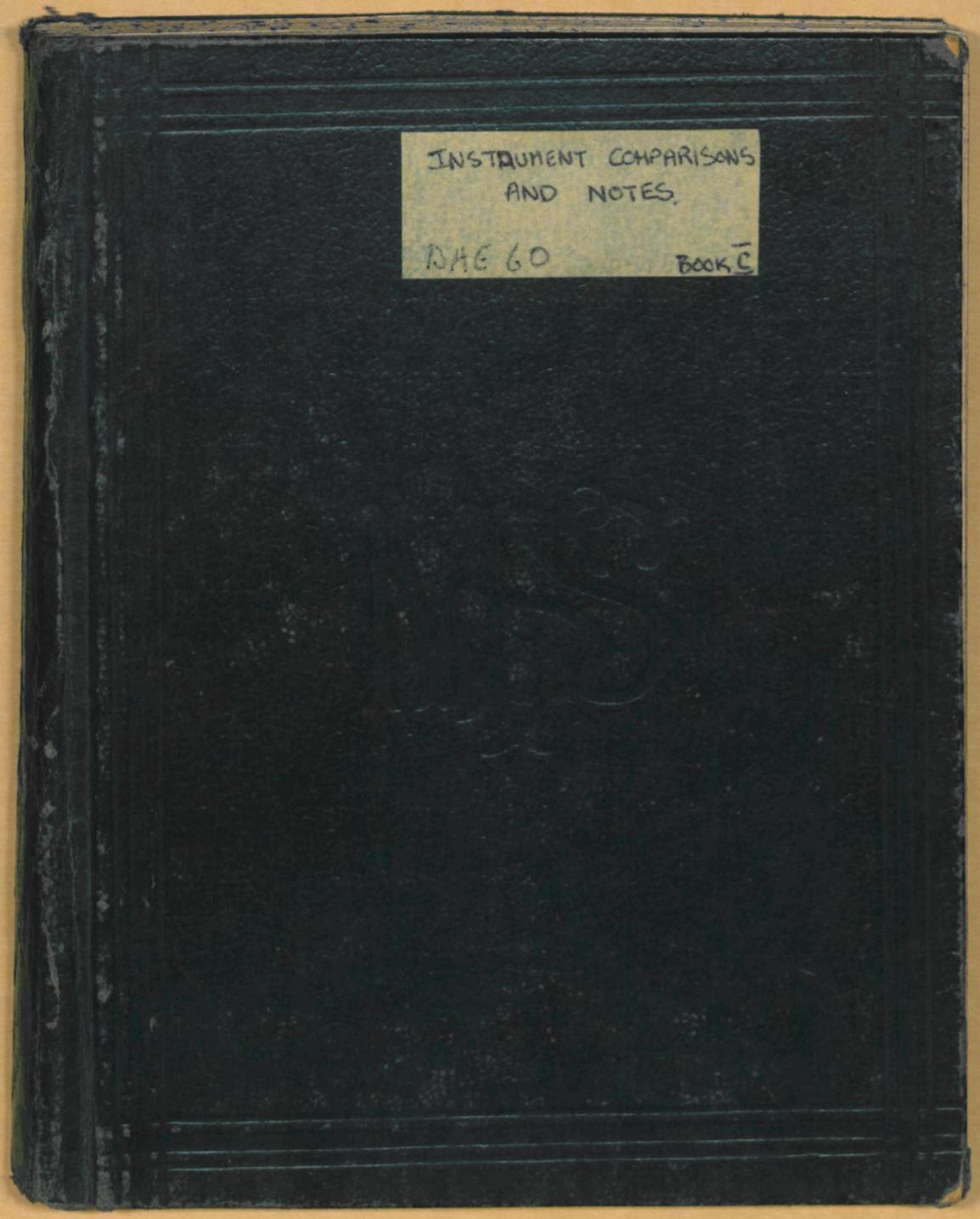
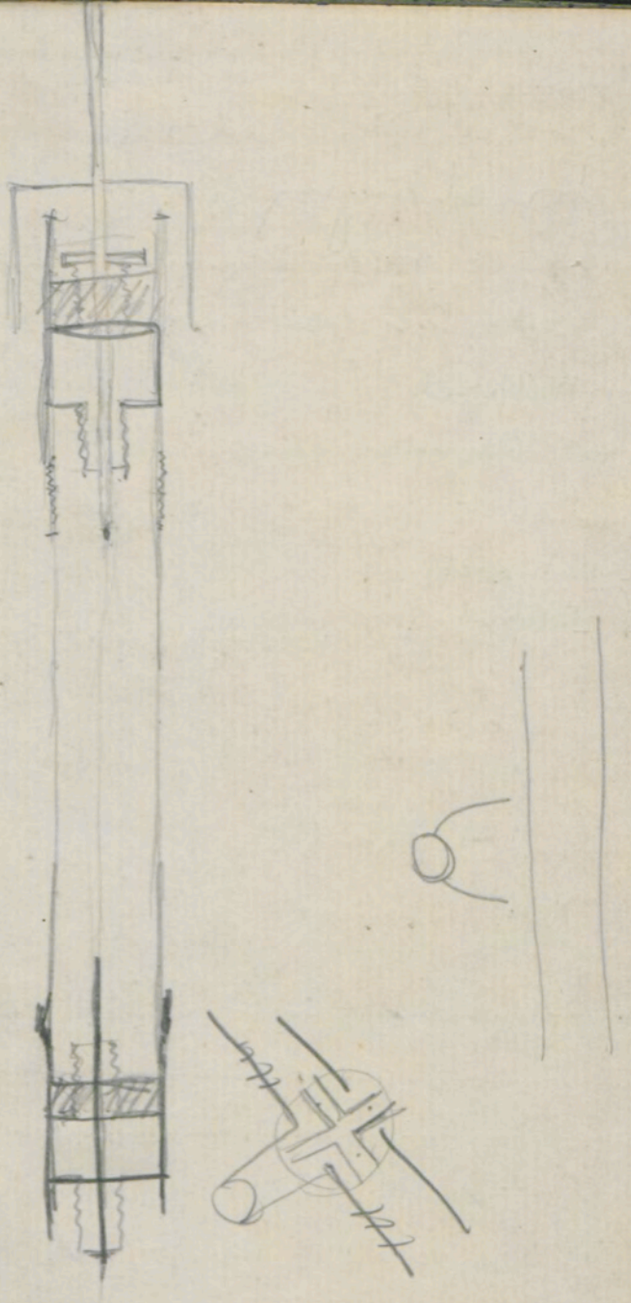

INSTRUMENT COMPARISONS
AND NOTES.
DAE 60
BOOK C

This note book contains
instrument comparisons
made in the Antarctic.



Dates for changing sunshine recorder cards.

W { 13th April.
  { 31st August
E { 12th Oct
S { 1st March
E { 12th April

Fitting the panels.

The whole hut can be boarded inside & out in a uniform manner except the two upper panels in the recess.

These two are fitted so that there is only a thickness of 4 inches between the inside & the outside.
The outer panels should be put in place first and the instruments fitted.
Then when all is finished insulation can be inserted from the inside and the inside boards nailed on.

Boards for both the inside & outside of the panels are sent after being properly fitted.

Erecting the hut.

Position The long side opposite the door should face the prevailing wind.

1st Lay down the four sleepers. (see sleeper with saw mark outside.)

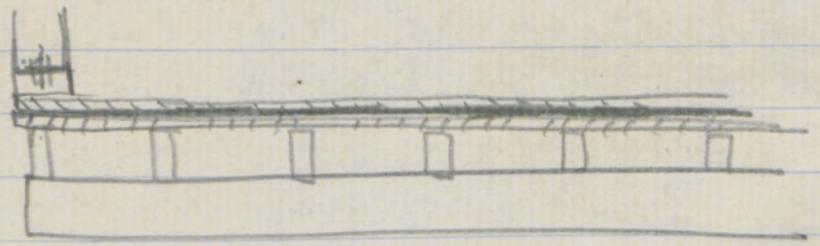
2nd. Put the joists across the sleepers.

The positions are saw marked

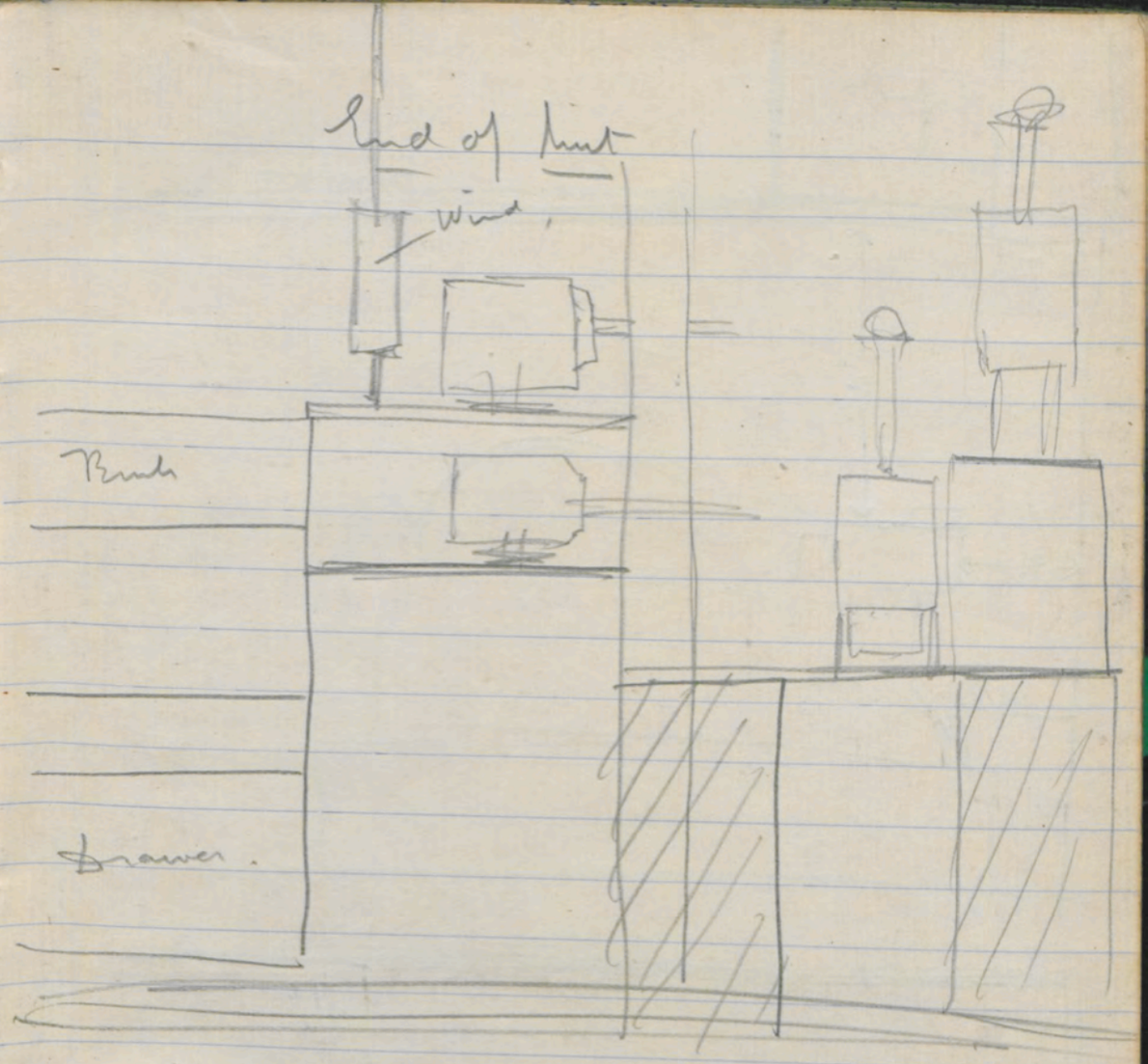
3rd. Lay down 1st floor.

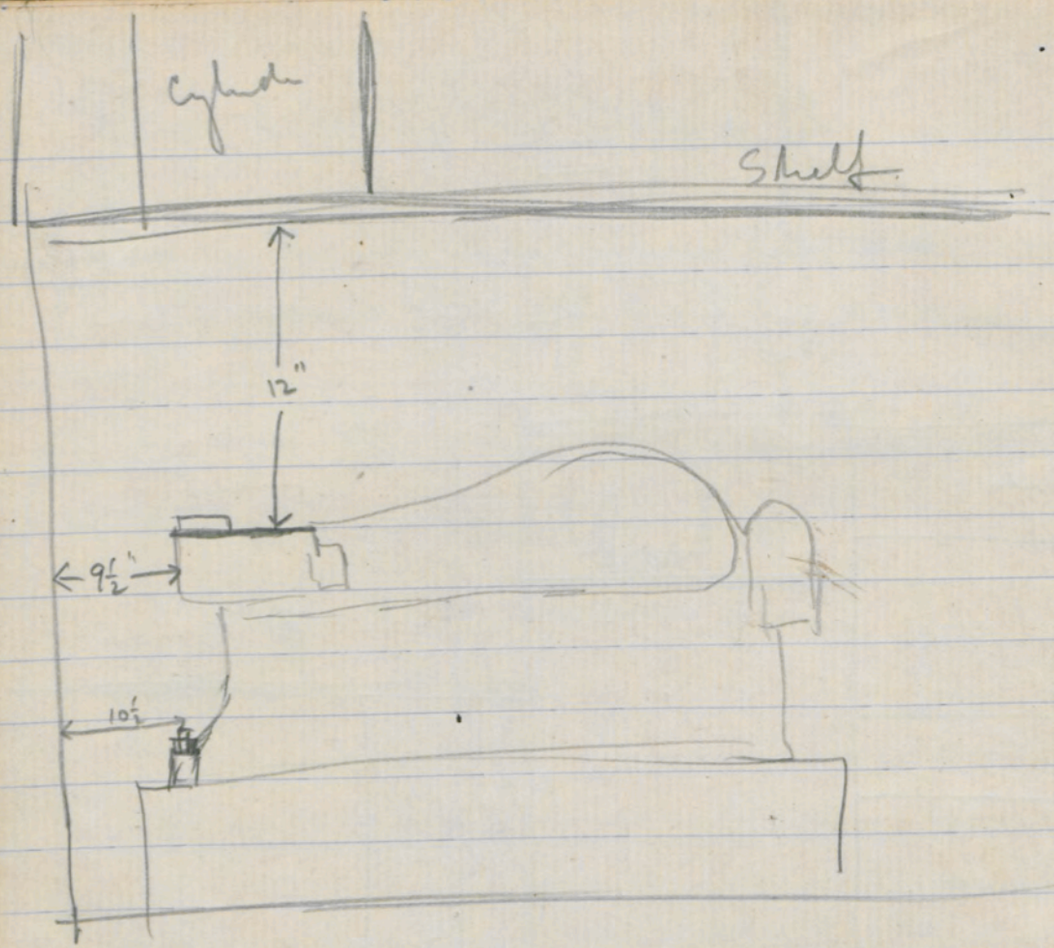
4th. Put down quilty.

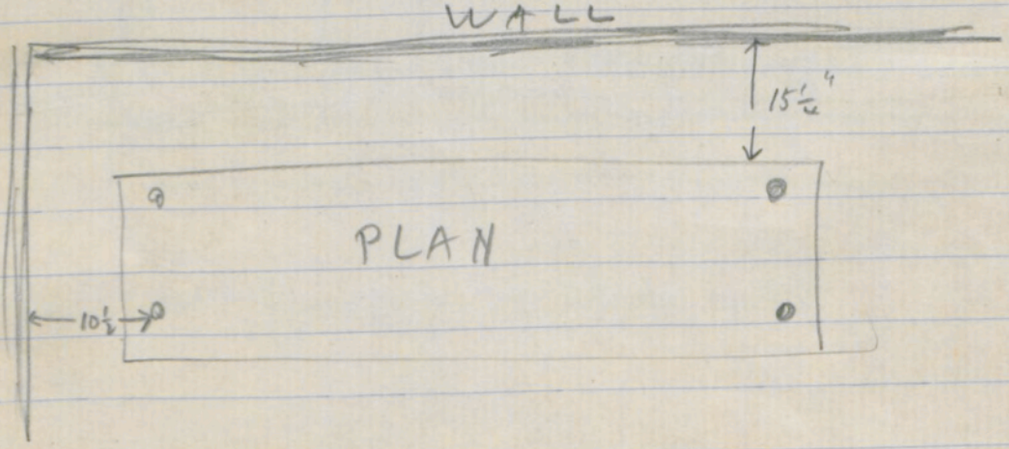
5th. Lay down 2nd floor



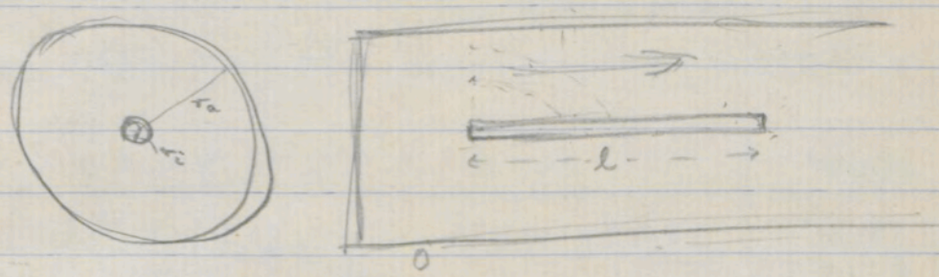
Then erect framework of whole hut.




Cylinder
Shelf
12"
9½"
10½"


WALL
15½"
PLAN
10½"

Conductivity self recorder. (Actual)



$r_i = .5$ cm. ✓

$r_a = 8.3$ cm. ✓

$l = 31$ cm. ✓

For satisfactory working we must have

$$G > \frac{2l \sim V}{\log_n \frac{r_a}{r_i}(r_a^2 - r_i^2)}$$

$$2l \sim V = 2 \times \frac{31}{2} \times 2,100 = 12400$$

$$\frac{r_a}{r_i} = \frac{8.3}{.5} = 16.6 \quad \log 16.6 = 1.2201$$

$$\log_n \frac{r_a}{r_i} = 1.2201 \times 2.3 = 2.8062$$

$$\text{Cap} = \frac{l}{2 \log \frac{r_a}{r_i}} = \frac{31}{2 \log 16.6} = \frac{31}{2 \times (1.2201) \text{ Log}_e}$$

$$= \frac{31}{2 \times 2.303 \times .507} = \frac{31}{2.8062} = 5.5.$$

3.6603
2.4402
2.8062

12.
124

·11

100

$1·29)\,100\,(·77$
91
·90

$1·2)\,100\,(·82$
96
·40

$32·3)\,35·1\,(110.$
32·3
280

$\frac{V_1}{V_2} = 1·29$

$V_2 = \frac{V_1}{1·29} = \frac{100}{1·29} =$

Assume $\lambda = 1 \times 10^{-4}$

~~$\frac{V_1}{V_2} = 2 \ldots \log \frac{V_1}{V_2}$~~

$t = 30 \times 60 = 1800$ sec

$K = 50.$

~~$t = 50 \times 6·47$~~

$\log \frac{V_1}{V_2} = \frac{1 \times 10^{-4} \times 1800 \times 195}{50 \times 6·47} = \frac{35·1}{32·3} = ·11$ approx

$= ·11$ approx $\frac{V_1}{V_2} = 1·29 \quad V_1 = 100 \quad V_2 = 77.$

195
1800
156000
195
351000

3 $\quad 2\frac{1}{2}$ cm $= 1 =$
$\frac{5}{2} = 1$
5 cm $= 2.$

8·3
8·3
249
664
6889

$r_a^2 = (8·3)^2 = 68·90$
$r_i^2 = (·5)^2 = ·25$
$\Big\}\; r_a^2 - r_i^2 = 68·65$

$\frac{2 l \pi V}{\log_n \frac{r_a}{r_i}(r_a^2 - r_i^2)} = \frac{12400}{2·806 \times 68·65}$

G $> 64·4$ cm/sec.
$> 25·76$ inch/sec.
$> 1548·$ inch/min
> 130 ft/min.

~~·4496~~
·4481
1·8366
2·2847

4·0934
2·2847
1·8087

2·3
2·3
69
46
5·29

$\lambda = \frac{K M^2}{2\pi l t} \log \frac{V_1}{V_2} \times \log \frac{r_a}{r_i}$ $\quad$ M = mod of nat log.

3·14

$= \frac{K \times 5·3}{6·28 \times 31 \times t} \log \frac{V_1}{V_2} \times 1·2201$

3·6603
61005
646653

$= \frac{K \times 6·47}{t \times 195} \log \frac{V_1}{V_2}$

6·28
1884
19468

Automatic Chart apparatus (proposed)

$r_a = 4$ cm

$r_i = \cdot 3$ cm.

$l = 50$ cm.

$V_2 = 50$ Volts.

$\frac{r_a}{r_i} = 133 \quad \log 133 = 2.1239$

$\log \frac{r_a}{r_i} = 1.12 \times 2.3 = 2.58$

$r_a^2 = 16$

$r_i^2 = \cdot 1$

$$G < \frac{2l\sigma V}{\log_m \frac{r_a}{r_i}(r_a^2 - r_i^2)} = \frac{2 \times 50 \times 1 \times 50}{2.6 \times 16.}$$

$$< \frac{5000}{41.6.} = 120 \text{ approx.} \quad \text{cm/sec}$$

< 7200 metre/min

< 216 ft/min.

~~Automatic Chart apparatus (Proposed)~~

$r_a =$

$r_a = 3$ cm.

Actual Chart int. (final)

$d_a = 5.1$ cm $r_a = 2.5$ cm.

$r_i = \cdot 3$ cm

$l = 30.4$ cm

$r_1 = \frac{\nu_2}{\nu_1} d \Big/ 1 - \frac{\nu_2}{\nu_1}$

Top of bar } No 1667 33·2"

Calibration of Tens Bars at Kew.

Top of bar. } No 1668. 35·2"

May 30/1910

Kew Standard	*1667.	1668.
29·781. 66·3.	29·775. 67·1°	29·775. 67·0°
+009	31·750 } Zero 2·000	31·750 } Zero 2·000.
29·790.	31·750.	31·755.
29·779	* 29·765. 66·7°	29·775. 66·4°
+009		
29·788 662.		

*Then do not agree & are therefore neglected in air correct.

Bar No 1668.

Zero

0 29·775 }
0 29·775 } 29·775

Zero

2" 31·750-2 } = 29·752.
31·755-2 }

ν_2 = 33·2 − 31·752. = 1·45 $\frac{\nu_2}{\nu_1}$ = ·423.

ν_1 = 33·2 − 29·775 = 3·43

d = 29·775 − 29·752. = ·023.

$r_1 = \frac{·423 \times ·023}{·577} = ·017.$

423
·023
1269
846
577)9729(017
577
3959

No 2.

Kew Standard.	1667.	1668.
29·772.	29·765.	29·770.
+·009	66·3.	66·2.
65·8.		
29·781	31·740	31·743
	31·742	·745
29·772	66·2°	66·1
+ 9	29·765	29·765
65·6.		
29·781		

No 1667

Zero			Zero		
0	29·764	29·765	2	31·740	29·741
0	29·765		2	31·743	

$\nu_2 = 33·3 - 31·74 = 1·56$ $\quad \frac{\nu_2}{\nu_1} = ·441$

$\nu_1 = 33·3 - 29·76 = 3·54$ $\quad 1 - \frac{\nu_2}{\nu_1} = ·559.$

$d = 29·765 - 29·741 = ·024.$

$h_1 = \frac{·441 \times ·024}{·559} = \frac{·0106}{·559}.$

$h_1 = ·019$

No 1668.

Zero			Zero		
0	29·770	29·767.	2	31·743	29·744.
0	29·765		2.	31·745	

$\nu_2 = 33·2 - 31·74$ $\quad 1·46$ $\quad \frac{\nu_2}{\nu_1} = ·425$

$\nu_1 = 33·2 - 29·77$ $\quad 3·43$ $\quad 1 - \frac{\nu_2}{\nu_1} = ·575.$

$d = 29·767 - 29·744 = ·023.$

$h_1 = \frac{·425 \times ·023}{·575} = ·017.$

343)1460(·425
1372
880
686
1940

425
23
1275
850
·575)9775(·017
575
4025

·575)·00900(·01

No 3

Ken Standard.	1667		1668	
29·746	29·740	66·3	29·740	66·2
+009	31·720		31·725	
29·755. 66·0	31·720		31·725	
	29·744	66·8.	29·744	66·4.

29·746
+009
29·755 66·2.

No 1667.

Zero
0 29·740
0 29·744 } 29·742

Zero
2 31·720
2 31·720 } 29·720

$v_2 = 33·3 - 31·72 = 1·58$ $\quad \frac{v_2}{v_1} = ·444.$

$v_1 = 33·3 - 29·74 = 3·56$ $\quad 1 - \frac{v_2}{v_1} = ·556.$

$d = 29·742 - 29·720 = ·022.$

$\mu_1 = \frac{·444 \times ·022}{556} = ·018.$

556) 9768 (·018
556
4208
888
588

No 1668.

Zero
0 29·740
0 29·744 } 29·742.

Zero
2 31·725
2 31·725 } 29·725.

$v_2 = 33·2 - 31·725 = 1·48$ $\quad \frac{v_2}{v_1} = ·428$ $\quad 1 - \frac{v_2}{v_1} = ·572$

$v_1 = 33·2 - 29·742 = 3·46$

$d = 29·742 - 29·725 = ·017$

$\mu_1 = \frac{·428 \times ·017}{·572} = \frac{7276}{572} = ·013.$

3·46) 1·480 (428
1384
·960
692
2680
1422

572) 7276 (013
572
1556
428
17
2996
428

No 4.

Kew Standard	1667.	1668
29·733	29·725 65·3	29·7275 65·1
009		
29·742 64·8°	31·7005	31·701
	31·7005.	31·701.
	29·725 65·5.	29·725 65·3

No 1667

Zero			Zero		
0	29·725	29·725	2	31·700	29·700
0	29·725		2	31·700	

$v_2 = 33·3 - 31·700$ 1·60 $\frac{v_2}{v_1} = ·447.$

$v_1 = 33·3 - 29·725$ 3·58 $1 - \frac{v_2}{v_1} = ·553.$

$d = 29·725 - 29·700 = ·025.$

$h_1 = \frac{·447 \times ·025}{·553.} = \frac{·0112}{·553} = ·020$

No 1668.

Zero			Zero		
0	29·727	29·726	2	31·701	29·701.
0	29·725		2	31·701	

$v_2 = 33·2 - 31·70$ 1·50 $\frac{v_2}{v_1} = ·432$

$v_1 = 33·2 - 29·73.$ 3·47 $1 - \frac{v_2}{v_1} = ·568$

$d = 29·726 - 29·701 = ·025.$

$h_1 = \frac{·432 \times ·025}{·568.} = ·017.$

Mean values of air correction.

1667.	1668.
—	·017
·019	·017
·018.	·013.
·020	·017
Mean ·019	·016.

Results.

A	B	C	D	E	F
Kew plotted.		1667	C	1668.	C
29·790	66·3	29·775	67·1	29·775.	67·0
788	66·2	765	66·7	775.	66·4
781	65·8	765	66·3	770	66·2
781	65·6	765.	66·2	765.	66·1
755.	66·0	740.	66·3	740.	66·2
755.	66·2	744	66·8	744	66·4
742.	64·8	725.	65·3	727·5	65·1
739	65·0	725.	65·5	725	65·3
Mean 29·766	65·7	29·750	66·3.	29·753	66·1

C − A.	B − D.	E − A.	B − F
− 015	−0·8	− 015	−·7
013	−·5	− 013	−·2
016	−·5	− 011	−·4
016	−·6	− 016	−·5
015	−·3	− 015	−·2
011	−·6	− 011	−·3
017	−·5	− 021	−·3
− 014	−·5	− 014	−0·3
Mean − ·0142	−·5	+ 0145.	
Correct + 0142		− 0145	
Temp. corrn.		− 0000.	
Baro. corrn. + 0129		+ 0137.	
air + 019		+ 016	
Sent correct − 006	(1667)	− 002	(1668)

See minute and erected values some days later.

June 19/10 on S.S. Terra Nova.
Calibration of Elektroscopes 2808, 2807, 2804
also. Elster + Geitel 1181.

~~2806~~ ~~2807~~ ~~2808~~ ~~1181~~

~~2806~~	−40 + 53·1 = 93·1	
07	−10 + 36·2 = 46·2	
08	−50 + 44·8 = 94·8	
1181.	−15 + 13 = 28	

			Volts from Curve.	
28 06	91 − 40 + 51 = 91	Mean 90·5	179.	
07	−20 + 25·5 = 45·5	45·5	98·4	
08	−50 + 42·8 = 92·8	92·7	184.	
1181	15. 12·5 = 27·5	27·5.	179·7	
08	92·5			
07	20 ~~+ 60~~ 45·5 = 45·5			
06	−40 + 50 = 90			

Volts from Curves.

06	35+45 = 80	79.5	157.5
07	20+20 = 40	39.7	86.
08	40. 41.5 = 81.5	81.4	164.
1181	12+10 = 22	= 22.0	155
08	40 41.2 = 81.2		
07	20 19.5 = 39.5		
06.	35 44 79		

06	30+41 = 71	m = 70.5	141.
07	18+17 = 35	= 35	77.
08	35. 37 72	= 71.8	145.
1181	11+8 = 19	= 19.	140.
08	35+36.5 = 71.5		
07	20+15 = 35		
06	30+40 = 70		

June 19 - Again

2806	-60+66 = 126.	= 125.5	245.5
07.	-60+64. = 124.	= 123.8	245.5
06	60+65 = 125		
07.	60+63.5 = 123.5		

2806.	-30+22.8 = 52.8		106.7
07	20+30 = 50.		106.5.

2806.	-10+13	23.0	47.
07	-10+10	20.0	45.

2806	50+54.5 = 104.5		205.5
07	50+51.5 = 101.5		203.5

Time.	1480		Lyttelton 1163		1157 (29.5 −.010; 30.0 −.010.)		A482 (29.5 −.010; 30.0 −.005)	
23/11/10	30.188	69.0°F			30.196	70.5°F	~~31.082~~	71.2°F
	30.182	69.2°F			30.188	~~(71.2°F)~~	31.080	71.3°F
	30.186	69.2°F			30.190	~~(71.2°F)~~	31.080	71.3°F
	30.184	69.2°F			30.186	70.5°F	31.085	71.2°F
4pm								
Mean.	30.185	69.2.			30.190	70.5		
24/11/10			29.5 −.005; 31.0 −.005					
11 o'clock	30.038	71.0.	30.052	71.0	30.042	71.0		
	30.030	71.0.	30.047	71.1	30.037	71.3		
	30.032	71.0	30.045	71.2	30.037.	71.3		
	30.030		30.045	71.3	30.036	71.5		
Mean	30.032	71.0.	30.047.	71.2.	30.038	71.3.		

Nov 23rd 1910

1156 (29.5 −.012; 30.0 −.012)		1668			1667			
30.182	69.8°F	0.0	~~[illegible]~~	69.0°F	0.0	30.165	69.4°F	
30.186	70.2°F	0.0	30.165	69.6°F	0.0	30.165	69.4°F	
30.186	70.0°F	0.0	30.165	69.3°F	0.0	30.162	69.4°F	
30.182	70.0°F	0.0	30.165	69.3°F	0.0	30.160	69.5°F	
		0.0	30.165	69.5°F	0.0	30.150	69.6°F	Time 4pm
		1.960	32.150	69.7°F	2.005	32.147	69.8°F	
30.184	70.05	1.960	32.150	69.7°F	2.005	32.147	69.8°F	
		0.0	30.160	69.8°F	0.0	30.155	69.8°F	
		0.0	30.165	69.3	0.0	30.164	69.4.	
30.034	70.2	0.0	30.017	70.0	0.0	30.015	70.0.	
30.036	70.3		30.012.	70.0	0.0	30.015	70.0	
30.032	70.2.		30.018	70.0	0.0	30.010	70.2	
30.030	70.5	0.0	30.015.	70.2	0.0	30.010	70.2	
		0.0	30.015	70.5.	0.0	30.000	70.8.	
		2.190.	32.180		2.290	32.272		
		2.185	32.180		2.290	32.272		
		0.0	30.010	71.0.	0.0	30.000	70.8	
30.033	70.3.	0.0	30.015	70.0.	0.0	30.012	70.1	

	1480		1163		1157		A482	
24/11/10								
16–22	29.920	72.7	29.937	73.0	29.930	73.5	29.930	74.6
	29.918	72.7	29.937	73.6	29.925	73.7	29.926	74.7
	29.916	73.0	29.932	73.7	29.926	73.7	29.926	74.8
	29.918	73.0	29.932	73.5	29.925	73.7	29.925	74.7
Mean	29.918	72.8	29.934	73.5	29.927	73.7	29.927	74.7
25/11/10	29.713	74.8	29.730	74.8	29.718	75.0	29.720	76.0
3.30 pm								
to								
4.15 pm								
	29.706	74.8	29.728	75.0	29.714	75.0	29.718	75.8
	29.709	74.8	29.725	75.0	29.713	75.0	29.715	76.1
	29.710	75.0	29.730	75.0	29.715	75.0	29.716	76.1
Mean	29.710	74.8	29.728	75.0	29.715	75.0	29.717	76.0

1156		1168				1667		
29.927	74.0	0.0	29.911	73.2	0.0	29.905	73.5
29.927	73.8	0.0	29.907	73.8	0.0	29.900	73.5
29.926	73.7	0.0	29.905	73.8	0.0	29.900	74.0
29.925	73.7	0.0	29.906	73.8	0.0	29.900	74.0
		0.0	29.907	74.0	0.0	29.900	74.0
		2.193	32.085		2.285	32.167	
		2.190	32.081		2.282	32.165	
		0.0	29.908	74.0	0.0	29.902	74.0
29.926	73.8	0.0	29.907	73.7	0.0	29.901	73.7
29.721	74.0	0.0	29.700	74.6	0.0	29.692	75.0
		2.550	32.220	74.6	2.280	31.955	74.8
		2.550	32.220	74.6	2.280	31.952	74.8
		0.0	29.695	74.6	0.00	29.692	75.0
29.712	75.1	0.0	29.693	75.0		~~29.695~~	~~75.0~~
29.712	74.9	0.0	29.695	75.0	0.0	29.695	75.2
29.716	75.0	0.0	29.695	75.0	0.0	29.692	75.2
29.715	75.0	0.0	29.696	74.8	0.0	29.693	75.0

Air correction at Lyttelton.

Bar No 1668 Top of tube 33·2"

1·960. 32·150 = 30·190.

0·000 30·162. ∴ d = 00·028

3·038) 1·050

$v_2 = 33·2 - 32·150 = 1·050$

$v_1 = 33·2 - 30·162 = 3·038$ $\frac{v_2}{v_1} = ·346$

Bar No 1668. Top of tube = 33·2"

32·083 29·907

2·192 00·000

29·891 29·907 ∴ d = ·016

v_1	v_2			
33·200	33·200			
29·907	32·083			
3·293	1·117	$\frac{V_2}{V_1}$ = ·311	$1-\frac{V_2}{V_1}$ = ·689	

$h_1 = \frac{·311 \times ·016}{·689} = ·0072.$

Bar No 1668.

32·180 30·012

2·187 00·

29·993 30·012 ∴ d = ·019

v_1	v_2			
33·200	33·200			
30·012	32·180			
3·188	1·020	$\frac{V_2}{V_1}$ = ·32.	$1-\frac{V_2}{V_1}$ = ·68	

$h_1 = \frac{·32 \times ·019}{·68} = ·0089$

Bar No 1668. Top of tube 33·2"

32·220 29·697.

2·550 00

29·670 29·697 ∴ d = ·027.

v_1	v_2			
33·200	33·200			
29·697	32·220			
3·503	·980	$\frac{V_2}{V_1}$ = ·280	$1-\frac{V_2}{V_1}$ = ·720	

$h_1 = \frac{·280 \times ·027}{·720} = ·012.$

Mean air.

·009

·007

·012

·009.

Bar No 1667. Top of tube 33·3

32·147	30·152
2·005	00·
30·142	30·152. ∴ d = ·010.

33·300	33·300.	$\frac{V_2}{V_1}$ = ·476	$1-\frac{V_2}{V_1}$ = ·524
30·150.	32·150.		
3·150	·150.		

$$h_1 = \frac{·010 \times ·476}{·524} = ·009.$$

Bar No 1667. Top of tube 33·3

32·272	30·000
2·290	00·
29·982	30·000 ∴ d = ·018

33·300	33·300	$\frac{V_2}{V_1}$ = ·305	$1-\frac{V_2}{V_1}$ = ·695
30·000	32·272		
3·300	1·028.		

$$h_1 = \frac{·018 \times ·305}{·695} = ·008$$

Bar No 1667. Top of tube 33·3.

32·166.	29·901.
2·283	00·000
29·883	29·901 ∴ d = ·018

33·300	33·300	$\frac{V_2}{V_1}$ = ·302	$1-\frac{V_2}{V_1}$ = ·698
29·901	32·166		
3·400	1·134		

$$h_1 = \frac{·018 \times ·302}{·698} = ·008.$$

Bar No 1667. Top of tube 33·3.

31·953	29·692.
2·280	00·
29·673	29·692 ∴ d = ·019

33·300	33·300	$\frac{V_2}{V_1}$ = ·375	$1-\frac{V_2}{V_1}$ = ·625
29·692	31·953		
3·608	1·347		

$$h_1 = \frac{·019 \times ·375}{·625}$$

·011

·009	31
·008	
·008	
·011	
·009	Mean

Temp.	1480			1163			1157			A 482			1156			1668			Mean press from all bars except 1480
70.	30.185 dt = +.8	+.002	30.187			---	30.190 −.5	−.001 −.010 −.011	30.179.				30.184 .00	.000 −.012 −.012	30.172	30.165 +.7	+.002. ±.002 +.009. +.009	30.173.	30.173
71.	30.032 00	000	30.032	30.047 −.2	−.000 −.005	30.042	30.038 −.3	−.001 −.010 −.011	30.027				30.033 +.7	+.002 −.012 −.010	30.023	30.015 +1.0	+.003 −.002 +.009 +.010	30.025 ~~[illegible]~~	30.027
73.7.	29.918 +.9	+.003	29.921	29.936 +.2	.000 −.005	29.929	29.927 00	.000 −.010	29.917	29.927 −1	−.003 −.005 −.008	29.919	29.926 −.1	.000 −.012	29.914	29.907 00	000 −.002 +.009	29.914 ~~[illegible]~~	29.916
75.0	29.710 +.2.	000	29.710	29.728 .00	.000 −.005	29.723.	29.715 00	000 −.010	29.705.	29.717 −1	−.003 −.005 −.008	29.709	29.715 00	000 −.012	29.703	29.696 +.2	.000 −.002 +.009	29.703 ~~[illegible]~~	29.706

~~Assuming that correct press is given by the mean of all the fully corrected bars we have the following variation of each fully corrected bar. No 1480 is neglected as we have no Kew correction for this bar. (over)~~

			~~3.830~~						3.820						3.812				
Mean.						29.972.			29.957						29.953.				

1667

Variation of each bar reading from mean of all barometers. (not fully corrected).

			1668	1163	1157	A482	1156	1667
				Ship	West part	Ship afore	East part	West part
30·164	+·002 −·006 +·009	30·169.						
+0·6	+·005							
			~~−·000~~		~~+·006~~		~~−·001~~	~~−·004~~
30·012	+·003 −·006 +·009	30·018	−·002	+·015	·000		−·004	−·009.
+0·9	+·006	~~30·024~~	−·002	+·013	+·001	+·003	−·002	−·012
			−·003	+·017.	−·001	+·003	−·003	−·010
29·901	000 −·006 +·009	29·904	−·002	+·015	000	+·003	−·003	−·010
00		~~29·910~~						

− sign means bar when fully corrected reads too low

−	+	−	−	−	−	
	−	−	−	−		ship.

29·693	000 −·006 +·009	29·696
00		~~29·706~~

Times for International Magnetic Runs.

Two hours consecutive quick runs at following dates and hours G.M.T. 0h. 0m a.m. = Greenwich midnight.

Runs from 8 am to 10 am G.M.T

May 29
June 2. 26. 30. } 1911
July 24. 28.

Runs from 5 p.m. to 7 p.m. G.M.T on

May 22. 26.
June 19. 23. } 1911
July 17. 21

Runs from 6 p.m. to 8 p.m. G.M.T on

November 20. 24
December 18. 22 } 1911
January 22. 26 1912.

Three pillars in hut.

11ft sq outside 1" wood.
Height 38". 14" below surface of floor
filled with 1 imbedded up to floor in
dust sand. Sand under floor all frozen.

Comparison of barometers at Cape Evans.

Monday Aug 21 1911

Time	Bar.	Lower vernier	upper vernier	Diff	A.T.
16-5.	1157		29·212	4.	48·8.
8.	1667	0·000	29·211		54·1
15	"	2·500	31·696.	29·196	
17.	"	0 000	29·211		54·4
19	1157.		29·215		49·0.
	1667	0·000	29·210.		55·0
	"	2·500	31·700.	29·200	
26	"	0·000	29·212.		55·0
29	1157		29·210		49·0
	1667	0·000	29·209		55·2
	"	2·500	31·697.	29·197	
35.	"	0 000	29·208		55·3
37	1157		29·209		49·0

Bar No 1667. Top of tube 33·3"

Mean upper readg	Mean lower readg
29·196	29·211
29·200	211
29·197	210
·593	212
29·198	209
	208
	29·210

$v_2 = 33·3 - 31·698 = 1·6$

$v_1 = 33·3 - 29·210 = 4·1$

$\frac{v_2}{v_1} = ·39$

$1 - \frac{v_2}{v_1} = ·61$

Mean t
54·1
54·4
55·0
55·0
55·2
55·3
50
54·8.

$d = 29·210 - 29·198 = ·012$

$h = \frac{·39 \times ·012}{·61} = ·00765 = ·008.$

Bar No 1157 :

Mean.	Mean t.
29·212	48·8
215	49·0
210	49·0
209	49·0
46	48·9
29·212	

·01 × ·6 = ·004

·610) ·004000 (·00

over.

Bar 1667.

Correction. air	+·005.
— temp	−·069
— bar (Kew)	−·006
Total correction	−·067.

Pressure = 29·210 − ·067 = 29·143

Bar 1157

Correct temp	−·054
— bar	−·010
Total.	−·064

Pressure = 29·212 − ·064 = 29·148

Diff = ·005 1157 being the higher

In Lyttleton

diff = ·010 1157 being the higher

Note on Correction of Fuess Barometer

In the Introduction to the Smithsonian tables attention is drawn (page xv) to an error caused by using the English tables for reduction to standard temperature when the barometer is graduated according to the metric method. The Fuess barometers are graduated both in inches & millimetres, but an inspection shows that the inch graduation is only the metric one converted. As the latter is correct at 0°C the former will also be correct at this temperature and not at 62° F for which the reduction tables are constructed. Hence the method to be employed in determining the correction is either to read the metric scale & convert the English measure into millimetres & the F scale into centigrade and use the metric tables. This has not been done in the reductions made in this book, so on the following

pages the calculations are remade according to this procedure.

Bar No 1667.

Fuess barometer at Cape Evans

Determination of correction at Kew

Mean results of all the readings (Kew bar with its correction of +·009 added).

Kew bar. 29·766

" temp 65·7.

Temp correction −·099.

∴ Mean pressure at Kew = 29·667 inches

Fuess bar. No 1617: 29·750 inches = 755·65 mm

" " temp 66·3°F = 19·06°C.

Temp correction = 2·35 mm = −·092 inches

air correction +·019

−·073

Mean press = 29·750 − ·073 = 29·677.

Hence instrument correction of Fuess bar No 1667

= 29·667 − 29·677 = −·010

Comparison of Kew barometer No 1157 (Cape Evans standard) and Fuess bar No 1667 at Lyttelton.

1157.	t.	1667.	t.
30·190	70·5	30·164	69·4
30·038	71·3	30·012	70·1
29·927	73·7	29·901	73·7
29·715	75·0	29·693	75·0
Mean. 29·968	72·6	29·943 in.	72·0° F
		= 760·56 mm	22·2° C

Temp correction −·119 2·75 mm = −·108.

Kew correction − −·010 −·010.

air correction +·009

Total correction −·129 −·109.

Corrected pressure 29·839 29·835

Difference between Fuess bars fully corrected at Lyttelton = ·004 No 1157 being the higher.

1st Comparison at Cape Evans.
Aug 21. 1911

1157	t.	1667.	t.
29·212.	48·9.	29·210.	54·8.
	= 741·94 mm		12·67°C.
temp correction	−·054.	1·52 mm =	−·060.
Kew "	−·010		−·010.
		air correction	+·008
Total correction	−·064.		−·062.
Corrected pressure	29·148		29·148

i.e. Two barometers agree exactly

Fuess barometer No 1668.
(Cape Adare Fuess bar).

Determination of correction at Kew.

Fuess bar 1668. 29·753 = 755·73 mm
" " temp 66·1°F = 18·94°C.

Temp correction = 2·34 mm = −·092. inches.
air correction = +·016
Total correction −·076. inches.
Pressure 29·677
Kew standard " (see above) 29·667

∴ Kew Correction of No 1668 = −·010.

Comparison of No 1668. with Nos 1667 + 1157 at Lyttelton (Nov 22. 24. 25. 1910.)

Bar No 1668.	30·165	69·3.
	30·015	70·0
	29·907	73·7
	29·696.	74·8.
Mean.	29·946.	72·0.

Pressure 29·946 inches = 760·50 mm.

Temp. 72·0°F = 22·2°C.

Temp correction = 2·75 mm = −·108 inches.

Kew correction −·010.

Air correction +·009.

Total correction −·109

Corrected pressure	Bar No		Departure from mean
	1668.	29·837	−·003
" "	1667	29·835	−·005
	1157	29·839.	−·001
	1156	29·834	−·006
	1163	29·854	+·014
	Mean	29·840	

Hypsometer Test. Tues Oct 31 1911

Hypsometer	Thermometer	Boiling Point	Correction	Corrected B.P.	Pressure
	139690	211·00	−·20	210·8	29·21
	139689	210·90	−·20	210·7	29·16
	139692	211·00	−·10	210·9	29·27

Bar 29·160. AT 42·0 Mean pressure. 29·21.

Correction +·024 (temp + gravity)

29·184

Comparison of Wulff Electroscope

Nov 25 1911

2806	2807	2808	2806	2807	2808.
150·2	152·2	–	295·0	297·5.	
131·3	132·1	146·7	257·0	261	280·0
113·2	112·8	125·0	222·5.	224·5.	242·0
96·7	95·0	105·1	191·0	191·5.	206·5.
78·0	75·7	84·0	155·0	156·	169·0.
59·0	55·1	62·0	116·5.	116·0	126·0.
37·8	34·7	40·0	77·5.	76·5.	83·5.
17·2	14·0	18·9	36	33	39·5.

Comparison of Barometers.

Cape Evans. Thurs Jan 11 1912.

Time	Bar.	Lower Vernier	Upper Vernier	Diff	AT.
9-51.	1157.		29·374		50·0
	1667	0·000	29·367.		11° C.
	1667	2·500	31·855	29·355	
	1667	0·000	29·366.		11·0 C
10-02.	1157		29·374		50·0
10 .13	1157		29·375.		49·8
		0·000	29·366		11·0
		2·500	31·856.	29·356	
		0·000	29·367.		11·3
10·21			29·375.		50·1
10·30			29·375.		50·6
		0·000	29·369		11·5
		2·500	31·864	29·364	
		0·000	29·369,		11·7
10 37			29·374		50·8

Air correction.

Mean Upper reading	Mean Lower reading.
29·355	29·367
29·358	366
29·364	366
25	367
Mean 29·358.	369
	369
	Mean 29·367

Top of Tube 33·3.

$v_2 = 33·3 - 31·9 = 1·4$

$v_1 = 33·3 - 29·4 = 3·9$

$\frac{v_2}{v_1} = ·36$

$1 - \frac{v_2}{v_1} = ·64$

$h_1 = \frac{\frac{v_2}{v_1} d}{1 - \frac{v_2}{v_1}}$

$d = 29·367 - 29·358 = ·009$

$h_1 = ·005.$

Bar No 1667.

Mean Lower reading = 29·367 = 745·91 mm.

AT = 11·0 = 11·2°C.
11·0
11·0
11·3
11·5
11·7
·15

Correction = 1·36 mm
= ·054 inches.

Correction { air = +·005
temp = −·054.
inst. −·010. }
−·059

∴ P = 29·367 − ·059
= 29·308

Bar No 1157.

29·374	50·0
74	50·0
75	49·8
75·	50·1
75·	50·6
76·	50·8.
29·375	50·2.

Correc= temp −·057
− inst −·010.
−·067.

P = 29·375 − ·067 = 29·308

Diff mil

Comparison of Ships & Cape Evans Barometer.

Height above sea level approx the same.

March 4 1912.

	Time				Read by
(1)	6·00.	Ship 1163.	29·235.	29·5	Self & Cs
(2)	6·20	Hut	29·230	34·0.	Gbl.
(3)		Ship	29·227.	(27·0?)	Pennell
(4)	6·55.	Hut	29·222.	34·0	Cs
(5)	7·05.	Ship	29·208	23·8.	Cs

	Ship 1163		Hut 1157.	
	29·235.	29·5	29·230	34·0
	29·208	23·8.	29·222.	34·0.
Mean	29·222.	26·2.	29·226.	34·0.
Hut correct	+ ·007		- ·014.	
	29·229		29·212	
Kew correct	- ·005		- ·010	
	29·224		29·202.	

Diff = ·022 ship bar being the higher

Taking 2 & 3 only as these were read exactly at the same time.

	Ship 1163	Hut 1157.
	29·227 (27)	29·230 (34)
Temp corr	+ ·004	- ·014
Kew Corr	- ·005	- ·010
	29·226.	29·206.

Diff ·020 ship bar being the higher

Comparison of Barometers at Lyttelton

		Kew correct		Kew correct		Kew correct		Kew correct
Tues April 9 1911	A 482	-010	1121	+002	1163	-005.	1156	-012.
	Ship Mean.		Lyttelton Standard.		Ships.		Eastern Party.	
	Mercury not run down.		29·670	68.	29·680.	67.	29·684	67.
			29·670	68	29·685	67.	29·688.	67
			29·672	68	29·685	67	29·688.	67
			29·672	68.	29·685	67	29·688.	67
			29·671	68	29·684		29·687	67
			+002		-005		-012	
			29·673		29·679.		29·675.	
Wednesday April 10 1911 3 p.m.			30·002 ~~30·001~~	62	30·010	61	30·016	62
			30·002	62	30·010	61	30·014	62
			30·002	62	30·015	61	30·012	62.
			30·002	62	30·010	61	30·014	62
			30·002	62	30·011	61	30·014	62.
			+002		-005		-012.	
			30·004		30·006		30·002	

Comparison of Fuess Standard with Station Bar (Cape Evans)

During the second year comparisons were made on three days. There appears however to have been something wrong with the setting of the lower vernier of the Fuess bar, as the bar was higher when the air was compressed into a small space, than when it occupied the full space.

The readings with raised mercury have therefore been rejected. Taking the lower readings we get the following result

Comparison May 13 1912

	Fuess bar. No 1667.		Station bar 1157.	
	h.	t.	h.	t.
	741·21.	13·9.	29·162	48·1
	741·37.	14·0.	29·171.	48·8.
	741·47	13·7.	29·178.	49·1
	741·77.	14·5.	29·186.	49·7.
	741·97.	14·4	29·198.	49·8
	742·20.	16·6	29·200	49·2
Mean	741·66	14·2	29·182.	49·1.
t. cor	−1·71		−·054.	
	739·95 mm		29·128	
=	29·132.			
Inst cor.	−·010.		−·010	
P	29·122		29·118	

Comparison Jan 1 1913.

Fuess bar 1667.		Station bar 1157.	
b.	t.	b.	t.
734·95.	13·7	28·936	53·5
735·00.	14·3	28·936	53·3
735·00.	14·0	28·936	53·3
735·02	14·4	28·936	53·2
735·02	14·2	28·936	53·1
735·05.	14·5	28·936	53·0
735·01.	14·2	28·936	53·2.
temp cor. −1·70.		−·064	
733·31 mm.			
28·870"		28·872	

Comparison. Oct 1 1912.

751·17.	42·8	29·572	38·1
751·10.	44·0	29·571	38·4
751·14	43·4 = 6·3°C	29·572.	38·2.
temp cor −·77		−·025	
750·37		29·547	
= 29·542.			

The comparison on May 13 was taken while the barometer was rising rapidly. the change being ·038" during the comparison lasting over an hour. The other two comparisons were made when the barometer was steady. The comparison on Oct 1 was only of two readings. The observation Jan 1st was very good + in taking the mean difference this has been weighted twice

allowing ·005 for air.

Date.	Station bar.	Fuess	difference.	
May	29·122	29·118.	+·004.	−·001
Oct.	29·537	29·532.	+·005	·000
Jan	28·862.	28·860.	+·002.	~~(2)~~·003.
		~~Mean.~~	~~+·004~~.	

No correction has been allowed for air, allowing the same amount as found previously (·005) the difference between the two barometers was ~~on the average ·004 the Fuess reading~~ ~~the Station~~ is shown in the last column

Bedroom goods (in hold)

L 1. Balance (in inst room) ✓
L 5. Chemicals. ✓ L. 2 ✓ 4 ✓ 3 ✓
L 6. Assortment. ✓
L 8. Glass tubing (acid) ✓
L 9. Flasks. ✓
L 10. Zinc sulphate ✓
L 11. Ammon chloride ✓
L 12. Copper sulphate & sulphur ✓
L 13. Chemicals ✓
L 14. Kieselguhr. 1 plaster of Paris. ✓
15. Assortment. ✓

L ✓6 boxes accumulators.
L ✓1. Case of sulphuric acid.
L ✓1 Case Bunsen rolls.
L ✓1 Case Bromide papers.
✓1 Hygrom clocks. for Melbourne.

L A. ✓ Petrol engine.
L B. ✓ Case with
L ✓C. } Calcium Hydride
L ✓D
L ✓E
L ✓F
L G. ✓ Balloons 2 Cases ✓
L ✓H. Balloon inst, hydrogen generator etc.
L ✓I. Small box glow lamps (in inst room)
L ✓J. Pendulum
L ✓K. " clock
(2) ✓L " comparing apparatus
L M. Pendulums.
✓L N. Dines pressure tube anemometer
✓L O. " " 2 tubes.
✓ P. Stoves.

IX ✓

~~XI~~ Hg, ink, thermo drum, oil for cut off

L bell adjments,

Anem^r recording tapes

Electrode

6 reels Cu wire insd.

Zn wire

~~Anem^r vanes~~

All. wind dirn recorder apps ~~but~~ except

brass rods

Clock for wind dirn recorder

Support for small cond^y cylinder

15 ohm res^ce bell (closed) (6" ...)

L X ✓ large glass t tubes

+ fur coat

(Closed)

XI ✓ Insulated wire ✓

L XII ✓ 3 Bendorf inst^s

L XIII ✓ metal tubes of different kinds.

Few tools & nail drawer.

L XV ✓ Glass slips ✓

VI ✓

L ~~XV~~ Fwind vanes

rods for wind dirn recorder & paper rolls,

& marker,

large res^ce with Ammeter & Voltr,

Cu Zn couples.

~~wind dir~~ anem^r recording box

Anem^r vane.

1 box Benndorf Accessories. 1 box Benndorf glass bells, & watch oil.

Galvanized iron tank. = V ✓

L ~~small t tubes.~~

2 litre bottles with taps

2 Bendorf needle boxes

Bolts for cond^y tube

spares for motors & dyn. brushes &c.

~~... watch ... oil~~

Cylinder for conductivity recorder

~~... tube (metal & ...)~~.

Cylinder for wind recorder

VI ✓ wind vanes

~~tube~~ for cond^{y} expt

wind ~~wire rec^{r}. marker &c. & stand~~ (not clock)

~~wire no. 28, 27, 30, 26 & 23~~

~~flex cord & Lx wire~~

Anem^{t} vanes

~~other electrode~~

~~Thermograph drum~~

~~electric tape~~

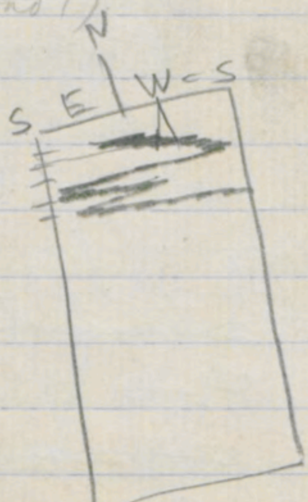
~~spring ink~~

VIII ✓ Anem^{t} recording apps in box

L 2 fans

~~support for small cylinder (cond^{y})~~

3 Armatures



IV ✓ 2 small res^{ces}

L 3 dry batteries

whole Thermograph outfit + 3 glass tubes

flexite

insulators for pot^{l} grad^{t}.

lead washers. Flexible metal & india rubber.

pointed iron tube for engine cylinder.

cup for head of wind vane.

VII ✓ small conical glass tubes for Daniell's

L support for large cond^{y} cylinder

small cond^{y} tube

incand^{t} lamps

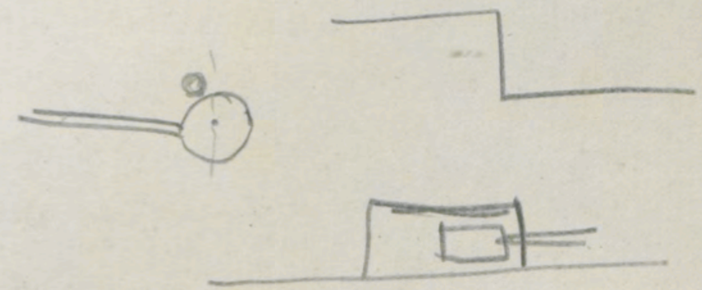
Closed

1 fan

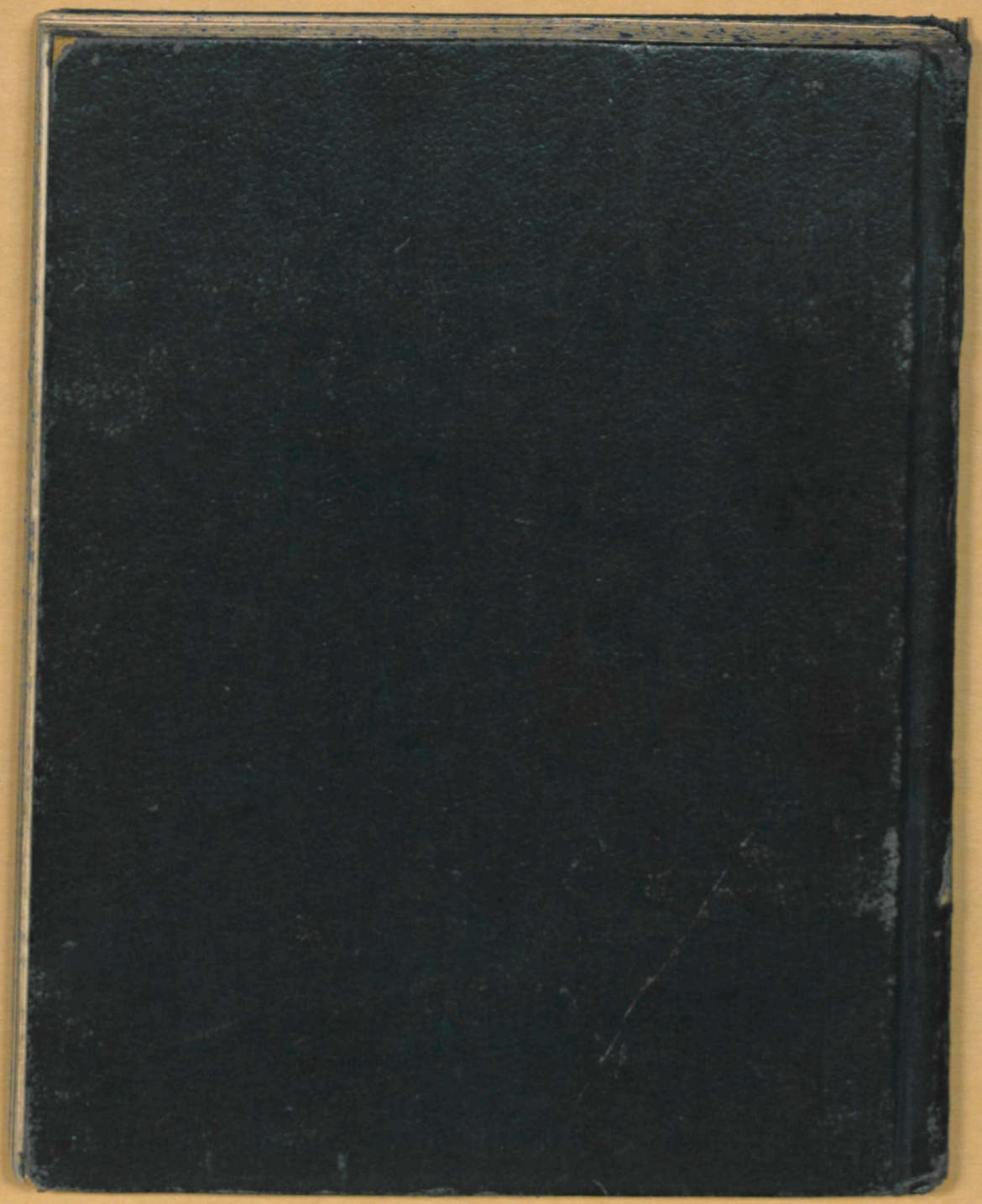
L No I ✓ 2 motor [illegible] 3 relays,
/ bells, (2)
1 double bells as for Beadorf.
1 ~~clock~~ Clock +1
bell insides 1+1

L II ✓ Dynamo + base
~~2 motor [illegible]~~ + bolts

III ✓ motor
L 2 Ammeters
fan frames
cut out.
2 bells.
Rad. Counter
1 elect^{de} + [illegible] for cond^{y}. determ^{ns}
multiple switch
fuse box
3 dry cells.



15
15
75
15
225



Günther & Tegetmeyer
Braunschweig.

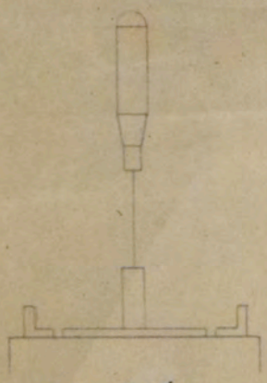
Elektroscop No. 1181.

	0	1	2	3	4	5	6	7	8	9	
0											0
1											1
2											2
3											3
4	33,5	37,4	41,9	43,3	44,4	46,1	44,5	48,9	50,3	51,7	4
5	53,1	54,5	55,9	57,3	58,4	59,5	60,3	61,2	62,1	62,9	5
6	63,4	64,6	65,4	66,3	67,1	68,0	69,0	70,0	70,8	71,8	6
7	72,4	73,6	74,6	75,5	76,1	76,8	77,4	78,1	78,4	79,3	7
8	80,0	80,6	81,3	81,9	82,5	83,2	83,8	84,5	85,2	85,9	8
9	86,6	87,3	88,0	88,4	89,4	90,1	90,8	91,5	92,2	92,8	9
10	93,4	94,0	94,6	95,2	95,8	96,4	94,0	94,6	98,2	98,8	10
11	99,4	100,0	100,6	101,0	101,4	102,2	102,4	103,2	103,8	104,3	11
12	104,8	105,3	105,9	106,4	106,9	107,4	108,0	108,5	109,0	109,5	12
13	109,9	110,4	110,9	111,3	111,8	112,3	112,4	113,2	113,7	114,1	13
14	114,6	115,1	115,5	116,0	116,5	116,9	117,4	117,9	118,5	119,0	14
15	119,5	120,0	120,6	121,1	121,6	122,1	122,7	123,2	123,7	124,2	15
16	124,8	125,3	125,8	126,3	126,8	127,4	127,9	128,4	128,9	129,4	16
17	129,9	130,5	131,0	131,5	132,0	132,5	133,1	133,6	134,1	134,6	17
18	135,1	135,6	136,1	136,6	137,1	137,6	138,1	138,5	139,0	134,5	18
19	140,0	140,5	141,0	141,5	142,0	142,5	143,0	143,6	144,1	144,6	19
20	145,1	145,4	146,2	146,4	147,2	147,8	148,3	148,8	149,3	149,9	20
21	150,4	150,9	151,3	151,8	152,2	152,8	153,1	153,6	154,0	154,4	21
22	154,9	155,3	155,8	156,2	156,6	157,1	157,5	158,0	158,4	158,9	22
23	159,3	159,8	160,2	160,4	161,2	161,6	162,1	162,6	163,0	163,5	23
24	164,0	164,4	164,9	165,4	165,8	166,3	166,8	167,2	167,7	168,1	24
25	168,5	169,0	164,4	169,8	140,2	140,6	141,1	141,5	141,9	142,3	25
26	142,4	143,1	143,6	144,0	144,4	147,8	145,2	145,7	146,1	146,6	26
27	144,1	144,4	148,2	148,4	149,2	149,4	180,2	180,8	181,3	181,8	27
28	182,3	182,8	183,4	183,9	184,4	184,8	185,2	185,4	186,1	186,5	28
29	186,9	184,3	184,8	188,2	188,6	189,0	189,4	189,9	190,3	190,4	29
30	191,1	191,5	192,0	192,4	192,8	193,2	193,6	194,0	194,4	194,6	30
31	195,2	195,6	196,0	196,4	196,8	197,2	197,6	198,0	198,4	198,8	31
32	199,2	199,6	200,0	200,4	200,8	201,2	201,6	202,0	202,4	202,8	32
33	203,3	203,6	204,0	204,4	204,8	205,2	205,6	206,0	206,4	206,8	33
34	207,2	207,6	208,0	208,4	208,8	209,2	209,6	209,9	210,2	210,6	34
35	210,9	211,2	211,5	211,9	212,2	212,5	212,8	213,2	213,5	213,8	35
36	214,1	214,4	214,8	215,1	215,4	215,7	216,1	216,4	216,7	217,0	36
37	217,4	217,7	218,0	218,2	218,5	218,7	219,0	219,2	219,4	219,6	37
38	219,9	220,1	220,3	220,6	220,8	221,0	221,3	221,5	221,7	221,9	38
39	222,2	222,4	222,7	222,9	223,1	223,4	223,6	223,8	224,1	224,3	39
40	224,5	224,8	225,0	225,2	225,5	225,7	225,9	226,2	226,4		40
	0	1	2	3	4	5	6	7	8	9	

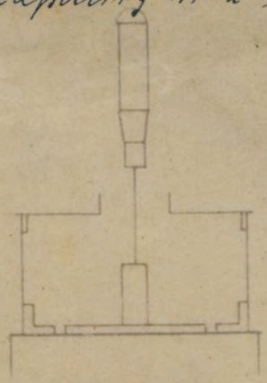
Die Kapazität ohne Zuleitungsstift und ohne Elektroskopdeckel ist 4,4 cm, mit metallischem Zuleitungsstift = 6,5 cm.

Braunschweig, den 3. September 1909

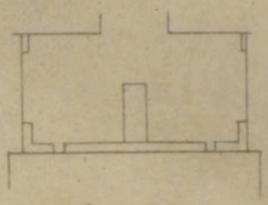
Capacity with insulated Vessel = 3,84 cm



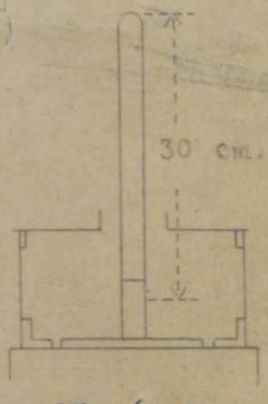
C1 = 3,21 cm



C2 = 3,54 cm

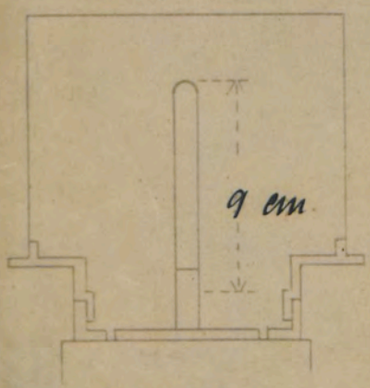


C3 = 2,33 cm

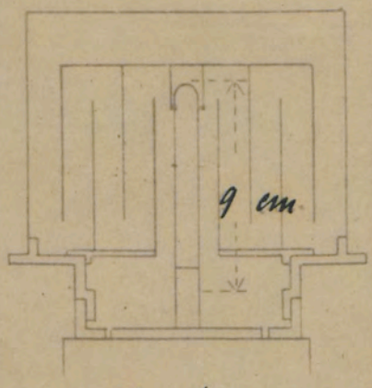


C4 = 6,45 cm

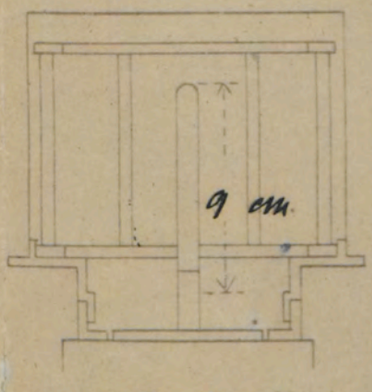
Kapazitätsverhältnis n = C3/C4 = 0,36



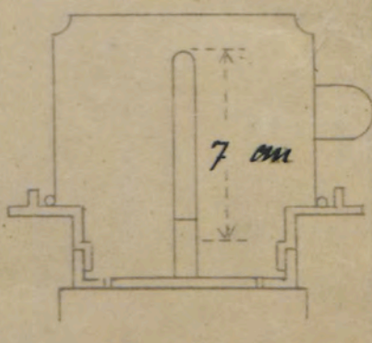
C5 = 3,70 cm



C6 = 6,8 cm



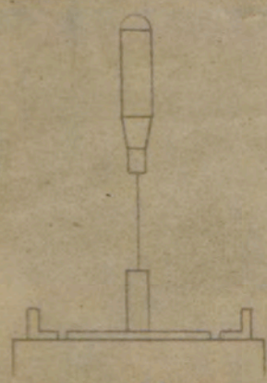
C7 = 3,72 cm



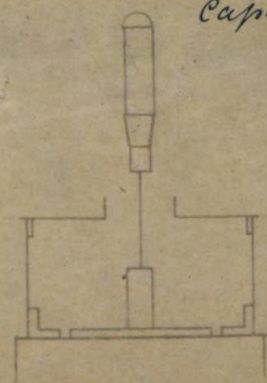
C8 = 3,42 cm

Kapazitäten des Elektrometers nach Wulf № 2808 Braunschweig, den 6. V. 10.

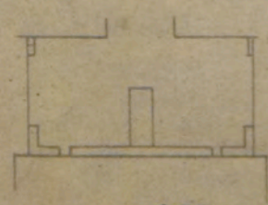
Capacity with insulated Vessel = 3,91 cm



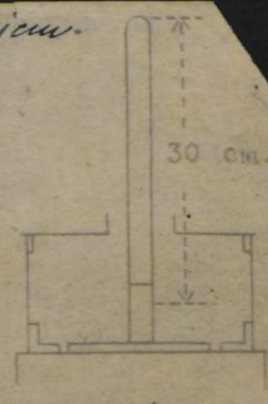
C1 = 3,32 cm



C2 = 3,62 cm

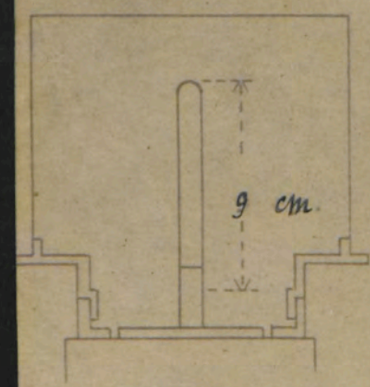


C3 = 2,31 cm

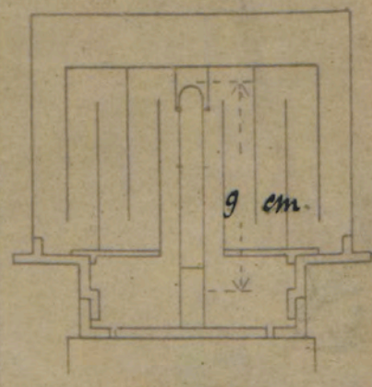


C4 = 6,40 cm

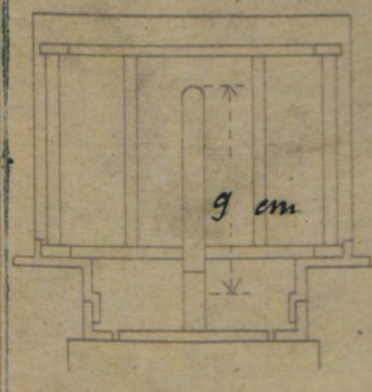
Kapazitätsverhältnis n = C3/C4 = 0,36



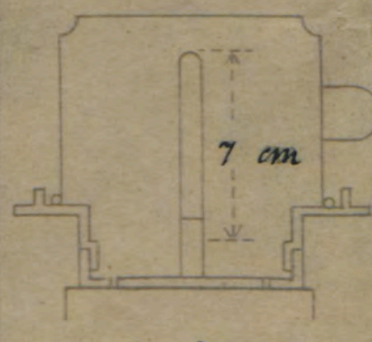
C5 = 3,72 cm.



C6 = 6,0 cm.



C7 = 3,74 cm.

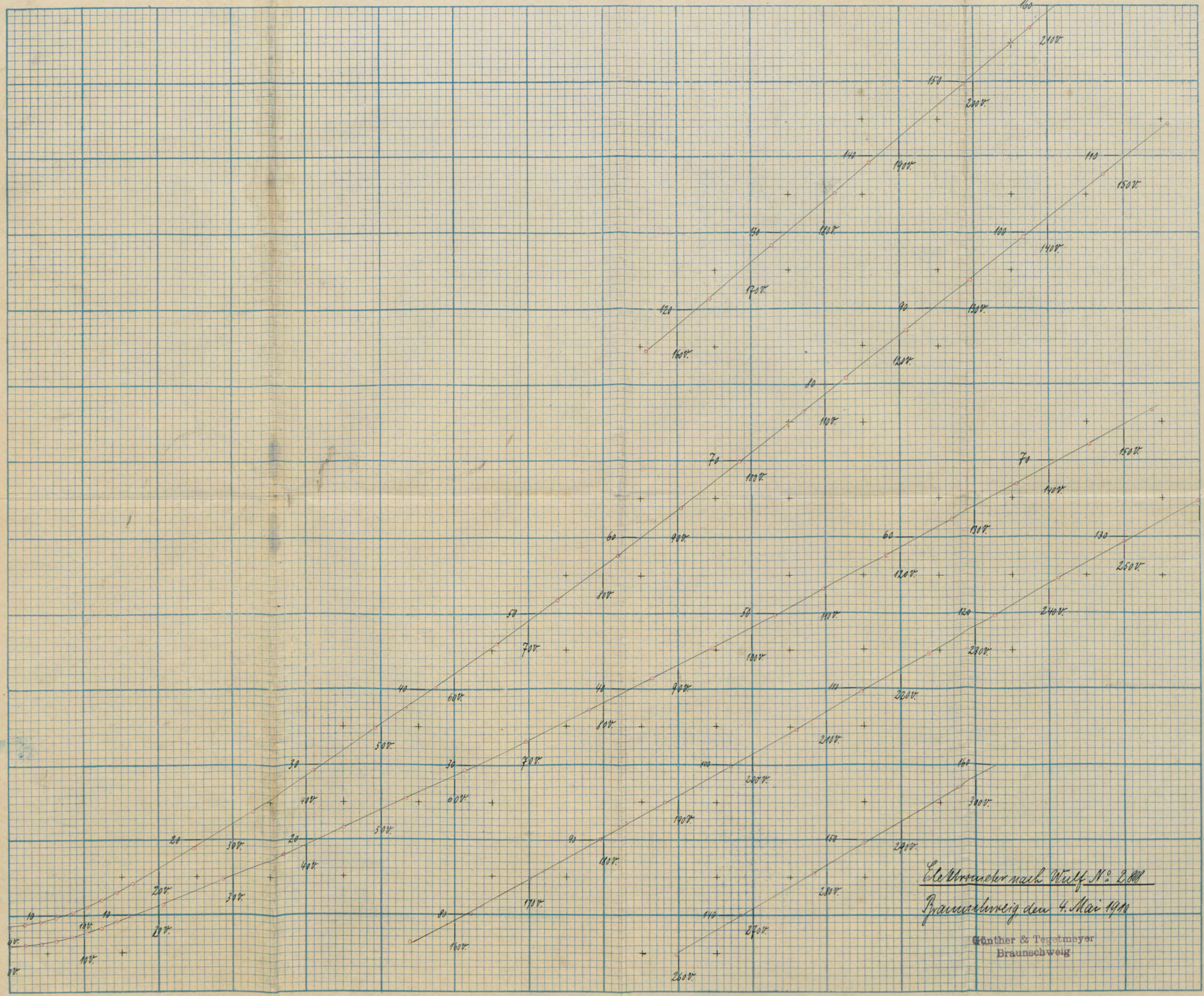


C8 = 3,40 cm.

Kapazitäten des Elektrometers nach Wulf № 2806 Braunschweig, den 6. V. 10.

Elektrometer nach Vorl. N°. 2806

Braunschweig, den 4. Mai 1910


160
210V.
150
200V.
140
190V.
130
180V.
120
170V.
160V.
110
150V.
100
140V.
90
130V.
120V.
80
110V.
70
100V.
90V.
60
80V.
50
70V.
40
60V.
50V.
30
40V.
20
30V.
20V.
10
10V.
0V.
70
150V.
140V.
130V.
120V.
110V.
100V.
90V.
80V.
70V.
60V.
50V.
40V.
30V.
20V.
10V.
0V.
120 233
70 = 141
50 = 92
1 = 1,84
Elektrometer nach Wulf No. 2.888
Braunschweig, den 4. Mai 1910
Günther & Tegetmeyer
Braunschweig