Hot Springs

Ark. Geological

Survey

Notes By

R. N. Brackett

Chemist.

1890

1890

Observations and notes on
Analyses of Hot waters at
Hot Springs, Arkansas
together with some Cold Springs in

GARLAND COUNTY.

By
R. N. Brackett —
Chemist to the Geological
Survey of Arkansas

Work begun Oct 24, 1890 — in ~~Hot Springs~~

Work in Hot Springs occupied
15 days. —

CONTENTS

Lab. No.

BIG IRON. Collected directe
any perceptible escape of any g
neutral. Water clear. No decided ta

Note Correction for TEMPERATURE - 1.4 per degree. (according T.C.M.)
R.A.B

Date collected		TEMP. water collected	AMT water added to Dish.	TEMP. water added to Dish.	Corr^d TEMP. water added to dish.	AMT water added to dish REDUCED to 15.6° C.
Oct. 25	PM.	unkt.	1 litre	38°C	36.6 C ✓	994.44 c.c.
			½ litre	29°C	27.6 ✓	a 498.68
			200 cc.	18°C	16.6 ✓	c 199.96
			50 cc.	18°C	16.6 ✓	d 49.99
			50 c.c.	18°C	16.6 ✓	d 49.99
Oct. 26	PM.	unkt	½ litre	43°C	41.6 ✓	b 496.30
			½ litre	22°C	20.6 ✓	e 499.53
			½ litre	18°C	16.6 ✓	e 499.92
			200 cc.	18°C	16.6 ✓	c 199.96
			50 cc.	18°C	16.6 ✓	d 49.99
Oct. 27	AM.	64°C	½ litre	19°C	17.6 ✓	e 499.63
			½ litre	22°C	20.6 ✓	e 499.53
			½ litre	23°C	21.6 ✓	e 499.43
			200 cc.	17°C	15.6 ✓	200.00
			50 cc.	18°C	16.6 ✓	d 49.99
Oct. 28	AM.	62°C	½ litre	29.5°C	28.1 ✓	a 498.61
			½ litre	27°C	25.6 ✓	a 498.95
			200 cc.	22°C	20.6 ✓	c 199.81
			½ litre	25°C	23.6 ✓	e 499.19
			50 cc.	25°C	23.6 ✓	d 49.92
Oct. 29	PM.	63.5°C	½ litre	53°C	51.6 ✓	494.17
			½ litre	36°C	34.6 ✓	497.56
			½ litre	27.5°C	26.1 ✓	a 498.88
			½ litre	24°C	22.6 ✓	e 499.31
Oct. 30		64°C	½ litre	41°C	39.6 ✓	b 496.71
			½ litre	39.5°C	38.1 ✓	b 496.96
						9917.61

2 BIG IRON

Correction 1.4 C for TEMP.

DATE Collected.	TEMP Water Collected.	AM'T water added to Dish.	TEMP. water added to Dish.	CORR^d TEMP. water added to dish.	AM'T water added to dish REDUCED to 15.6°C.
Oct. 30 PM.	6.4°C	½ litre	29.5°C	28.1 ✓	a 498.61
		½ litre	17.5°C	16.1 ✓	b 499.96
		½ litre	17°C	15.6 ✓	✓ 500.00
Nov. 4 AM.	6.3.8°C	½ litre	49.5°C	48.1 ✓	✓ 494.95
		½ litre	28.5°C	27.1 ✓	a 498.75
		½ litre	27°C	25.6 ✓	a 498.95
		½ litre	26°C	24.6 ✓	b 499.07
		½ litre	26°C	24.6 ✓	b 499.07
		250cc	24.5°C	23.1 ✓	c 249.62
		250cc.	25.5°C	24.1 ✓	c 249.56
		½ litre	25.5°C	24.1 ✓	b 499.12
		½ litre	28°C	26.6 ✓	a 498.82
		250cc	28°C	26.6 ✓	c 249.41
		250cc.	27.5°C	26.1 ✓	c 249.44
		½ litre	27°C	25.6 ✓	a 498.95
Nov. 5 AM	6.5°C	½ litre	26°C	24.6 ✓	b 499.07
		½ litre	26°C	24.6 ✓	b 499.07
		250cc.	26°C	24.6 ✓	c 249.53
		150cc.	26°C	24.6 ✓	✓ 149.72
Nov. 6 PM.		½ litre	44°C	42.6 ✓	✓ 496.10
		½ litre	33°C	31.6 ✓	a 498.11
		250cc.	33°C	31.6 ✓	c 249.06
		½ litre	32°C	30.6 ✓	a 498.25
		½ litre	30°C	28.6 ✓	a 498.54
		½ litre	29°C	27.6 ✓	a 498.68
		½ litre	32°C	30.6 ✓	a 498.25
					11 118.66

BIG IRON.

Correction for TEMP @ Main

3

Date Collected.	T. w. Collected	Amt w. added to Dish	T. w. added to Dish	Corr^{d} TEMP. water added to dish.	Amt water added to dish REDUCED to 15°6 °C.
Nov. 7 A.M.	6.5°C	½ litre	31°C	29.6 ✓	a 498.40 ✓
		250 c.c.	31°C	29.6 ✓	✓ 249.20
		½ litre	32°C	30.6 ✓	a 498.25
		½ litre	33°C	31.6 ✓	a 498.11
		250 c.c.	31°C	29.6 ✓	✓ 249.20
		½ litre	31°C	29.6 ✓	a 498.40
		½ litre	31°C	29.6 ✓	a 498.40
		½ litre	31.5°C	30.1 ✓	a 498.33
		½ litre	33°C	31.6 ✓	a 498.11
		½ litre	32°C	30.6 ✓	a 498.25
		½ litre	32°C	30.6 ✓	a 498.25
		½ litre	32°C	30.6 ✓	a 498.25
		½ litre	31°C	29.6 ✓	a 498.40
Nov. 9 A.M.	unit	250 c.c.	36.5°C	35.1 ✓	✓ 248.73
		½ litre	34°C	32.6 ✓	✓ 497.90
		½ litre	31.5°C	30.1 ✓	a 498.33
		½ litre	31°C	29.6 ✓	a 498.40
		½ litre	31°C	29.6 ✓	a 498.40
		½ litre	31°C	29.6 ✓	a 498.40
		150 c.c.	29°C	27.6 ✓	✓ 149.68
Nov. 10 A.M.	unit	½ litre	53°C	51.6 ✓	✓ 494.17
		250 c.c.	53°C	51.6 ✓	✓ 247.08
	Wash waters				
Nov 10 A.M.	unit	250 c.c.	24.5°	23.1 ✓	✓ 249.62
		250 c.c.	24°C	22.6 ✓	✓ 249.66
		50 c.c.	24°C	22.6 ✓	✓ 49.93
					10159.85

Total amt water used 31196.12 cc

31.4
31.2

4 RECTOR. Collected directly from spring. No H_2S or any Perceptible evolution of any gas. Reaction toward litmus paper neutral (carry faintly and) water clear. No decided taste.

(Correct for TEMP 1.4)

Date Collected	T. water Corrected	Am't water added to Dish	T. Water added to Dish	Corr'd TEMP Water added to dish	Am't water added to dish Required to 15.6°C.
Oct. 25 P.M.	und't	1 litre	40° C	38.6 ✓	a 496.88
		½ litre	25° C	23.6 ✓	b 499.19
		200 c.c.	18° C	16.6 ✓	c 199.96
		50 c.c.	18° C	16.6 ✓	d 49.99
		50 c.c.	18° C	16.6 ✓	d 49.99
Oct. 26 P.M.	und't	½ litre	42° C	40.6 ✓	a 496.51
		½ litre	29° C	27.6 ✓	e 498.68
		½ litre	22° C	20.6 ✓	b 499.53
		200 c.c.	18° C	16.6 ✓	c 199.96
		50 c.c.	18° C	16.6 ✓	d 49.99
Oct. 27 P.M.	60° C	½ litre	37° C	35.6 ✓	✓ 497.39
		½ litre	25° C	23.6 ✓	b 499.19
		½ litre	18° C	16.6 ✓	b 499.92
		200 c.c.	20° C	18.6 ✓	c 199.94
		100 c.c.	20° C	18.6 ✓	✓ 99.97
Oct 28 A.M.	61° C	½ litre	30° C	28.6 ✓	e 498.54
		½ litre	27° C	25.6 ✓	e 498.95
		½ litre	23° C	21.6 ✓	b 499.43
Oct. 29 A.M.	61° C	½ litre	33° C	31.6 ✓	e 498.11
		½ litre	29.5° C	28.1 ✓	e 498.61
		½ litre	25° C	23.6 ✓	b 499.19
		½ litre	24.5° C	23.1 ✓	b 499.24
		½ litre	28° C	26.6 ✓	e 498.82
		½ litre	28.5° C	27.1 ✓	e 498.75
		½ litre	26° C	24.6 ✓	b 499.07
Nov. 3 A.M.	61° C	½ litre	21.5° C	20.1 ✓	b 499.58
					10.3 25.38

RECTOR

(Corr^tns for TEMP @ 1.4) Mean.

Date Collected	T. water Collected	Amt water added to dish	T. water added to dish	Corr^d TEMP water added to dish.	Amt water added to dish REDUCED to 15°C.	
		½ litre	16°C	14.6 ✓	✓ 500.07	
Oct 29 A.M.	6/0°C	½ litre	18°C	16.6 ✓	✓ 499.92	
		½ litre	23°C	21.6 ✓	✓ 499.43	
Nov. 3 A.M.		½ litre	25°C	23.6 ✓	✓ 499.19	
		½ litre	25°C	23.6 ✓	✓ 499.19	
		½ litre	25°C	23.6 ✓	✓ 499.19	
		½ litre	24°C	22.6 ✓	✓ 499.31	
Nov. 5 A.M.	6/0°C	½ litre	31.5°C	30.1 ✓	✓ 498.33	
		½ litre	28.5°C	27.1 ✓	✓ 498.75	
		½ litre	29°C	27.6 ✓	✓ 498.68	
		½ litre	28°C	26.6 ✓	✓ 498.82	
		½ litre	27°C	25.6 ✓	✓ 498.95	
Nov. 5 P.M.	unst	½ litre	26°C	24.6 ✓	✓ 499.07	
		½ litre	25°C	23.6 ✓	✓ 499.19	
		½ litre	28°C	26.6 ✓	✓ 498.82	
		½ litre	29°C	27.6 ✓	✓ 498.68	
Nov. 6 P.M.	unst.	250cc.	34.5°C	33.1 ✓	✓ 248.90	
		½ litre	33°C	31.6 ✓	✓ 498.11	
		½ litre	31°C	29.6 ✓	✓ 498.40	
		½ litre	29°C	27.6 ✓	✓ 498.68	
		½ litre	30°C	28.6 ✓	✓ 498.54	1249.05
Nov. 7 P.M.	unst	250cc.	41°C	39.6 ✓	✓ 248.35	
		½ litre	33.5°C	32.1 ✓	✓ 497.98	
		½ litre	32°C	30.6 ✓	✓ 498.25	
		½ litre	30.5°C	29.1 ✓	✓ 498.47	
		½ litre	29°C	27.6	✓ 498.68	

6 RECTOR

(Correct for TEMP. 1.4)

Date Collector	T.w. Collected	Amt w. added to Dish	T.w added to Dish	Corr'd Temperature. w. added to Dish	Amt water added to Dish REDUCED to 15.6 C.
		250 cc.	30°C	28.6 ✓	a 249.27
Nov. 8 P.M.	56°C	½ litre	52°C	52.6 ✓	✓ 493.92
		250 cc.	35.5°C	34.1 ✓	✓ 248.82
		½ litre	35°C	33.6 ✓	b 497.73
		½ litre	33°C	31.6 ✓	c 498.11
		½ litre	32°C	30.6 ✓	c 498.25
		½ litre	32°C	30.6 ✓	c 498.25
Nov. 9 P.M.	undt	½ litre	41°C	39.6 ✓	✓ 496.70
		½ litre	33.5°C	32.1 ✓	b 497.98
		½ litre	33°C	31.6 ✓	c 498.11
		½ litre	32°C	30.6 ✓	c 498.25
		250 cc.	30°C	28.6 ✓	a 249.27
		½ litre	30°C	28.6 ✓	c 498.54
		½ litre	28°C	26.6 ✓	c 498.82
		½ litre	26°C	24.6 ✓	a 499.07
		½ litre	26°C	24.6 ✓	a 499.07
Wash water					
Nov. 10 P.M.	undr	250 cc.	24°C	22.6 ✓	a 249.66
		250 cc.	23°C	21.6 ✓	a 249.72
					7719.524

Total water used.

3051.4.87 cc.

ALUM.

Collected directly from spring. Water clear. Odor H₂S, or any perceptible evolution of any gas. Reaction toward litmus paper neutral. No decided taste.

(Correct for Temp. 1.4)

Date collected	T. water Collected	Amt water added to Dish	T. water added to Dish.	Corr° Temp. water added to Dish	Amt water added to Dish REDUCED to 15.6 C.
Oct. 25 P.M.	und't	1 litre	41° C	39.6 ✓	1993.40
		½ litre	22° C	20.6 ✓	a 499.53
		200 c.c.	18.° C	16.6 ✓	b 199.96
		50 c.c.	18.° C	16.6 ✓	c 49.99
		50 c.c.	18.° C	16.6 ✓	c 49.99
Oct. 26 P.M.	und't	½ litre	39° C	37.6 ✓	1997.05
		½ litre	26° C	23.6 ✓	a 499.19
		½ litre	22° C	20.6 ✓	a 499.53
		200 c.c.	18.° C	16.6 ✓	b 199.96
		50 c.c.	18.° C	16.6 ✓	c 49.99
Oct. 27 P.M.	48° C	½ litre	41° C	39.6 ✓	d 496.70
		½ litre	26° C	23.6 ✓	a 499.19
		½ litre	22° C	20.6 ✓	a 499.53
		200 c.c.	17.5° C	16.1 ✓	b 199.98
		50 c.c.	17.5° C	16.1 ✓	c 49.99
Oct. 28 A.M.	49° C	½ litre	33° C	31.6 ✓	e 498.11
		½ litre	28° C	26.6 ✓	e 498.82
		½ litre	27° C	25.6 ✓	e 498.95
		200 c.c.	23° C	21.6 ✓	b 199.77
		100 c.c.	23° C	21.6 ✓	✓ 99.89
Oct. 29 A.M.	50° C	½ litre	41° C	39.6 ✓	d 496.70
		½ litre	32° C	30.6 ✓	e 498.25
		½ litre	29° C	27.6 ✓	e 498.68
		½ litre	25° C	23.6 ✓	a 499.19
		½ litre	28° C	26.6 ✓	e 498.82
		½ litre	27.5° C	26.1 ✓	e 498.88

10 0 7 0.0 4

8 ALUM

(Correction for Temp 1.4)

Date Collected	T. water Collected	Amt water added to Dish	T. water added to Dish	CORR? TEMP water added to Dish	Amt water added to dish REDUCED to 15.6°C
Oct 29 AM	50°C	½ litre	26.5°C	25.1 ✓	a 499.01
		½ litre	16°C	14.6 ✓	b 500.07
		½ litre	20°C	18.6 ✓	a 499.85
		½ litre	16°C	14.6 ✓	b 500.07
		½ litre	16°C	14.6 ✓	b 500.07
Nov. 3 AM.	48°C	½ litre	18°C	16.6 ✓	a 499.92
		½ litre	23°C	21.6 ✓	a 499.43
		½ litre	26°C	24.6 ✓	a 499.07
		½ litre	26°C	24.6 ✓	a 499.07
Nov. 4 PM	cool	½ litre	26°C	24.6 ✓	a 499.07
		½ litre	24°C	22.6 ✓	a 499.31
		½ litre	25°C	23.6 ✓	a 499.19
Nov. 5 AM.	48°C	½ litre	31°C	29.6 ✓	c 498.40
		½ litre	29°C	27.6 ✓	c 498.68
		½ litre	29.5°C	28.1 ✓	c 498.61
		½ litre	29°C	27.6 ✓	c 498.68
		½ litre	27.5°C	26.1 ✓	c 498.88
		½ litre	27°C	25.6 ✓	c 498.95
Nov. 6 AM.	48°C	½ litre	45°C	43.6 ✓	✓ 495.89
		½ litre	29°C	27.6 ✓	c 498.68
		½ litre	32.5°C	31.1 ✓	c 498.16
		½ litre	32°C	30.6 ✓	c 498.25
		½ litre	32°C	30.6 ✓	c 498.25
		½ litre	31.5°C	30.1 ✓	c 498.33
		½ litre	30.5°C	29.1 ✓	c 498.47
		½ litre	28°C	26.6 ✓	c 498.82

12 971.18

ALUM

@ Mam
(Correction for Temp 1.4)

Date collected	T water collected	Am't w. added to dish	T. w. added to dish	Corr'd Temp. water added to dish	Am't water added to dish REDUCED to 15°.6 C.
Nov. 6 A.M.	48°C	1/2 litre	30°C	28.6 ✓	a 498.54
		1/2 litre	31°C	29.6 ✓	a 498.40
		1/2 litre	31°C	29.6 ✓	a 498.40
		250 cc.	30°C	28.6 ✓	b 249.27
Nov. 7 P.M.	undt	1/2 litre	30°C	28.6 ✓	a 498.54
		1/2 litre	30°C	28.6 ✓	a 498.54
Nov. 8 A.M.	48.5°C	1/2 litre	31°C	29.6 ✓	a 498.40
		1/2 litre	30°C	28.6 ✓	a 498.54
Nov. 7 P.M.	undt	1/2 litre	33°C	31.6 ✓	a 498.11
		250 cc.	32°C	30.6 ✓	b 249.13
Nov. 8 A.M.		1/2 litre	33°C	31.6 ✓	a 498.11
		250 cc.	31.5°C	30.1 ✓	b 249.17
		1/2 litre	32°C	30.6 ✓	a 498.25
		1/2 litre	31.5°C	30.1 ✓	a 498.33
		1/2 litre	30°C	28.6 ✓	a 498.54
Nov. 9 A.M.	undt	1/2 litre	33°C	31.6 ✓	a 498.11
Nov. 8 A.M.	undt	250 cc.	31°C	29.6 ✓	b 249.20
		250 cc.	27.5°C	26.1 ✓	b 249.44

Wash water for Alum.

Nov. 9 A.M.	undt	250 cc.	26°C	24.6 ✓	b 249.54
		250 cc.	27°C	25.6 ✓	b 249.48

{ Note: added $CH_3.CO_2H$ to get off of
Did not take off (dissolve) so
as possible by rubbing with glass

8224.04

Total 31265.26

10 OLD HALE

Collected from 15 inch pipe (length), leading directly from spring. Water clear. Odor 0, or perceptible evolution of any gas. Reaction toward litmus paper neutral or slightly [illegible]. No decided taste.

Date collected		T. water Collected.	Am't water added to Dish	T. water added to Dish	(Correction for Temp. 17.4) CORR. TEMP water added to Dish. ✓	Am't water added to each REDUCED to 15.6° C
Oct. 26	P.M.	cool 4.	½ litre	36°C	34.6	a 497.56
			½ litre	25°C	23.6	b 499.19
			½ litre	22°C	20.6	b 499.53
			200 cc.	18°C	16.6	c 199.96
			50 cc.	18°C	16.6	✓ 49.99
Oct. 27	A.M.	60.5°C	½ litre	23°C	21.6	b 499.43
			½ litre	25°C	23.6	b 499.19
			½ litre	18°C	16.6	b 499.92
			200 cc.	30°C	28.6	c 199.42
Oct. 28	A.M.	63°C	½ litre	31°C	29.6	d 498.40
			½ litre	23°C	21.6	b 499.43
			½ litre	26°C	24.6	b 499.07
Oct. 29	P.M.	62°C	½ litre	35.5°C	34.1	a 497.64
			½ litre	24°C	22.6	b 499.31
			½ litre	27°C	25.6	d 498.95
			½ litre	28°C	26.6	d 498.82
			250 cc.	15°C	13.6	✓ 250.07
Nov. 3	A.M.	62.5°C	½ litre	47.5°C	46.1	✓ 495.37
			½ litre	16°C	14.6	✓ 500.07
			½ litre	18°C	16.6	b 499.92
			250 cc.	24°C	22.6	e 249.66
			100 cc.	24°C	22.6	✓ 99.96
Nov. 4	P.M.	63°C	½ litre	33.5°C	32.1	a 497.98
			½ litre	26.5°C	25.1	b 499.01
			½ litre	25°C	23.6	b 499.19
			250 cc.	24°C	22.6	e 249.66
						10,776.70

Date collected	T. water Collected	Amt. water added to Dish	T. water added to Dish	Corrected for Temp. 17.7 CORR'D TEMP water added to dish ✓	Amt water added to dish REDUCED to 15.6 C.
		100 cc.	25°C	23.6	✓ 99.84
For. 5 P.M.	6 3°C	½ litre	5°5°C	53.6	✓ HG 3.68
		½ litre	32°C	30.6	a HG8.25
		½ litre	29°C	27.6	a HG8.68
		½ litre	27°C	25.6	a HG8.95
		½ litre	25°C	23.6	b HG9.19
		½ litre	25°C	23.6	b HG9.19
		½ litre	28.5°C	27.1	a HG8.75
		250 c.c.	34°C	32.6	✓ 248.95
For. 6 P.M.	mist	½ litre	34.5°C	33.1	c HG7.80
		½ litre	32°C	30.6	a HG8.25
		½ litre	30.5°C	29.1	a HG8.47
		250 cc.	28°C	26.6	d 249.41
For. 7 P.M.	6 3°C	½ litre	32°C	30.6	a HG8.25
		½ litre	32°C	30.6	a HG8.25
		½ litre	32°C	30.6	a 498.25
		250 cc.	31°C	29.6	d 249.20
For. 7 P.M.	mist	½ litre	31°C	29.6	a HG8.40
		½ litre	29°C	27.6	a HG8.68
For. 8 P.M.	6 3°C	½ litre	44°C	42.6	✓ HG6.10
		½ litre	38°C	36.6	c HG7.22
		250 cc.	33°C	31.6	d 249.06
		½ litre	31°C	29.6	a HG8.40
		250 cc.	31°C	29.6	d 249.20
		250 cc	30.5°C	29.1	d 249.24
		½ litre	31°C	29.6	a 498.40
		½ litre	30°C	28.6	a 498.54

15 6.60

12 OLD HALE.

Correction for Temp. (1.24)

Date collected.	T. W. collected	Amt T. W. added to Dish	T. W. added to Dish.	CORR'D TEMP. of added T. W.	Amt T. W. added to Dish Reduced to 15°.6 C
		250 cc.	30°C	28.6	a 249.27
		200 cc.	29°C	27.6	√ 199.47
Nov. 10 A.M.	unfit	½ litre	58.5°C	57.1	√ 492.84
		½ litre	33.5°C	32.1	√ 497.98
		½ litre	26°C	24.6	b 499.07
		½ litre	26.5°C	25.1	b 499.01
		½ litre	26°C	24.6	b 499.07
		½ litre	26.5°C	25.1	b 499.01
		½ litre	26.5°C	25.1	b 499.01
		½ litre	25°C	23.6	b 499.19
		½ litre	25°C	23.6	b 499.19
Nov 11 Am.		½ litre	35°C	30.6	c 498.25
		½ litre	27.5°C	26.1	c 498.88
		½ litre	27.5°C	26.1	c 498.88
		½ litre	27°C	25.6	c 498.95
Nov 12 P.M.		½ litre	39.5°C	38.1	√ 496.96
		½ litre	51°C	49.6	√ 494.64
	Washwater				
Nov 12 Am.		250 cc	25°C	23.6	a 249.59
		250 cc.	25°C	23.6	a 249.59
					8418.85
				Total	30752.15 cc

RAL

Collected from air pipe about 60 ft. long, directly from spring to reservoir. Water clear; no H_2S, or perceptible evolution of any gas. Reaction toward litmus paper neutral. No decided taste. Very faint

Date Collected.	T. water Collected.	Amt water added to Dish	T. water added to Dish.	Corr^{d} Temp. water added to Dish.	Amt water added to Dish Reduced to 15.6 C.
Oct. 26 P.M.	unk	1 litre	44.5°	43.6	✓ 991.78
		½ litre	22° C	20.6	a 499.53
		200 cc.	18° C	16.6	b 199.96
		100 cc	18° C	16.6	c 99.98
Oct 27 A.M.	57.5° C	½ litre	21° C	19.6	a 499.63
		½ litre	22° C	20.6	a 499.53
		½ litre	22° C	20.6	a 499.53
		200 cc.	22° C	20.6	b 199.81
		100 cc.	22° C	20.6	c 99.91
Oct 27 P.M.	61.5° C	½ litre	29° C	27.6	d 498.68
		½ litre	20° C	18.6	a 499.85
Oct. 28. A.M.	61.5° C	½ litre	32° C	30.6	d 498.25
Oct 27 P.M.	61.5° C	½ litre	29° C	25.6	d 498.95
		½ litre	21.3° C	21.6	a 499.43
Oct 28 A.M.	61.5° C	200 cc.	23° C	21.6	b 199.77
		50 cc.	23° C	21.6	✓ 49.94
		½ litre	26.5° C	25.1	a 499.01
		400 cc.	28° C	26.6	✓ 399.06
Oct 29 P.M.	60.5° C	½ litre	38° C	36.6	✓ 497.22
		½ litre	23° C	21.6	a 499.43
		½ litre	26° C	24.6	a 499.07
		½ litre	27.5° C	26.1	d 498.88
		300 cc.	28.5° C	27.1	✓ 299.25
Nov. 3 A.M.	61° C	½ litre	42° C	40.6	✓ 496.51
		½ litre	21.5° C	20.1	a 499.58
		½ litre	16° C	14.6	✓ 500.07
					11022.6

14 RAL. (Coection for Temp 1.7 C

Date Collected.	T. water Collected	Amt water added to Dish	T. water added to Dish.	CRR² TEMP. water added to Dish.	Amt water added to Dish REDUCED to 15.6 C
		½ litre	18°C	16.6	a 499.92
		250 c.c.	23° C	21.6	b 249.77
		100 c.c.	23° C	21.6	✓ 99.88
Nov. 4 P.M.	37°C	½ litre	33.5°C	32.1	c 497.98
		½ litre	27.5°C	26.1	d 498.88
		½ litre	25°C	23.6	a 499.19
		½ litre	23.5°C	22.1	a 499.37
		250 c.c.	23°C	21.6	b 249.72
Nov. 5 A.M.		½ litre	36.5°C	35.1	c 497.46
		250 c.c.	44°C	42.6	e 248.05
		½ litre	31.5°C	30.1	d 498.33
		½ litre	30.5°C	29.1	d 498.47
		½ litre	29.5°C	28.1	d 498.61
		250 c.c.	27°C	25.6	b 249.48
		250 c.c.	27°C	25.6	✓ 99.89
Nov. 6 A.M.	crust	½ litre	49°C	47.6	✓ 495.05
		½ litre	29.5°C	28.1	d 498.61
		½ litre	31°C	29.6	d 498.40
		½ litre	33°C	31.6	d 498.11
		½ litre	32.5°C	31.1	d 498.16
		½ litre	32°C	30.6	d 498.25
		½ litre	31°C	29.6	d 498.40
		½ litre	29°C	27.6	d 498.68
		300 c.c.	30°C	28.6	✓ 299.12
		½ litre	40.5°C	39.1	✓ 496.79
Nov. 7 P.M.	crust	250 c.c.	36°C	34.6	e 248.78
					10663.30

RAL

(Correction for Temp 1.4 C)

Date collected	T.W. collected	Amt w added to Dish	T.w. added to Dish	CORR? for temp. water added to Dish	Amt water added to Dish REDUCED to 15°.6 C.
		½ litre	33.5°C	32.1	a 497.98
		½ litre	31.5°C	30.1	b 498.33
		½ litre	30°C	28.6	b 498.54
Nov. 8 AM.	and.	½ litre	49°C	47.6	√ 495.05
		250 cc.	30.5°C	29.1	c 249.24
		250 cc.	32°C	30.6	c 249.13
		½ litre	33°C	31.6	b 498.11
		½ litre	32.4°C	32.6	a 497.90
		½ litre	33.5°C	32.1	a 497.98
		½ litre	33°C	31.6	b 498.11
		½ litre	32.5°C	31.1	b 498.16
		½ litre	31°C	29.6	b 498.40
		½ litre	30°C	28.6	b 498.54
Nov. 9 AM.	and	½ litre	32.9°C	30.6	b 498.25
		½ litre	31°C	29.6	b 498.40
		½ litre	31°C	29.6	b 498.40
		½ litre	29°C	27.6	b 498.68
		½ litre	28°C	26.6	b 498.82
		½ litre	26°C	24.6	√ 499.07
wash water					
Nov. 10 AM		250 cc.	24°C	22.6	c 249.66
		250 cc.	24°C	22.6	c 249.66
					9466.41
					31152.32

(31.5 32.3)

16 EGG. Collected directly from spring. Clear No H_2S or spontaneous evolution of any gas. No decided taste. Reaction towards litmus paper neutral (coffee faintly acid).

(Correction for Temp 1.4°C)

Date collected.	T. water Collected.	Am't. water added to Dish	T. water added to Dish	Corr'd Temp. water added to Dish.	Am't water added to Dish Reduced to 15.6°C.
Oct. 27 A.M.	62°C	½ litre	29°C	27.6	a 498.68
		½ litre	23°C	21.6	b 499.43
		½ litre	22°C	20.6	b 499.53
		200 cc.	23°C	21.6	c 199.76
		0 cc.	22°C	20.6	v 49.94
Oct. 27 P.M.	65°C	½ litre	29°C	27.6	a 498.68
		½ litre	18°C	16.6	b 499.92
		½ litre	28°C	26.6	a 498.82
Oct. 27 P.M.	65°C	200 cc.	28°C	26.6	c 199.53
		200 cc.	28°C	26.6	c 199.53
Oct. 28 A.M.	64°C	½ litre	28°C	26.6	a 498.82
		½ litre	23°C	21.6	b 499.43
		½ litre	28°C	26.6	a 498.82
		200 cc.	29°C	27.6	c 199.47
Oct. 29 A.M.	64°C	200 cc.	30°C	28.6	c 199.42
		½ litre	29°C	27.6	a 498.68
		½ litre	24°C	22.6	b 499.31
		½ litre	24°C	22.6	b 499.31
		½ litre	26.5°C	25.1	b 499.01
		½ litre	16°C	14.6	δ 500.07
		½ litre	16.5°C	15.1	δ 500.03
		½ litre	19°C	17.6	b 499.83
		½ litre	24°C	22.6	b 499.31
		½ litre	23°C	23.6	b 499.19
		½ litre	23°C	21.6	b 499.43
Oct. 4 A.M.	64°C	½ litre	23°C	21.6	b 499.43

3.38
3.3
1.0

E.G.G.

C.W.P.M.

(Correction for Temp. 1.4°C)

Date Collect°	Tm. Collected	Amt in added to Dish	T. in add° to Dish	Corr° (temp. W. add° to Dish)	Amt water added Hg to Dish Reduced to 15.6°C.
		250 c.c.	26°C	24.6	a 249.54
		½ litre	26°C	24.6	b 499.07
Nov. 5 Aft.	6.4°C	½ litre	27°C	25.6	c 498.95
		½ litre	25.8°C	24.1	b 499.17
		½ litre	29°C	27.6	c 498.68
		250 c.c.	32°C	30.6	a 249.13
Nov. 6 A.M.	6.3°C	1 litre	32°C	30.6	√ 996.50
		½ litre	30.5°C	29.1	c 498.47
		250 c.c.	29°C	27.6	a 249.34
		½ litre	30°C	28.6	c 498.54
Nov. 6 Aft.	6.3°C	250 c.c.	31°C	29.6	a 249.20
		½ litre	32°C	30.6	c 498.25
		½ litre	31.5°C	30.1	c 498.33
		½ litre	30°C	28.6	c 498.54
		½ litre	31.5°C	30.1	c 498.33
		250 c.c.	32°C	30.6	a 249.13
Nov. 8 A.M.	6.3°C	½ litre	31°C	29.6	c 498.40
		½ litre	31°C	29.6	c 498.40
		½ litre	31°C	29.6	c 498.40
		½ litre	30°C	28.6	c 498.54
		½ litre	31°C	29.6	c 498.40
		½ litre	31.5°C	30.1	c 498.33
		½ litre	30°C	28.6	c 498.54
		200 c.c.	28.5°C	27.1	√ 199.50
Nov 10 am.		½ litre	37.5°C	36.1	√ 493.08
		½ litre	35°C	33.6	√ 497.73
					11908.44
			See k.	40	11,700
		1 litre	24°C	24.6	√ 499.37

18 ROCKAFELLOW BATH HOUSE:

No. 1. from iron pipe 1800 ft. long connected with Egg Spring. Clear Reaction toward litmus neutral. No decided taste. No. Nos. 2. 3. 4. 5. 6. 7. 8. or apparent evolution of gas.

Collected in bath room

Date Collected.	T. water collected	Am't water added to Dish	T. water added to Dish.	Corr'd temp. water added to Dish.	Am't water added to dish Reduced to 15°6. C
Oct. 27 P.M.	50°C	2 litres	50°C	48.6	✓ 1979.39
		1 litre	19°C	17.6	a 999.66
		1 litre	20°C	18.6	a 999.70
		200 cc.	25.5°C	24.1	✓ 199.65
Oct 29 A.M.	57°C	1 litre	57°C	49.6	b 989.28
		1 litre	41°C	39.6	c 993.40
		½ litre	29.5°C	28.1	d 498.61
		1 litre	27.5°C	26.1	e 997.76
		½ litre	28.5°C	27.1	d 498.75
Oct. 30 P.M.	58.5°C	1 litre	40°C	38.6	c 993.76
		1 litre	29°C	27.6	e 997.36
		230 cc.	15.5°C	14.1	✓ 250.05
		150 cc.	15.5°C	14.1	✓ 150.03
Nov. 4 A.M.	58.5°C	1 litre	51°C	49.6	b 989.28
		1 litre	44°C	42.6	✓ 992.20
		1 litre	25.5°C	24.1	f 998.25
		1 litre	24.5°C	23.1	f 998.48
		½ litre	26.5°C	25.1	✓ 499.01
		½ litre	29.5°C	28.1	d 498.61
Nov. 5 A.M.	58.5°C	1 litre	29°C	27.6	e 997.36
		1 litre	26.5°C	25.1	f 998.02
		300 cc.	29°C	27.6	✓ 299.21
Nov. 6 P.M.	[illegible]	1 litre	36.5°C	35.1	✓ 994.92
		1 litre	31°C	29.6	✓ 996.80
		½ litre	29°C	27.6	d 498.68
Nov. 7 A.M.	[illegible]	1 litre	36°C	34.6	✓ 995.12
					21303.34

Rockafellow B.H.

Date collected	T. w. collected	Am't w. added to Dish	T. w. added to Dish	Corr'd temp. water added to Dish.	Am't water added to dish. Reduced to 15.6 C
Nov. 7 P.M.	undt.	1 litre	31°C	29.6	a 996.80
Nov. 8 A.M.	undt.	½ litre	30°C	28.6	b 498.54
		1 litre	50°C	48.6	✓ 989.69
		1 litre	35°C	33.6	✓ 995.46
		½ litre	32°C	30.6	b 498.25
Nov. 9 A.M.	undt.	1 litre	52.5°C	51.1	✓ 988.58
		1 litre	32°C	30.6	a 996.50
		1 litre	29°C	27.6	✓ 997.36
		1 litre	26.5°C	25.1	c 998.02
		1 litre	24°C	22.6	c 998.62
[illegible] water		250 cc.	24.0°C	22.6	d 249.66
		250 cc.	23.5°C	22.1	d 249.68

9457.16

Magnesia.

{Collected directly from spon[...]
Reaction toward litmus neut[...]
or percept. evolution of any ga[...]

Date Collected.	T. water Collected	Am't water added to Dish.	T. water added to Dish.	Corr'd temp water added to dish.	Am't water added to dish Reduced to 15.6 C.
Oct. 28 A.M.	53°C	1 litre	28°C	26.6	a 997.64
		1 litre	28°C	26.6	a 997.64
		1 litre	25°C	23.6	b 998.38
		1 litre	28°C	26.6	a 997.64
		200 cc.	28°C	26.6	✓ 199.53
Oct. 29 A.M.	52.7°	1 litre	25°C	23.6	b 998.38
		1 litre	23°C	21.6	b 998.86
		1 litre	26°C	24.6	b 998.14
		1 litre	27°C	25.6	a 997.90
		250 cc.	15°C	13.6	✓ 250.07
Oct. 30 P.M.	53°C	1 litre	16.5°C	15.1	d 1000.06
		1 litre	17°C	15.6	d 1000.00
		1 litre	18°C	16.6	c 999.84
		1 litre	22°C	20.6	c 999.06
		½ litre	24°C	22.6	✓ 499.31

12932.45

20 MAGNESIA.

After getting somewhat Concrete @ 9 am

Date Coll^{d}	T. water collected	Amt water added to Dish	T. water added to	Temp of water added to Dish.	Amt water added to Dish reduced to 15.6°C
Nov. 4 AM.	53°C	1 litre	26.5°C	25.1	a 998.02
		1 litre	25.5°C	24.1	a 998.25
		1 litre	25°C	23.6	a 998.38
		1/2 litre	28°C	26.6	b 499.82
		1/2 litre	28°C	26.6	b 499.82
		1/2 litre	28°C	26.6	b 499.82
		1 litre	29°C	25.6	c 997.90
Nov. 5 AM.		1 litre	29°C	25.6	c 997.90
		1 litre	29°C	27.6	c 997.36
Nov. 6, AM.		1 litre	32°C	30.6	d 996.50
		1 litre	31°C	29.6	d 996.80
		1 litre	28°C	26.6	c 997.64
		1 litre	30°C	28.6	c 997.08
Nov. 7, AM.	wash.	1 litre	31°C	29.6	d 996.80
		1 litre	30°C	28.6	c 997.08
		1 litre	29°C	27.6	c 997.36
		1 litre	29°C	27.6	c 997.36
Nov 8 Am.	wash.	1 litre	31°C	29.6	d 996.80
		1 litre	31°C	29.6	d 996.80
		1 litre	30°C	28.6	c 997.08
		1 litre	32°C	30.6	d 996.50
		1 litre	31°C	29.6	d 996.80
		1 litre	30°C	28.6	c 997.08
		1 litre	25°C	23.6	a 998.38
		1 litre	25°C	23.6	a 998.38
		1/2 litre	25°C	23.6	✓ 499.19
		1 litre	33.5°	32.1	✓ 995.96
		1 litre	25.5°	24.1	a 998.25
		1 litre	25°C	23.6	a 998.38

2 @ 930.40

HAPPY HOLLOW:

Collected from spring-basin a large tile - sewer pipe section. Clear; reaction neutral. No odor or taste of perceptible evolution of any gas.

Date collected	T. water Collected.	Amt water added to Dish	T. water added to Dish.	REMARKS.
Oct. 26 PM.	und't.	1/2 litre	18°C	estimated
		1/2 litre	18°C	estimated.
		1/2 litre	18°C	estimated.
		200 cc.	18°C	estimated.
		60 cc.	18°C	estimated.
Oct. 27 PM.	19°C	1/2 litre	19°C	
		1/2 litre	18°C	
		1/2 litre	19°C	OK
		1/2 litre	20°C	24, 1/2 litres at 317.5 cc
		1/2 litre	21°C	(250 cc / 5 dips at 18°C)
		1/2 litre	23°C	
		1/2 litre	23°C	
		1/2 litre	27°C	
		1/2 litre	27.5°C	
		1/2 litre	23°C	
		1/2 litre	25°C	
		1/2 litre	25.5°C	
		1/2 litre	15.5°C	
		1/2 litre	20°C	
		1/2 litre	16°C	
		1/2 litre	17°C	
		1/2 litre	22.5°C	
		1/2 litre	23.5°C	
Nov. 4 AM.	19°C	1/2 litre	23.5°C	
		1/2 litre	22°C	
		1/2 litre	22.5°C	3, 15, 12, 250 OK

22 HAPPY HOLLOW.

@ W. Pm.

Date Collected	Tm. Collected	Amt. m. added to Dish	Tm. added to Dish	Remarks
Nov. 4 PM		½ litre	25°C	
		½ litre	26°C	mixed Nov 4 + 5 a.m.
Nov. 5 A.M.	19°C	½ litre	26°C	T. air 20°C
		½ litre	26°C	
		½ litre	24°C	
		½ litre	27.5°C	
		½ litre	34.5°C	mixed with Nov 6 P.m.
Nov. 6 P.m.	unkt	250 cc	30°C	
		½ litre	30°C	
		½ litre	28°C	Nov. 7, 6 a.m.
		½ litre	27.5°C	5,250
		½ litre	28°C	
Nov. 7 P.M.	unkt	½ litre	28°C	
		½ litre	29°C	
		½ litre	28°C	
		½ litre	35°C	Nov 8 2 P.m.
		½ litre	28.5°C	12,280 cc at 7 28.0°C
Nov. 8 a.m.	unkt	250 cc.	29°C	23 ½ litres at 64 0.5°C
		½ litre	31.5°C	1, ½ litre at 29.5
		½ litre	31.5°C	200 cc at 28.5
		½ litre	30°C	
		½ litre	30°C	10,560
		200 cc	28.5°C	(wanted 7-17 6)
Nov. 10 P.M.	18°C	½ litre	18°C	
		½ litre	24.5°C	
		½ litre	24°C	12,200 cc

Date Collected	T.w. collected	Am't added to Dist.	T.w. added to Dist.	REMARKS
	½ litre	23.0°C		
	½ litre	21°C		
	½ litre	21°C		1, ½ lb
	½ litre	21.5°C		
	½ litre	21°C		
	½ litre	22°C		
	½ litre	22°C		
	½ litre	24°C		
	½ litre	25°C		
	½ litre	24°C		11, ½ lb @ 24 8.0
	½ litre	23.5°C		
	Washwater			
	250 c.c.	23.5°C		= ½ l @ 20°C
	Sup. 21 210 cc	18		
		241		
		20.7		
		12,250	OK	
		12,200	OK	
		5.5	OK	
		250	OK	
		30,200	OK	
		Total V. with HH Corrections		
		719.0	728.0	
			28.5	
			29.	
			30.	
			87.5	
			87.0	
			661.	

Temperature Determinations

Big Iron.

Date	Temp.	Remarks.
Oct. 27 A.M.	64°C	Taken in the spring.
P.M.	66°C	In iron pipe 3 ft. from reservoir. (Back of Superior)
Oct 28 A.M.	65.5°C	" " " " " "
	62°C	In a glass dipped from spring.
Oct. 29 P.M.	63.5°C	" " " " "
	66°C	In iron pipe 3 ft. from reservoir (Back of Superior)
	65°C	In Big Iron bath house at end of pipe nearest Spring.
Oct. 30 A.M.	65°C	In pipe 3 ft from reservoir
	63.7°C	In glass.
P.M.	64.4°C	" "
Nov 4 A.M.	63.8°C	" " } Temp. air 12°C
	65°C	In pipe }
Nov. 5 A.M.	63.5°C	In glass
	65°C	In pipe } T. air 11°C
	65°C	In bot. left @ 2 minutes immersed in spring }
Nov. 6 P.M.	65°C	" left for 5 mins. in spring } T. air. 27°C
Nov. 7 A.M.	65°C	" left for 5 mins in spring } T. air 20°C

Mean 65°C = 149°F

Av Corr 63.6 = 146.5 F

$\sqrt{65}$

13
9
17
32
149° F

65
63.6

$\sqrt{63.6}$

12.72
9
17 4.48
32
146.5

RECTOR.

Date	Temp.	Remarks.
Oct 27 PM.	60° C	In spring.
Oct 28 AM	61° C	In spring
	59° C	In a glass full dipped from spring.
Oct 29 AM.	61° C	In spring
	58-58.5°C	In glass of water from spring. (variation due to thick glass of thermometer)
Oct 30 AM.	61°C	In spring.
	58.5°C	In glass.
Nov 3 AM	61°C	In spring } T. of air 12°C
	58°C	In glass }
Nov 4.	58.8°C	In glass
	61°C	In spring } T. air 11°C
	60°C	In bot. immersed in spring left @ 2 min. }
Nov 7		

61°C
1.4
$\sqrt{9.6}$
11.82
9
107.28
32
139.3 F

C and D - 59.6 = 139.28 F
Mean - 61°C = 141.8 F

T. D

Alum.

Date	Temp.	Remarks.
Oct 27 PM.	48°C	In spring. - impossible to read closely in spring
Oct. 28 AM.	49°C	In spring
	47°C	In glass full dipped from spring
Oct. 29 AM.	50°C	In spring
	48°C	In glass of water from spring
Oct. 30 AM.	49°C	In glass, taken several times very rapidly.
Nov. 3 AM.	48°C	In glass .. (Tr of air 13°C)
Nov. 5 AM.	48°C	In glass.
	48°C	In bot. immersed in spg @ 2 mins { T. air 13°C
Nov. 6 AM.	48°C	" " " " " T. air 19°C

48°C
1.4
5] 46.6
9.32
9
5] 83.88
32
115.88 F

Cent 46.6°C = 115.88 F
Cent 48°C = 118.4 F

5] 48
9.6
9
5] 86.4
32
118.4

OLD HALE

Date	Temp.	Remarks.
Oct. 27 A.M.	60.5°C	At end of 15 inch pipe from spring.
Oct 28 A.M.	63°C	In spring issuing from 15 inch pipe.
	59°C	In a glass full (dipped) from 15 inch pipe
Oct. 29 P.M.	60.5°C	" " " " " " "
	62°C	As issues from end of 15 inch Log pipe.
Oct 30 A.M.	62.5°C	" " " " " " "
	61.5°C	In glass, Latter reversal time, rapidly.
Nov. 3 A.M.	62.5°C	As issues from pipe } T. of air 13°C
	61°C	In glass }
Nov. 4 P.M.	63°C	As issues from Pipe . T. air 17°C
Nov. 5 P.M.	63°C	" " " " T. air 22°C
Nov. 7 A.M.	63°C	" " " " T. air 20°C

63°C
1.4
5 | 61.6
12.32
9
11 | 0.88
32
142°9

Corrd 61.6 = 142.97
Uncorr 63°C = 145.4F

5 | 63.
12.6
9
11 | 3.4
32
146.4

T. D.

RAL

Date	Temp.	Remarks.
Oct. 27 A.M.	57.5°C	Not running strong. Taken at end of 60 ft pipe.
P.M.	61.5°C	Running strong " " " " "
P.M.	62°C	Taken in hole in pipe (60 ft.) 10 ft from end.
Oct. 28 A.M.	61.5°C	End of 60 ft pipe
	62°C	In hole in pipe 10 ft from end.
Oct. 29 P.M.	61°C	" " " " " " "
	60.5°C	As issues from end of 60 ft pipe.
	59.5°C	In glass full collected from end of 60 ft pipe.
Oct. 30 A.M.	61°C	As issues from end 60 ft pipe
	61.5°C	In pipe 10 ft. from end.
	60°C	In glass Taken several times rapidly.
Nov. 3 A.M.	61°C	As issues from pipe } T. air 13°C
	61°C	In pipe }
Nov. 4 P.M.	57°C	Issuing from pipe. Tair 13°C. } not flowing strongly.
Nov. 5 A.M.	61°C	" " "
	61.3°C	In pipe
	61°C	In bottle as flowing in issued @ 5 min } T. air 11°C
	60°C	In glass

Cent 59° = 139.°28 F

Mean Cent - 61°C = 141.°8 F

61°C
1.4
5) 9.6
11.92
9
10 3.28
3 2
139.°28 F

5) 61
12.2
10 9.8
3 2
141.8

EGG. O

Date	Temp.	Remarks.
Oct. 27 A.M.	62°C	Difficulties in determining - in getting into spring.
P.M.	65°C	In spring but under better conditions than above.
Oct. 28 A.M.	64°C	In spring.
	60°C	In glass dipped from spring.
Oct. 29 A.M.	64°C	In spring
	59.5°-61°C	In glass - variation caused by heat nec. to raise of thick glass of thermometer
Oct. 29 A.M.	57°	At Rockafellow Bath House.
Oct. 27 A.M.	59°	" " " " .
Oct. 30 A.M.	62.5°C	In glass
	64°C	In spring.
Oct. 30 P.M.	58.5°C	As issues from 1800 ft pipe in bath room No 1. Rockafellow.
	58°C	In glass taken rapidly - from Rockafellow pipe bath room No 1. -
Nov. 4 A.M.	62°C	In glass } T. air 13°C
	64°C	In spring }
	58.5°	Rockaf. B.H. issuing from pipe. T air 12°C
Nov. 5 A.M.	64°C	In spring } T. air 11°C
	62°C	In glass }
	63°C	In bot. immersed in spring @ 5 mins. }
Nov. 6 A.M.	63°C	" " " " } T. air 19°C
	62°C	In glass }

Aver. - 62.6°C = 144.68°F

Uncorr - 64°C = 147.2°F

5) 64
12.8
9
11.5 2
32 .07
147.27

64°C
1.4
5) 62.6
12.52
9
112.68
32
144.68

T.D.

MAGNESIA. (NB) Impossible to take T. in the Spring.

Date	Temp.	Remarks	
Oct 28 AM	53°C	In glass dipped from Spring.	
Oct 29 AM	52.7°C	" " "	Taken several times rapidly
Oct. 30 AM	53°C	" " "	
P.M.	53°C	" " "	
Nov. 4 AM	53°C	" " "	
Nov. 5 AM	53°C	" " "	T. air 13°C

53°C
1.4
5) 51.6
10.32
9
92.88
32
124°.88 F

5) 53
10.6
9
95.4
32
127.4

Corr^d – 51°.6 C = 124°.88 F
Uncorr – 53°C = 127°.4 F

Rocky

Uncorr – 58°.5 C = 137°.3 F
Corr – 57°.1 C = 134°.78 F

5) 58.5
11.7
9
105.3
32
137°.3 F

5) 57.1
11.42
9
102.78
32
134.78

Nam[e]
Big
Egg
Old H
Alum
Magnes
Recto
Ral
Rocka
Chaly
Happ
Mount
Magbe
Light
Gillen
Potas
Grand
Red

List of Springs Collected for analysis, with localities & nature of spring.

Name	Locality	Nature	
Big Iron	S.E. Corner of Big Iron bath house	Hot.	
Egg	S.E. of reservoir back (E.) of Arlington	Hot.	
Old Hale	S.E. Corner of Old Hale bath house.	Hot.	
Alum	In front (W.) of Old Hale bath house	Hot	
Magnesia	Under Magnesia bath house	Hot	
Rector	S.E. Corner of New Rector bath house	Hot.	
Rail	Back (E.) of Big Iron bath house.	Hot.	
Rockafellow b.h.	No 12 Park avenue. Water from Egg Spring	Hot.	
Chalybeate	2 mi. E. of Hot Springs	Cold	—
Hot Spy Hollow	1/4 mi. from Arlington Hotel	Cold	
Mountain Valley		Cold	
Mayberry	Omit for present	Cold	}
Lightfoot	" " "	Cold	}
Gillen	" " "	Cold	}
Potash Sulphur		(Cold)	
Grandma Chase		Cold	
Dripping			
Red Chalybeate			

TEMPERATURE EXPERIMENTS.

CAVE — on bench back of New Reelor bath house, just south west of EGG.

DATE	TEMP.	REMARKS
Oct 29 P.M.	63° C	dripping

Miscl.

T. Determinations

Arsenic – not original old Arsenic, which now dried up – but spring back of Brig. hon bath house on bench.

Date	Temp.	Remarks
Oct 29 PM.	40°C	leaving from pipe 25 ft long.
	41°C	" " " 9 ft long

GRANDMA CHASE'S DRIPPING Spring. 35

next to pool last up creek. Flow clear, intermittent through green moss. No bromide yellow iron stains

such as characterises current of dripping springs.
Reaction neutral. No smell or taste. No H_2S.
T. 17.5°C (For CO_2 took 250cc @ 17.5°C.)
Collected for analysis 4 ½ Gallon bottles of water, Nov 3, 1890. Br.

Date	T. water Coll.	Amt water add'd. to Dish	Amt water add'd to Dish	REMARKS
Nov 3 Br.	17.5°C	1 litre		T. taken in flask. Could not get to spring

GRANDMA CHASE'S, RED CHALYBEATE 37

Collected in reservoir - 9 mm section followed out Redrich Crum deposit about ¼ in on surface of spring hence name. Water slightly clouded with iron hydroxide deposit. Reaction neutral. Strong taste of iron and odor but no reaction for H_2S with clean silver dollar or Lead acetate. Gases collected for CO_2 & H_2S. 250 cc for CO_2 T 17.5°C (taken in flask) 4 ½-Gal. bottles collected Nov 3 Pm for analysis. T. 18.1°C in spring.

DATE	T. water Coll	ANT. water add'd to Dish	T. water add'd to Dish
Nov. 3 Pm.	18.5°C	1 litre	

H H Chalyb. on evaporation turns brown & deposits reddish brown hydroxide of iron) →

HAVE:	2 litres	21.5 °C
	2 litres	20.0
	19 litres	482.0
	1 litre	26.0
	1 litre	31.0
	25 litres	580.5 °C

~~Avg ½ litre 23 °C~~

HENCE AVERAGE TEMP. PER LITRE = 24 °C

HENCE ACTUAL NO LITRES = 24.95

TOTAL VOL. ACT. USED = 24,950 cc.

24,950 cc.
499
25,449 cc

HAPPY HOLLOW CHALYBEATE – basin

of spring large sewer pipe section; stained with reddish brown deposit iron, same in bottom of spring; water clear, taste of iron; Reaction neutral. No H_2S, or apparent escape of gas. – on standing gets cloudy & deposits yellow – to reddish yellow hyd. iron.

Date Collected	T. water Collect^d	Amt w. in^d to Dish	T.W. added To Dish		Remarks.
Nov. 4 AM.	19°C	2 litres	21.5°C	✓	T. air 15.5°C
		½ litre	24.5°C	✗	
Nov. 5 A.M.	20°C	1 litre	22°C	✓	T. air 20°C
		1 litre	22°C	✓	
		½ litre	27°C	✗	
Nov. 6 AM.	20°C	2 litres	20°C	✓	T. air 19°C
		1 litre	28.5°C	✓	
		1 litre	29°C	✓	
		1 litre	27.5°C	✓?	Nov 7. 6 am
Nov. 6. PM		1 litre	29°C	✓	11,000
		1 litre	29°C	✓	
Nov. 8 am	unsh	1 litre	26°C	✓	mixed with Nov 6 PM Nov 8, 11 am
		1 litre	27°C	✓	
		½ litre	31°C	✗	
		½ litre	31°C	✗	15,000
Nov. 10 AM.	unsh	1 litre	19°C	✓	(wasted at least
		1 litre	19°C	✓	18,000)
		1 litre	24.5°C	✓	raining
		1 litre	24°C	✓	
		1 litre	24°C	✓	
Nov. 11 AM.	unsh	1 litre	24°C	✓	raining
		1 litre	22°C	✓	
		1 litre	24°C	✓	23,000
		1 litre	25.5°C	✓	2,500 OK
		1 litre	26°C	✓	25,500
wash water		250 cc.	23°C		
		250 cc.	23°C		

Notes on Deposit formed on evaporation of waters evaporated at Hot Springs Ark.
R. N. B.

BIG IRON.

White crystalline deposit ($CaCO_3$(?)) soon after evaporation began of 1 litre. Deposit continued to increase steadily & remained pure white as more water evaporated.

ALUM. Same as in the case of Big Iron but color of deposit cream instead of white.

RECTOR. In all respects the same as Big Iron.

OLD HALE - In all respects same as Big Iron.

RAH - Same as ALUM. tho' deposit near white in color.

EGG - deposit rapid & pins. - cream color.
" from Rockafellow Bath House same as EGG except a shade darker. And on standing & cooling a reddish brown small deposit settles out from Rockafellow B.H. but not from

Notes on Deposits Continued.

water from Egg spring direct. Must be iron pipes as Rock & pillow bath house water.

MAGNESIA. Deposit slow & slight, pure white. Appears to be much weaker than other hot waters examined. After getting somewhat concentrated gets milky. While all other hot waters examined slow clear deposit is formed even when most concentrated than Mg water.

HAPPY HOLLOW. upper - east spring.
a very slight, almost black, deposit, which forms a scum on surface during evaporation then sinks - Even after 7 liters evaporated to less than 2 liters - deposit very, very slight - water must be very weak (as per Riggs & Bs analysis (U.S. Bull. 55)

EGG.

(Correction for Blank .1°C)

Date collected	T.W. collected	Am't added to Dil.	T.W. added	Corr'd temp. of water added to Dil.	Am't water added to Dil. reduced to 15.6°C
Nov. 10 AM.	unit	½ litre	32°C	30.6	a 498.25
		½ litre	30°C	28.6	a 498.54
		½ litre	29°C	27.6	a 498.68
		½ litre	28°C	26.6	a 498.82
		½ litre	26.5	25.1	b 499.01
		½ litre	27°C	25.6	a 498.95
		½ litre	26°C	24.6	b 499.07
		½ litre	25°C	23.6	b 499.19
Nov. 11 AM.	unit	½ litre	27°C	25.6	a 498.95
		½ litre	27°C	25.6	a 498.95
		½ litre	27°C	25.6	a 498.95
		½ litre	28°C	26.6	a 498.82
		½ litre	28°C	26.6	a 498.82
		½ litre	30°C	28.6	a 498.54
		½ litre	27°C	25.6	a 498.95
Nov 12 AM.	unit	½ litre	45°C	43.6	✓ 495.89
	Wash water.				
Nov. 12 AM		250 cc.	25°C	23.6	c 249.59
		250 cc.	25°C	23.6	c 249.59
					8477.56

10,050
11,750
5
392 50

MAGNESIA

Mate collected	Tw collected	Bm't add'd to Flask	Tw add'd Flask	Corr Temp	Corr Volume
Nov. 11 A.M.	1 litre	250 c	23.6		998.38
Wash Water					
	250 c.c.	25 c	23.6		249.59
	250 c.c.	25 c	23.6		249.59
					1497.56

12.950
2 "
3 "
4 "
40.450

Lab. No. 2486

HOT SPRINGS = City Water Works Water.

Collected in glass stoppered 4 lb Am. bottle - from hydrant in Eccles & Hogabroom Drug Store - Nov. 12 1890.

water a little cloudy - (heavy rains for several days.)

Strong 1 c.c. S.S. NH_4Cl = .00112 grams NH_3

Make dilute solution by taking 5 c.c. Strong & making up to 500 c.c. - i.e. diluting 99 times.

Dilute SS NH_4Cl 1 c.c. = .0000112 gm NH_3
(= $\frac{112}{100}$ milligram) Nov 18 1890

Reaction neutral. Used for analysis unfiltered.

A little in clear tube gave for Cl slight reaction
" " " " " " H_2SO_4 none
" " " " " " Ba none
70 cc in a por c. "dish" gave Fe none

100 cc req'd - 1 c.c. $AgNO_3$ = .000666 grams Cl
= 0.466 grs. per Imp. Gal.
= 0.388 " " U.S. Gal.

TOTAL SOLIDS - used 100 c.c. of water.

wt D + T.S. = 15.7835
wt D = 15.7794
wt T.S. = 0.0041

T.S. in grains per Imp Gallon = 2.87
" " " " U.S. Gallon = 2.39
" " Grams per litre = 0.041
" " Milligrm " " = 41

Action of residue - on ignition - turns dark brown light yellow but does not turn white - little or no organic matter very slight odor on ignition. wt T.S. after ignition = .0031 = 2.17 grs

Lab No 486 H.S. City water.

For free + albuminoid ammonia:

Used 500 c.c. of water:

Free ammonia:

I	50 c.c.	1.3 c.c. NH_4Cl
II	"	0.5 c.c. "
III	"	0.1 c.c. "
IV		trace
	Total	= 1.9 c.c. NH_4Cl

F. Am. (2 X 0.021) milligrams per litre
or parts per million.
= 0.042 " "

Albuminoid Ammonia:

I	50 c.c.	2.5 c.c. NH_4Cl
II	"	0.7 c.c. "
III	"	0.4 c.c. "
IV	"	0.3 c.c. "
V	"	0.2 c.c. "
	Total	= 4.1 c.c. "

Al. Am. = (2 X .046) milligrams per litre
or parts per million.
= 0.092 "

Total Free + Albuminoid Ammonia = 6.0 c.c. NH_4Cl

Used 500 c.c. of water for Total ammonia.

I	50 c.c.	3.0 c.c. NH_4Cl
II	"	1.0 c.c. "
III	"	0.5 c.c. "
IV	"	1.9 c.c. "
V	"	0.2 c.c. "
VI	"	0.1 c.c. "
		6.7 c.c. "

T. Am. = .140 parts per million
∴ Al. Am. = .098 " " "

Lab No 2486 - U. S. City Water.

Resumé

TOTAL SOLIDS	———	2.39	grs. pr U S Gallon
" " after ignition	—	1.80	
		Pts pr. Million	Pts pr Mil.
FREE AMMONIA	———	0.042	
ALBUMINOID "	———	0.092	0.098
Total Ammonia	—	0.134	
By Separate determ" " "	———	0.140	

	Grs. pr. U.S. Gal
Chlorine	0.388

No reaction for sulphuric acid or barium; copper or iron with ferrocy. & $(NH_4)_2S$.

Residue mainly iron apparently.

Organically & Inorganically very pure water.

R. W. Nov 18, 1890

Carbonic Acid Determinations.

Lab. No. 479

Old Hale. wt $Ba(OH)_2$ = 2.0105 grams.
With some $CaCl_2$

Volume of water 200 cc at 49.5° C {Corr'd T 48.1 C}

Corr'd Volume at 15.6 C 197.98 cc.

wt CO_2 = 0.04455 grams. = Total Carbonic acid.

Correction for $Ba(OH)_2$ = .01266 " CO_2

∴ Total CO_2 = .03189 grams.

CO_2 — 9.3879 grs to U.S. gallon

as CO_3 12.7675 " " "

Note: Decanted most of water thro a small plaited filter & add filter to flask. Then liberated CO_2 by H_2SO_4 (dilute) — & collected & wgh'd. — warmed on water bath before filtering

---

Old Hale. Combined CO_2 —

Vol. water 250 cc at 14° C.

wt CO_2 = .01753 grams.

CO_2 — 4.0954 grs U.S. gallon

as CO_3 — 5.5697 " " "

note: Heated ~~[illegible]~~ gradually to boiling & boiled gently for ~~[illegible]~~ after 3 minutes (or 10) to drive off any free carbonic acid — then treated with 10cc. H_2SO_4, collected & wgh'd evolved CO_2

Separation of cryst. precip. on boiling ($CaCO_3$)

CO_2 Determination.

Lab. No 477

Rector at $Ba(OH)_2$ = 2.0088
with some $CaCl_2$

Vol. of water 200 cc at 57.5° C. {Cond T 56.1 C
Cond volume 197.23 cc at 15.6 C.
wt CO_2 = 0.03925 = Total CO_2.
Correction for $Ba(OH)_2$ = 0.01265 grms.
∴ Total CO_2 = 0.02660 grms.

Total CO_2 — 7.8602 grs per U.S. gallon.
as CO_3 — 10.6899 grs per U.S. gallon

Note: same as old Hale Co. apt not warmed before filtering.

Rector Combined CO_2 — vol. water 250 cc. at 16° C
wt CO_2 = 0.01715 grams.
Combined CO_2 — 4.0001 grs per U.S. gallon.
as CO_3 — 5.4401 grs per U.S. gallon
Note: Heated gradually to boiling & boiled gently for ½ hr before treating with H_2SO_4 & C for CO_2.
Separation of [$CaCO_3$ ($MgCO_3$)] Cryst. precipitate.

CO_2 Determination
Lab. No. 476

Big Iron. wt $Ba(OH)_2$ = 2.0086
wt some $CaCl_2$ —

vol. water 200cc at 61°C. (Cor'd T. 59.6 C)
Corr'd Volume " 196.97 cc at 15.6 C. —
wt CO_2 = 0.04040 grams = Total CO_2
Correction for $Ba(OH)_2$ = 0.01265
∴ Total CO_2 = 0.02775

Total CO_2 = 8.1634 grs. per U.S. gallon.
As CO_3 = 11.1022 " " "

Note as before (above) see Lecture

Big Iron Comb'd CO_2
vol. water 250cc at 17°C (Cor'd T. 15.6 C)

wt CO_2 = 0.0129 grams.

Note: boiled same as before. Separated cpt. precip. as before ($CaCl_2$ & $MgCO_3$ probably). Bumped a good deal when boiling.

Comb'd CO_2 3.00879 per U.S. gallon
As CO_3 4.0919 "

CO_2 Determination —
Lab. No 480

Ral. at $Ba(OH)_2$ = 2.0086
with $CaCl_2$ —

Vol. of water 200 cc. at 56.5° C {Cal T = 55°C}

Cor'd — Volume water 197.33 at 15.6 C
at CO_2 = 0.04030 grams. Total CO_2 —
Correction for $Ba(OH)_2$ = 0.01265
∴ Total CO_2 = 0.02765

Total CO_2 — 8.1692 grs. U.S. Gallon
as CO_3 — 11.1101 " " "

Note: as before. See Recto of Bijou —

Ral. Combd CO_2 —
Vol. water 250 cc. at 16.5° C

CO_2 = 0.0149 grams.

note: boiled as before — separation cyst. precip. as before.

Combined CO_2 3.4703 grs U.S. gallon
as CO_3 — 4.7264 " "

CO_2 - Determination.

Lab. No. 2481

EGG' ⊙ — wt $Ba(OH)_2$ = 2.0086 grams.

with ca CO_2

Vol of water 200 cc. at 58°C { Cond 77 / 56.6 C

Cond volume at 15°C 197.18 cc.

wt CO_2 = 0.04000 grams. = Total CO_2.

Correction for $Ba(OH)_2$ = 0.01265

∴ Total CO_2 = 0.02735

CO_2 8.0468 grs per gallon

or CO_3 10.9436 " " "

Note: as in Rector, et seq.

EGC — Cond CO_2

vol water 250 cc. at 17°C

wt CO_2 = 0.0137 grams.

CO_2 — 3.1954 grs per gallon.

or CO_3 — 4.3457 " " "

Note: boiled as before & separation Crypt. Precip.

CO_2 — Determination.

Lab. No 2478

ALUM. at $Ba(OH)_2$ = 2.0109 grams.
with $CaCl_2$

Volume of water 200 cc. at 42° C { Corrected 40.6

Corrd. volume at 15.6 C 198.6

at CO_2 = 0.02421 grams. = Total CO_2

Correction for $Ba(OH)_2$ = 0.01266

∴ Total CO_2 = 0.02944 grams.

CO_2 — 8.6299

as CO_3 — 11.7367

Note: as in EGR —

Alum Comb'd CO_2

Vol water 250 cc. at 19° C

wt CO_2 = 0.0162 grams.

CO_2 — 3.7785 lbs per gallon

as CO_3 — 5.1388 lbs per gallon.

Note: as in Qq

CO_2 Determination.

Lab. No 483.

MAGNESIA – with $CaCl_2$ wt $Ba(OH)_2$ = 2.0107 grams.

Vol. of water 200 cc. at 50°C. (Corr'd T 48.6C)
Corr'd V. at 11.6 — 197.93

wt CO_2 = 0.02449 grams. = Total CO_2
Correction for $Ba(OH)_2$ = 0.01266
∴ Total CO_2 0.03224 grams.

CO_2 — 9.4462
as CO_3 — 12.8468
note: as in Recta Et seq.

Magnesia. Combd CO_2
Vol. water 250 cc. at 16°C

wt CO_2 = 0.0167 grams.

note: boiling Separation as before

CO_2 — 3.8952
CO_2 — 5.2974

CO_2 Determination.

Lab. No 24852

Rockafellow Bath House (Egg Spring)

wt $Ba(OH)_2$ = 2.0102 4

(with $CaCl_2$)

Vol. of water - 200 cc. at 5.2°C. (Grad T 5 0.6)

Corr'd Volume at 15.6 C 197.76

wt CO_2 = 0.03850 grams = Total CO_2

Correction for $Ba(OH)_2$ = 0.01266

∴ Total CO_2 = 0.02584 grams.

CO_2 — 7.4695

as CO_3 — 10.1585

note: as in Magnesia etc.

Rockafellow B.H. — Comb'd CO_2

vol. water 250 cc. at 16°C

wt CO_2 = 0.0160 grams.

note: as in Magnesia.

CO_2 — 3.7318

as CO_3 — 5.0752

CO_2 Determination —
Lab. # 24824

Happy Hollow. wt $Ba(OH)_2$ = 2.0110 grams.
With $BaCl_2$ —

Vol. of water 200 c.c. at 19°C

wt CO_2 = .0296 grams. = Total CO_2
Correction for $Ba(OH)_2$ = .012669
∴ Total CO_2 = 0.016931 grams.

Note: as Magnesia & Rockefeller &c.

Happy Hollow Comb'd CO_2
Vol of water 250 c.c. at 16.5°C

wt CO_2 = .00215 grams.

Note: boiling as before, but no Separation.

CO_2 Determination –
Lab. No 2485

Happy Hollow Chalybeate – with $CaCl_2$. wt $Ba(OH)_2$ = 2.0120

Vol of water 250 cc. at 19° C.

wt CO_2 = 0.04110 grams. = Total CO_2.
Correction for $Ba(OH)_2$ = 0.01267
∴ Total CO_2 = 0.02843 grams.

Note: as in Happy Hollow.

Happy Hollow Chalyb. Cont'd CO_2
Vol water 250 cc at 21.5° C

wt CO_2 = 0.00035 grams.

Note: Before measuring 250 cc. filtered water – for copious separation of hydroxides had taken place. Collected on precip – for determination – In filtrate determine CO_2 & Total solids – adding in amt ion necessary for volume used for Total solids. The 250 cc filtered water were like annual. no separation.

CO_2 – Determination. G. 51.8921 CO_2 free

Potash Sulphur – ~~with $CaCl_2$~~   wt $Ba(OH)_2$ = 2.0107 grams.

Volume of water 250 cc. at 14°C.

wt CO_2 = 0.06420 = Total CO_2

Correction for $Ba(OH)_2$ – 0.01266

∴ Total CO_2 — 0.05154 grams.

note: as in Happy Hollow &c.

Potash Sulphur – Cont^d CO_2

vol. water 250 cc. at 22°C

For Sulphur of H_2S see page 64

wt CO_2 =   Can't Determine. CO_2

note: Collected for H_2S determination filtered by decantation & 250 cc taken for CO_2. Boiled &c as usual.

Used for Alkalies. — 250 cc. at 22°C

K = 0.01505 grm.
Na = 0.05857 "

wt KCl + NaCl = 0.1774 grams.
wt KCl = 0.0287 "
wt NaCl = 0.1487 "
wt K_2PtCl_6 = .0940 grams.

K = .06020 grms to litre
Na = 23428 " " "

} NB Clarke Bul [illegible] 55 for 92 found K = 0227 Na = .7?2 to [illegible]

CO_2 Determination.

Dripping Spring (Grandma Chase) wt $Ba(OH)_2$ = 2.0100
with $CaCl_2$

Vol of water 250 cc. at 17.5° C.

wt CO_2 = 0.02760 = Total CO_2.
Correction for $Ba(OH)_2$ = 0.01266
∴ Total CO_2 = 0.03494 grams.

notes as in Black Sulphur ppt

Dripping Spring Carbonic acid continued.
Total CO_2 = 8.1489 Sp. Lt. Yellow
as CO_3 = 11.07784

11.07784
6.52426 O_3 for Ca
4.55358

∴ CO_2 free Spring water, 3.3351

CO_2 Determination –

Red Chalybeate (Grandma Chase) at $Ba(OH)_2$ = 2.0033
(with $CaCl_2$)

Vol water 250 cc. at 17.5° C

wt CO_2 = 0.02405 – Total CO_2.
Correction for $Ba(OH)_2$ = 0.01262
∴ Total CO_2 = 0.02788 grams.

notes on Duplicate

R.C. Carbonic acid Determ continued

Total CO_2 = 6.4183 grs. per U.S. gallon
CO_3 = 8.7289 " " " "

8.7289
.1102 CO_3 for Ca
8.6187 CO_3 free grs per U.S. gallon
or Free CO_2 = 6.3372 grs per U.S. gallon

Blank CO_2 Determination

I wt $Ba(OH)_2$ with $CaCl_2$ = 2.0024 grams

wt CO_2 = 0.0116 grms. ∴ 1 gram $Ba(OH)_2$ = .00579 CO_2

II wt $Ba(OH)_2$ with $CaCl_2$ = 2.0096 grams.

wt CO_2 = 0.0139 grams. ∴ 1 grm. $Ba(OH)_2$ = .0069 CO_2

III wt $Ba(OH)_2$ with $CaCl_2$ = 2.0131 grams.

omit

wt CO_2 = 0.0199 grams. ∴ 1 grm. $Ba(OH)_2$ = CO_2

Note: I & III added water in others without previous addition of water determined CO_2.

Mean of I & II = 0.00630 grms. CO_2 = 1 grm $Ba(OH)_2$

Potash Sulphur for Sulphur of H_2S — or for H_2S.

Vol. of water 680 cc.

at $BaSO_4$ = 0.00712 grams.
at S = 0.000978 "
at H_2S = 0.001039 "

680 cc. nat. water = .001039 gms H_2S
10 cc. " " = .0000152 " "
70 c.c. " " = .0010689 " "

∴ H_2S = 0.10689 grains p. Imp. Gallon
or = 0.08904 " " U.S. Gallon.
or = 0.001527 gms. p. Litre
or = 1.527 parts p. Million
(= Milligrams p. litre)

R. Brackett
Nov. 29, 1890 —
Little Rock,
Arkansas.

THERMOMETER – Corrected in Office of Weights & Measures – of the U.S. Coast & Geodetic Survey Washington D.C.

By T.C. Mendenhall

See letter to J.C. Branner State Geologist Ark. Jan. 24, 1891

Corrections made were as follows:

Reading	Correction.	
0	− 1°.3	From these Average Correction per degree is 1.4
5	− 1.4	
10	− 1.5	
15	− 1.5	
20	− 1.4	
25	− 1.5	
30	− 1.3	
35	− 1.2	

THESE THE ONLY CORRECTIONS GIVEN.

Copy

R.N.B.

65°C = 149° F Incorrect.

Big Iron 66° C = 150.8° F

Rector 61° C = 141.8° F

Alum < 50° C = 122°
49° C = 120.2° F

Old Hale 63° C = 145.4° F

Ral 62° C = 143.6° F

Egg 64° C = 147.2° F

Magnesia 53° C = 127.4° F

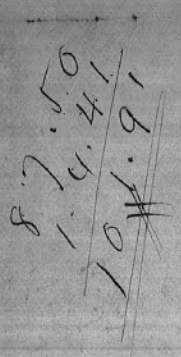
Rockafellows 59° C = 138.2° F.

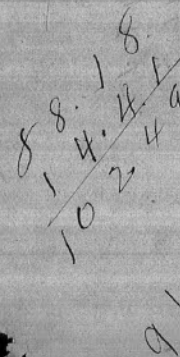
Happy Hollow 19° C = 66.2° F.

Cave 63° C = 145.4° F

Arsenic 41° C = 105.8° F

T	V	Factor
59°.6	1.016312	1.015361
57°.1	1.014479	1.013530
56°.6	1.015224	1.014274
50°.6	1.012248	1.011301





degrees C and factor for reducing volume at
15°.6 C. Hot Springs, Garland county, Ark., Rot 2 water. R. B.

T. °C	V.	F = (V at x° / V at 15°.6 C)	T. °C	V.	F = (V at x° / V at 15°.6
13°.6	1.000649	0.999713	31°.6	1.004805	1.003866
14.1	1.000715	0.999779	32.1	1.004977	1.004038
14.6	1.000785	0.999849	32.6	1.005149	1.004212
15.1	1.000857	0.999921	33.1	1.005322	1.004388
15.6	**1.000936**	**1.000000**	33.6	1.005494	1.004565
16.1	1.001015	1.000078	34.1	1.005666	1.004742
16.6	1.001096	1.000159	34.6	1.005836	1.004918
17.6	1.001273	1.000336	35.1	1.006011	1.005096
18.6	1.001464	1.000527	35.6	1.006183	1.005274
19.6	1.001663	1.000726	36.6	1.006528	1.005586
20.1	1.001765	1.000828	37.6	1.006873	1.005931
20.6	1.001872	1.000931	38.1	1.007045	1.006103
21.6	1.002089	1.001141	38.6	1.007217	1.006275
22.1	1.002199	1.001261	39.1	1.007389	1.006446
22.6	1.002312	1.001374	39.6	1.007562	1.006619
23.1	1.002429	1.001491	40.6	1.007955	1.007012
23.6	1.002547	1.001609	41.6	1.008380	1.007437
24.1	1.002666	1.001728	42.6	1.008805	1.007867
24.6	1.002789	1.001857	43.6	1.009230	1.008280
25.1	1.002914	1.001976	46.1	1.010292	1.009324
25.6	1.003042	1.002104	47.6	1.010930	1.009982
26.1	1.003170	1.002231	48.1	1.011143	1.010197
26.6	1.003302	1.002363	48.6	1.011355	1.010400
27.1	1.003435	1.002496	49.6	1.011780	1.010833
27.6	1.003572	1.002633	50°.6 / 51.1	1.012248 / 1.012496	1.011301 / 1.011534
28.1	1.003710	1.002771	51.6	1.012744	1.011796
28.6	1.003852	1.002913	52.6	1.013239	1.012299
29.1	1.003994	1.003055	53.6	1.013736	1.012798
29.6	1.004138	1.003199	56.1	1.014976	1.014040
30.1	1.004287	1.003347	57.1	1.015472	1.014545
	1.004459	1.003509	56°.6 / 59.1	1.015249 / 1.014479	1.014274 / 1.013