CLAYS.

Limestones.

KAOLINS

Vol. II

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No. 278. Grayish soft clay: (Benton)
Marked: "Note book 64; pg 6. July 4th. 1859.
Herrick + Davis bank. N.W 1/4 of S.W. 1/4 Section 2;
2 S; 15 W. Pottery clay. W. Kennedy.

for water & loss BB. wt = 2.0000 gm

Percent water 2.34%
1 = 10.5260
2 = 10.5253

c+c of wt	= 10.5722
after	= 10.5253
water at 110°C	= 0.0469

Percent loss BB. 5.98%

c+c of ignit	= 10.5253
after	= 10.4085
loss BB	0.1168

Bi_2O_3 fusion.

wt air dry	= 1.0084
dried at 110°C	= 0.9849

$K_2O = 0.0127$ gm
$Na_2O = 0.0117$ gm

D + Alk Cl	= 14.3239
D wt	= 14.1715
KCl + NaCl	= 0.0424
KCl	= 0.0202
NaCl	= 0.0222

$K_2O = 1.28\%$
$Na_2O = 1.18\%$

cruc + K_2PtCl_6	= 22.7895
cruc	= 22.7233
K_2PtCl_6	= 0.0662
KCl_0	0.0202

Alkali Carb. fusion
No Manganese or CO_2

SiO_2 = 69.95%

wt air dry	= 1.0285
dried at 110°C	= 1.0045
c. ash + SiO_2	= 20.04800
c + ash .000085	= 19.345285
SiO_2	= 0.70272

$Fe_2O_3 + Al_2O_3 = 23.78\%$
$Fe_2O_3 = 1.44\%$
Al_2O_3 22.34%

c. ash + Fe + Al	= 18.889400
c + ash .000085	= 18.650485
$Fe_2O_3 + Al_2O_3$	= 0.23892
c. ash + Fe_2O_3	= 18.70038
c + ash	= 18.685785
Fe_2O_3	= 0.01452

Lab no 278

C. ash + CaO =	15.36746
C + ash =	15.367385
CaO	0.00002

C. ash + $Mg_2P_2O_7$ =	15.3673
C. + ash =	15.3649
$Mg_2P_2O_7$ =	0.0024
MgO	0.0008

MgO. Slight trace not ignitable

Summary

SiO_2	69.95	%
Al_2O_3	22.34	"
Fe_2O_3	1.44	"
CaO	trace	"
MgO	0.08	"
K_2O	1.28	"
Na_2O	1.18	"
Loss on ignition	5.98	"
	102.25	%

Sand very fine, and little grit. No efferescence with HCl
25 grams for sand.

C. ash + Sand =	15.51070
C + ash =	15.39724
Sand =	0.11346

No. 279. Benton Pottery clay.
Marked; " Note book 64. pg 12. July 5th 1889.
S. M. Henderson's clay pit. Benton, Upper clay.
W. Kennedy "

water + loss BB	wt	= 2.0000 gm
Percent water 1=9.1590 2=9.1580 1.96%	c + c of wt	= 9.1972
	after	= 9.1580
	water at 110°C	= 0.0392
Percent loss BB	c + c of ignit	= 9.1580
	after	= 9.0467
	loss BB	= 0.1113
Bi_2O_3 fusion.	wt air dry	= 1.0123 gm
	dried at 110°C	=
	D + Alk Cl	= 15.8263
	Dish	= 15.7882
	KCl + NaCl	= 0.0381
	KCl	= 0.0228
	NaCl	= 0.0153
	crue + K_2PtCl_6	= 22.6015
	crue	= 22.5268
	K_2PtCl_6	= 0.0747
	KCl_6	=
Alk. Carb. fusion.	wt air dry	= 1.0109 gm.
	dried at 110°C	=
	c. ash + SiO_2	= 19.35530
	c + ash .000055	= 18.650685
	SiO_2	= 0.70462
	c. ash + Fe + Al	= 9.55980
	c + ash .000055	= 19.34985
	$Fe_2O_3 + Al_2O_3$	= 0.21482
	c + ash + Fe_2O_3	= 18.66890
	c. ash + ~~Fe Al~~ 3	= 18.650885
	Fe_2O_3	= 0.01802

Lab No 279.

C. ash + CaO =	18.70150
C + ash =	18.700385
CaO =	0.00112

MgO. Very slight trace. not estimated.

Summary:

SiO_2 (total)	71.09
Al_2O_3	19.86
Fe_2O_3	1.81
CaO	0.11
MgO	Trace
K_2O	1.45
Na_2O	0.81
Loss ignition	5.67
Total:	100.80

N.B. For Sand 25 grams clay. No effervescence with HCl.
Sand very fine; after little micr. scales.

C. ash + Sand =	16.27870
C. ash =	15.51085
Sand =	0.76792

No. 280. Gray, rather sandy clay. Marked: "Note book 47, pg 24. June 8th, 1889. From Ark. Valley R.R. 1 3/4 N of Sweet Home. W. Kennedy."

for water & loss BB. wt : = 2.0000 gm

Percent water 1 = 9.4302, 2 = 9.4295, 1.17%

	c+c bf ht	= 9.4529
	after	= 9.4295
	water at 110°C	= 0.0234

Percent loss BB. 1.91%

	c+c bf ignit	= 9.4295
	after	= 9.3916
	loss BB	= 0.0379

Bi_2O_3 fusion.

	wt air dry	= 1.0261
	dried at 110°C	=
	D + AlKCl	= 14.1907
	D	= 14.1715
	AlKCl	= 0.0192
	KCl	=
	NaCl	=

K_2O = 0.0041 gm
Na_2O = 0.0065

K_2O = 0.40%
Na_2O = 0.66%

	cruc + K_2PtCl_6	= 22.6230
	cruc	= 22.6015
	K_2PtCl_6	= 0.0215
	KCl	=

Alk. Carb. fusion

	wt air dry	= 1.0056
	dried at 110°C	=
	c. ash + SiO_2	= 20.94370
	c + ash .000116	= 20.045416
	SiO_2	= 0.89829

90.38%

	c ash + Fe_2O_3 + Al	= 18.71630
	c + ash .000085	= 18.650885
	$Fe_2O_3 + Al_2O_3$	= 0.06542

6.58% $Fe_2O_3 + Al_2O_3$

2.10% Fe_2O_3

	c. ash + Fe_2O_3	= 15.38350
	c + ash	= 15.362585
	Fe_2O_3	= 0.02092

4.48% Al_2O_3

Teab No 280.

c. ash + CaO = 15.36910
c ash = 15.367485
CaO = 0.00162

0.16% CaO.

MgO. Very slight trace. Not estimable.

Ordinary
SiO_2 90.38 %
Al_2O_3 4.48 "
Fe_2O_3 2.10 "
CaO 0.12 "
MgO trace
0.41 "
0.26 "
Loss 1.91 "
100.10 %

Note. Sand - 25 grams Kaolinitic clay. No efflorescence with HCl.
Sand mostly fine, but considerable quantity of coarse particles

18.39% Sand

C. ash Sand = 20.82420
C ash .000485 = 16.27875
Sand = 4.54542

No 281. Yellowish sandy clay marked: "Note book 47 fig 2. May 28. 1889. Edge of low bluff on new road leading north from Fort Smith crossing, about 200 yards N. Thickness 5 feet. W Kennedy.

For water & loss BB.

1 = 10.5595
2 = 10.5572
3 = 10.5557 percent water
2.96%

wt	=	2.0000 gm
c+c ff ht	=	10.6149
after	=	10.5557
water at 110° C	=	0.0592

Percent loss B.B.

c+c ff ignit	=	10.5557
after	=	10.4899
loss BB	=	0.0658

Alkali Carb. fusion for Anal. (partial)

wt airdry	=	1.0236 gm.
dried at 110°C	=	.9934
c+ash+SiO2	=	20.169 20
c+ash	=	19.343685
SiO2	=	0.82552
C.ash+Fe+Al	=	19.46900
c+ash	=	19.343585
Fe2O3+Al2O3	=	0.12542
C.ash+Fe2O3	=	19.36980
c+ash	=	19.343585
Fe2O3	=	0.02622
C.ash+CaO	=	18.65200
c+ash	=	18.648885
		0.00312

Magnesia trace.

C. ark + Sand = 11.130 58

C + ash. = 07.19 730

Sand = 3.9332

No. 282 Disintegrated Syenite. Marked: "Note book 47; pg 25. June 8. 1889. From cut 2 miles N of Sweet Home on Arkansas Valley R.R. W. Kennedy.

For water and loss BB.

9.5350
9.5370
9.5310

Water 3.50%

wt	=	2.0000 gm
c + s bf ht	=	9.6011
after	=	9.5310
water at 110°C	=	.0701

c + s bf ignit	=	9.5310
after	=	9.4224
loss BB	=	0.1086

Fe_2O_3 fusion for Alkalies. wt air dry = 1.0333 gm.
dried at 110°C = .9972

D + Alk Cl	=	15.8443
D	=	15.7883
Alk Cl	=	0.0560
cruc + K_2PtCl_6	=	22.7233
cruc	=	22.6230
K_2PtCl_6	=	0.1003
KCl	=	0.0306

K_2O = .0193
Na_2O = .0134
K_2O = 1.94%
Na_2O = 1.34%
NaCl + KCl
KCl
NaCl 0.0254

Alk. Carb. fusion for and. wt air dry = 1.0169 gm
dried at 110°C = .9814

c. ash SiO_2	=	19.20600
c + ash	=	18.64885
SiO_2	=	0.55712

56.76%

c. ash + Fe + Al	=	19.63170
c + ash	=	19.34278
$Fe_2O_3 + Al_2O_3$	=	0.28892

$SiO_2 + Fe_2O_3$ 29.43%

No. 282.

c. ash + Fe_2O_3 = 15.39950
c + ash = 15.363185
Fe_2O_3 = 0.036132

$Al_2O_3 + Fe_2O_3$ 29.43
Fe_2O_3 3.70
Al_2O_3 25.73
SiO_2

c. ash + CaO = 18.655760
c + ash = 18.651316
CaO = 0.004429
CaO = .43%

---

282 (II). Fe_2O_3 — ash c. fp + Fe_2O_3 = 15.395000
" c. 000085 = 15.358085
3.7 wt% Fe_2O_3 wt Fe_2O_3 = 0.03692

SiO_2 56.76
Al_2O_3 25.73
Fe_2O_3 3.70 } 29.43
CaO .43
MgO trace
K_2O 1.93 1.94
Na_2O 1.33 1.34
Ign. loss .562
95.50 95.52

---

282 (II). water + loss wt used = 20000 gm
1 = 9.5406
2 = 9.5358
3 = 9.5340
Percent water 3.36%
c + s of ht ---- = 9.6012
after = 9.5340
water lost at 110° C = 0.0672

1 = 9.4356
2 = 9.4356
Percent loss on ig. 5.09%
c + s of ignit = 9.5340
after = 9.4356
loss on ignition = 0.0984

Alk carb. fusion: wt air dry = 1.0253 // wt dry at 110° C = 0.9909 >>

Percent SiO_2 58.60
orig. ash + SiO_2 = 19.22740
c + ash = 18.646716
SiO_2 0.58069

Fe wt 27.66%
wt c. fp. + Al_2O_3 Fe_2O_3 = 19.61059
" c. 000291 = 19.34180
0.2741

No. 286. "Notebook 3. pg 157. July 19. 1889.
"Soapstone" from well of A.W. Norris, Mabbsdale.
J.C. Branner."

for water and loss B.B. wt = 2.0000 gm

1 = 9.4119
2 = 9.4119 Percent Water
9.46%

C+Sh+lt = 9.6011
after = 9.4119
water at 110°C = 0.1892

Percent lost B.B.
6.88%

C+Sh ignit = 9.4119
after = 9.2871
loss B.B = 0.1248

Fe_2O_3 fusion

wt air dry = 1.0039
dried at 110°C = 0.9090 gm

D+ Alk Cl = 14.20180
D = 14.17185
KCl + NaCl = 0.02995
KCl = 0.01595
NaCl = 0.01400

K_2O = .01007 gm
Na_2O = .00742

K_2O = 1.10%
Na_2O = 0.81%

cruc + K_2PtCl_6 = 22.8417
cruc = 22.7895
K_2PtCl_6 = 0.0522
KCl = 0.01595

Alk. Carb. fusion

wt air dry = 1.0278
dried at 110°C = 0.9306 gm

Percent SiO_2
65.27%

C. ark + SiO_2 = 19.95010
C ark = 19.342685
SiO_2 = 0.60742

$Al_2O_3 + Fe_2O_3$ 26.09%
Fe_2O_3 = 7.34

C. ark + $Al_2O_3 + Fe_2O_3$ = 18.88980
C ark = 18.646985
$Fe_2O_3 + Al_2O_3$ = 0.24282

Al_2O_3 18.75%

C ark + Fe_2O_3 = 8.49690
C ark = 8.428585
Fe_2O_3 = 0.06832

Lab. No. 288.

Percent CaO

0.81% CaO

C + ash + CaO = 18.65440
C + ash = 18.64678 5
CaO = 0.00762

Percent MgO

1.26% MgO

C. ash + $Mg_2P_2O_7$ = 19.37460
C + ash = 19.34 1816
$Mg_2P_2O_7$ = 0.03279
MgO = 0.01181

Resume. Analysis of 288 dried at 110°C:

Silica	=	65.27 %
Alumina	=	18.75 "
Ferric oxide	=	7.34 "
Lime	=	0.81 "
Magnesia	=	1.26 "
Potash	=	1.10 "
Soda	=	0.81 "
Lost on ignition	=	6.88 "
		102.22 %

Water lost at 110°C = 9.46%

Lab No 287 Alk. (II)

wt S + Alkali =
wt S = 15.7886
" NaCl + KCl =
" KCl =

(See page 14)

Lab. No. 287. ~~marble~~ crystallized limestone, marked:
" Note book 72, pg 79. July 14. 1889. No 1.
Land of Wm. Nale, Lafferty Cr.
" R.A.F. Penrose Jr."

for water and loss B.B. wt = 1.0891

1 = 20.3507
2 = 20.3507
Percent water = 0.12%

c+l bf ht = 20.3520
after = 20.3507
water at 110°C = 0.0013

Percent loss B.B.
1 = 19.9149
2 = 19.9127
43.44%

c+l bf ignit = 20.3507
after = 19.9129
loss B.B = 0.4378

I for anal. dissolved in dil. HCl — — — — — — — — 2.0103 air dry
2.0079 dry at 110°C

II for manganese — — — — — — — — 5.0069 gm air dry
5.0009 dry at 110°C

III for Phosphoric acid — — — — 5.0042 gm air dry
4.9982 dry at 110°C

I Percent insol matter
0.65%

c. ash + insol matter I = 8.62830
c + ash = 8.615187
insol matter I = 0.01312

Percent $Fe_2O_3 + Al_2O_3$ I
0.80%

c + Fe + Al. I + ash = 19.35580
c + ash = 19.342585
$Fe_2O_3 + Al_2O_3$ I = 0.01622

I c ash + Fe_2O_3 = 8.42850
c + ash = 8.422185
I Fe_2O_3 = 0.00632

II wt c. ash + Fe + Al = 19.38920
wt c + ash = 19.342285
$Fe_2O_3 + Al_2O_3$ II (5.0009 gm) = 0.04692

II. c. ash + Fe_2O_3 = 8.59540
reacts for Manganese } c + ash = 8.572385
Fe_2O_3 = 0.02302

S.N.B.

Percent Insol matter II
0.67%

c. ash + Insol matter = 15.39100
c + ash = 15.357385
Insol matter II = 0.03362

14 Lab No. 287.

c.ash + CaO (2) = 15.58490

1 = 15.5849
2 = 15.5849

I

c+ash	=	15.35921660
(100cc of 500 ~~200cc of 250~~) CaO (2)	=	0.22569
CaO	=	1.12845
(2) $CaCO_3$	=	1.98099

I

c.ash + CaO (1)	=	15.58290
c+ash	=	15.35751 6
(100cc of 500) CaO (2)	=	0.22539
$CaCO_3$	=	

a For analysis at air dry = 20.0274 gm
20.0034 gm dried @ 110°

287 II alkalies from 5.0009 dried @ 950° C.

wt ppt + alk chl.	=	15.81695
" ppt	=	15.78860
" NaCl + KCl	=	0.02835
" KCl	=	.0018
" NaCl	=	0.02655
wt Cl. + K_2PtCl_6	=	22.4195
" Cl	=	22.4133
" K_2PtCl_6	=	0.0062
" KCl	=	0.0018

K_2O = .0011 = 0.02%

Na_2O = .0140 = 0.27%

P_2O_5 - from 4.9982 grms 287.

wt c ppt + $Mg_2P_2O_7$	=	15.37 2850 grams.
" c.	=	15.35 7985 grams.
wt $Mg_2P_2O_7$	=	0.01487 grams.

0.19% P_2O_5

P_2O_5 = 0.0095 grams

a 287. Residue

c+ash+R	=	15.48210
c+ash	=	15.35056
Residue	=	0.13159

0.65%

SiO_2 from Residue

wt SiO_2 + cruc ppt	=	15.41730
wt cruc ppt	=	15.33928
wt SiO_2	=	0.07802

0.39% SiO_2

a 20. gm

a 287. P_2O_5 = 0.286 o/o.

wt $Mg_2P_2O_7$ = 0.08989 gm
P_2O_5 = 0.0374

287 a. (1) 100 cc
" " " "

wt $Fe_2O_3 + Al_2O_3$ = 0.01832 gm
wt Fe_2O_3 = 0.01362 "
wt Al_2O_3 = 0.00470 "

Resume of partial analysis of 287. Limestone.

Insol. matter	0.67 o/o	reacts for Mn.
Fe_2O_3 (from solution HCl)		
Al_2O_3		
CaO		
MgO		
K_2O	0.02	
Na_2O	0.27	
MnO	undetermined = 0.82	
P_2O_5		0.87

287 a 100 cc (1)
wt Mn_3O_4 = 0.013222 gm
287 a. wt O+AlKCl = 15.8123
O = 15.7881
KCl+NaCl = 0.0242
KCl = 0.0109
NaCl = 0.0133

287 a. 20.0034 grams. after sep P_2O_5, sol made up to 250 cc. 19.9794 gm dry at 110° C.

287 a 10 cc. (1)
1 =
2 =
C. ash + CaO = 15.64080
C + ash = 15.197716
CaO = 0.44309

287 a 10 cc (2) CaO = 0.44289 gm

a 287 Residue CaO = 0.00732 gm. .03 o/o CaO

287. a. 10 cc (1) $Mg_2P_2O_7$ = 0.01429 gm
MgO = =

287 a. 10 cc (2) $Mg_2P_2O_7$ = 0.00909 gm
MgO = =

287 Residue a. wt $Mg_2P_2O_7$ = 0.00322 gm.
wt SiO_2 = 0.00942 gm.

287 a. 200 cc.
287 a. Residue
wt $Fe_2O_3 + Al_2O_3$ = 0.03873
wt Fe_2O_3 = 0.01692
wt Al_2O_3 = 0.02181

Lab. No. 288. Kaolin, marked: "Notebook 64, pg 25. NW 1/4 of SE 1/4 section 16; 2S; 14W. Kaolin from well, bored into 10 ft." W. Kennedy

for water and loss B/B

1 = 10.5347
2 = 10.5830
3 = 10.5305
4 = 10.5295

Percent water 2.14%

wt	=	2.0000 gm
C + K ff lt	=	10.5724 gm.
after	=	10.5295
water at 110°C	=	0.0429

13.23%
13.28

C + K ff ignit	=	10.5295
after	=	10.2695
loss B/B	=	0.2600

Bi_2O_3 fusion for Alkalies

wt air dry	=	1.0068 gm
wt dried at 110°C	=	0.9853

K_2O = .00229 gm = 0.22%
Na_2O = .00619 gm = 0.62%

ppt + Alk Cl	=	15.8035
ppt	=	15.7883
Alk Cl	=	0.0152
K Cl		0.0034
Na Cl	=	0.0116

cruc + K_2PtCl_6	=	22.8538
cruc	=	22.8417
K_2PtCl_6	=	0.0121
KCl	=	0.0036

Alk Carb. fusion. — wt air dry = 1.0139 gm.
dry at 110°C = 0.9923

Reacts for manganese.

46.92% SiO_2

C. ark + SiO_2	=	19.11240
C + ark	=	18.64677 0
SiO_2	=	0.46563

Fe + Al.

Al_2O_3 / Fe_2O_3 = 41.86 + 3.81%

wt C. ff. + $Fe_2O_3.Al_2O_3$	=	19.7572
" C. .00008 + corr 116	=	19.34 1807
" $Al_2O_3 + Fe_2O_3$	=	0.4154
" Fe_2O_3	=	

wt C. ff. + Fe_2O_3	=	15.3977
" C.	=	15.3575
wt Fe_2O_3		0.0402

4.05% Fe_2O_3

(Divided section for manganese)

Lead No 288

CaO

wt crf. + CaO = 15.36059
" C. = 15.356885
0.90 % " CaO = 0.00902

Mn_3O_4

wt crf + Mn_3O_4 = 15.35970
wt C. 0.00085 = 15.35793
wt Mn_3O_4 = 0.00177

0.17 % Mn_3O_4

MgO – very faint trace.

(See page 68)

Resumé of 288:

SiO_2	46.92	
Al_2O_3	37.81	41.86
Fe_2O_3	4.05	
CaO	0.90	
MgO	very faint trace	
K_2O	0.22	
Na_2O	0.62	
Mn_3O_4	.14	
Loss on ignition	13.28	
	103.94 %	103.80
		.14
		103.94

46.92
40.62
1.30

Lab. No 289. Kaolin, marked: "Notebook 64; pg 24. July 24, 1889. S.E 1/4 of S.E. 1/4 section 16; 28; 14W. Kaolin known to be 15 feet, but not gone through. W. Kennedy."

for water and loss
1 = 9.0740
2 = 9.0695
3 = 9.0 6 gained

Percent water 6.38%

wt	= 2.0000 gm
c + K of lgt	= 9.1972
after	= 9.0695
water at 110° C	= 0.1277

Loss B.B. 14.34%

c + K of ignit	= 9.0695
after	= 8.8009
loss B.B	= 0.2686

Bi2O3 fusion for Alkalies.

K2O = .0034 = 0.35%
Na2O = .0089 = 0.94%

wt air dry	= 1.0111 gm
wt dry at 110° C	= 0.9466
D + Alk Cl	= 14.19485
D	= 14.17255
KCl + NaCl	= 0.02230
KCl	= 0.0055
NaCl	= 0.0168
D. + cmc + K2PtCl6	= 22.8719
cmc	= 22.8538
K2PtCl6	= 0.0181
KCl	= 0.0055

Alk. Carb fusion

wt air dry	= 1.0232 gm.
wt dry at 110° C	= 0.9580

Reacts for manganese.

H7.82%

C. ash + SiO2	= 19.57130
C + ash	= 19.13100
SiO2	= 0.4582

Fe + Al

wt C + ppt. + Fe2O3 Al2O3	= 19.71430
" C. .000116	= 19.34151 6
" Fe2O3 + Al2O3	= 0.37279

wt C. ppt. Fe2O3	= 15.37014
wt C. .000085	= 15.35748 5
wt Fe2O3	= 0.01292

(N.B. This iron gave faint reaction for manganese)

CaO. wt c ff + CaO = 15.37 5550
(0.999 of CaO) in C.c = 15.36 5985
in CaO = 0.00957

MgO - - faint trace.

Resume' 289:

SiO_2	47 82	
Al_2O_3	37 57	38.91 %
Fe_2O_3	1.34	
CaO	0.99	
MgO	faint trace.	
MnO	trace strong	
K_2O	0.35	
Na_2O	0.94	
Ign on Ignition -	14.34	
	103.35 %	103.35

Lab. No. 291. Crystalline limestone, marked:
"Note book 72; pg. 69. July 10. 1889.

No. 2.: Land of Jake Colie. N.E 1/4 of SW 1/4, Sect 6; 14N; 7W.
R.A.F. Penrose Jr.

for water and loss at = 1.0014
1 = 20.3421
2 = 20.3420
Percent water 0.12%
c+l of lt = 20.3433
after = 20.3420
water at 110°C = 0.0013

Percent loss B.B 43.19%
c+l of ignit = 20.3420
after = 19.9100
loss B.B. = 0.4320

for Ca+c. I Percent Insol matter 0.45% wt air dry = 2.0001
wt dry at 110° C = 1.9977

for Mn. +c Percent insol matter = 0.50% wt air dry = 5.0490
wt dry at 110° C = 5.0430

for Phosphoric acid. II wt air dry = 5.0538
wt dry at 110° C = 5.0478

The insols from I + II were fused + tested on foil.
No reaction for Manganese or Chromium.

See after sep P_2O_5 made up to 250 cc

I For analysis. wt air dry = 20.0001
wt dried at 110°C = 19.9977

P_2O_5 in 5.0478 gm dry at 110°C. $Mg_2P_2O_7$ = 0.01362 gm.
P_2O_5 = 0.0087 gm.

I 291. Residue from HNO_3. (To be refused with Alk Carb.) wt residue = 0.16082 gm
0.80 = Residue wt SiO_2 = 0.09902 gm
wt $Fe_2O_3 + Al_2O_3$ = 0.05472 gm.
wt Fe_2O_3 =
wt Al_2O_3 =
wt CaO =
wt MgO =

Lab N° 291 Limestone
R.A.H. Penrose Jr.

291. P_2O_5 from 20.0001 gm. (19.9761)
Percent P_2O_5 0.185 % wt $Mg_2P_2O_7$ = 0.05801 gm.
wt P_2O_5 = 0.03710

291. for analysis. wt acidy = 20.0255 gm
III. - - - wt dry at 110°C = 20.0015
291 III wt Residue = 0.15579 gm
fused with Alk. Carb. No reaction for Mn.
291 III SiO_2 0.51% wt SiO_2 = 0.10252 gm.

291 I 200 cc. wt SiO_2 = 0.00532 gm.
0.03 %

291 III Residue wt $Fe_2O_3 + Al_2O_3$ = 0.05043 gm.
0.21 % " " " Fe_2O_3 = 0.04082
0.04 % " " " Al_2O_3 = 0.00961

291 III Residue. CaO = 0.02% wt CaO = 0.00482 gm.

291 III Residue wt $Mg_2P_2O_7$ = 0.00979 gm.
MgO = 0.00352 gm = 0.017%

291 I 10 cc. (1) wt CaO = 0.44049 gm
Percent CaO = 55.06 % } CaO from 19.9977 gm = 11.01225 gm
291 I 10 cc (2 CaO = 0.44209 gm
CaO = 54.66 % (RNB). 54.76 % gPS.

291 I 10 cc. wt $Mg_2P_2O_7$ = 0.00539 gm.
0.34% MgO
MgO = 0.0019

Note: no manganese in residue as detected to determine

291 I 100 cc (1) wt $Fe_2O_3 + Al_2O_3$ = 0.00412
wt Fe_2O_3 = 0.00252
wt Al_2O_3 = 0.00160

$Fe_2O_3 + Al_2O_3$ = .05 %
Fe_2O_3 = .03
Al_2O_3 = .02
Fe_2O_3 = 0.03 % gPS.

Resume' of 292 1/3

Silica SiO_2	0.73 per cent
Al_2O_3	0.21 " "
Fe_2O_3	0.11 " "
Mn_3O_4	0.15 " "
CaO	54.82 " "
MgO	0.24 " "
K_2O	0.01 " "
Na_2O	0.48 " "
Loss in ignition	43.08
	99.86

Lab. No. 292. Crystalline limestone, pink, like 291. marked: " No 3. Note book 72, pg 63. July 13. 1889.

Brooks Mine. N.W¼ of N.E¼, Section 15, 14N. 7W.
R.A.F. Penrose Jr."

for water & loss B/B.

1 = 19.6708
2 = 19.6703

Percent water 0.090/0

1st	=	1.0241 gm
Crucible + ppt	=	19.6713 gm
after	=	19.6703
water at 1100°C	=	0.0010

Percent loss B/B. 43.08%

Crucible + ppt	=	19.6703
after	=	19.2295
loss B/B	=	0.4408

For P_2O_5 — II —
No reaction for H_3PO_4

Wt air dry limestone = 5.0414 gm.
" dried at 1100°C = 5.0369 >

For analysis wt air dry = 20.0060 gm.
dry at 1100°C = 19.9880 >

Insol matter II. Crucible + Insol = 15.41260
Insol = 1.10% Crucible = 15.357185
Insol matter = 0.055542

No reaction for Manganese with this portion.

Portion for analysis (20.006) — treated with di HCl
a. Residue b. Filtrate — made up to 250 cc
Took 2 portions 10 cc each for Calcium.
" " " 100 cc " " Fe, Al, Mn, Mg etc.

NB 2 4 5

a. Residue (Insol. matter from HCl sol.) 1.10%

Wt Crucible + Residue = 18.867404
" Crucible = 18.646516
" Wt Residue = 0.220889

Aug. 13th 89 Fuse Residue with Na_2CO_3 & K_2CO_3 — dissolve — faint but decided reaction for Mn. —

SiO_2 0.69%

Wt Crucible + SiO_2 = 15.497700
" Crucible = 15.357885
" SiO_2 = 0.139815

Lost Sol. of fusion containing Fe Al Mn.

wt air dry limestone for (Fe Al / Mn) in Residue = 40.1402 grams.

Residue (a) from 40.0 grams air dry L. CaO

CaO 0.04% CaO

wt c.ff + CaO = 15.364600
wt c. .000116 = 15.356116
wt CaO = 0.00849

MgO Residue (a) 0.023

wt c.ff + $Mg_2P_2O_7$ = 18.6671
wt c. .000116 = 18.6554016
wt $Mg_2P_2O_7$ = 0.01309
wt MgO = 0.0047

292. Res. from 40.1402 SiO_2 0.67%

wt SiO_2 = 0.26917 grams

Residue a. from 40.1402 grams. Residue = 0.99[illegible]%

wt c.ff. + Residue = 19.673400
wt .000116 = 19.273816
wt Residue = .399584

Residue a. from 40.1402 grams air dry L.
Fe + Al

wt c.ff + Al_2O_3. Fe_2O_3 = 18.733400
wt c. .000085 = 18.643285
wt Al_2O_3. Fe_2O_3 = 0.09012

(N.B. from Residue not to exhibit quantity of manganese)

Al_2O_3 + Fe_2O_3 = 0.09012
Fe_2O_3 = 0.02192
Al_2O_3 = 0.06820

292. Analysis of Solution - Filtrate b.

(1) 100 cc. SiO_2 0.049% SiO_2

wt c.ff. + SiO_2 = 15.361800
wt c. .000085 = 15.357885
wt SiO_2 = 0.00392

(2) 100 cc.

wt c.ff. + SiO_2 = 15.3628
wt c. = 15.357298
wt SiO_2 = 0.00482

(1) 100 cc. Fe_2O_3 + Al_2O_3 Fe_2O_3 + Al_2O_3 = 0.14%
Fe_2O_3 = 0.06%
Al_2O_3 0.08%

wt c.ff + Fe_2O_3. Al_2O_3 = 18.655300
wt c. .000085 = 18.643785
wt Fe_2O_3. Al_2O_3 = 0.01152

wt c.ff + Fe_2O_3 = 15.361200
wt c. .000085 = 15.356185
wt Fe_2O_3 = 0.00502

(2) 100 cc. Fe_2O_3. Al_2O_3 Fe_2O_3 Al_2O_3 = 0.13%
0.06
0.07%

wt c.ff. + Fe_2O_3 Al_2O_3 = 19.285900
wt c. .000085 = 19.270485
wt Fe_2O_3. Al_2O_3 = 0.01042

(2) Fe_2O_3 100 c.c. 0.0690%

wt c. fp. + Fe_2O_3 = 15.3668 ao
wt c. ooo85 = 15.3612 81
wt Fe_2O_3 = 0.00552

292 (1) D + Alk KCl = 15.8632
D = 15.7889
NaCl + KCl = 0.0743

wt c + K_2PtCl_6 = 22.4288
wt c = 22.4238
K_2PtCl_6 = 0.0050

K_2O = 0.01%
Na_2O = 0.48%

292 (2) 100 c.c. wt $Mg_2P_2O_7$ = 0.05049 gm. wt MgO = 0.01819 gm

MgO = 2.2%

292 (2) KCl + NaCl = 0.0738 gm

292 (2) K_2PtCl_6 = 0.0112 gm

292 (1) 100 cc Mn_3O_4

wt c. fp. + Mn_3O_4 = 19.2822 ao
wt c. ooo116 = 19.2727 16
wt Mn_3O_4 = 0.0109 69

292 (2) 100 cc Mn_3O_4

wt c. fp + Mn_3O_4 = 19.2978 50
wt c. ooo085 = 19.2824 83
wt Mn_3O_4 = 0.0153 7

Mean = .01253 = 0.15% Mn_3O_4.

292 (2) Alk. Cl. D + Alk Cl =
D = 15.7887
Alk Cl =

292. analysis. Sol. Filtrate b. 2 portions 10 c.c. for Ca (Mg).

(1) 10 c.c. wt c. fp + CaO = 19.0723 0
wt c. ooo116 = 18.6435 76
wt CaO = 0.4287 9

(2) 10 c.c. wt c. fp + CaO = 19.6945 00
wt c. ooo116 = 19.2755 16
wt CaO = 0.4189 9

{Rate. Mg from 10 c.c. very small quantity. So wait} {+ determine Mg in 100 cc portions.

(1) 10 c.c. from 500 c.c. from 40.1402 grams for CaO.

wt c. fp + CaO = 19.7145 0
wt c = 19.2719 1
wt CaO = 0.4425 9

1 = 19.7160
2 = 19.7145
3 = 19.7145

(2) 10 c.c. from 500 c.c. from from 40.1402 grams for CaO

wt c. fp + CaO = 19.0795 00
wt c. = 18.6432 16
wt CaO = 0.4362 9

1 = 19.0945
2 = 19.0806
3 = 19.0899

(1) 10 c.c. MgO from 19.988 grams dry l.

wt c. fp. $Mg_2P_2O_7$ = 18.6539 00
wt c. ooo085 = 18.6437 85
wt $Mg_2P_2O_7$ = 0.0101 2
wt MgO = .0036

0.045% MgO

293
Lab. No 298. Crystalline limestone, marked
" No 4. Note book 72, pg 25. July 9. 1889.
Maxfield property. N.W 1/4 of N.E 1/4, Sec 30, 14N, 6W.
R.A.F. Penrose Jr."

for water + loss BB
1 = 20.3757
2 = 20.3755
0.40 %

wt	=	1.0384 gm
C + l bf ht	=	20.3797
after	=	20.3755
loss at 110°C	=	0.0042

On ignition the mass sintered together

H2.46 %

C + l bf ignit	=	20.3755
after	=	19.9522
loss BB	=	0.4233

I For Phosphoric acid. wt air dry = 5.0090 gm
NB dried at 110°C → no reaction for H_3PO_4

For analysis wt air dry = 20.0022 gm
dried at 110°C = 19.9222

Reacts for Manganese.

Insol. matter from HNO_3 I.

Crucible + Insol matter	= 18.7510
" Crucible	= 18.6468
" Insol matter	= .10412

Gave very strong reaction for Mn.

Analysis 20.0022 air dry - treated with dil HCl -
a. Residue
b. Filtrate - made up to 250 c.c.

Took:
- 2 portions 10 c.c. each for { Ca, Mg
- 2 portions 100 c.c. each for { Fe Al Mn, Mg, Alk

a Residue 2.08 %

wt C. + Residue	=	19.7563
wt C.	=	19.3414 85
wt Residue	=	0.41482

Fused a Residue with alk. Carbonates -
Reaction for Manganese very, very strong!

293 a. Residue. - wt c. ff + SiO_2 = 15.66827
= 15.668400
wt c. 000081 = 15.497781
wt SiO_2 0.170062

SiO_2
0.85% SiO_2

Note MgO - trace.

Res a CaO wt c. ff. + CaO = 15.375500
0.0520% wt c. 000081 = 15.364681
wt CaO = 0.01082

Residue al. MgO. wt c. ff + $Mg_2P_2O_7$ = 18.700000
.015% wt c. 000085 = 18.691485
wt $Mg_2P_2O_7$ = 0.00852
wt MgO = 0.00300

Residue 293. Fe + Al wt c. ff + $Fe_2O_3.Al_2O_3$ = 19.405850
wt c. 000116 = 19.272566
wt $Fe_2O_3.Al_2O_3$ = 0.133284

Fe_2O_3 = 60% $Fe_2O_3 + Al_2O_3$ = 0.13329
Al_2O_3 = .06 Fe_2O_3 = 0.11962
Al_2O_3 = 0.01367

On fusion decided not reaction. RNB

(1) 293. 10 c.c. MgO Filt b. wt c. ff + $Mg_2P_2O_7$ = 15.394225
wt c. 000116 = 15.378416
wt $Mg_2P_2O_7$ = 0.01584
wt MgO =

(2) 293. 10 c.c. MgO Filt b. wt c. ff + $Mg_2P_2O_7$ = 18.691400
wt c. 000116 = 18.667216
0.02419
wt MgO =

% Mean = 0.90%
Mean = .0072 MgO

293 Solution Filtrate b analysis.

(1) 10 c.c. CaO wt c. ff. + CaO = 19.0667
wt c. 000116 = 18.643616
wt CaO (+Mn) = 0.42309

(Sep. Mn + repn. as)
53.09% Contains some Mn

(1) 10 c.c. CaO wt c. ff + CaO = 19.075400
wt c. 000116 = 18.643816
wt CaO (+Mn) = 0.43159

after sep. of Mn from (1) wt c. ff + CaO = 19.054900
wt c. 000116 = 18.643916
wt CaO = 0.41099

Filtrate : 61.57%

(1) 100 c.c. SiO_2 wt c. ff + SiO_2 = 15.392900
wt c. 000081 = 15.380785
wt SiO_2 = 0.01212

0.15%

(2) 100 c.c. SiO_2 wt c. ff. + SiO_2 = 15.368300
wt c. 000085 = 15.356081
wt SiO_2 = 0.01217

0.15%

293 (1) AlKCl = 0.0508 gm. K_2PtCl_6 = 0.0114 gm

Na_2O = .0251 = .31
K_2O = .0021 = .02

KCl = 0.0024

293 (2) AlKCl = 0.0640 gm.

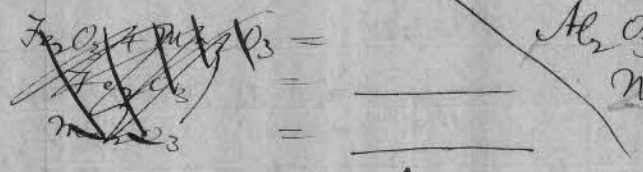
28 293.

(1) 100 c.c. (Ferrite)$_2O_3$ — wt c.ppt + Fe_2O_3 Al_2O_3 = 19.474900
wt c. .000116 = 19.245616
wt Fe_2O_3 + Al_2O_3 = 0.19929

(Reserve for Mn)

$Fe_2O_3 + Al_2O_3 + Mn$ = 2.50%

Have $Fe_2O_3 + Al_2O_3 + Mn_3O_4$ = 0.19929
Fe_2O_3 + [illegible] = 0.14872
0.05057
$Al_2O_3 + Mn_3O_4$ = 0.04412
Al_2O_3 = 0.04412
Mn_3O_4 = 0.00645



(1) 293 100 cc. Mn_3O_4 — wt c.ppt + Mn_3O_4 = 15.38072
wt c. = 15.35769 83
wt Mn_3O_4 = 0.02322

(2) 293 100 cc Ferrite — wt c.ppt + Fe_2O_3 Al_2O_3 = 18.907000
wt c. .000116 = 18.643932
wt Fe_2O_3 . Al_2O_3 = 0.26307
wt Fe_2O_3 = 0.15402
wt Al_2O_3 = 0.10905

$Al_2O_3 + Fe_2O_3$ 3.30%
Note. on prein for sep. Ferrite got decided reaction for manganese

Note: Alumina (1) 293 too high — Alumina in (1) 293 more nearly Correct. R.N.B

Mean of Fe_2O_3 in (1) & (2) = 0.15437 = 1.89 %
Al_2O_3 (1) = 0.04412 = 0.55 "
Mn_3O_4 (1) = 0.02296 = 0.37 "

293. residue. — c. ash + Mn_3O_4 = 19.37360
1 = 19.37336 — c + ash = 19.27138 5
2 = 19.37336. 0.5% — Mn_3O_4 0.10222

293. (2) 100 cc
1 = 19.3304
2 = 19.3300
3 = 19.3300

c + ash + Mn_3O_4 = 19.33000
c + ash = 19.271285
Mn_3O_4 = 0.05872

(note omit Mn_3O_4 of 293 (1) and Al_2O_3 293 (2)

293 (1) 100 c.c — c. ash + $Mg_2P_2O_7$ = 15.41370
c + ash = 15.352516
$Mg_2P_2O_7$ = 0.06119

293 (2) 100 cc. — of $Mg_2P_2O_7$ = 0.06969 gm.

Lab. No 294. Crystalline limestone, rather dark in color; marked: "Notebook 72; pg 43. July, 9. 1889. Polk Bayou road. 4 m above Batesville. No. 5." R. A. F. Penrose Jr. "

For water and loss BB wt = 1.0359 gm

Percent water
0.13%

c+l bf ht = 16.3932 gm
after = 16.3918
water at 110°C = 0.0014

On ignition the mass sintered together.

c+l bf ignit = 16.3918
after = 15.9540
loss BB = 0.4378

H2. 3% ✓

I For Phosphoric acid. wt air dry = 5.0175 gm.
dry at 110°C =

No reaction for H_3PO_4

II For analysis. wt air dry = 20.0028 gm.
wt dried @ 110° = 19.9768 "

Insol. matter from I. wt couc. fp + Ins. R. = 15.435400
" couc. .000085 = 15.357185
" Insol. matter .07822

Gave very strong reaction for Mn.

Analysis. 20.0028. - made up after treatment with HCl { b. Filtrate / a Residue

b Filtrate made up to 250 c.c. -

Took: { 2 portions: 100 c.c. each for Fe Al Mn Alk
2 portions: 10 c.c. each for Ca.

a. Residue wt C. fp. + Residue = 18.962650
wt C. .000116 = 18.645616
wt Residue = 0.31704

{1.08% Insoluble Matter or Residue}

a Residue fused with alk. Carbonates. Reaction for Manganese very, very strong! Cl. No 293.

294 a. Residue SiO_2

0.114 %

wt c. ff. + SiO_2 = 15.38070
wt c. .000085 = 15.357885
wt SiO_2 = 0.02282

Residue a. $Fe_2O_3 + Al_2O_3$ –
$Fe_2O_3 + Al_2O_3$ = %
Fe_2O_3 = 0.44 %
Al_2O_3 = .088 %

wt c. ff. + $Fe_2O_3 . Al_2O_3$ = 15.47270
wt c. = 15.356216
wt $Fe_2O_3 . Al_2O_3$ = 0.10649
wt Fe_2O_3 = 0.08882
wt Al_2O_3 = 0.01767

1 = 18.6610
2 = 18.6607

Residue CaO

.08 %

. c. ash + CaO = 18.66070
C + ash .000085 = 18.643085
CaO = 0.01762

294. Residue. Mg

.027 % MgO

c ash + $Mg_2P_2O_7$ = 8.58770
crue. = 8.572485
$Mg_2P_2O_7$ = 0.01522
.00548

294 Residue Mn.

1 = 19.57723
2 = 19.57714
3 = 19.5711

1.50

c. ash + Mn_3O_4 = 19.57110
C + ash = 19.270716
Mn_3O_4 = 0.30039

294(2) 100 cc.

c. D + 2KCl = 14.2123
D = 14.1721
KCl + NaCl = 0.0402

c + K_2PtCl_6 = 22.4729
crue = 22.4667
K_2PtCl_6 = 0.0062

KCl = .0018

K_2O = 0.0027 = 0.01 percent
Na_2O = 0.0507 = 0.25 " "

KCl + NaCl = 0.0240 2
KCl = 0.0018
NaCl = 0.0384

Arkansas Geological Survey

294. b Filtrate

(1) 10 cc. CaO. wt c. fp. + CaO = 19.7138
52.81% CaO wt c. .000116 = 19.27.5816
" CaO = .143799

(2) 10 cc. CaO. wt c. fp. CaO = 19.7118 ao
52.53% wt c. .000116 = 19.276016
wt CaO = .45579

(Note: Mg so small quantity wait + determine in 100 cc portions.)

(1) 100 c.c. SiO_2 wt c. fp + SiO_2 = 19.3682 ao
0.13% wt c. .000080 = 19.357085
wt SiO_2 = 0.01112

(2) 100 c.c. SiO_2 wt c. fp + SiO_2 = 15.368450
0.15% wt c. .000081 = 15.356135
wt SiO_2 = 0.01232

294(1) 100 cc $Fe_2O_3+Al_2O_3$ c. ash + Fe + Al = 18.67410
0.41 $Fe_2O_3+Al_2O_3$ c + ash = 18.640585
.12 Fe_2O_3 $Fe_2O_3+Al_2O_3$ = 0.03352
.29 Al_2O_3

Note: Fusion with KOH gives some reaction for manganese. decided

294(2) 100 cc c. ash + Fe/Al 0.36050
c + ash = 15.353885
$Fe_2O_3+Al_2O_3$ = 0.00662

294(1) 100 cc c. ash + Fe_2O_3 = 18.65060
.12% c + ash = 18.640585
Fe_2O_3 = 0.01002
Reacts faintly for Manganese

294(2) 100 c.c. c. ash + Mn_3O_4 = 19.43600 | 1 = 19.4366
2.07 c + ash 19.269885 | 2 = 19.4360
Mn_3O_4 = 0.16612

294(1) 100 cc c. ash + Mn_3O_4 = 19.34660 | 1 = 19.3468
.69 % c + ash = 19.269285 | 2 = 19.3466
Mn_3O_4 = 0.07732

294(1) 100 cc. wt $Mg_2P_2O_7$ = 0.06179 gm.

Lab No. 295. Crystalline limestone, -pink; marked: "Note book 72. pg 43. July 11. 1889. Cason Property. S.W¼ of S.W¼, Sect 34; 14N; 6W. No 6. R.A.F. Penrose Jr."

	water + loss BB. wt	=	2.03828
0.024%	c+l bf ht	=	21.37968
	after	=	21.37880
	water at 110°C	=	0.00088
	c+l bf ignit	=	21.3788
43.41% Loss on ignition	after	=	20.49942
	loss BB	=	0.88846
For P_2O_5	wt air dry	=	5.0031 gm
No reaction for H_3PO_4	dry at 110°C	=	
For analysis	wt air dry	=	20.00079gm.
			19.9927

Insol. matter from HNO_3. wt Cruc. fp. + Im. = 18.681850
" Cruc. .00085 = 18.646785
" Insol. matter = .035107

Reaction for Mn not very strong but distinct

Analysis 20.0007 grams. with dil HCl
a Residue
b Filtrate — made up to 250 c.c.
Took: 2 portions 100 c.c for SiO_2, Fe, Al, ~~Ca~~, ~~Mg~~ + Alk
2 portions 10 c.c for Ca + (Mg)

a Residue	wt c. fp + Residue	=	19.436015
	wt C.	=	19.296016
0.70%	wt Residue	=	0.14014

a Residue fused with Alk Carbonates — Manganese reaction very slight.

SiO_2 — Residue.	wt c. fp + SiO_2	=	15.444900
0.412%	wt C. .00085	=	15.359785
	wt SiO_2	=	0.08512

295. Residue - only a trace of manganese.

295 Residue .05. wt CaO = 0.01109 gm

295 Residue. $Fe_2O_3 + Al_2O_3 = 0.04982$ gm

$Fe_2O_3 = .06$ $Fe_2O_3 = 0.01342$

$Al_2O_3 = .18$ $Al_2O_3 = 0.03640$

295. Residue. $Mg_2P_2O_7 = 0.00732$ gm

.01 $MgO = 0.0026$

295 (1) 100 cc wt $Mg_2P_2O_7 = 0.06062$ gm

Percent MgO = 0.10% wt MgO = 0.02184 "

295. (1) 100 cc SiO_2. wt crk + SiO_2 = 15.3743

0.034% SiO_2 wt crk = 15.37355

wt SiO_2 0.00272

Abnormal

(2) 100 cc SiO_2 wt crk + SiO_2 = 15.358100

0.029 wt crk. = 15.355868

wt SiO_2 = 0.00232

N.B From 10 cc only a trace of Mg.

295 (1) CaO. 10 cc of 250 cc. C. ash + CaO = 15.08870

1 = 19.0905 C + ash .000116 = 15.64346

2 = 19.0900 CaO = 0.44524

3 = 19.0887

55.67%

295 (2) CaO. 10 cc of 250 cc

1 = 15.7998 C. ash + CaO = 15.79870

2 = 15.7990 C + ash .000116 = 15.35586

3 = 15.7987 CaO = 0.44284

55.37

Mean CaO = 55.52%

295 (1) 100 cc. wt $Fe_2O_3 + Al_2O_3$ = 0.01452 gm

$Fe_2O_3 + Al_2O_3 = .18$ wt Fe_2O_3 = 0.00652

$Fe_2O_3 = .08$

.10 = Al_2O_3 wt Al_2O_3 = 0.00800 gm

295 (2) 100 cc. wt $Fe_2O_3 + Al_2O_3 = 0.06652$

" "

295 (1) 100 cc $Mn_3O_4 = 0.04272$ gm. 0.53% Mn_3O_4

D = 14.1708

295 (1) 100 cc. wt KCl + NaCl = 0.0547 gm.

wt KCl = 0.0191 wt $K_2PtCl_6 = 0.0628$ gm

wt NaCl = 0.0356

K_2O = 0.0300 = 0.15%

NaO = 0.0479 = 0.23%

295 Resume:

Silica	0 45	per	cent.
Alumina	0 28	"	"
Ferric oxide	0 14	"	"
Manganese oxide (Mn_3O_4)	0. 53	"	"
Lime	53. 57	"	"
Magnesia	0 111		
Potash	0 15	"	"
Soda	0 23	"	"
Loss on ignition	43. 41	"	"
	100 87		

Lab. No 296. Crystalline limestone, Trenton.
Marked: "Notebook 72. July 10. 1889.
No 7. St Clair Spgs. 3m S of Hickory Valley.
R.A.F. Penrose Jr. "

water + loss BB	wt	=	2.024522
0.042% of water.	C+L bf ht	=	17.402227
	after	=	17.401400
	loss at 110°C	=	0.000087
	C+L bf ignit	=	17.401400
43.35%	after	=	16.515510
	loss BB	=	0.885890
I For P_2O_5	wt air dry	=	5.0003 grams.
No reaction for P_2O_5	dried at 110°C	=	
I For analysis	wt air dry	=	20.0000 grams.
	Dries @ 110°	=	19.992
Insol. matter from HNO_3 I	wt conc. fp. + Dm.	=	15.397700
	" Conc. 000 St	=	15.357116
	= Not matter.		0.040059

No reaction for Mn.-

Analysis 20.0000 gms. air dry Limestone - with
die Hcl - a Residue
le Filtrate - made up to 200cc.
Took: 2 portions 100cc each for Ca (mg)
2 " 100cc each for Fe, Al, Mn mg Alk.

a Residue -	wt c. fp. + Residue	=	18.797600
	" C. .000116	=	18.644486
0.76% Residue.	wt Residue	=	0.153114

a Residue just with dil. Carbonates - very faint, but decided manganese reaction.

a Residue. SiO_2	wt c. fp + SiO_2	=	15.471300
0.51%	wt c. 000083	=	15.368380
	wt SiO_2	=	0.102920

Residue. .16
.05 Fe
.11 Al

wt Fe_2O_3 + Al_2O_3	=	0.033222
wt Fe_2O_3	=	0.011112
Al_2O_3	=	0.022210

296.

(1) 296. 100 cc SiO_2
.043

wt crucible + SiO_2 = 15.36165
wt crucible = 15.35818
wt SiO_2 = 0.00347

(2) 296. 100 cc. SiO_2
.039

Cr. crucible + SiO_2 = 7.20050
Crucible = 7.19738
SiO_2 = 0.00312

296(1) 10 cc
1 = 19.71225
2 = 19.71221

Cr. crucible + CaO = 19.71220
Crucible = 19.27700 16
CaO = 0.44219

296(2) 10 cc
1 = 15.7870
2 = 15.7870

Crucible + CaO = 15.78700
Crucible = 15.35421 6
CaO = 0.43279

296(2) 100 cc. Mn_3O_4 = 0.02102 gm

296(1) 100 cc $Fe_2O_3 + Al_2O_3$ = 0.01712 gm
Fe_2O_3 = 0.01102
Al_2O_3 = 0.00610

296(2) 100 cc $Fe_2O_3 + Al_2O_3$ = 0.01782 gm
Fe_2O_3 = 0.01252
Al_2O_3 = 0.00530

296(1) 10 cc. $Mg_2P_2O_7$ = 0.01012 gm
MgO = 0.0036

296. Residue wt CaO = 0.00722 gm.
" " wt

296. Residue wt $Mg_2P_2O_7$ = 0.00922 gm.
MgO = 0.0033

Note. not enough Mn to determine in Residue.

Lab. No 297. Crystalline limestone
Dark color, marked "Notebook 72. pg 85.
July 15. 1889. Wm. Martin property.
5 m. W of Custerman.
No 8. R. A. F. Penrose Jr. "

water above Bzn. wt = 2.03215

c+l. bfht = 20.67885
" afht = 20.66640
" loss @ 110-111° = 0.01245

Water = 0.61%

c+l bfht = 20.66640
" afht = 19.94135
Loss Bzn. = 0.7249

Percent Loss BB
35.89%

I For P_2O_5. no reaction for P_2O_5.
wt air dry = 5.0002 gm

Insol. matter from HNO_3 I wt c. fp. + Dm. = 18.990100
" c. .000116 = 18.646735
" Dm mat = .34337

Very strong Mn reaction.

II For Analysis wt air dry = 20.00535
wt ign @ 110 = 19.88327

Analysis. 20.00535 gram. with dil. HCl.
a. Residue
b. Filtrate - made up to 250 cc. -
Took. { 2 portions 10 cc. each for Ca (Mg)
{ 2 portions 100 cc. " " { Fe, Al, Mn, Mg, alk

II a. Residue - wt c. fp + Residue = 20.4586
wt c. .000116 = 19.295516
5.84% Residue. wt. Residue = 1.16309

a. Residue fused with Alk. Carbs. Reacts for manganese very/very/very Strong!!

II SiO_2 from Residue (a) 3.58%
wt c. fp. + SiO_2 = 19.35709
wt c. .000116 = 18.643916
wt SiO_2 = 0.71309

II 297. Residue. (Test for manganese - No Mn.
wt CaO = 0.00889 gm
.04% CaO

II 297(2) 100cc crt + ash + SiO_2 = 18.28618
crt + ash = 18.26213 5
SiO_2 = 0.02397

0.30

43.81 297.(1) 10cc. II wt CaO = 0.34849 gm.

42.13 297(2) 10cc. II wt CaO = 0.33509 gm.

85.94
42.97

Note: 297 (1) 10cc gave only a slight trace of magnesia

297 (1) 100cc. II wt $Fe_2O_3 + Al_2O_3 + Mn_3O_4$ = 0.23919 gm.
wt Fe_2O_3 = 0.05172
wt $Al_2O_3 + Mn_3O_4$ = 0.18747 gm.

Note: can't get Al_2O_3 from this portion

II 297 Residue .08% MgO wt $Mg_2P_2O_7$ = 0.04692 gm.
" MgO = .0169

III Weighed for Residue air dry = 5.1081 gm
dry at 110°C = 5.0774

II 297(2) 100cc. wt $Al_2O_3 + Fe_2O_3$ = 0.91178 gm.

Note: This fused entirely in the crucible to brown mass. Fused with $KHSO_4$ formed yellow melt – treated with HCl and water – evap'd nearly to dryness – treated with water – an oxychloride or substance like an oxychloride separated.

Memorandum Redetermine Fe (+Al) from filtrate and Fe, Al, Mn from Residue

II 297. Residue 1 = 15.54150 2 = 15.54118 3 = 15.54101 4 = 15.53888 5 = 15.52997 6 = 15.53107 7 = 15.53107
0.01739 + 0.01372 = 0.18367 = Mn_3O_4
0.92%
C. + ash + Mn_3O_4 = 15.53070
C + ash = 15.33338 16
Mn_3O_4 = 0.19739

III 297 III Residue. 3.63% wt SiO_2 = 0.18432 gm.

III 297 Residue wt $Al_2O_3 + Fe_2O_3$ = 0.03952 gm.
wt Fe_2O_3 = 0.00922
wt Al_2O_3 = 0.03030

.77

III 297 Residue wt Mn_3O_4 =

297 297II Residue 0.18367 − 0.11152 = 0.07215 Mn_3O_4 0.36%

297. 2.86% Mn_3O_4 II 297(1) Mn_3O_4 = 0.22810 gm.

3.11% Mn_3O_4 II 297(2) 100cc Mn_3O_4 = 0.25179 gm

297 II (2) wt $Fe_2O_3 + Al_2O_3$ = 0.06283 gm.
*after repns. & sep. Ba wt $Fe_2O_3 + Al_2O_3$ = 0.05412 / 0.68%

3.94% 297 III Mn_3O_4 = 0.20042 gm.

297 III $Fe_2O_3 + Al_2O_3$ = 0.26923 gm
Fe_2O_3 = 0.09909
Al_2O_3 = 0.17014

297 II (1) 100 cc. wt $Mg_2P_2O_7$ = 0.05077 gm.
In 100cc wt MgO = 0.01829
0.2249 MgO In 250cc " " = 0.04573

297 Resume

SiO_2	8.90	per cent
Al_2O_3	3.94	" "
Fe_2O_3	2.13	" "
Mn_3O_4	3.94	" "
CaO	42.97	" "
MgO	0.30	" "
K_2O	0.35	" "
Na_2O	0.16	" "
Loss ignition	35.89	" "
	93.58	

* After sep. of Ba - iron & alumina still present tho' apparently not so badly.

297(1) 100cc wt KCl + NaCl = 0.0689 gm
wt KCl = 0.0444
wt NaCl = 0.0245
wt K_2PtCl_6 = 0.1454
wt KCl = 0.0444

K_2O = 0.0280 in 100cc
= 0.0700 in 250cc = 0.35%
Na_2O = 0.0129 in 100
= 0.0322 in 250cc = %

297. for investigation. wt air dry = 25.0215 gm

Percent Residue — reacts for Mn. wt dry at 110°C = →

wt residue (from HCl) = 1.14663 gm

Treat with Conc. HCl. A Residue

fused with Na_2CO_3 K_2CO_3 B. Solution, treated with H_2S – no precip. only sulphur. Treated with NH_4OH, NH_4Cl, $(NH_4)_2S$. HCl sol. conc. of $(NH_4)_2S$ precip. hot bright yellow color while hot, lost on cooling.

SiO_2 from Residue = 0.98032 gm

Lab. No. 305. Pinkish, soft, clay, marked:
"Note book 64, pg 7. (2) July 4. 1889.
N.W 1/4 of N.W 1/4, Sect 1; 2 S; 15 W.
Woosley pottery clay, near Benton. W. Kennedy.

1 = 10.5292
2 = 10.5268
3 = 10.5252
4 = 10.5252

for water + loss BB. wt = 2.0000 gm
Percent water 2.37% — c+c bf ht = 10.5726
after = 10.5252
water at 110° C = 0.0474

Percent Loss BB 8.11% — c+c bf ignit = 10.5252
after = 10.3667
loss BB = 0.1585

for sand wt air dry = 25.00 gm
wt dry at 110° C =
c. ash + Sand =
c + ash =
Sand =

for analysis Alkali Carbonate fusion — wt air dry = 1.0006 gm
wt dried at 110° C = 0.9769

Bi_2O_3 fusion for Alkalies — wt air dry = 1.0005 gm
wt dry at 110° C = 0.9768 gm

c. ash + SiO_2 = 19.90000
c + ash = 19.268616
SiO_2 = 0.630384

64.52% (64.46, 64.49 recr)
Percent SiO_2 64.52%

c. ash + Fe_2O_3 + Al_2O_3 = 18.965600
c + ash = 18.640285
Fe_2O_3 + Al_2O_3 = 0.32532

Percent Fe_2O_3 + Al_2O_3 33.30% (Recover Al_2O_3)

c. ash + Fe_2O_3 = 15.37180
c + ash = 15.351185
Fe_2O_3 = 0.02062

2.11% Fe_2O_3

Percent CaO 0.31%

c. ash + CaO = 19.27130
c + ash = 19.268216
CaO = 0.00309

MgO trace 0.00%

305. Woosley's clay - Benton. Alk Carb. fusion:

wt air dry	=	0.4989
wt dry at 110°C	=	0.4873 "
c. ash + SiO_2	=	19.57920
c. ash	=	19.265185
SiO_2	=	0.31402

64.46 %

c. ash + Fe + Al	=	8.548900
c. ash	=	8.422301
$Fe_2O_3 + Al_2O_3$	=	0.1266

Percent $Fe_2O_3 + Al_2O_3$ 25.97 %

2.11
23.86

305.

c. + Alk Cl	=	14.2077
D. ish	=	14.1722
NaCl + KCl	=	0.0355
KCl	=	0.0018
NaCl	=	0.0337

K_2O = 0.00113 gm
Na_2O = 0.0178 gm

c. wt + K_2PtCl_6	=	22.4573
c. wt	=	22.4514
K_2PtCl_6	=	0.0059
KCl	=	0.0018

Percent
K_2O = 0.11 %
Na_2O = 1.82 %

Resume. Analysis of clay 305, dried at 110° C:

Silica	=	64.49 %
Alumina	=	23.86 "
Ferric oxide	=	2.11 "
Lime	=	0.31 "
Magnesia	=	0.00 trace
Soda	=	1.82 "
Potash	=	0.11 "
Loss on ignition	=	8.11 "
total	=	100.81 percent.

water lost at 110° C = 2.37 %

Sand: obtain dry clay used = 25 grams.
Note: no effervescence with HCl - absence of $CaCO_3$. -

C. ash + Sand	=	7.24850
c. ash	=	7.200585
Sand	=	0.04792

0.19 %

No eff. with HCl

Lab. No 307. White fibrolitic Kaolin, marked: "
" Note book 47, pg 34, June 17. 1889.
SE 1/4, NW 1/4 Section 10; 1S; 13W. Kaolin,
J.W. Hopkins. W. Kennedy. "

for water + loss
1 = 9.1857
2 = 9.1847
percent water
0.62%

BB. " = 2.0000 gm
c+c of lot = 9.1972
after = 9.1847
water at 110°C = 0.0125

Percent Loss BB.
12.54%

c+c ignit = 9.1847
after = 8.9154
loss BB = 0.2693

for Bi_2O_3 fusion for Alkalies

wt air dry = 1.0311 gm
wt dry at 110°C = 1.0248 gm

wt K_2O = 0.00061 gm
wt Na_2O = 0.00712 "

percent K_2O = 0.06%
percent Na_2O = 0.69%

~~wt~~ Alk Cl = 15.8083
= 15.7889

KCl + NaCl = 0.01440
KCl = 0.00097
NaCl = 0.01343

anhyd K_2PtCl_6 = 22.4605
= 22.4573
anhyd K_2PtCl_6 = 0.0032

for analysis
Alk Carb fusion

wt air dry = 1.0189 gm.
wt dry at 110°C = 1.0126 gm

Percent SiO_2
45.15%

C, ash + SiO_2 = 20.03660
C + ash = 19.579316
wt SiO_2 from reduction of Al + Fe
0.00372 gm = 0.36%
0.45729

Percent $Fe_2O_3 + Al_2O_3$
41.82%

C + ash + ~~Fe~~ Al = 15.770900
C + ash = 15.377401
$Fe_2O_3 + Al_2O_3$ = 0.4225

1 = 15.7786
2 = 15.7734
3 = 15.7719
4 = 15.7709
fused with HK 534.

wt C, ash + Fe = 15.40830
C + ash = 15.377885
Fe_2O_3 + ~~Al~~ = 0.03042

Percent Fe_2O_3
3.00%

Percent Al_2O_3
38.82%

307 Most probably contains titanium.

Percent CaO 0.89

c. ash + CaO	=	15.35410
c + ash	=	15.345085
CaO	=	0.00902

MgO - very slight trace.

Resume. Analysis of Clay 307, dried at 110°C.

	I	II Redetermination
Silica (total)	45.15 %	45.20 %
Al_2O_3	38.82 "	37.60 "
Fe_2O_3	3.00 "	3.00 "
CaO	0.89 "	0.89 "
K_2O	0.06 "	0.06 "
Loss BB	13.54 "	13.54 "
MgO	0.00 Trace	0.00 "
Na_2O	0.69	0.69 "
Total	102.15 %	100.98 %

Water lost at 110°C 0.62 %

307. Wt air dry = 1.0018.
wt dry at 110°C = 0.9970 gm
1st wt SiO_2 = 0.46492 gm (refuse) Percent water 0.47 %

C + K bf ht = 19.5863
after = 19.5815
water at 110°C = 0.0048

45.26 % SiO_2

C. ash + SiO_2 = 19.64120
C + ash = 19.18995
SiO_2 = 0.45125

$Fe_2O_3 + Al_2O_3$ = 40.60 %
Fe_2O_3 = ____ "
Al_2O_3 =

wt $Fe_2O_3 + Al_2O_3$ = 0.40473
wt Fe_2O_3 = ____
wt Al_2O_3

25 gm air dry for Sand | dry at 110°C =

C. ash + Sand = 8.48415
C + ash = 8.42285
Sand = 0.06182

267 I SiO_2 = 63.62%

No. 267. II

1 = 10.3989
2 = 10.3924

percent water
1.49%

for water + loss BB wt	=	20000 gm
C + 267 II wt	=	10.4222
after	=	10.3924
water at 110°C	=	0.0298
C + C of ignit	=	10.3924
after	=	
loss BB	=	

1 wt SiO_2 = 20.3696 = 66.27%
2 = 20.3655 = 65.45 "

for analysis
Alk Carb fusion
Percent SiO_2
~~66.27~~ 66.27%

wt air dry	=	0.5098 gm
wt dry at 110°C	=	0.5023 gm.
C. ash + SiO_2	=	20.36960
C ash	=	20.036685
SiO_2	=	0.33292

Percent Fe_2O_3 + Al_2O_3 (267 II)
24.27%

C. ash + Fe + Al	=	19.38540
C ash	=	19.26347
Fe_2O_3 + Al_2O_3	=	0.12193

No 276 II
1 = 9.4194
2 = 9.4194

percent water
2.16%

for water + loss BB wt	=	2.0000 gm
C + C of ht	=	9.4527
after	=	9.4194
water at 110°C	=	0.0433
C + C of ignit	=	9.4194
after	=	
loss BB	=	

for anal Alk carb fusion
Percent SiO_2
65.79%

wt air dry	=	0.49749 gm.
wt dry at 110°C	=	0.4867 "
C. ash + SiO_2	=	18.95650
C ash	=	18.636285
SiO_2	=	0.32022

Percent Fe + Al
25.86%

C. ash + Fe + Al	=	18.76120
C ash	=	18.635816
Fe_2O_3 + Al_2O_3	=	0.12589

No. 288 II
percent water
1.51%

for water + loss BB. wt	=	20000 gm
C + C of ht	=	9.1974
after	=	9.1672
water at 110°C	=	0.0302
C + C of ignit	=	C ash + SiO_2 = 18.84550
after	=	C ash = 18.635185
loss BB	=	(44.29%) SiO_2 = 0.21032

for anal Alk carb fusion:
Refused

wt air dry	=	0.4820
wt dry at 110°C	=	0.4748
C. ash + SiO_2	=	
C ash	=	
SiO_2	=	
C ash + Fe + Al	=	
C ash	=	
Fe_2O_3 + Al_2O_3	=	

No. 289 II. for water loss BB. wt = 2.00000 gm

10.2829
10.2834

Percent water
6.94

c+c of lt = 10.4222
after = 10.2834
water at 110°C = 0.1388

Alk Carb fusion. wt air dry = 0.5171 gm
wt dry at 110°C = 0.4813 "

Percent SiO_2
44.67 %

c. ash + SiO_2 = 19.478768
c+ash = 19.263585
SiO_2 = 0.215502

Percent $Fe_2O_3+Al_2O_3$
26.49 %

c-ash+Fe+Al = 19.389300
c+ash = 19.261785
$Fe_2O_3+Al_2O_3$ = 0.127752

267. III Alk Carb fusion wt + air dry = 0.1994 gm
wt dry at 110°C = 0.1965 "

Percent SiO_2
61.99 %

Carh+$Si O_2$ = 19.385500
c+ash = 19.263685
SiO_2 = 0.121815

Percent Fe+Al = wt Fe+Al ox = 0.05552 gm
28.25

267 IV. Alk Carb fusion. wt air dry = 0.1974
dry at 110°C = 0.1945

Percent SiO_2
62.73 %

c. ash+ SiO_2 = 15.466900
c+ash = 15.344885
SiO_2 = 0.122202

Percent $Fe_2O_3+Al_2O_3$
27.10 %

c-ash+Fe+Al = 18.687300
c+ash = 18.634585
$Fe_2O_3+Al_2O_3$ = 0.052715

289 III
wt air dry = 0.2179
wt dry at 110°C = 0.2028

Percent SiO_2
47.24 % III
(47.82 % I)

cash+SiO_2 = 18.730200
c+ash = 18.634385
SiO_2 = 0.095815

cash+Fe+Al =
c+ash =
$Fe_2O_3+Al_2O_3$ =

No 288. III

Percent SiO_2

44.73% III

(SiO_2 II = 44.29%)

Percent $Fe_2O_3 + Al_2O_3$

30.54%

wt air dry = 0.2261 gm

wt dry at 110°C = 0.2227 "

wt c. ash + SiO_2	=	19.36140
c + ash	=	19.26178 5
SiO_2	=	0.09962
c + ash + Fe Al	=	19.32450
c + ash	=	19.256485
$Fe_2O_3 + Al_2O_3$	=	0.06802

289 IV Percent water 6.94%

Percent SiO_2

IV = 44.82%

(II = 44.67%)

wt air dry = 0.2537 gm.

wt dry at 110°C = 0.2361

c. ash + SiO_2	=	18.73640
c + ash	=	18.630585
SiO_2	=	0.10582

Percent $Fe_2O_3 + Al_2O_3$

43.29%

c. ash + $Fe_2O_3 + Al_2O_3$	=	18.73280
c + ash	=	18.630585
$Fe_2O_3 + Al_2O_3$	=	0.10222

2nd wgt = 18.7328.

Refused with HK_2SO_4.

c. ash + $Fe_2O_3 + Al_2O_3$	=	18.72830
c + ash	=	18.626185
$Fe_2O_3 + Al_2O_3$	=	0.10212.

289 V. Percent water

wt air dry = 0.3179 gm

wt dry at 110°C = 0.2959

Percent SiO_2

47.96% (+0.00482)

2nd wt 0.13383 gm.

c. ash + SiO_2	=	18.76800
c + ash	=	18.626085
SiO_2	=	0.14192
c. ash + Fe + Al	=	18.72790
c + ash	=	18.60467
$Fe_2O_3 + Al_2O_3$	=	0.12323 (O.K)

0.1 2 3 3 3 (refused)

289 VI

Remainder SiO_2 0.00482 gm

SiO_2 0.13772 + 0.00432 = 0.14204

SiO_2 48.01%

wt air dry = 0.3178 gm

wt dry at 110°C = 0.2958

c. ash + SiO_2	=	19.39400
c + ash	=	19.256285
SiO_2	=	0.13772

Percent $Fe_2O_3 + Al_2O_3$

40.94%

c. ash + Fe + Al	=	15.45760
c + ash	=	15.33647
$Fe_2O_3 + Al_2O_3$	=	0.12113

Refused $Fe_2O_3 + Al_2O_3$ wt = = 0.12202

Lab. No 309. Iron determination in clay marked; "Note book 84, pg 64. 15 foot bed of red clay, bluff on bank of White River. W. Kennedy."

1=
2=
3=

for water wt = 1.0125
c+c of lit = 16.3575
after = 16.3021
water at 110°C = 0.0554

Percent water 5.47%

wt for analysis air dry = 0.5017
dry at 110°C = 0.4743 gm

Treated with Dil. HCl.
Percent Residue insolin dil. HCl. 66.960%

wt c.ash+Residue = 8.74000
c+ash = 8.422385
Residue = 0.31762

Percent Fe_2O_3 4.79%

c.ash+Fe_2O_3 = 15.37780
c+ash = 15.355085
Fe_2O_3 = 0.02272

Lab. No. 314. Sand determination in Maj. Jesse Ross' clay (air dried brick), W. Kennedy. under shelter.

wt clay = 25.00 gm. air dry.
Percent Sand 5.95%
c.ash+Sand = 9.91110
c+ash = 8.42248 5
Sand = 1.48862

314 - Note: no effervescence with Conc or dil. HCl. (Hydrochloric acid.)

Lab No 315. State ditch at Philadelphia Crossing of Camden Road

For Sand 25 grams air dry Clay:

wt C. ash + sand = 28.1415
wt C. ash = 19.2563
wt Sand = 8.8852

Note. No effervescence with dil. or Conc. HCl

Lab. No 311. Gray clay marked:
" Sep. 9. 1889. Cheltenham Mo.
Fire clay bed 6'—8'. Liebe Works,
Cheltenham. J. C. Brunner. "

For water

1 = 10.3454	
2 = 10.3454	
3 =	

Percent water
3.84%

+ Crucible + BB	wt	= 2.0000
c+c of wt		= 10.42228
after		= 10.34544
water at 110°C		= 0.07769

Percent Loss BB.
10.88%

c+c of ignit		= 10.34544
after		= 10.13600
loss BB		= 0.2094

Bi2O3 fusion for alkalies, wt air dry = 1.0086 gm
wt dry at 110°C = 0.9699 >

D + AlKCl		= 14.1916
D		= 14.1720
AlKCl		= 0.0196
KCl		= 0.0018
NaCl		= 0.0178

Na_2O = 0.0094 gm
K_2O = 0.0011 gm

Percent
Na_2O = 0.96%
K_2O = 0.11%

Crue + K_2PtCl_6		= 22.4667
crue		= 22.4605
K_2PtCl_6		= 0.0062

Y Alk. Carb fusion.

	wt air dry	= 1.0154
	dry at 110°C	= 0.9765 >

Percent SiO_2
56.69% first weight.
Y Refuse

c. ash + SiO_2		= 19.81190
c + ash		= 19.25828
SiO_2		= 0.55362

Percent SiO_2 second weight after fusion
54.84% Y

c. ash + SiO_2		= 15.87440
c + ash		= 15.33885
SiO_2		= 0.53555

Mean = 0.55363 I

SiO_2	=	0.01812
		0.55364

= 56.69 per cent SiO_2

Alkali-Carbonate fusion II wt air dry = 1.0557 gm
wt dry at 110°C = 1.0152 >

311 II wt SiO_2 = 0.57902 } Mean of
Percent SiO_2 = 57.03% } SiO_2 = 56.86%

311 II wt $Fe_2O_3 + Al_2O_3$ = 0.33010
Percent Fe + Al = 32.51%
Percent Fe_2O_3 = 4.44%
wt Fe_2O_3 = 0.04512
Percent Al_2O_3 = 28.07
Al_2O_3 = 0.28498

Fe_2O_3 = 4.44 + 0.54 = 5.03%.

wt CaO = 0.00282 gm
Percent CaO = 0.27
wt $Mg_2P_2O_7$ = 0.00932 gm.
wt MgO = 0.00335 "
Percent MgO = 0.32%

Resume 311.

Silica	56.86	per cent
Alumina	28.07	" "
Ferric oxide	5.03	" "
Lime	0.27	" "
Magnesia	0.32	" "
Potash	0.11	" "
Soda	0.96	" "
Loss on ignition	10.88	" "
Total	102.50	per cent
Water @ 110° C	3.54	per cent

BOB

for Sand 25 gm air dry clay. wt sand = 2.45 gm

Lab. No. 312. Sample of 3 pieces of shale clay, red, gray and light gray; equal portions of each. Label:
" Sept. 9. 1889. Cheltenham Mo.
Shale clay under fire clay bed. Used for pipe.
Mr. Dickenson says it is the strongest he knows of.
J.C. Branner.

for water & loss BB	wt	= 2.0000
1 = 10.3704		
2 = 10.3690	Percent water c+c of ht	= 10.4224
3 = 10.3686	after	= 10.3686
2.695%	water at 110° C	= 0.0538
Percent lost BB	c+c of ignit	= 10.3686
5.88%	after	= 10.2541
	loss BB	= 0.1145

Bi_2O_3 fusion for — — — wt air dry = 1.0155 gm.
— — Alkalies — — — — dry at 110° C = 0.9882 >

K_2O = 0.0307 gm	D + AlkCl	= 14.2317
Na_2O = 0.0062 gm	D	= 14.1713
K_2O = 3.16%	AlkCl	= 0.0604
Na_2O = 0.62%	KCl	= 0.0487
	NaCl	= 0.0117
	crucr + K_2PtCl_6	= 22.6398
	crucr	= 22.4804
	K_2PtCl_6	= 0.1594

Alk. Carb. fusion I — — wt air dry = 1.0227 gm.
— — wt dry at 110° C = 0.9952 " >

Percent SiO_2 I	C. ash + SiO_2	= 19.7897
54.03 percent SiO_2	C + ash	= 19.2519
	SiO_2	= 0.5377

Alk. Carb. fusion II. wt air dry = 1.0338 gm.
— — — — — wt dry at 110° C = 1.0060 " >

(0.000085)	Silica (in part)	= 0.55842 gm
54.92%	after rewashing	= 0.54583 gm
Mean = 54.48%		0.00672
	SiO_2	= 0.55255

312 II wt $Fe_2O_3 + Al_2O_3$ = 0.32719 gm

Percent $Fe_2O_3 + Al_2O_3$ = 32.52% wt Fe_2O_3 = 0.09872

Percent Fe_2O_3 = 9.81 wt Al_2O_3 = 0.22847 gm

Al_2O_3 22.71%

---

312 II wt CaO = 0.00532 gm

Percent CaO = 0.52%

---

312 II wt $Mg_2P_2O_7$ = 0.07259 gm

Percent MgO 2.59% wt MgO = 0.02615 gm.

Resumé 312.

Silica	54.58 %	per cents
Alumina	22.71 %	
Ferric oxide	9.81 %	
Lime	0.52 %	
Magnesia	2.59 %	
Potash	3.16 %	
Soda	0.62 %	
Loss on ignition	5.88 %	
Total	99.87 %	

10 0.21

312. 25 grams air dry sand

wt air dry sand = 0.66 gram

air dry sand = 2.64 per cent.

RNB

Lab No. 313 Limestone Penrose Ref. Jo
Marked: "Simmon's Mine. 2W NE 29-14-6
Note book 72, p: 17 July 9, 1889. Coll
Ref. F. Penrose Jr."

for water & loss BB		wt	=	1.0000 gm
1 = 16.3375	Percent water	C+l of ht	=	16.3393
2 = 16.3374	0.19%	after	=	16.3374
3 =		water at 110°C	=	0.0019
Percent Loss BB.		C+l of ignit	=	16.3374
40.21%		after	=	15.9360
		Loss BB.	=	0.4014

I For Phosphoric Acid. wt air dry = 5.0048 gm.
wt dry at 110°C = 4.9953

P_2O_5 I
0.146%

C. ash + $Mg_2P_2O_7$ = 18.80800
C + ash = 18.771916
P_2O_5 = 0.02308 | $Mg_2P_2O_7$ = 0.03609

Residue I
Percent Residue
%
C. ash + Residue = 8.90730
C + ash = 8.671985
Residue = 0.23532

Percent SiO_2 in Residue
wt SiO_2 from Residue =
Percent Fe_2O_3 + Al_2O_3 in Residue =
wt Fe_2O_3 + Al_2O_3 from Residue =
Percent Fe_2O_3 =
Fe_2O_3 (Residue) =
Percent Al_2O_3 =
Al_2O_3 (Residue) =
Percent Mn_3O_4 =
wt Mn_3O_4 in Residue =
Percent CaO
wt CaO (Residue) =
Percent MgO Residue
wt $Mg_2P_2O_7$ (Residue) =
wt MgO " =

After sept. P_2O_5 made up to 500 cc 39.93 x 5 g

II for Analysis wt air dry = 40.0086 gm
" dry at 110°C = 39.9385
wt residue from 40.0086 gm = 1.94867 gm

Percent Residue =

II 313 Residue SiO_2 = 0.28192 gm
0.70%

P_2O_5 (40 gm) wt $Mg_2P_2O_7$ = 0.05812
percent P_2O_5 = 0.09% wt P_2O_5 = 0.03717

313 Note. Residue from HNO_3 – fused with Na_2CO_3 K_2CO_3 – filtrate some SiO_2 treated with $(NH_4)_2S$ etc. – precip. with $(NH_4)_2S$ not all sol. in dil. HCl ; left brown residue which seemed to dissolve in water with yellow color – brown residue dissolved readily in hot conc. HNO_3 – yellow color due to some manganese –

313 II 10 cc. (1) wt CaO = 0.40519 gm.
CaO was brownish in color, & was redissolved in dil. HCl.

313 II, R. wt CaO = 0.03259 gm.
Dark colored. Al = 0.01142
CaO 0.05% CaO = 0.02117

* 313 II R. wt $Al_2O_3 + Fe_2O_3$ = 0.11372 gm
reacts strongly for Mn, & sticks to the crucible. 0.01142
0.12514

313 II 10 cc (2) wt CaO = 0.40409 gm.

313 II 10 cc (1) wt $Mg_2P_2O_7$ = 0.01349 gm
0.60 % MgO 0.60 wt MgO = 0.00486

313 II R. wt $Mg_2P_2O_7$ = 0.00939 gm
.008% wt MgO = 0.00338

313 II 200 cc. SiO_2 = 0.00412 gm.
SiO_2 = 0.02 %

* 313 II R wt $Fe_2O_3 + Al_2O_3 + Mn_3O_4$ = .125140 gms.
wt $Fe_2O_3 + Al_2O_3$ = .097615
wt Mn_3O_4 = .027753

wt $Al_2O_3 + Fe_2O_3$ = .097615
wt Fe_2O_3 = .071570
wt Al_2O_3 = .026044

313 R. wt Mn_3O_4 = 1.71759 gm
4.30 %

313 II 100 cc (1) wt $Fe_2O_3 + Al_2O_3$ = 0.15450
wt Fe_2O_3 = 0.12112
wt Al_2O_3 = 0.03338

1.08 % 313 II 100 cc (1) Mn_3O_4 = 0.08672 gm.

Resumé 3/13

Silica	0 72	per cent
Alumina	07	(in part)
Ferric oxide	17	(in part)
Manganese, protoxide	4 37	(in part)
Lime	50. 63	per cent
Magnesia	60	
Potash		
Soda		
Phosphoric acid	0. 46	
Loss on ignition	40 21	" "
	97. 25	6.77

Lab No 316. Kaolin, white, soft, marked:
"Note book 47, pg 48. June 24. 1889.
Hill on Middle Pine Bluff road, nearly ½ mile
South of road to Hall Littlejohn's place. Sec. 5, 1S., 12W.
Surface. W. Kennedy. "

for water & loss BB

1 = 9.6020	wt	= 2.0180 gm
2 = 9.5961	C + K bf ht	= 9.6190
3 = 9.5948	after	= 9.5934
4 = 9.5948	water at 110°C	= 0.0256

at 130° = 9.5934

Percent water 1.26%

Percent Loss BB	C + K bf ignit	= 9.5934
13.61%	after	= 9.3221
	loss BB	= 0.2713

for Bi_2O_3 fusion for Alkalies

wt air dry = 1.0197 gm.
wt dry at 110°C = 1.0069 gm.

Na_2O = 0.00376 gm
K_2O = 0.00233 "

D + Alk Cl	=	14.1817
D	=	14.1709
Alk Cl	=	0.0108
KCl	=	0.0037
NaCl	=	0.0071

Na_2O = 0.37% } = 0.60%
K_2O = 0.23% }

crue + K_2PtCl_6	=	22.6520
crue	=	22.6398
K_2PtCl_6	=	0.0122

For Alkali Carborate fusion

wt air dry = 1.0247 gm
wt dry at 110°C = 1.0118 gm

C + C + ht = 19.6502

No reaction for Mn on fusion.

water 1st wt = 19.6380
2 = 19.6348
3 = 19.6341
4 = 19.6341

Percent water 1.57%

C. ash + SiO_2	=	15.79120
C + ash	=	15.32285
SiO_2	=	0.46792
Silica in part only	=	0.00652
wt remaining SiO_2	=	0.47444

SiO_2 46.89%

Percent Fe_2O_3 + Al_2O_3 40.12%
Fe_2O_3 = 1.56
Al_2O_3 = 38.76

wt Fe_2O_3 + Al_2O_3	=	0.40603 gm.
wt Fe_2O_3	=	0.01382

60. Lot. No 316. Kaolin

316 (Kaolin) wt CaO = 0.00662

316 MgO wt $Mg_2P_2O_7$ = 0.00722 gm
wt MgO = 0.00259 gm
60

Resumé:

Silica	46 89	per cent		46 27
Alumina	38 76	(40.12)		38 57
Ferric oxide	1 36			1 36
Lime	65			0.34
Magnesia	25	"		0.25
Potash	23			0.23
Soda	37			0.37
Loss on ignition	13 61			13 61
Total	102 12	per cent.		
Water @ 110°C.	1 57			

316. wt air dry = 1.0066 gm. Lt + Kbft = 21.1887
Percent water 1.41% wt dry at 110°C = 0.9924 " after =
water at 110°C =

Percent SiO_2 46.27%

Part of SiO_2 = 0.45222 gm
remainder = = 0.00702
SiO_2 = 0.45924

Percent $Fe_2O_3+Al_2O_3$

39.93%
1.86
38 57

wt $Fe_2O_3+Al_2O_3$ = 0.39632 gm.

wt of CaO = 0.00339 gm

Percent CaO = 0.34%

Lab. No 288. IV wt air dry = 0.3061 gm
wt dry at 110°C = 0.3015 " >

Percent SiO_2
46.27%

C. ash + SiO_2 = 18.75720
C + ash = 18.61768 5
SiO_2 = 0.13952

Percent Fe_2O_3 + Al_2O_3
24.74%

C. ash + Fe_2O_3 + Al_2O_3 = 19.32330
C + ash = 19.24868 5
Fe_2O_3 + Al_2O_3 = 0.07462

Lab. No 288. V

wt air dry = 0.3086 gm
wt dry at 110°C = 0.3040 " >

C. ash + SiO_2 = 19.41230
C + ash = 19.24768 5

Percent SiO_2 0.16462

wt SiO_2 after reworking = 0.15643 gm
" SiO_2 after refluxing
In part = 0.13638 gm

289 25 grams. for sand &c.
air dry.

Very little can be
washed out - a few black grains.

Lab. No 324. Clay-like mass & labeled:
" Oct 17. 1889. R.R. cut, Pine Bluff road,
above Sweet Home. Decomposed Syenite. J.C. Branner

for water & loss BB wt = 2.02122 gm

9.3990
9.3787
9.3776 } Percent water

C + S of lt = 9.4723
after = 9.3776
4.68% Fe water at 110°C = 0.0947

C + S of ignit = 9.3776
after = 9.2103
loss BB = 0.1673

Bi2O3 fusion wt air dry = 1.0740 gm
wt dry at 110°C = 1.0238

D + Alk Cl = 15.8332
D = 15.7892
KCl + NaCl = 0.0440
KCl = 0.0319
NaCl = 0.0121

$K_2O = 0.0196 = 1.91\%$
$Na_2O = 0.0064 = 0.62\%$

crue + K_2PtCl_6 = 22.8438
crue = 22.7394
K_2PtCl_6 = 0.1044

For anal.
Alk Carb fusion wt air dry = 1.0285 gm.
wt dry at 110°C = 0.9758 gm

I
wt SiO_2 = 0.53422 gm

0.51374 = $SiO_2 + TiO_2$
0.01560 = TiO_2 (?) (Refused SiO_2) (impure) = 0.49662 gm
0.49814 = SiO_2 + 0.01712
0.51374

V
C ash + ~~Fe~~ + Al = 20.43460
C + ash = 20.18616
~~Fe_2O_3~~ + Al_2O_3 = 0.24799

~~C + ash + Fe~~
C + ash + Fe_2O_3 = 19.25670
C + ash = 19.20078
Fe_2O_3 = 0.05592

324 II Alk Carb fusion wt air dry = 1.0153 gm.
wt dry at 110° C = 0.9678 "

Percent SiO_2 c ash + SiO_2 = 19.74590
51.79% (h part) c + ash = 19.24368 5
SiO_2 = 0.50132

324 II remainder of SiO_2 = 0.03572 = 3.62%
Total per cent SiO_2 = 55.61 note remark: .03572 SiO_2
one percent ash:

324 III Alk Carb fusion for analysis wt air dry = 1.0136 gm
wt dry at 110° C = 0.9662 "

c ash + SiO_2 = 19.70480
c + ash = 19.20958 5
SiO_2 = 0.49522
Residue of SiO_2 from HF (TiO_2 ?) = 0.00582
SiO_2 = 0.48940 gm

324 Ca (Mn) III (No manganese!!) (reairsolut)
c. ash + CaO (Mn_3?) = 20.19340
c + ash = 20.18741 66
CaO (+ Mn?) = 0.00599
Al_2O_3 = 0.00322
III CaO -- = 0.00277 gm

MgO
0.21%
c. ash + $Mg_2P_2O_7$ = 11.44790
c + ash = 11.44201 6
$Mg_2P_2O_7$ = 0.00589
MgO = 0.00212 gm

324 III
Percent Fe_2O_3 + Al_2O_3
31.58%
c. ash + Fe + Al = 20.49070
c + ash = 20.18548 6
Fe_2O_3 + Al_2O_3 = 0.30522
Fe_2O_3 = 0.04712
Al_2O_3 = 0.25810

324. 25 gm. for Sand.
Wt Sand = 2.20222 gm)

Resume 324:

SiO_2	50.65	%
Al_2O_3	26.71	"
Fe_2O_3	4.87	"
CaO	0.62	"
MgO	0.21	"
K_2O	1.91	"
Na_2O	0.62	"
Loss B.B.	7.62	"
SiO_2	0.06	" from SiO_2 portion
	94.33	"
MnO_2	trace.	

288 VI Complete analysis.

for water + loss BB. wt = 2.0000 gm

1 = 9.4230
2 = 9.4218

Percent water 1.46%

c + c of wt =	9.4511 gm
after =	9.4218
water at 110°C =	0.0293

Percent loss B.B. 13.82%

c + c of ignit =	9.4218
after =	9.1493
loss BB =	0.2725

Bi_2O_3 Fusion for Alkalies

wt air dry = 1.0309 gm
wt dry at 110°C = 1.0159 " >

$K_2O = 0.00543 = .53\%$
$Na_2O = 0.00551 = .54$

D + Alk Cl =	14.1890
D =	14.1700
KCl + NaCl =	0.0190 gm
KCl =	0.0086
NaCl =	0.0104
cruc + K_2PtCl_6 =	22.5524
cruc =	22.5242
K_2PtCl_6 =	0.0282

Alk. Carb fusion VI for analysis

wt air dry = 1.0020 gm
wt dry at 110°C = 0.9874 >

Percent SiO_2 45.62%

wt SiO_2 = 0.4502 gm

288 VI Percent Fe + Al 38.23%

wt $Fe_2O_3 + Al_2O_3$ = 0.3775 gm

288 VII Alk. Carb. fusion. For analysis (and TiO_2)

wt air dry = 1.0067 gm
wt dry at 110°C = >

288 VI wt CaO = 0.0019 gm

2.0%

Resume 288

SiO_2	45 62	per cent
Al_2O_3	34.18	" "
Fe_2O_3	4 05	" "
CaO	0.20	" "
MgO	trace faint	
Mn_3O_4	0.14	" "
Loss on ignition	13 82	" "
K_2O	0.53	" "
Na_2O	0.62	" "
	99.08	
	03	
	99 19	

Lab. Nos. 288, 289, & 307, most probably contains titanium

289. VII Complete analyses.

for water & loss B.B. wt = 2.0000 gm.

1 = 10.4658
2 = 10.4622
3 = 10.4671
4 = 10.4641
5 = 10.4640
6 = 10.4640

Percent water 5.51%

C+K of ht	=	910.5725
after	=	10.4622
water at 110°C	=	0.1103

Percent loss BB 14.37%

C+K of ignit	=	10.4622
after	=	10.1906
loss BB	=	0.2716

Bi_2O_3 fusion for alkalies. wt air dry = 1.0254 gm
wt dry at 110°C = 0.9690 >

wt K_2O = 0.00202 gm
wt Na_2O = 0.00334 gm

Percent
K_2O = 0.20%
Na_2O = 0.34%

D + AlkCl	=	15.7977
D	=	15.7882
AlkCl	=	0.0095
KCl	=	0.0032
NaCl	=	0.0063

cruc + K_2PtCl_6	=	22.5242
cruc	=	22.5135
K_2PtCl_6	=	0.0107

Alk. Carbonate fusion for analyses wt air dry = 1.0072 gm.
wt dry at 110°C = 0.9518 gm >

SiO_2 (in part) = 44.97%

289 VII wt SiO_2 (in part) = 0.42803
(remainder =
289 VII SiO_2 Total =

$Fe_2O_3 + Al_2O_3$ = 40.21% 289 VII $Fe_2O_3 + Al_2O_3$ = 0.38280 gm

---

Percent CaO = 0.25 289 VII CaO = 0.00249 gm

Resume 289 VII

	Silica =	44.97 %	✓
Fe_2O_3 = 1.34 %	$Fe_2O_3 + Al_2O_3$ =	40.21 "	✓
	Lime =	0.25 "	✓
	Potash =	0.20 "	✓ OK
	Soda =	0.34 "	✓
	Loss on Ignition =	14.37 "	✓
	Magnesia =	00.00 trace	✓
	Manganese =	00.00 trace	✓
		100.34 %	

Most probably contains titanium

Lab. No. 325. White clay ~~with streaks of red~~, marked:
" Note book 21, pg 31. Nov. 19. 1889.

W 1/2 lot 11, Ridgewood. SW 1/4 of N.E. 1/2. Sect 25, N, 12 W.
In bottom of 26 foot well. J.C. Branner. "

for water & loss BB. wt = 2.0000

(1 = 13.4168)
(2 = 13.4168) Percent water
1.24 %

c+c of wt	=	13.4417
after	=	13.4168
water at 110° C	=	0.0249

Percent Loss BB
6.86 %

c+c of ignit	=	13.4168
after	=	13.2813
loss BB	=	0.1355

Bi_2O_3 fusion for alkalies

wt air dry	=	1.0180
wt dry at 110° C	=	1.0032
D + Alk Cl	=	14.1957
D	=	14.1697
KCl + NaCl	=	0.0260
KCl	=	0.0185
NaCl	=	0.0075

$K_2O = 0.0116 = 1.15\%$
$Na_2O = 0.0039 = .38\%$

crue + K_2PtCl_6	=	22.6131
crue	=	22.5524
K_2PtCl_6	=	0.0607
2KCl	=	0.0185

Alk Carb fusion

wt air dry	=	1.0191 gm
wt dry at 110° C	=	1.0065 gm

fusion gives a very pale green color.

Percent SiO_2
67.90

c.ash + SiO_2	=	20.869400
c + ash	=	20.185985
SiO_2	=	0.68342

Percent Fe_2O_3
1.33 %

Percent Al_2O_3
22.07 %

c+ash+Flux Al	=	19.43370
c+ash	=	19.19938
$Fe_2O_3 + Al_2O_3$	=	0.23432
Fe_2O_3	=	0.01342
Al_2O_3 wt Fusse	=	0.22090
	=	0.00132
Al_2O_3	=	0.22222

325 (with some Alumina)

Wt CaO = 0.00189 gm
Wt Fe+Al = 0.00132 "
Wt CaO = 0.00057

Percent CaO
0.05%

Percent MgO
0.59%

Wt $Mg_2P_2O_7$ = 0.01659 gm
Wt ~~MgO~~ = 0.00597 "

Resume 325

SiO_2	Silica	67.90 %
Al_2O_3	Alumina	22.07 "
Fe_2O_3	Ferric oxide	1.33 "
CaO	Lime	0.05 "
MgO	Magnesia	0.59 "
K_2O	Potash	1.15 "
Na_2O	Soda	0.38 "
	Loss on ignition	6.86 "
	Manganese	0.00 Trace slight.
		100.33 %

Lab. No 326. White clay, with streaks of red, marked: "Nov. 19. 1889. Notebook 21. pg 31. Lot 7, Ridgewood. Sect. 25, 1N, 12W; SW¼ NE½. Well 12' deep. White in bottom, pink on top of it; gravel on top. J.C. Brannes."

For water & loss BB.

13.0745
13.0514
13.0500
13.0480
13.0480

Percent water 2.04 %

wt = 2.0000

c+c of lt = 13.6889 gm

after = 13.6480

water at 110°C = 0.0409

Percent Loss BB: 6.82 %

c+c of ignit = 13.6480

after = 13.5142

loss BB = 0.1338

Bi_2O_3 fusion. for Alkalies.

wt air dry = 1.0184 gm.

wt dry at 110°C = 0.9977

D + Alk Cl = 14.2038

D = 14.1697

K_2O = .01389 = 1.39 %

Na_2O = .0064 = .64 %

Alk oxides = 2.03 %

KCl + NaCl = 0.0341

KCl = 0.0220

NaCl = 0.0121

---

cruc + K_2PtCl_6 = 22.6853

cruc = 22.6131

K_2PtCl_6 = 0.0722

KCl = 0.0220

Alk. Carb fusion.

wt air dry = 1.0092 gm.

wt dry at 110°C = .9887

No Manganese.

66.22 % SiO_2

c, ash + SiO_2 = 11.71000

c + ark = 11.055283

SiO_2 = 0.65472

24.86
2.06
22.80

$Fe_2O_3 + Al_2O_3$ = 0.24584 gm

Fe_2O_3 = 0.02042

Al_2O_3 = 0.22542

0.12

wt CaO (with some Fe_2O_3) = 0.00389 gm

(Fe_2O_3 = 0.00262 "

CaO = 0.00127

76
326.

0.70 %

wt $Mg_2P_2O_7$ = 0.01939 gm.
wt MgO = 0.00698

24.86
24.58
.28
10.47
100.75

Resumé 326

Silica	66 22
Alumina	22 80 (24.58)
Ferric oxide	2 06
Lime	0 12
Magnesia	0 70
Potash	1 39
Soda	.64
Loss on ignition	6 82
	100 75
Sand	0 41
Water @ 110-115° C.	2 04

326. 25 grams for Dan's air dry.
no eff. with HCl.

.41% Wt Sand = 0.10092 gm.

Lab. No. 327. Gray clay, marked:
"Toronto, Canada. Specimen of clay used for making White Brick. (furnished by Wm. Kennedy)

for water & loss BB wt = 2.0000

1 = 14.2196
2 = 14.2175
3 = 14.2175

Percent water 1.91%

C + C of wt	=	14.2557
after	=	14.2175
water at 110° C	=	0.0382

Percent Loss BB 11.66%

C + C of ignit	=	14.2175
after	=	13.9887
loss BB	=	0.2288

Bi_2O_3 fusion for Alkalies

wt airdry = 1.0192 gm
wt dryat 110° C = .9998

K_2O = 0.0166 = 1.66%
Na_2O = 0.0086 = 0.86"

D + Alk Cl	=	15.8310
D	=	15.7854
KCl + NaCl	=	0.0426
KCl	=	0.0263
NaCl	=	0.0163

crue + K_2PtCl_6	=	22.5739
cru	=	22.4877
K_2PtCl_6	=	0.0862
KCl	=	0.0263

Alk. Carb fusion.
faint reaction for Manganese.

wt airdry = 1.0319 gm
wt dryat 110° C = 1.0122 gm

Percent SiO_2 44.48%

C. ark + SiO_2	=	19.64930
C + ark	=	19.19938
		0.44992

Percent Fe + Al = 16.94%
" Fe_2O_3 = 5.57 "
" Al_2O_3 = 11.37%

C. ark + Fe + Al	=	18.75960
C + ark	=	18.58807
$Fe_2O_3 + Al_2O_3$	=	0.17153
Fe_2O_3	=	0.05642
Al_2O_3	=	0.11511

Percent CaO

16.63 %

c. ash + CaO = 20.3525 g

c + ash = 20.1841 "

CaO = 0.16839

c. ash + $Mg_2P_2O_7$ = 20.28400

c + ash = 20.18501 "

$Mg_2P_2O_7$ = 0.09899

3.52 %

MgO = 0.03567

SiO_2	44.48 %
Al_2O_3	11.37 "
Fe_2O_3	5.57 "
CaO	16.63 "
MgO	3.52 "
Mn	trace "
K_2O	1.66 "
Na_2O	0.86 "
Loss on ignition	15.42
total ---	= 99.51 %

327. Loss B.B.

wt air dry = 0.5281 gm

Percent Loss B.B. wt dry at 110°C = 0.5181 "

15.42 % c + c ff ignit = 19.1060

after = 19.0261

0.0799

The clay fused completely in the crucible.

Lab. No. 328. Pottery clay, marked:
"Note book 76, pg 69. Nov. 23. 1889.
S½ S.E.¼ Sect 27, 7N, 30W. Sebastian Co.
Wm. Kennedy."

for water + loss BB wt = 2.0000

14.1800 C + c of wt = 14.2559
14.1787 after = 14.1787
Percent water 3.86% water at 110°C = 0.0772

C + c of ignit = 14.1787
3.95% after = 14.1027
loss BB = 0.0760

for Bi_2O_3 fusion. wt air dry = 1.0268 gm.
wt dry at 110°C = 0.9852 "

0.66% = .0066
K_2O 0.00657 D + Alk Cl = 14.1907
Na_2O 0.00567 = .57% D = 14.1696
KCl + NaCl = 0.0211
KCl = 0.01024
NaCl = 0.0107

cruc + K_2PtCl_6 = 22.6082
cruc = 22.5739
K_2PtCl_6 = 0.0343
KCl = 0.0104

Alk. Carb. fusion. wt air dry = 1.0138 gm
faint color for Mn. wt dry at 110°C = 0.9747

C + ash + SiO_2 = 19.38350
C + ash = 18.58798.5
81.61% SiO_2 = 0.79552

C. ash + Fe_2Al = 19.32350
13.22% C + ash = 19.19457
2.7% $Fe_2O_3 + Al_2O_3$ = 0.12893
10.52 Fe_2O_3 = 0.02632
Al_2O_3 = 0.10261

0.32% CaO 328. wt CaO = 0.00319 gm

wt $Mg_2P_2O_7$ = 0.01119 gm

0.40% wt MgO = 0.00403

328. 10 gm. for Sand. Dry at 110°C = 9.6144 gm.

wt Sand = 1.7728 gm.

no eff with HCl in Cold.

18.43% Sand in clay dry at 110°C

OK

Resume 328

Silica	81.61	per cent.
Alumina	10.52	
Ferric oxide	2.70	
Lime	0.32	
Magnesia	0.40	
Potash	0.66	
Soda	0.57	
	3.95	" "
	100.73	

Lab. No. 329. "Pottery clay said to be from Bridges place, 5 mi North of Van Buren, Ark. furnished by Wm Kennedy."

for water loss B.B. wt = 2.0000 gm

13.6332
13.6315
13.6315

Percent water 2.85%

crc & wt = 13.6886
after = 13.6315
water at 110°C = 0.0571

Percent Loss B.B. 5.53%

crc & wt = 13.6315
after = 13.5240
loss B.B = 0.1075

Bi_2O_3

wt air dry = 1.0294 gm
wt dry at 110°C = 1.0001 gm 1.0001 gm

Na_2O = 0.00573 gm
K_2O = 0.01636 "

D + alkcl = 14.2060
D = 14.1693
KCl + NaCl = 0.0367
KCl = 0.0259
NaCl = 0.0108

Na_2O = 0.57%
K_2O = 1.63%

crc + K_2PtCl_6 = 22.6931
crc = 22.6082
K_2PtCl_6 = 0.0849
KCl = 0.0259

Alk Carb Fusion.

wt air dry = 1.0020 gm
wt dry at 110°C = 0.9735 gm

67.64%

c. ash + SiO_2 = 19.24670
crash = 18.588185
SiO_2 = 0.65852

Percent Fe + Al = 24.05%

" Fe_2O_3 = 2.48
Al_2O_3 = 21.57%

c. ash Fe & Al = 20.41500
crash = 20.183801
$Fe_2O_3 + Al_2O_3$ = 0.2342
Fe_2O_3 = 0.0242
Al_2O_3 = 0.2100

329

CaO = 0.27%

Crucible + Cal = 20.187000
Crucible = 20.184316
CaO = 000269

Percent MgO
0.62%

wt $Mg_2P_2O_7$ = 0.01699 gm
wt MgO = 0.00612 "

Resumé 329.

Silica	67.64	per cent
Alumina	21.57	per cent
Ferric oxide	2.48	
Lime	0.27	
Magnesia	0.62	
Potash	1.63	
Soda	0.57	
Loss on ignition	5.53	
	100.31	%

Lab. No. 330. Sandy clay, marked:
" Arkansas river, material supposed to slip.
(Pottery clay). Wm. Kennedy. "

for Sand @ 25 gm. Consec Eff. with HCl & Cl

with mica scales, and a heavy black substance used in acids

C. ash + Sand = 15.3564
C + ash = 12.4255
Sand = 2.9304

Percent Sand
12.23 in clay dry at 110° C

For water & Loss BB. Wt = 2.0000
14.1723 Percent water C + C of Wt = 14.2559
14.1720 after = 14.1720
4.19% water at 110°C = 0.0839

Percent Loss BB C + C of ignit = 14.1720
7.01% after = 14.0375
Loss BB = 0.1345

Bi_2B_3 fusion. Wt air dry = 1.0084
Wt dry at 110°C = 0.9662 gm

K_2O = 0.01111 gm
Na_2O = 0.00642 gm
K_2O = 1.14%
Na_2O = 0.66%

D + Alk Cl = 15.8175
D = 15.7878
KCl + NaCl = 0.0297
KCl = 0.0176
NaCl = 0.0121

crucible + K_2PtCl_6 = 22.7507
crucible = 22.6931
K_2PtCl_6 = 0.0576

Alk Carb fusion
faint color for Manganese.
Wt air dry = 1.0241 gm.
Wt dry at 110°C = 0.9812 gm.

SiO_2
70.95%
C. ash + SiO_2 = 20.8799 0
C + ash = 20.1836 85
SiO_2 = 0.6962 A

332. Albany slip for Sand 25 grams.
Strongly effs with HCl in dres.
wt sand = 0.00542

Lab. No 332. "Slip for pottery, Albany N.Y.,
1=14.3930 Furnished by Wm. Kennedy."
2=14.3920

For water & loss BB		wt =	2.0000
Percent Water	c+c & wt	=	14.4253
1.66%	after	=	14.3920
	water at 110°C	=	0.0333
Percent Loss BB	c+c & ignit	=	14.3920
7.41%	after	=	14.2462
	loss BB	=	0.1458
Bi_2O_3 fusion	wt air dry	=	1.0197
	wt dry at 110°C	=	1.0028

K_2O .01192 = 1.18%
Na_2O .00812 = 0.80%

D + Alk Cl	=	14.2034
D	=	14.1692 gm
KCl + NaCl	=	0.0342
KCl	=	0.01888
NaCl	=	0.01532

c wet + K_2PtCl_6	= 22.8125
c wc	= 22.7507
K_2PtCl_6	= 0.0618
KCl	= 0.01888

Alk Carb fusion reacts for Mn, but not very strong

wt air dry	=	1.0013 gm.
wt dry at 110° C	=	0.9847

Percent SiO_2
58.05 per cent.

c ash + SiO_2	= 20.75320
c + ash	= 20.18158
SiO_2	= 0.57162

Percent $Fe_2O_3 + Al_2O_3$ = 21.62%
Percent Fe_2O_3 = 6.76 "
Percent Al_2O_3 14.86 "

wt $Fe_2O_3 + Al_2O_3$	= 0.21293 gm
wt Fe_2O_3	= 0.06662
wt Al_2O_3	= 0.14631

Percent CaO
6.61%

wt CaO = 0.06509 gm.

Percent $CaCO_3$ = 11.80%

wt $Mg_2P_2O_7$ = .08419
wt MgO = .03033

3.08%

Resumé 332

Silica	58	05	per cent.
Alumina	14	86	" "
Ferric oxide	6	76	" "
Lime	6	61	" "
Magnesia	3	08	
Potash	1	18	" "
Soda	0	80	" "
Loss on ignition	7	41	" "
	98	75	5.67

OK

Lab. No. 335. Gray, almost white, sandy clay, with somewhat the appearance of Kaolinite. marked: " Notebook 64, pg 26. July 26. 1889. Crooked Creek, on N.E. 1/4 of S.W. 1/4 Sect 15, 15, 14W. About 3/4 mile west of Collegeville, About 7 feet from surface. (5) W. Kennedy. "

1= 14.42416
2= 14.4219 grains

for water + loss BB,	wt	=	2.0000 gm
Percent water	C+C of wt	=	14.4259
0.21%	after	=	14.4216
	water at 110°C	=	0.0043
Percent Loss BB	C+C of ignit	=	14.4216
2.79%	after	=	14.3658
	Loss BB	=	0.0558

Alk. Carb. fusion.

wt air dry = 1.0460 gm
wt dry at 110°C = 1.0438 "

Percent SiO_2	C. ash + SiO_2	=	20.05360
82.45 percent SiO_2	C ash	=	19.19298
	SiO_2	=	0.86062
Percent $Fe_2O_3 + Al_2O_3$			
12.60	C. ash + Fe + Al	=	20.31300
0.80 Fe_2O_3	C ash	=	20.181485
11.80 Al_2O_3	$Fe_2O_3 + Al_2O_3$	=	0.13152
	Fe_2O_3	=	0.00842
	Al_2O_3	=	0.12310
Percent CaO	C. ash + CaO	=	18.58440
0.31%	C ash	=	18.581132
	CaO	=	0.00327
Percent MgO	wt $Mg_2P_2O_7$	=	0.00739 gm
0.25%	wt MgO	=	0.00266 "

Resumé of 335.

Silica	82 45	per cent.
Alumina	11 80	12.60
Ferric oxide	80	
Loss on ignition	2 79	" "
Total	97. 84	

water @ 110–115°C	0 21	per cent.
Sand	27 37	" "

100 %
97.84
2.16

10 gm. Sand air dry — 9.98 gm. dry at 110°C

Sand = 2.7320 gm.

Percent Sand in clay dry at 110°C = 27.37 %

Laf. No. 333. Clay labelled: "Notebook 76, pg 17. Nov. 2. 1889. North side of N.W 1/4, N.E. 1/4 Sec 34, 8 N, 26 W. Judge T. F. Potter land. Reported fire-clay. Wm. Kennedy."

=21.1660
=21.1659

Water & loss BB. wt = 2.0000 gm

Percent water 1.33%

C + cb/ht = 21.1925 gm
after = 21.1659
water at 110°C = 0.0266

Percent Loss BB 2.25%

C + C of ignit = 21.1659 gm
after = 21.1211
loss BB = 0.0448

Alk Carb fusion. String reaction for Mn.

wt air dry = 1.0260 gm
wt dry at 110°C = 1.0124 "

Percent SiO_2 88.66%

C. ash + SiO_2 = 20.08880
C + ash = 19.191185
SiO_2 = 0.89762

$Fe_2O_3 + Al_2O_3$ = 8.28%

wt $Fe_2O_3 + Al_2O_3$ = 0.08272 gm.
+ Fe + Al = 0.00111
$Fe_2O_3 + Al_2O_3$ = 0.08383

Fe_2O_3 = 2.55 "

Fe_2O_3 = 0.02582

Al_2O_3 = 5.73%

Al_2O_3 = 0.05801

Trace (very slight) of Lime; little magnesia.

Resume 333:

Silica	88.66%	8866
Ferric oxide	2.55 "	2.55
Alumina	5.73 "	5.73
Lime	0.00 trace	
Loss on ignition	2.25	2.25
Total	= 99.19%	99.19

Water in air dry dry, lost at 110°–115°C. = 1.33%

333 1 gram for sand.
Percent Sand to left with HCl in Calc.
17.94% ck sand = 1.77082 gm.

O.K.

Lab. No. 334. Pottery clay; marked: "Note book 84, fg 104.
Oct. 19. 1889. In small stream on east side of college at Clarksville; under 2 feet of brown, almost black arenaceous shales, & 18 inches gravelly soil. Blue clay with snuff-colored streaks. Wm Kennedy."

22.1034 for water + loss BB
1 gram

	wt	=	2.0000 gm
Percent water	C+C of lt	=	22.1815 "
3.90%	after	=	22.1034
	water at 110°C	=	0.0781
Percent Loss BB	C+C of ignit	=	22.1034
7.90%	after	=	21.9515
	loss BB	=	0.1519

Alk. Carb. fusion. wt acidy = 1.0000 gm.
Faint green color wt dry at 110°C = 0.9610

Percent SiO_2 55.36% — wt SiO_2 = 0.53202 gm.

Percent Fe + Al Oxides — wt $Fe_2O_3 + Al_2O_3$ = 0.30833 gm.
$Fe_2O_3 + Al_2O_3$ 32.08 %
Fe_2O_3 = 5.12 "
Al_2O_3 = 26.96 %
wt Fe_2O_3 = 0.04922
wt Al_2O_3 = 0.25911

Percent CaO 0.30% — wt CaO = 0.00289 gm

Percent MgO 1.16% — wt $Mg_2P_2O_7$ = 0.03119
wt MgO = 0.011239

O.K. BBS

Resume' 334

Silica	55.	36
Alumina	26	96
Ferric oxide	5	12
Lime	0	30
Magnesia	1.	16
Alkalis + Soda	2.	69
Loss on ignition	1.	03
	7	90
	100	52

1 | 1

334. Bi_2O_3 fusion.

wt air dry = 1.02299 gm
wt dry at 110°C = 0.9831 gm

wt Na_2O = 0.01018 gm
wt K_2O = 0.02647 "

Percent
K_2O = 2.69 %
Na_2O = 1.03 "
total 3.72

D + Alk Cl = 14.2303
D = 14.1692
KCl + NaCl = 0.0611
KCl = 0.0419
NaCl 0.0192

ener K_2PtCl_6 = 22.9913
ener = 22.8539
K_2PtCl_6 = 0.1374

Lab. No. 336. Pottery clay, marked: "Note book 84 pg 32. John Foley, N.E 1/4, S.E. 1/4, Sec 18, 13S, 24W. Clay which will vitrify. Upper bed (8) Wm. Kennedy."

1=20.5369 For water + loss B.B.	wt	=	2.0000 gm
Percent water	c+c & ht	=	20.5816 "
2.23%	after	=	20.5369 "
	water at 110°C	=	0.0447 "
Percent Loss B.B	c+c of ignit	=	20.5369 "
5.40%	after	=	20.4312
	loss B.B	=	0.1057

Alkali Carb. fusion — wt air dry = 1.0230 gm.
Extremely faint color for Mn. — wt dry at 110°C = 1.0002

Percent SiO_2	wt SiO_2 (in part)	=	0.75802 gm
76.33%	remainder	=	0.00547
	SiO_2	=	0.76349

$Fe_2O_3+Al_2O_3$ Note likely contains titanium. Not determined.

~~Fe~~ = 17.28%	wt $Fe_2O_3+Al_2O_3$	=	0.17292 gm.
Fe_2O_3 = 1.24"	wt Fe_2O_3	=	0.01242
Al_2O_3 = 16.04%	wt Al_2O_3	=	0.16050

B.S. B.K.

Resumé 336

Silica	76.33	per cent.
Alumina	16 04	" "
Ferric oxide	1 24	" "
Loss on ignition	5 40	" "
Total	99 01	" "
Lime Magnesia alk	.99	" "
	100 00	" "

Note lime slight trace.
10 grams for sand. no eff. with HCl Cold.
wt sand =

336. 10 gm for Sand wt Sand = 1.2820 gm.
13.1% H. 110-115°C

Lab. No. 351. "Notebook 84, pg 50. Sept. 4. 1889.
Clay from underfoot of new entry to mine of the Camden Coal & Mining Co.
Mch Lester station. W. Kennedy.

for water & loss BB. wt = 2.0000

10.7132
10.7134 Percent water c+c & wt = 10.7883
10.7139
10.7138 3.72% after = 10.7139
" " water at 110°C = 0.0744

Percent Loss BB c+c & wt = 10.7139 gm
5.38% after = 10.6103
Loss BB = 0.1036

Alkali Carb. Fusion wt air dry = 1.0088 gm.
Fair reaction for Mn wt dry at 110°C = 0.9713 gm

Percent SiO_2 wt + SiO_2 = 0.77142 gm.
79.42%

Percent Fe+Al = 15.52% $Fe_2O_3 + Al_2O_3$ = 0.15075 gm
2.17 " Fe_2O_3 = 0.02112 "
13.35% Al_2O_3 =

Arkansas Geological

Resumé 351

Silica	79.42	
Alumina	13.35	15.52
Ferric oxide	2.17	
Lime very little	not determined.	
Magnesia		
Potash		
Soda		
Loss on ignition	5.38	
	100.32	

OK
P.S.B.

Lab No. 337. Gray Pottery Clay. marked " almost white
84, page 35. August 30, 1889. W½. S.E. ¼ of
Section 3, 15 S., 20 W. Climax Pottery Coll.
" "
Wm Kennedy.

1=22.1600
2=22.1583
3=gained

For water & loss BB — wt = 2.0000 gm
Percent water — crc of lt = 22.1799 gm.
1.08% — after = 22.1583
water at 110°C = 0.0216

Percent Loss BB — crc of ignit = 22.1583
5.09% — after = 22.0576
Loss BB = 0.1007

Alkali carb. fusion — wt air dry = 1.0475 gm.
Extremely faint color for Mn. — wt dry at 110°C = 1.0362 >

75.99% SiO_2. — wt SiO_2 = .78747 gms.

Percent Fe+Al — wt $Fe_2O_3 + Al_2O_3$ = 0.18109 gm
17.47% — wt Fe_2O_3 = 0.01402 "
Fe_2O_3 = 1.35 — wt Al_2O_3 = 0.16707
Al_2O_3 = 16 12

Note. Slight trace of calcium.

Resume' 337.

Silica	75 99	per cent.
Alumina	16 12	" "
Ferric oxide	1 35	" "
Lime slight trace		
Magnesia		by difference 1.45
Potash		
Soda		
Loss on ignition	5 09	" "
Total	98.55	per cent.

B.W.S.
C.C.

337 Sand — 10 grams for sand.
0.75% dried @ 110-115° No eff. with HCl in cold
Sand Very small quantity. wt of sand = 0.07492 gm

Lab. No 352 " Notebook 76. fg 35. Nov. 6, 1889
R.R. cutting 2 miles East of Ozark.
Fireclay lying under 3 inches of coal. Clay 20 inches thick.
from feet under sandstones. W. Kennedy. "

For water + loss BB. wt = 2.0000 gm.
9.1539 / 9.1539 Percent Water 2.65% wt of lt + c after = 9.2069 "
after = 9.1539
wt at 110°C = 0.0530

Percent loss BB 6.74 wt of lt + c after ignit = 9.1539 gm.
after = 9.0225
loss BB = 0.1314

Alkali Carb fusion. wt air dry = 1.0332 gm.
wt dry at 110°C = 1.0059

Percent SiO_2 62.92% wt SiO_2 = 0.63292 gm.

Fe + Al = 26.77%
Fe_2O_3 = 3.17 "
Al_2O_3 = 23.60%

wt $Fe_2O_3 + Al_2O_3$ (in part) = 0.26703
remainder = 0.00232
$Fe_2O_3 + Al_2O_3$ = 0.26935
Fe_2O_3 = 0.03192
Al_2O_3 = 0.23743

Percent CaO = 0.23% wt CaO = 0.00232 gm
Percent MgO 0.57% wt $Mg_2P_2O_7$ = 0.01609 gm
0.00579 "

Resume 352
Silica 6292 per cent.
Alumina 2360 26.54
Ferric oxide 317
Lime 023
Magnesia 57
Potash
Soda by difference 277
Loss on ignition 674

100.00 (6725) 97.25

Lab. No. 338. Pink clay, marked: "Notebook 84, pg 17.
Aug. 23. 1889. O. E. Hetrick's clay pit on ⊕
NE¼, NE¼, Sec 24, 4S, 17W; Pottery clay. (No 12). W. Kennedy."
One acre in extent

For water & loss BB. wt = 2.0000 gm.

1 = 10.5425
2 = 10.5352
3 = 10.5352

Percent water 2.01%

C+C of lit = 10.5754 "
after = 10.5352
water at 110°C = 0.0402

Percent Loss BB 5.33%

C+C of ignit = 10.5352 gm
after = 10.4307
Loss BB = 0.1045

Alkali carb fusion wt air dry = 1.0094 gm
wt dry at 110°C = 0.9892

Percent SiO_2 73.24%

wt SiO_2 = 0.72452 gm.

Percent Fe & Al
= 20.65%
Fe_2O_3 = 1.04 "
Al_2O_3 = 19.61%

wt $Fe_2O_3 + Al_2O_3$ = 0.20433 gm.
Fe_2O_3 = 0.01032
Al_2O_3 = 0.19401

Resume' 338

Silica	73.24	
Alumina	19.61	20.65
Ferric oxide	1.04	
Lime		C.K.
Magnesia	.78	
Potash		B&S
Soda		
Loss on ignition	5.33	
	100.00	

10 gm. for Sand. No effervescence with conc. HCl.
wt Sand = 0.46932 gm.

4.78 % H.C. @ 110°-115°C.

Lab No. 297 Redetermination of silica, alumina, ferric oxide, lime, manganese, water & loss R.B.

For water & loss R.B. & manganese

wt air dry = 1.0250
wt @ 110°-115°C = 1.0198

0.50 % wt water = 0.0052
36.13 % wt loss R.B. = 0.3685

wt Mn_3O_4 =

For silica, alumina, ferric oxide, lime & manganese

wt air dry = 2.0060
wt @ 110°-115°C = 1.9958

4.10 % wt SiO_2 = .08192

Reacts for Mn } 6.49 % wt $Fe_2O_3 + Al_2O_3$ = .12959 Mn_3O_4 4.2 %

wt Fe_2O_3 =

wt Mn_3O_4 =

50 cc. wt CaO = .09129 gram. } make up to 500 cc.
50 cc. wt CaO = .09159 " }

Mean Total CaO = 0.9144 = 4.581 %

In this found $Fe_2O_3 + Al_2O_3$ = .00522 = 1.30 %

CaO = 44.51 %

For P_2O_5 wt air dry = 2.0007
wt @ 110°-115°C = 1.9907

wt $Mg_2P_2O_7$ = .09409
3.02 % P_2O_5 = .06018

---

1 gm portion (1.0198 gm.) − wt Mn_3O_4 =

Note test Mn_3O_4 for Ba!
test CaO for Mn etc. Used both portions together = .18288 gm CaO =

Lab. No. 339. Grayclay, marked:
" Notebook 84. pg 32. Aug 29. 1889. John Foley.
N.W.1/4, S.E.1/4, Section 18, 13S, 20W.
(No 1) Fire-clay. W. Kennedy."

For water & Loss BB.

10.5378
10.5361
.0017 gained

Percent water
1.92%

wt = 2.0000 gm
C+c & wt = 10.5745 gm.
after = 10.5361
water at 110°C = 0.0384

Percent Loss BB
5.65%

C+c & ignit = 10.5361
after = 10.4252
Loss BB = 0.1109

Alkali Carbonate fusion. wt air dry = 1.0228 gm
wt dry at 110°C = 1.0032

Percent SiO_2
73.87%

wt SiO_2 = 0.74112 gm

Percent
$Fe_2O_3 + Al_2O_3$ = 19.02% wt $Fe_2O_3 + Al_2O_3$ = 0.19082 gm
Fe_2O_3 = 1.64 " wt Fe_2O_3 = 0.01652
Al_2O_3 = 17.38% wt Al_2O_3 = 0.17430

339
Residue
Silica 73.87
Alumina 17.38 } 19.02
Ferric oxide 1.64
Lime
Magnesia 1.46
Potash
Soda
Loss on ignition 5.65
100.00 (98.54

297 (See page 103)

2.33 Fe_2O_3 from 2 gm. portion = .0246 N

$Al_2O_3 + Fe_2O_3$ =

req'd 5.25 cc $KMnO_4$ = .0246 N Fe_2O_3

For Mn wt air dry = 1.0023

wt % @ 110°-115°C = _____

wt Mn_3O_4 =

Résumé of 297.

Silica	44	10	per cent.
Alumina	4	16	" "
Ferric oxide	2	33	" "
Lime	44	51	" "
Magnesia		30	
Manganese oxide	4	30	
Potash		35	
Soda		16	
Loss on ignition	36	13	" "
Phosphoric acid		0.02	" "
Total		99.36	

Water @ 110°-115°C — 0.50(7) per cent.

OK
Rapo
July 25 1894

Lab. 340. White clay, marked: "Notebook 84, pg 27. Aug 30, 1889. Roe's pottery clay on old Boston road. (No. 3) W. Kennedy."

10.5446
10.5444

For water & Loss BB. wt = 2.0000 gm

Percent water	C+C & lt	= 10.5750
1.53%	after	= 10.5444
	water at 110°C	= 0.0306

Percent Loss BB.	C+C & ignit	= 10.5444
5.70%	after	= 10.4320
	Loss BB	= 0.1124

Alk. Carb. Fusion. wt air dry = 1.0534 gm.
Very faint color for Mn wt dry @ 110°C = 1.0373

Percent SiO_2 74.85% wt SiO_2 = 0.77652 gm

Percent	18.32%	wt $Fe_2O_3 + Al_2O_3$ =	0.19012 gm
" "	1.12	wt Fe_2O_3 =	0.01172
" "	17.20	wt Al_2O_3 =	0.17840

Received 3/10

Silica	74.85	per cent
Alumina	17.20	18.32 "
Ferric oxide	1.12	
Lime trace very slight		
Magnesia	1.13	" "
Alkalies		
Loss on ignition	5.70	
	100.00	

Lab. No. 341. "Note book 41, pg 6. May 7th. 1889.
Ouachita Co. N.E ¼ S.W ¼ Sec 2, 12S, 18W.
Siliceous clay from land of Camden Coal Co.
(20) A. Winslow.

10 grams for Sand. Norff. with Cold Hcl.

47.74%

wt sand = 4.74652 gm

10.5629
10.5618
1 gained

for water & Loss BB, wt = 2.0000 gm

Percent water 0.66%

crc & lgt = 10.5750
after = 10.5618
water at 110°C = 0.0132

Percent Loss BB 5.98%

crc & lgt = 10.5618 gm
after = 10.4429
Loss BB = 0.1189

Alk Carb fusion

wt air dry = 1.0016 gm.
wt dry at 110°C = 0.9950 "

Percent SiO_2 76.21%

wt SiO_2 = 0.75832 gm.

Percent 16.75%

" " 0.75%

" " 16.00

wt $Fe_2O_3 + Al_2O_3$ = 0.16673 gm
wt Fe_2O_3 = 0.00752
wt Al_2O_3 = 0.15921

Sand
47.74

Remarks 341

Silica	76 21
Alumina	16 00 } 16.75
Ferric oxide	0.75
Lime slight trace	
Magnesia	1 06
Alkalies	
Loss on ignition	5 98
	100 00 (98.94)

Sand in spec. @ 110°-115° C 47.74 per cent.

Lab. No. 342. Soft gray clay, marked: "Note book 84, pg 30. Aug 30. 1889.
Climax Firebrick & tile work Bank. Middle bed.
Pottery & Firebrick. W. Kennedy."

10.5442
10.3440

for water & Loss BB — wt = 2.0000 gm

Percent water 1.54% — C+C of wt = 10.5748
after = 10.5440
water at 110°C = 0.0308

Percent Loss BB. 5.14% — C+C of ignit = 10.5440 gm
after = 10.4427
Loss BB = 0.1013

Alk Carb. fusion — wt air dry = 1.0268 gm
wt dry at 110°C = 1.0110 "

Per cent 75.32% wt SiO_2 = 0.76152 gm.

Percent
$Fe_2O_3 + Al_2O_3$ = 17.67%
Fe_2O_3 = 0.92%
Al_2O_3 = 16.75

wt $Fe_2O_3 + Al_2O_3$ = 0.17873 gm.
wt Fe_2O_3 = 0.00932
wt Al_2O_3 = 0.16941

Resumé 342

Silica	75 32	per cent.
Alumina	16 75	(17.67)
Ferric oxide	0 92	
Lime slight trace	1.87	
Magnesia		
Alkalies		
Loss on ignition	5 14	" "
Total	100 00	(98.13)

Lab. No. 343. Gray & yellow clay, marked:
" Note book 84, pg 35. Aug 30. 1889.
Lower bed of Climax tile & pottery Co. pit on
west of S. E 1/4 Sec 5, 15S, 28W.
(No 11) W. Kennedy."

for water & loss BB. wt = 2.0000 gm

21.1215 gain

Percent water 3.33%

C+C & wt = 21.1881 gm.
after = 21.1215
water at 110°C = 0.0666

Percent Loss BB 3.95%

C+C & ignit = 21.1215
after = 21.0450
loss BB = 0.0765

Alkali Carb. fusion. wt air dry = 1.0106 gm.
Slight green color. wt dry at 110°C = 0.9770

Per cent 74.76% wt SiO_2 = 0.73042 gm.

Percent
~~$Fe_2O_3 Al_2O_3$~~ = 17.40%
Fe_2O_3 = 3.44%
Al_2O_3 = 13.96%

wt $Fe_2O_3 + Al_2O_3$ = 0.17003 gm.
wt Fe_2O_3 = 0.03362 "
wt Al_2O_3 = 0.13641 "

Percent CaO
0.51%

wt CaO = 0.00499 gm.

Percent MgO
1.10%

wt $Mg_2P_2O_7$ = 0.03009 gm
wt MgO = 0.01084

Resumé 343

Silica	74.76	74.76
alumina	13.96	13.96
Ferric oxide	3.44	3.44
lime	0.51	0.51
Magnesia & alkalies		1.10
Loss on ignition	3.95	3.95
	100.00 (96.06)	97.72

Bluish gray fatty clay.

Lab. No. 344. "Note book 84, pg 31. Aug 29. 1889.
John Foley. N.W. 1/4, S.E 1/4 Sec 18, T 3 S, R 4 W.
Shaly clay. (No 2) W. Kennedy."

for water & Loss BB. wt = 1.9938 gm

9.2920
9.2905
gain

Percent water at 110°C — Crucible & lid = 9.3243 gm
1.69% — after = 9.2905
water at 110°C = 0.0338

Percent Loss BB. — Crucible & lid = 9.2905
5.78% — after = 9.1771
Loss BB = 0.1134

Alkali Carb. fusion — wt air dry = 1.0226 gm
wt dry at 110°C = 1.0054 "

SiO_2 = 72.48 % — wt SiO_2 = 0.72872 gm.

Fe+Al = 19.76 % — wt $Fe_2O_3 + Al_2O_3$ = 0.19872 gm
1.52 = Fe_2O_3 — wt Fe_2O_3 = 0.01532
18.24% = Al_2O_3 — wt Al_2O_3 = 0.18340

Recalc 344

Silica	72 48	per cent.
Alumina	18 24	19.76 "
Ferric oxide	1 52	" "
Lime trace		
Magnesia	1 98	" "
Alkalies		
Loss on ignition	5 78	" "
	100 00	(98.02)

Lab. No 345. Pink clay, marked: "Notebook 84, pg 15. Aug. 23. 1889. O.C. Atchison's clay pit.
Brick clay. From Leland. W. Kennedy.
(Brown & pink, equal portions in sample)

for water & Loss BB

10.1047
10.1044

Percent water 2.18%

wt = 2.0000 gm
C+C & lgt = 10.1487
after = 10.1044
water at 110°C = 0.0437

Percent Loss BB 6.34%

C+C. & lgnit = 10.1044 gm
after = 9.9802
Loss BB = 0.1242

Alk. Carb fusion.

wt air dry = 1.0101 gm
wt dry at 110°C = 0.9881 "

72.59 = SiO_2 wt SiO_2 = 0.71732

Percent $Fe_2O_3 + Al_2O_3$ = 17.26% wt $Fe_2O_3 + Al_2O_3$ = 0.17062 gm.
" Fe_2O_3 = 1.18 wt Fe_2O_3 = 0.01172 "
" Al_2O_3 = 16.08 wt Al_2O_3 = 0.15890 "

wt $Mg_2P_2O_7$ = 0.00719 gm
0.26% wt MgO = 0.00259

Resumé 345

Silica	72.59	per cent.
Alumina	16.08	17.26
Ferric oxide	1.18	
Ferrous oxide	—	
Magnesia	.26	
Alkalies	3.65	
Loss on ignition	6.34	
	100.00 (99.82)	

Lab. No. 346. " Note book 84 pg 39.
Drain at Camden Lumber Co's Mill.

Blue clay underlying red sand, & blue sandy clay.
About 12 ft from surface. W. Kennedy

for water & loss BB.

10.0568	Percent Water	wt	= 2.0000 gm
10.0546		crc & lid	= 10.1483
10.0508		after	= 10.0502
10.0502	4.90	water at 110°C	= 0.0981

Percent Loss BB		crc & ignit	= 10.0502
5.38%		after	= 9.9477
		Loss BB	= 0.1025

Alkali Carb. fusion
on BB no manganese.

wt air dry = 1.0016 gm.
wt dry at 110°C = 0.9526 "

Percent SiO_2 75.92% wt SiO_2 = 0.72322 gm

Percent $Fe_2O_3 + Al_2O_3$ = 17.06% $Fe_2O_3 + Al_2O_3$ = 0.16253 gm.
" Fe_2O_3 = 1.82 Fe_2O_3 = 0.01732
" Al_2O_3 = 15.24 0.14521

Resumé of 346.

Silica	95.92	per cent	
Alumina	15.24	14.06	"
Ferric Oxide	1.82		
Lime (with Magnesia, Potash, Soda)	1.64	"	"
Loss on ignition	5.38	"	"
	100.00	(98.36)	

OK 1908

Lab. No. 347. Notebook 84, Pg 90. Oct 11. 1889.
S.W. 1/4, N.W. 1/4, Sec 4, 7N, 18W.

Near line of Sec 5, extends into Sec 5.

Fire clay, Wm. Ross. W. Kennedy.

for water & loss BB

9.1757 / 2.1749 Percent water 1.60%	wt	=	2.0000 gm
	crc & wt	=	9.2069 "
	after	=	9.1749
	water at 110°C	=	0.0320

Percent Loss BB 3.12%	crc & ignit	=	9.1749
	after	=	9.1135
	loss BB	=	0.0614

Alkali Carb. Fusion.
reacts for Mn

wt air dry = 1.0054 gm.
wt dry at 110°C = 0.9894 "

Percent SiO_2
90.49%

SiO_2 = 0.89532 gm.

Percent
$Fe_2Al_2O_3$ = 6.60%
Fe_2O_3 = 1.38%
Al_2O_3 = 3.22%

wt $Fe_2O_3 + Al_2O_3$ = 0.06533 gm
wt Fe_2O_3 = 0.01372
wt Al_2O_3 = 0.05161

Resumé 347.

Silica	90.49	
Alumina	5.22	6.60
Ferric oxide	1.38	
Lime slight trace		0.16
Magnesia	undetermined	
Potash		
Soda		
Loss on ignition	3.17	
	100.26	93.60

347. 10 gm. air dry for Sand. wt Sand = 3.0422
Percent Sand = 30.53 %

Lab. No 348. "Note book 84, pg 108.
S.E. 1/4, S.W. 1/4 Sect 31, 10N, 23W. In coarse of section.
Clay undoubtedly overlying & in contact with coal.
W. Kennedy.

---

for water & loss BB. wt = 2.0000 gm

10.0030
9.9977
9.9940 gained } Percent water 4.93%

C+C & lid = 10.0927 gm
after = 9.9940
water at 110°C = 0.0987

Percent loss BB 9.11%

C+C & lignit = 9.9940 gm.
after = 9.8207
loss BB = 0.1733

Alkali Carb. fusion. wt airdry = 1.0086 gm
Somewhat yellow - dirty look
wt dry at 110°C = 0.9589 "

Percent SiO_2 51.30%

wt SiO_2 = 0.49192 gm.

Percent Fe + Al = 35.26%
Fe_2O_3 = 10.57 "
Al_2O_3 = 24.69 "

wt $Fe_2O_3 + Al_2O_3$ = 0.33813 gm
wt Fe_2O_3 = 0.10142
wt Al_2O_3 = 0.23671

Percent CaO 0.32%

wt CaO = 0.00309 gm.

Percent MgO 0.63%

wt $Mg_2P_2O_7$ = 0.01699 gm
wt MgO = 0.00612

For Sulphur, in pressure bottle. wt airdry = 1.0000 gm
wt dry at 110°C = 0.9507 "

Very slight reaction for Sulphuric acid

wt crue + $BaSO_4$ =
wt crue =
wt $BaSO_4$ =

For Alkalies Bi_2O_3 fusion

wt airdry = 1.0501
wt dry at 110°C = 0.9984 gm

K_2O 0218 = 2.18%
Na_2O 0072 = 0.72%

P + Alk Cl = 14.2168
P = 14.1685

KCl + NaCl = 0.0483
KCl 0.0346
NaCl = 0.0137

crue + K_2PtCl_6 = 23.2971
crue = 23.1838

K_2PtCl_6 = 0.1133
KCl = 6.0326

Resume 348

Silica	51.30	%
Alumina	24.69	} 35.26
Ferric oxide	10.57	}
Lime	.32	OK
Magnesia	.63	
Potash	2.18	Bad
Soda	.72	
Loss on ignition	9.11	
	99.52 %	OK

II 348 - Alk. Carb fusn. wt air dry = 1.0000 gm
wt dry @ 110° Cent = 0.9548
52.24% SiO_2 wt SiO_2 = 0.49882 gm

wt Fe_2O_3 + Al_2O_3 =
wt Fe_2O_3 =

wt CaO =

wt $Mg_2P_2O_7$ =
wt MgO =

348 II Water + loss BB wt = 2.0000 gm
Percent water c + c of wt = 9.2063
4.52% after = 9.1159
water at 110°C = 0.0904

Percent loss BB. c + c of ignit = 9.1159
after = 8.9428
loss BB = 0.1731

Lab. No. 349. White clay apparently a very pure Kaolin, marked: "Note Book 100, pg 79. J.C. Branner."

for water & loss BB.

9.0978	Percent Water	Wt	= 2.0000 gm
9.0964		C + C of lt	= 9.2067 gm
9.0960	5.53%	after	= 9.0960
		water at 110° C	= 0.1107

8.6652	Percent Loss BB	C+C of ignit	= 9.0960 gm.
8.6488		after	= 8.6484
8.6484	23.69%	loss BB	= 0.4476

Alk. Carb. Fusion

wt air dry = 1.0038 gms
wt dry at 110°C = 0.9483 "

38.86% wt SiO_2 = 0.36852

Percent

35.41%
0.21
35.20

wt $Fe_2O_3 + Al_2O_3$ = 0.33582 gm
wt Fe_2O_3 = 0.00202
wt Al_2O_3 0.33380

Percent CaO 0.31

wt CaO = 0.00299 gm

Percent MgO 0.38

wt $Mg_2P_2O_7$ = 0.01049 "
wt MgO =

23.69
22.84
.80

Resume of 349. (One hundred and twenty fifth page)

Silica	38.86	per cent.
Alumina	35 20	35.41
Ferric oxide	0 21	
Lime	31	
Magnesia 38		
Potash	1 73	
Soda		
Loss on ignition	23 69	" "
	10 0 0 0	(97.96)
		98.27

OK. BWS

Ark. Geolo

Ark. Geological Survey

or in whole

$SiO_2 : Al_2O_3 : H_2O$

0.648 : 0.345 : 1.31

nos. 6 : 3 : 12

would give formula

$12H_2O . 3Al_2O_3 . 6SiO_2$

or $4H_2O . Al_2O_3 . 2SiO_2$

Ordinary Kaolin has formula:

$2H_2O . Al_2O_3 . 2SiO_2$

So the relation of alumina and silica is the same in this material as in ordinary kaolin i.e. 1 : 2

$Al_2O_3 : 2SiO_2$

but the water is twice as great.

January 2, 1890 R. N. Brackett

Ark Geolog. Survey Laboratory

Lab. No. 350. Red clay resembling a chocolate clay: "Note book 100, pg 75. J C Branner."

for water + Loss BB. wt = 2.0000 gm.

9.1440
9.1429
9.1417
9.1417

Percent water 9.40%

C+c of ht = 9.3308
after = 9.1417
water at 110°C = 0.1891

Percent Loss BB 8.64%

C+c of ignit = 9.1417
after = 8.9851
loss BB = 0.1566

Alkali Carb fusion. wt air dry = 1.0170 gm.
wt dry at 110°C 0.9209 "

Percent SiO_2 41.16%

wt SiO_2 = 0.37912 gm.

Fe_2O_3 =

Al_2O_3 =

Percent $Fe_2O_3 + Al_2O_3$ = 27.67%
Fe_2O_3 = 4.54 "
Al_2O_3 = 23.13%

wt $Fe_2O_3 + Al_2O_3$ = 0.25482 gm
Fe_2O_3 = 0.04182 "
Al_2O_3 = 0.21300 "

Percent CaO 1.48%

wt CaO = 0.01369 gm.

0.89%

wt $Mg_2P_2O_7$ = 0.02299 gm
wt MgO = 0.00828 "

350. Bi_2O_3 fusion. wt air dry = 0.5428 gm
wt dry at 110°C = 0.4916

D + Alk Cl = 15.7979
Dish = 15.7879
KCl + NaCl = 0.0100

KCl = 0.0066
NaCl = 0.0034

K_2O = .00416 = 0.846%
Na_2O = .00180 = 0.36%

cruc + K_2PtCl_6 = 23.0129
cruc = 22.9913
K_2PtCl_6 = 0.0216

41.16 / 40.24 / 0.88

41.16 / 34.31 / 1.85

Rosaura 350 850 ... dorsa

Silica	41.16	
Alumina	23.13	27.67
Ferric oxide	4.07	
Lime	1.48	
Magnesia	.89	
Potash	.84	
Soda	.36	
Loss on ignition	8.64	
	80.84	

nB Aq extract of 350 gave decided but not very strong reaction for Chlorine (HCl); very faint reaction for H_2SO_4.

350. for P_2O_5. wt air dry = 1.0260 gm
wt dry at 110°C = 0.9291 "

Percent P_2O_5 wt $Mg_2P_2O_7$ = 0.00282 "
0.19% wt P_2O_5 = 0.00180 "

350. Alk. Carb. II wt air dry = 1.0472 gm
wt dry at 110°C = 0.9487 "

1 = 19.0550
2 = 19.0542
3 = 19.0544 gain

19.1527
19.0542
0.0985 = water at 110°C

Percent water at 110°C = 9.40%

19.0542
18.9721
0.0821 = Loss BB.

Percent Loss BB 8.64% 8.65

1st wt SiO_2 = 0.39663 gm
(refused) 2nd wt SiO_2 = 0.36855 " 39.66

Some silica seems to have gone through into filtrate - crapd in Pt. dish and a brownish substance is formed on the platinum - evap to dryness to sep. silica /RN.B/

(passed this) wt SiO_2 = 0.00442
0.00922 gm

on evaporating several times with HCl & drying on water bath in air bath as usual a brown to yellow crystalline substance formed - difficultly soluble in water containing HCl - but rather readily soluble in water cold, alone, forming a yellow solution. somewhat
- in hot water rather readily soluble - forming a yellow solution - Some cryst out in acid HCl Sol. - heated till all dissolved - passed H_2S thro' it - dark brown precip. -

Percent total of silica = 40.28%

See Vol. 4 Class &c. p. 31

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Specimens for hydrauticity.

K – Dark

J – light –

L – stratified

Einer & Amend

Amend

Amend

Einer &

Messrs Einer & Amend

Einer & Amend

Einer & Amend

Einer & Amend

Einer

1° No effervescence with HCl or ponda after heating; Attacked with water & ponda slacked very little – let stand over night.

Einer & Amend / Amend

Einer & Amend

Amend

For ~~color~~ hydraulicity in three specimens marked L K J.

L stratified
K dark
J light.

Fanatical

Fanatical

Fanatical

L at beg. = ~~18.62161~~
at end " 110°-115° C } = R Rn B

1° 2° 3° B Buff Custard Powder color much almost - perhaps lighter - with water slaked almost none with HCl slight effervescence B

K at beg. = 9.0684
at end. @ 110°-115° C =

1° 2° 3° Burned to light - dirty cream color; powdered & treated with dist. water slaked somewhat; - stood over night with HCl no effervescence

J at beg. = 21.526905
" end @ 110°-115° C } =

1° 2° 3° Burned - color scarcely changed. Treat with dist. water make paste, slaked only a little; less than K. with HCl effervescence