = 0.01892 "
wt CaO = Trace = 0.00152
wt $Mg_2P_2O_7$ = 0.00369 grams
wt MgO 0.00132 "

Percent MgO 0.13
Percent CaO 0.15
SiO_2 1.77
Al_2O_3 3.7
Fe_2O_3 1.91
Total 7.66

12.88% wt $Fe_2O_3 + Al_2O_3$ = 0.12702 grams.
4.44
8.44 wt Fe_2O_3 = 0.04382 "

Solution.

33.25% wt CaO = 0.32774

wt $Mg_2P_2O_7$ = 0.28887

10.56% wt MgO = 0.10409

CO_2 for CaO (23.31) = 18.31 % CO_2
CaO for P_2O_5 (8.41%) = 9.94 % CaO.
CO_2 for MgO (10.56%) = 11.61 %

Note: (3)CaO for P_2O_5 (8.41) = 9.94
or 8.41
9.94
18.35 % $Ca_3(PO_4)_2$ = $3CaO.P_2O_5$

$CaCO_3$ = 41.62 = {18.31 CO_2 / 23.31 CaO
$MgCO_3$ = 22.17 = {11.61 CO_2 / 10.53 MgO

Resumé of 377

Silica	1	77	per cent
Alumina	6	89	" "
Ferric oxide	6	35	" "
Lime	33	40	" " OK.
Magnesia	10	69	" "
Potash	0	12	" "
Soda	0	48	" "
Phosphoric acid	8.	41	" "
Loss on ignition	31	73	" "
	101	76	← rough summation

Soluble matter	95 94	In Conc. HNO_3
Insol matter in Conc HNO_3	4 06	
	Total	

Dr. Brauner

Lab No 378. Soft Calc. J.C.B.

For water / Loss BB calc wt air dry = 2.0013 grams
" 2. @ 110°-115°C = 1.9963 "

wt C + 378 bfht = 20.7056
" + " afht = 20.7005
wt lost 110°-115°C = 0.0051

water 0.25 %

wt C + 378 bfht BB. = 20.7005
" + " afht BB. = 19.8586
wt lost B.B. 0.8419

Loss BB 42.17 %

Bi_2O_3 fusn. (wt D = 16.7800 5)

K_2O

Na_2O

wt Na Cl + K Cl = 0.02105 grams
wt K Cl =
" Na Cl =
wt K_2PtCl_6 = lost.
wt K Cl =

For P_2O_5 wt air dry = 1.0004 grams
wt 2. @ 110°115°C = 0.9979

Per Cent P_2O_5 0.31 % wt $Mg_2P_2O_7$ = 0.00492 grams.
wt P_2O_5 = 0.00314 "

For Complete Analysis wt air dry = 1.000055 grams
(Just with HNO_3 soln.) " 2. @ 110°/115°C 0.99805

Per cent 3.33 % wt Residue = 0.03332 grams
2.20 % R wt SiO_2 = 0.02197 "
0.69 % R wt $Fe_2O_3 + Al_2O_3$ = 0.00697 "
0.38 " R wt Fe_2O_3 = 0.00382 "
0.31 Al_2O_3 R

0.27 % R wt CaO = 0.00272 grams.
R wt $Mg_2P_2O_7$ = 0.00549 "
0.19 % wt MgO = 0.00197 "

3 CaO for P_2O_5 (.31 %) = 0.36 %
$Ca_3(PO_4)_2$ = .69 % (36 / 31) Ca = .26
MgO for CO_2 .23
CaO left = 53.36 % from 53.72 deg CO_3 = .49
$CaCO_3$ = 95.27 % MgO left = 0.70
from .93

Be_2O_3 fusion 378.

wt air dry = 2.0031 grms
" d. @ 110°-115°C = 1.9981 "

wt KCl + NaCl = 0.0133 grams
" KCl = 0.0048
" NaCl 0.0085
wt K_2PtCl_6 = 0.01595 grms
wt KCl = 0.0048

K_2O = .0030 = 0.15%
Na_2O = .0045 = 0.22%

378 sol. 0.97% wt Fe_2O_3 + Al_2O_3 = 0.00972 grms
.49% wt Fe_2O_3 = 0.00492 "
.48% Al_2O_3

53.72% wt CaO = 0.53619 grams
wt $MgO + K_2O$ = 0.02097 grams
0.93% wt K₂O = 0.00935 "

Resumé of 378.

Phosphoric acid (P_2O_5)	0	31	per cent
Silica	2	20	per cent
Alumina	0	79	" "
Ferric oxide	0	87	" "
Lime	53	99	" "
Magnesia	1	12	" "
Potash	0	15	" "
Soda	0	22	" "
Loss on ignition	42	17	" "
	101	81	
Soluble matter	96	67	} In conc HNO_3
Insol. matter	3	33	
Total	100	00	

Conc.

Dr Branner

Lab. No 379. Rapts No 98. Dec 08

Water, Case BB, Calc.

Water 0.17%

Loss BB 43.31%

Bi_2O_3 fum.

K_2O = .00216 = 0.10%

Na_2O = .00415 = 0.12%

wt air dry	= 2.0007 grams
" d. @ 110°-115°C	= 1.9973 "
Crt C + 379 bfht	= 20.7008
" C + 379 afht	= 20.6973
" Loss = Water	= 0.0035
Crt C + 379 bfht BB	= 20.6973
" C + 379 afht BB	= 19.8222
wt Loss B.B.	= 0.8751
wt alk. chs + O	= 15.79750
wt O	= 15.78625
" NaCl + KCl	= 0.01125
" KCl	= 0.00343
wt NaCl	= 0.00782
wt K_2PtCl_6	= 0.01125

For P_2O_5

Percent 0.38% P_2O_5

wt air dry	= 1.0005 grams.
" d @ 110°-115°C	= 0.9988
wt $Mg_2P_2O_7$	= 0.00602 grams
" P_2O_5	= 0.00385 "

For Complete Analysis

0.09%

wt air dry	= 1.0003 grams
" d. @ 110°-115° C	= 0.9986 "
wt Residue	= 0.00097 grams
R wt SiO_2	=
R wt Fe_2O_3 + Al_2O_3	=
R " Fe_2O_3	=
R " Al_2O_3	=
R wt CaO	=
R wt $Mg_2P_2O_7$	=
R wt MgO	=

Solution 0.08% wt $Fe_2O_3 + Al_2O_3$ = 0.00582
.13 " wt Fe_2O_3 = 0.00132
.45 " Al_2O_3 = ———
55.51% wt CaO = 0.55439 gram

~~0~~ " $Mg_2P_2O_7$ = 0.01759 gram
0.64% " MgO = 0.00646 "

3 CaO for P_2O_5 (.38) = .44
— $Ca_3(PO_4)_2$ = 0.82%

Remain CaO = 55.51
.44
50.07

$CaCO_3$ = 99.13%

Resumé of 379.

			per cent
Silica & insol. matter	0	09	" "
Alumina	0	45	" "
Ferric oxide	0	13	" "
Lime	55	51	" "
Magnesia	0	64	" "
Potash	0	10	" "
Soda	0	20	" "
Phosphoric acid	0	38	" "
Loss on ignition	43	31	" "
Total	100	81	

Soluble Matter	99	91%	In conc. HNO_3
Insoluble matter	0	09	
Total	100	00	

Teab No 103 - White Novaculite J. J. Sutton Hot Springs.
Redetermination of Silica:

Water = 0.002%

wt air dry = 0.36045 Grams.
" d. @ 110°-115°C = 0.36044 "

after drunk. wt SiO_2 = 1st 0.35562
by remaining " = 2nd 0.36132
2) .71694
Mean 0.35847 Gram

99.45%.

Teab No. 100 Red Novaculite J. J. Sutton Hot Springs
Redeterm. Silica

water = 0.04%

wt air dry = 0.4877 Grams.
" d. @ 110°-115°C = 0.4876

Faint blue color.

99.51%

wt SiO_2 = 0.48522 Gram.