

KG
11366
v. 765

*Investigation of Errors of West
Circle from Stops.
Results for 1° and 5° Spaces.
1885*

L12

West Circle.

Single degrees $87^{\circ} - 102^{\circ}$

Microscope E

	1885 Apr. 15	16	17	27	30	May 1	Mean	Σ	180+E	1837
87-88	+6.70	5.80	6.97	7.10	7.32	7.13	6.85	+0.6 -0.6	-0.6	-0.6
88-89	6.92	5.70	6.97	7.57	7.67	7.30	7.02	+1.1 +0.5	+0.8	+1.4
89-90	5.02	5.33	5.53	7.60	8.13	7.13	6.53	-.38 -3.3	+1.0	+0.2
90-91	5.53	5.37	7.23	7.83	8.03	6.50	6.75	-.16 -4.9	+4.6	+3.6
91-92	5.70	5.97	6.70	8.13	9.13	8.87	7.42	+5.1 +0.2	+1.2	-3.4
92-93	5.30	5.33	7.13	8.10	8.80	7.17	6.97	+0.6 +0.8	-0.2	-1.4
93-94	3.97	4.60	6.10	6.87	7.17	6.83	5.92	-.99 -9.1	-6.3	-6.1
94-95	4.73	5.10	6.80	7.80	8.50	7.13	6.68	-.23 -1.4	-3.6	+2.7
95-96	5.30	4.83	7.38	8.33	8.87	7.50	7.04	+1.3 -1.0	-7.4	-3.8
96-97	6.17	6.23	7.20	8.43	9.00	7.13	7.36	+4.5 -5.6	-4.4	+3.0
97-98	5.97	5.70	7.37	8.00	8.60	7.93	7.23	+3.2 -2.4	-2.5	+1.9
98-99	5.31	6.10	7.30	8.00	8.10	8.10	7.78	+2.4 +0.0	-2.8	-0.3
99-100	5.90	6.53	7.87	8.00	9.10	7.50	7.48	+1.5 +5.5	-0.1	+2.7
100-101	4.50	6.27	7.38	7.40	7.50	6.63	6.61	-3.0 +2.7	+1.3	+1.4
101-102	4.53	6.80	6.60	7.37	6.63	7.83	6.63	-.28 -.01	0.0	-1.3

10364

+ 6.916

Microscope G

<u>Apr 15</u>	<u>16</u>	<u>17</u>	<u>27</u>	<u>30</u>	<u>May 1</u>	<u>Σ</u>	<u>180+g</u>	<u>Σ</u>	<u>2</u>	
+6.40	6.93	6.87	7.93	8.24	8.17	7.42	+07	-04	-04	+07
6.54	7.00	6.63	7.87	7.77	8.43	7.37	+02	+31	+35	+09
6.00	6.93	7.80	8.47	8.70	7.43	+7.55	+20	+63	+32	+29
6.40	6.77	7.07	8.77	8.43	7.60	7.51	+16	+57	-06	+45
7.10	7.10	7.13	8.77	8.87	7.60	7.76	+41	+78	+21	+86
5.93	6.40	7.50	8.30	8.83	7.60	7.44	+09	+111	+33	+55
5.47	5.63	7.13	8.13	8.60	7.27	7.04	-31	+97	-14	+64
5.60	6.10	7.07	8.17	9.20	7.70	7.31	-04	+95	-02	+90
6.10	6.07	7.50	7.90	9.50	7.97	7.51	+16	+91	-04	+96
5.37	6.87	6.60	7.53	8.53	6.00	6.52	-52	+05	-86	+23
6.33	6.07	7.53	7.93	8.43	7.63	7.32	-03	-27	-32	+20
6.06	7.10	7.63	8.63	8.30	8.20	7.65	+30	-20	+07	+50
5.73	6.60	6.70	6.77	7.97	6.87	6.77	-58	-68	-48	90
5.97	7.63	7.15	7.50	7.57	7.00	7.14	-21	-25	+43	
5.87	8.10	7.37	7.87	7.87	8.53	7.60	+25	-01	+24	

7.014
11021
7.35

Single degrees 87°-102°

Microscope π

	Apr 15	16	17	27	30	May 1	Mean	Δ	Σ	180+ Σ	Σ	
87.81	5.50	6.37	7.50	7.50	8.31	7.50	+7.13	-.08	-.08	-19	-19	0064
81.89	5.78	6.83	7.20	7.67	7.80	7.70	+7.16	-.05	-.13	-.05	+14	25
89.90	6.06	6.90	7.63	8.50	9.03	7.83	+7.163	+42	+29	-22	-17	1764
90.91	5.90	6.93	7.03	8.43	8.13	7.67	+7.35	+14	+43	-09	+13	196
91.92	6.10	6.27	7.53	8.37	8.70	8.90	+7.65	+44	+87	+10	+19	1936
92.93	6.17	7.33	7.83	8.23	8.40	8.10	+7.68	+47	+134	+94	+84	2209
93.94	6.30	6.70	7.80	8.37	9.10	8.13	+7.73	+52	+186	+186	+92	2709
94.95	5.80	5.93	7.50	8.20	8.93	7.47	+7.27	+06	+192	+202	+16	36
95.96	6.43	6.17	8.05	8.60	9.47	7.60	+7.72	+57	+243	+2.46	+44	2801
96.97	5.53	7.10	6.53	6.87	8.20	6.47	+6.78	-43	+200	+2.11	-35	1849
97.98	5.50	5.87	6.87	7.23	8.07	7.27	+6.80	-41	+159	+2.02	-09	1681
98.99	5.90	6.80	7.53	7.37	8.13	7.33	+7.18	-03	+156	+1.37	-65	9
99-100	5.30	6.30	7.17	7.33	7.53	7.23	+6.81	-40	+1.16	+71	-66	1600
100-101	4.77	6.37	6.82	6.47	6.57	6.37	+6.23	-98	+18	+55	-16	9604
101-102	5.27	7.47	7.00	7.23	7.27	8.10	+7.06	-15	+03	+01	-54	225
							10818	π				29493
							7.212					1814
												$\pm .43$

Microscope H

Apr 15	16	17	27	30	May 1	Mean	180 + H $\bar{z}$
+570	6	7	7	7	7	7	+01 +01
6.24	6.83	7.83	8.50	7.47	7.87	7.46	+18 +17
6.00	6.83	7.53	8.60	8.03	7.97	+7.66	+42 +24
5.67	7.00	7.83	8.57	7.70	7.60	+7.02	+98 +56
6.00	6.07	7.20	8.27	8.43	7.90	+7.02	+46 -52
6.03	6.27	7.63	8.10	8.47	7.80	+7.02	+1.23 +77
5.33	6.10	6.47	7.57	8.87	7.27	+7.02	+1.21 -02
5.53	6.23	7.37	7.73	8.17	7.27	+7.02	+1.28 +07
5.40	5.83	7.30	7.93	7.97	7.50	+7.02	+1.16 -12
5.93	7.80	7.17	8.20	9.53	6.30	+7.02	+1.18 +02
5.70	5.60	7.30	7.40	8.50	6.63	+7.02	+1.00 -18
5.42	6.13	6.80	7.97	7.50	6.70	+7.02	+30 -70
5.40	6.50	7.27	6.67	7.03	6.83	+7.02	-23 -53
4.63	6.60	6.88	6.70	7.60	6.43	+7.02	-25 -02
5.40	8.17	7.70	7.60	7.40	7.97	+7.02	-02 +23

+7.198

Single degrees 102-117 Apr 16 forward June 5 reversed order
Microseris E.

1885		Apr 16		June 5	mean	Σ	180+E p42
102-103	5.27	6.50	6.24	-08	-08	+1.19	119
103-104	5.80	6.38	6.09	-24	-32	+1.14	-05
104-105	5.93	6.20	6.06	-26	-58	+9.0	-24
105-106	5.90	5.95	5.92	-41	-99	+28	-62
106-107	6.40	7.55	6.98	+66	-33	+99	+71
107-108	5.10	6.00	5.55	-78	-111	+67	-32
108-109	6.07	6.30	6.18	-14	-125	-22	-89
109-110	5.93	6.85	6.39	+06	-119	-54	-32
110-111	6.03	6.95	6.49	+17	-102	-73	-19
111-112	6.07	7.05	6.56	+23	-79	+102	+1.75
112-113	6.43	7.40	6.92	+60	-19	+68	-34
113-114	5.97	6.90	6.44	+11	-08	+44	-24
114-115	5.67	5.27	5.47	-85	-93	+108	+64
115-116	5.97	6.65	6.31	-02	-95	+21	-87
116-117	7.17	7.40	7.28	+96	+01	+02	-19
90.41		99.35	94.88				
6.027		6.623	6.325				

1885		Apr 16		June 5	Σ	180+E	180+E
102-103	6.60	6.65	6.78	-21	-21	-13	+03
103-104	6.73	6.80	6.76	-23	-44	-39	-12
104-105	7.57	7.20	7.38	+38	-06	-32	+53
105-106	6.43	6.75	6.59	-40	-46	-72	-07
106-107	7.00	7.25	7.12	+13	-33	-33	-40
107-108	7.13	7.85	7.49	+49	+16	-47	+18
108-109	7.63	7.55	7.59	+60	+76	-24	+08
109-110	7.00	6.25	6.62	+37	+39	-40	+38
110-111	6.60	6.80	6.70	-30	+09	-46	-22
111-112	6.50	6.85	6.68	-31	-22	-50	+38
112-113	7.23	7.45	7.34	+35	+10	-03	+28
113-114	7.13	8.12	7.62	+62	+75	+33	-15
114-115	6.40	6.23	6.32	-67	+08	-42	+17
115-116	6.67	7.05	6.86	-13	-05	-50	+1.19
116-117	7.03	7.05	7.04	+04	-01	-00	+0.3
103.96		105.85	104.89				
6.931		7.056	6.993				

J.

H.

Apr 16 June 5 mean Σ 180 + 71
 +651 740 696 +26 +26 +04 +04
 +753 6.72 7.12 +42 +68 +1.26 +1.22
 7.20 6.55 6.88 +17 +85 +85 -41
 647 6.75 6.61 -09 +76 +87 +02
 703 7.85 7.44 +74 +150 +1.56 +69
 673 7.20 6.96 +25 +1.75 +2.27 +71
 647 6.65 6.56 -14 +1.61 +1.61 -66
 587 6.25 6.11 -59 +1.02 +1.07 -54
 630 6.15 6.22 -49 +.53 +.96 -11
 7.20 6.60 6.90 +20 +73 +1.40 +44
 628 6.60 6.44 -26 +.47 +.89 -51
 683 6.25 6.54 -17 +30 -32 -1.21
 590 590 590 -80 -50 -35 -03
 637 7.10 6.74 +04 -46 -21 +14
 703 - 7.20 7.16 +45 -01 -03 +18
 7.72 1147 1054
 6.648 6.765 6.703

Apr 16 June 5 Σ $\frac{1}{2}T \times \frac{1}{2}W$
 6.72 7.05 6.88 +19 +19 +22 -29 +29
 693 6.80 6.86 +16 +35 +53 +14 +157
 663 6.45 6.54 -15 +20 +52 +17 -03
 613 6.45 6.29 -41 -21 +27 +87 +70
 710 6.95 702 +33 +12 +81 +124 +63
 610 7.05 6.58 -12 00 +87 +36 +60
 7.23 6.90 7.06 +37 +37 +99 +04 -82
 593 5.75 5.84 -86 -49 +27 +84 -88
 703 6.00 6.52 -17 -66 -06 +1.19 -35
 6.87 7.00 6.94 +24 -42 +15 -37 +82
 673 6.70 6.72 +03 -39 +04 +32 +05
 693 7.20 7.06 +36 -03 +13 -22 +10
 667 6.10 6.38 -31 -34 -42 -12 +10
 623 7.30 6.76 +06 -28 -37 +40 +52
 737 +660 6.98 +29 +01 +00 +00 +40
 10.60 10.30 1043
 6.707 6.686 6.695

Single degrees 117°-132°

Apr 17 forward June 9 reversed order

Microscope E

1885

Apr 17 June 9 Σ 180+E p44

117-118	+8.00	9.18	8.59	+13	+13	+08	+08
118-119	~~8.27~~	8.85	8.56	+10	+28	+10	+02
119-120	~~8.40~~	8.10	7.75	-71	-48	-35	-45
120-121	8.37	8.35	8.36	-10	-58	-25	+10
121-122	7.40	8.52	7.96	-50	-1.08	-60	-35
122-123	8.47	9.20	8.13	+37	-78	-73	-13
123-124	8.37	8.65	8.51	+05	-66	-12	+61
124-125	7.27	8.50	7.88	-58	-124	+05	+17
125-126	8.07	8.20	8.13	-33	-157	-37	-42
126-127	7.67	8.45	8.06	-40	-159	-13	+24
127-128	9.57	9.90	9.73	+127	-70	-35	-22
128-129	8.97	9.02	8.99	+53	-19	+33	+68
129-130	8.53	8.75	8.64	+18	+04	+38	+05
130-131	8.37	8.80	8.58	+12	+18	+15	-23
131-132	8.10	8.55	8.32	+14	+00	+00	-15

119.83

7.989

126.89

8.46

1885

Apr 17 June 9 Σ 180+g

8.47	8.52	8.41	-16	-16	+37	+37
8.10	8.38	8.24	-38	-49	+16	-21
7.77	8.05	8.01	-56	-105	-65	-81
7.50	7.95	7.72	-85	-190	-49	+16
7.83	8.85	8.34	+23	-212	-09	+40
8.50	9.40	8.95	+38	-184	-07	+02
8.70	9.25	8.57	+40	-144	+26	+33
8.33	9.20	8.76	+19	-125	-18	-44
9.43	9.25	9.34	+77	-48	+83	+101
8.50	8.78	8.64	+07	-41	+121	+38
8.60	9.32	8.96	+39	-02	+71	-50
8.40	8.32	8.36	-21	-23	+03	-68
8.17	8.60	8.38	-19	-42	-04	-07
9.23	9.60	9.41	+84	+42	+28	+32
7.67	8.52	8.09	-48	-06	+02	-26

124.22

8.281

128.58

8.572

L 1885

Apr 17	June 9		Σ	180+H	Σ
8.57	8.60	8.56	-14	-14	+18 +18
8.50	9.08	8.79	+08	-06	-19 -37
7.30	8.20	7.75	-95	-1.01	+50 +69
7.30	8.00	7.65	-1.06	-2.07	+27 -23
8.07	9.15	8.61	-09	-2.16	-19 -46
8.43	8.60	8.51	-20	-2.36	-14 +05
8.43	9.30	8.86	+16	-2.20	+32 +46
9.00	9.75	9.37	+66	-1.54	+44 +12
8.93	9.00	8.96	+26	-1.28	+47 +03
8.20	8.10	8.15	-56	-1.84	-11 -58
8.87	9.70	9.28	+58	-1.26	-48 -37
8.30	9.78	9.04	+33	-9.3	+39 +87
8.53	9.25	8.89	+19	-7.4	+18 -21
9.43	9.50	9.46	+75	+01	+54 +36
8.53	8.88	8.70	00	+01	+00 -54
6.55	14.89	10.54			
8.423	8.992	8.705			

H 1885

Apr 17	June 9		Σ	180+H	Σ
8.36	8.18	8.27	-36	-36	+05 +05
7.63	8.90	9.20	+57	+21	+42 +37
7.00	7.90	7.46	-1.17	-96	+33 -09
7.50	8.50	8.00	-63	-1.59	+27 -06
7.57	8.55	8.06	-57	-2.16	+58 +31
8.73	9.25	8.99	+36	-1.80	+48 -10
8.40	8.20	8.30	-33	-2.13	+69 +21
8.17	9.30	8.73	+10	-2.03	+68 -01
8.47	9.15	8.81	+18	-1.85	+20 -48
8.60	9.00	8.80	+17	-1.68	+65 +45
9.23	9.22	9.22	+59	-1.09	+19 -46
8.73	9.12	8.92	+29	-80	+41 +22
8.87	9.40	9.13	+50	-30	+40 -01
8.73	9.20	8.96	+33	+03	-01 -41
8.37	8.88	8.62	-01	+02	00 +01
5.63	13.35	9.47			
8.375	8.890	8.631			

Single degrees 132°-147°

Microscope E

Apr 27 forward June 9 reversed order

cf

Apr 27	June 9	Σ 180+E p46			
132-133	+9.03 8.70 +886 -26 -26	Σ +1.09 +109			
133-134	9.93 9.80 9.86 +73 +47 +154 +45				
134-135	9.30 9.00 9.15 +03 +50 +1.66 +12				
135-136	8.37 7.90 8.14 -99 -49 +193 +27				
136-137	9.00 8.12 8.56 -56 -105 +170 -23				
137-138	9.73 8.35 9.04 -09 -114 +125 -45				
138-139	9.93 9.60 9.76 +64 -50 +132 +07				
139-140	9.00 8.20 8.60 -58 -103 +199 +67				
140-141	8.57 8.55 8.56 -56 -1.59 +1.71 -28				
141-142	9.80 9.75 9.78 +65 -94 +200 +29				
142-143	9.67 9.70 9.78 +66 -28 +292 +92				
143-144	8.93 8.40 8.66 -47 -75 +224 -68				
144-145	9.77 9.35 9.56 +44 -31 +103 -121				
145-146	9.10 8.70 8.90 -23 -54 +58 -45				
146-147	9.73 9.60 9.66 +54 00 00 -58				
	5.06 13.72 187				
	+9.337 8.915 9.125				

Apr 27	June 9	Σ 180+G			
+9.04	9.55 ⁰⁰ 9.02 -12 -12	Σ +17 +17			
9.13	8.60 8.86 -28 -40 +20 +03				
10.03	9.50 9.76 +63 +23 +73 +53				
8.23	7.75 7.99 -1.15 -92 +156 +83				
9.40	8.68 9.04 -10 -102 +150 -06				
8.67	8.35 8.51 -62 -1.64 +165 +15				
8.77	8.80 8.78 -36 -2.00 +248 +83				
8.87	9.05 8.96 -18 -2.18 +208 -40				
9.33	9.75 9.54 +41 -1.77 +243 +35				
9.50	9.65 9.58 +44 -1.33 +207 -36				
9.43	9.45 9.44 +30 -1.03 +132 -75				
9.17	8.65 8.91 -22 -1.25 +1.29 -03				
9.47	8.55 9.01 -13 -1.38 +32 -97				
10.10	9.90 10.00 +86 -52 +38 +06				
9.73	9.60 9.66 +53 +01 +04 -34				
3.87	23 206				
9.258	9.015 9.137				

H

H

Apr 27 June 9			Σ		
+8.98	9.55	9.26	+05	+05	+83+83
9.10	9.00	9.05	-16	-11	+67-16
9.77	8.95	9.36	+14	+03	+34-33
8.23	8.05	8.14	-107	-104	+78+44
9.60	9.30	9.45	+24	-80	+1.56+78
9.90	9.45	9.68	+46	-34	+218+62
8.00	8.60	8.30	-91	-125	+276+58
9.63	9.50	9.56	+35	-90	+286+10
8.83	8.95	8.89	-33	-1.23	+2.27-59
9.60	9.60	9.60	+39	-84	+2.97+20
8.77	9.05	8.91	-30	-1.14	+2.52+05
9.67	9.40	9.54	+32	-82	+2.44-38
9.40	8.85	9.12	-09	-91	+97-1.17
9.67	10.20	9.94	+73	-18	+102+05
9.37	9.42	9.40	+18	00	00 -102
1.352	287	320			
9.235	9.191	9.213			

Apr 27 June 9			Σ		
9.22	8.80	9.01	-22	-22	
10.47	8.95	9.71	+48	+26	
8.83	8.95	8.89	-35	-09	
9.03	8.25	8.64	-59	-68	
9.43	8.90	9.16	-07	-75	
10.13	8.85	9.49	+25	-50	
8.20	8.70	8.45	-78	-128	
8.20	7.95	8.08	-1.15	-2.43	
9.27	9.35	9.31	+07	-2.36	
10.23	10.00	10.11	+88	-1.48	
9.27	8.10	8.68	-55	-2.03	
10.40	9.55	9.98	+74	-1.29	
9.37	9.25	9.31	+08	-1.21	
9.47	9.50	9.48	+25	-96	
10.20	10.18	10.19	+95	-01	
572	128	349			
9.448	9.019	9.233			

Single degrees 147° - 162°
Microscope E

	Apr 30	June 10	mean	Σ
147-148	9.50	6.90	8.20	+99 +99
148-149	9.73	6.02	7.88	+66 +165
149-150	9.00	5.92	7.46	+25 +190
150-151	7.50	6.11	6.80	-42 +148
151-152	7.90	5.85	6.88	-33 +115
152-153	7.83	4.80	6.32	-90 +25
153-154	8.33	5.22	6.78	-43 -18
154-155	8.03	5.71	6.87	-35 -53
155-156	8.30	6.72	7.51	+30 -23
156-157	8.00	5.68	6.84	-38 -61
157-158	8.30	6.45	7.38	+17 -44
158-159	8.67	6.08	7.38	+16 -28
159-160	8.90	6.66	7.78	+57 +29
160-161	8.03	6.28	7.16	-06 +23
161-162	7.90	6.08	6.99	-22 +01
	5.92	48	323	
	8.395	6.032	7.215	

Apr 30 forward.

	Apr 30	June 10	Σ
9.42	6.68	8.05	+88 +88
8.20	6.18	7.19	+01 +87
7.80	5.82	6.86	-31 +56
8.83	6.54	7.68	+50 +106
8.17	5.65	6.91	-26 +80
8.50	5.82	7.16	-02 +78
7.33	4.95	6.14	-103 -25
8.93	5.86	7.40	+22 +03
8.57	5.90	7.24	+07 +04
8.80	5.85	7.22	+04 +08
8.13	5.80	6.96	-21 -13
8.37	6.55	7.46	+28 +15
8.40	6.28	7.34	+17 +32
8.10	6.48	7.29	+11 +43
7.77	5.70	6.74	-43 00
5.22	06	264	
8.348	6.004	7.176	

Note: The above results for June 10 are the means of two series

<i>J.</i>	Apr 30	June 10	mean	Σ
928	7.28	8.28	+1.20	+120
840	6.60	7.50	+41	+161
790	5.92	6.91	-17	+144
797	6.40	7.18	+09	+153
837	6.10	7.24	+16	+169
800	5.52	6.76	-33	+136
743	5.29	6.36	-72	+64
810	6.46	7.28	+19	+83
797	5.70	6.84	-24	+59
793	5.48	6.70	-39	+20
833	5.85	7.09	+01	+21
740	6.18	6.79	-30	-09
777	6.26	7.02	-06	-15
887	6.62	7.74	+65	+50
717	6.00	6.58	-50	00
1589	166	1627		
+8059	6.111	7.085		

<i>H.</i>	Apr 30	June 10	mean	Σ
965	7.60	8.62	+1.40	+140
760	5.98	6.79	-.44	+96
797	5.98	6.98	-.24	+72
870	6.55	7.62	+39	+111
813	6.25	7.19	-.03	+108
797	5.95	6.96	-.27	+81
737	4.78	6.08	-1.14	-39
880	6.01	7.40	+17	-16
810	6.15	7.12	+10	-26
763	6.10	6.86	+37	-63
867	5.75	7.21	-.01	-64
867	6.72	7.70	+47	-17
817	6.38	7.28	+06	-11
840	6.20	7.30	+07	-04
810	6.45	7.28	+06	+02
1393	285	339		
8.262	6.190	7.226		

one forward, the other reversed. See page 25 Record Book

Sample Degrees 162°-177°
Microscope E

May 4 forward June 11 reversed order
G

	May 4	June 11	mean	Σ
162°-163°	+600	6.25	6.12	+07 +07
163-164	560	6.75	6.18	+13 +20
164-165	527	6.40	5.84	-22 -02
165-166	540	6.05	5.72	-33 -35
166-167	587	5.80	5.84	-21 -56
167-168	573	5.95	5.84	-22 -78
168-169	537	6.40	5.88	-17 -95
169-170	613	5.90	6.02	-03 -98
170-171	590	6.70	6.30	+24 -74
171-172	580	6.35	6.08	+03 -71
172-173	~~573~~ 573	6.55	6.14	+09 -62
173-174	650	7.05	6.78	+72 +10
174-175	537	6.45	5.91	-14 -04
175-176	533	6.10	5.72	-33 -37
176-177	643	6.40	6.42	+36 -01
	1143	510	79	
	5.762	6.340	6.053	

	May 4	June 11	mean	Σ
	²⁸ ~~650~~	6.75	6.52	+13 +13
	607	7.20	6.64	+25 +38
	583	6.15	5.99	-40 -02
	590	7.10	6.50	+11 +09
	~~600~~	7.10	6.55	+16 +27
	637	5.80	6.08	-31 -04
	637	7.05	6.71	+32 +28
	530	5.80	5.55	-84 -56
	563	7.00	6.32	-07 -63
	687	7.00	6.94	+55 -08
	583	6.45	6.04	-35 +43
	623	6.85	6.54	+15 -28
	~~607~~	7.00	6.86	+47 +19
	687	7.00	6.94	+55 +74
	567	5.70	5.68	-71 +03
	175	995	586	
	6117	6.663	6.391	

H

May 4	June 11	mean	I	
~~5.93~~ 6.23	7.65	6.94	+58	+58
5.87	7.40	6.64	+28	+86
6.63	6.65	6.64	+28	+114
6.40	7.35	6.88	+52	+1.66
5.20	6.20	5.70	-66	+1.00
5.57	6.35	5.96	-40	+60
6.00	6.40	6.20	-16	+44
6.33	6.80	6.56	+20	+64
6.03	6.85	6.44	+08	+72
6.97	7.40	7.18	+82	+154
5.33	5.80	5.56	-80	+74
5.83	6.50	6.16	-20	+54
6.20	7.50	6.85	+49	+123
5.20	6.40	5.80	-56	+47
5.90	5.95	5.92	-44	+03
1469	1120	543		
5.979	6.747	6.362		

May 4	June 11	mean	2	
~~6.53~~ 6.13	6.70	6.42	+16	+16
6.03	7.15	6.59	+32	+48
6.47	6.20	6.34	+08	+54
5.90	6.60	6.25	-02	+52
6.53	6.70	6.62	+36	+18
5.23	6.25	5.74	-53	+35
5.97	7.20	6.58	+32	+67
5.40	6.75	6.08	-19	+98
6.50	6.95	6.72	+46	+54
6.30	6.85	6.58	+31	+25
5.93	6.55	6.24	-03	+122
5.17	6.15	5.66	-60	+62
5.83	6.40	6.12	-15	+47
5.90	7.15	6.52	+26	+73
5.17	5.75	5.46	-80	-07
1346		6.204		
5.897				

Simple degrees 177° - 192°
Microscope E

May 8 forward June 11 reversed order
of

	May 8	June 11			
172-178	⁹⁴ +5.67	6.85	6.40	+3.6	-36
178-179	6.03	7.45	6.74	-2	-38
179-180	6.03	7.20	6.61	-1.8	-53
180-181	5.50	7.30	6.40	-36	-85
181-182	5.37	6.95	6.16	-.61	-150
182-183	5.87	7.20	6.53	-.23	-173
183-184	6.03	6.90	6.46	-30	-203
184-185	6.07	8.10	7.08	+1.22	-171
185-186	7.37	8.45	7.91	+1.15	-56
186-187	6.507	6.90	6.48	-.28	-54
187-188	6.70	7.70	7.20	+1.44	-40
188-189	6.20	7.00	6.60	-.16	-56
189-190	7.07	8.25	7.66	+1.90	-44
190-191	5.57	6.95	6.26	-.51	-107
191-192	^{6.50} 5.832	7.40	6.95	+1.15	+14
	5.888		6.762		

	May 8	June 11			
^{6.513} 5.47	6.80	6.66	-.25	-25	
6.43	7.20	6.81	-.10	-35	
7.30	7.15	7.22	+1.31	-04	
5.97	6.75	6.36	-.55	-59	
5.73	6.10	5.92	-.99	-158	
6.37	6.90	6.63	-.28	-186	
6.20	6.75	6.47	-.44	-230	
6.60	7.40	7.00	+1.05	-221	
6.90	7.15	7.02	+1.11	-210	
6.70	8.10	7.40	+1.45	-161	
7.30	7.45	7.37	+1.46	-115	
5.67	7.15	6.41	-.50	-165	
~~5.560~~ 6	7.60	7.10	+1.19	-146	
7.30	7.80	7.55	+1.64	-82	
6.97	8.50	7.73	+1.82	00	
7.57		10.365			
6.505		6.91			

J

May 8 June 11

~~6.26~~	~~6.57~~	6.95	6.60	-03	-03
6.17	7.30	6.73	+10	+07	
6.63	6.95	6.79	+16	+23	
6.13	~~6.75~~	~~6.44~~	-19	+02	
~~5.37~~	6.75	6.06	-57	-53	
6.17	7.10	6.63	-01	-54	
6.17	6.85	6.57	-12	-66	
6.30	6.40	6.35	-28	-54	
7.17	7.60	7.38	+25	-19	
5.90	7.05	6.46	-17	-36	
6.47	7.10	6.78	+15	-21	
5.77	6.35	6.06	-57	-58	
6.00	7.25	6.62	-01	-79	
6.20	7.65	6.92	+29	-50	
<u>6.83</u>	7.35	<u>7.09</u>	+16	-04	
		6.628			

H

May 8 June 11

~~6.57~~	7.30	6.93	+06	+06	
7.03	7.40	7.21	+34	+10	
6.90	6.85	~~6.47~~	+00	+10	
5.77	~~8.50~~	~~6.18~~	-69	-29	
~~5.77~~	6.20	5.98	-88	-118	
6.43	7.30	6.86	-01	-119	
5.87	6.70	6.28	-59	-178	
5.73	7.10	6.41	-46	-229	
~~6.80~~	7.90	7.35	+48	-176	
6.37	8.00	7.18	+31	-145	
~~6.67~~	8.25	7.46	+59	-86	
6.40	6.75	6.56	-29	-115	
7.87	8.10	7.98	+11	-04	
6.43	~~7.15~~	6.79	-08	-12	
<u>6.33</u>	7.70	<u>7.02</u>	+15	+03	
		6.872			

Simple degrees 192° - 207°
 Microscope E.

	May 11		Mean	Σ	
	I	II			
192-193	+8.02	7.40	7.66	+38	+38
193-194	7.78	7.50	7.64	+36	+74
194-195	7.73	7.51	7.62	+34	+108
195-196	7.52	7.03	7.27	-01	+107
196-197	7.64	7.04	7.34	+05	+112
197-198	7.90	8.50	8.20	+92	+204
198-199	7.58	7.65	7.63	+35	+239
199-200	6.24	6.31	6.27	-101	+138
200-201	6.56	7.32	6.94	-34	+104
201-202	7.14	7.82	7.48	+19	+123
202-203	6.70	7.28	6.99	-29	+59
203-204	6.75	6.58	6.66	-62	+32
204-205	5.88	5.65	5.76	-152	-120
205-206	7.63	7.55	7.59	+31	-89
206-207	8.01	8.36	8.18	+90	.00
			7.282		

Series I and II forward
 G

	May 11		Mean	Σ	
	I	II			
7.85	7.46	7.65	-13	-13	
9.18	7.56	8.37	+59	+46	
8.13	7.65	7.49	+11	+57	
8.02	7.33	7.67	-11	+46	
8.90	7.64	8.27	+49	+95	
8.23	8.40	8.31	+53	+148	
7.85	7.70	7.27	-01	+147	
6.91	6.66	6.78	-100	+47	
7.29	7.52	7.40	-38	+09	
7.61	8.32	7.96	+18	+27	
7.73	7.58	7.65	-13	+14	
7.82	7.38	7.60	-18	-04	
7.64	7.40	7.52	-26	-30	
7.99	6.95	7.47	-31	-61	
8.91	7.81	8.36	+58	-03	
		1167			
		7.778			

Y

May 11	II	mean	Σ	
+8.22	7.60	7.91	+26	+26
8.08	7.13	7.60	-05	+21
8.43	7.55	7.99	+35	+56
8.72	7.43	8.08	+43	+99
7.90	7.74	7.82	+17	+116
8.16	7.93	8.04	+40	+156
7.68	7.70	7.69	+04	+160
7.51	7.51	7.51	-14	+146
6.62	7.12	6.87	-77	+69
7.01	7.37	7.19	-46	+23
7.80	7.63	7.72	+07	+30
7.78	7.83	7.80	+16	+46
7.58	7.75	7.66	+01	+47
7.36	7.30	7.33	-32	+15
7.38	7.61	7.50	-14	+01
		971		
		7.647		

H

May 11	II	Σ	
8.65	8.36	8.50	+101
8.61	7.63	8.12	+63
6.76	6.88	6.82	-67
7.15	7.03	7.09	-40
7.87	7.64	7.76	+27
7.63	7.17	7.40	-09
7.88	7.05	7.46	-03
6.84	6.71	6.78	-71
6.66	7.42	7.04	-45
8.77	8.62	8.70	+121
7.40	7.73	7.56	+07
6.85	7.48	7.16	-33
7.54	7.20	7.37	-12
7.27	6.85	7.06	-43
7.68	7.41	7.54	+05
		736	
		7.491	

Single degrees 207° - 222°
Microscope E

Series I forward II reversed order


May 12		II		I	
207-208	+7.78	6.25	7.01	+16	+16
208-209	7.35	5.75	6.55	-20	-14
209-210	7.50	6.10	6.80	-05	-19
210-211	7.50	5.80	6.65	-20	-39
211-212	7.60	6.55	7.07	+22	+17
212-213	7.00	6.20	6.60	-26	-43
213-214	6.55	6.15	6.35	-50	-93
214-215	7.40	6.85	7.12	+27	-66
215-216	8.15	6.52	7.33	+48	-18
216-217	6.45	6.05	6.25	-60	-78
217-218	7.25	7.00	7.12	+26	-52
218-219	7.15	6.80	6.97	+12	-40
219-220	8.25	7.55	7.90	+105	+65
220-221	6.85	7.15	7.00	+15	+80
221-222	6.30	5.80	6.05	-80	-60
109.08		9.652	10.777		
7.272		6.435	6.812		

May 12		I		II	
8.18	6.40	7.29	+10	+10	+13
8.35	6.40	7.38	+18	+28	+07
8.00	7.10	7.55	+36	+64	+22
7.50	6.85	6.77	-43	+21	-09
6.85	6.40	6.63	-56	-35	-09
7.25	6.70	6.57	-22	-57	-50
7.35	6.35	6.55	-35	-92	-92
8.65	7.35	8.00	+81	-11	-39
7.40	6.47	6.54	-25	-36	-27
8.10	6.95	7.53	+83	-03	-40
7.05	5.90	6.48	-72	-75	-63
8.00	7.35	7.67	+48	-27	-33
8.85	8.45	8.65	+146	+1.19	+92
6.95	6.91	6.93	-27	+88	+84
6.50	6.15	6.25	-86	-04	00
1148		10053	10756		
7.1658		6.729	7.196		

117

May 12

I	II			
1850	6.35	+742	+53	+53
7.10	5.20	6.15	-74	-21
770	6.60	7.15	+26	+05
6.80	5.45	6.13	-76	-71
8.00	6.00	7.00	+11	-60
6.80	5.55	6.17	-73	-131
770	6.20	6.51	+06	-125
795	6.35	7.15	+26	-100
8.15	7.22	7.65	+99	-20
775	6.50	7.12	+23	+03
6.80	6.05	6.43	-47	-44
7.30	6.90	7.10	+21	-23
770	7.25	7.46	+57	+34
6.80	7.05	6.53	+04	+38
6.55	6.40	6.47	-42	.00
11488	10723			
11160	9507	10331		
7440	6268	6887		

Jt.

May 12

I	II			
9.08	7.20	814	+112	+112
7.75	5.95	6.55	+17	+95
7.35	5.85	6.60	-43	+53
7.50	5.20	6.35	-67	-14
7.80	6.60	7.20	+15	+04
7.00	5.70	6.35	-65	-64
7.80	6.50	7.15	+13	-57
8.00	5.90	6.55	-07	-58
7.20	6.28	6.74	-28	+6
7.35	5.95	6.65	-35	-124
7.90	6.90	7.40	+35	-16
8.15	7.90	8.02	+1.00	+14
7.10	7.80	7.45	+43	+57
7.35	6.90	7.12	+10	+67
6.60	6.10	6.35	-68	.00
1133	9623	10533		
7596	6449	7222		

Single degree 222° - 237°

Series I forward II reversed order

Microscope E

by

May 13

Σ

	I	II	Mean		Σ
222-223	+6.95	4.20	5.57	-03	-03
223-224	7.15	5.95	6.55	+98	+92
224-225	5.70	4.40	5.05	-55	+37
225-226	7.40	5.60	6.50	+90	+127
226-227	6.50	4.50	5.50	-10	+117
227-228	6.20	5.35	5.78	+18	+135
228-229	5.90	5.60	5.75	+15	+150
229-230	6.05	4.45	5.25	-35	+115
230-231	6.35	4.70	5.52	-08	+107
231-232	5.90	4.10	5.00	-60	+47
232-233	5.65	4.15	4.90	-70	-23
233-234	6.20	4.80	5.50	-10	-33
234-235	5.35	4.05	4.70	-90	-123
235-236	7.15	6.95	7.05	+1.45	+122
236-237	5.66	5.15	5.40	-20	+02
	9425	7395	8401		
	6.283	4.930	5.607		

May 13

Σ

	I	II	Mean		Σ
222-223	6.90	5.30	6.10	+08	+08
223-224	7.20	5.95	6.57	+54	+62
224-225	5.82	4.35	5.08	-94	-32
225-226	7.10	6.00	6.55	+52	+20
226-227	6.95	5.60	6.28	+26	+46
227-228	5.95	5.20	5.57	-46	00
228-229	6.05	5.80	5.93	-09	-09
229-230	6.70	5.00	5.85	-18	-27
230-231	6.60	5.25	5.93	-09	-36
231-232	6.55	4.60	5.57	-46	-82
232-233	7.05	5.50	6.28	+26	-56
233-234	6.50	5.00	5.75	-28	-84
234-235	6.20	5.75	5.97	-05	-89
235-236	6.60	7.20	6.90	+87	-02
236-237	6.60	5.50	6.05	+03	+01
	9867	8200	9038		
	6.578	5.467	6.025		

J

H

May 13		mean	Σ	
I	II			
+690	5.25	6.07	+30	+30
7.30	4.70	6.00	+23	+53
6.65	5.25	5.95	+18	+71
6.80	5.40	6.10	+33	+104
6.00	4.35	5.17	-60	+44
5.75	5.30	5.52	-25	+19
5.65	5.40	5.53	-25	-06
6.00	4.60	5.30	-47	-53
6.75	5.80	6.28	+51	-02
6.30	4.65	5.46	-31	-33
5.70	4.70	5.20	-57	-90
5.65	4.35	5.00	-77	-167
6.35	4.55	5.45	-32	-199
7.25	7.35	7.30	+152	-47
6.55	5.90	6.23	+46	-01
9560	9755	8656		
6.373	5.170	5.771		

May 13		mean	Σ	
I	II			
8.15	6.00	7.07	+1.44	+144
7.05	5.25	6.15	+51	+195
5.95	4.75	5.35	-28	+167
6.05	4.55	5.30	-34	+133
5.25	4.45	4.85	-78	+55
5.45	4.80	5.12	-52	+03
6.00	4.85	5.42	-21	-18
5.95	5.15	5.55	-09	-27
5.95	4.55	5.25	-38	-65
6.20	4.80	5.50	-14	-79
7.05	5.60	6.32	+69	-10
5.35	4.30	4.83	-81	-91
6.25	5.05	5.65	+01	-90
6.35	6.35	6.35	+72	-18
5.75	5.85	5.80	+16	-02
9275	7630	8451		
6.163	5.086	5.634		

May 14 1885
Single degrees from 237°-252°

Microscope E.

	I	II	mean		Σ
237-238 - +	6.10	5.30	5.70	- .36	-36
238-239	6.38	6.70	6.54	+ .48	+12
239-240	6.05	6.30	6.18	+ .12	+24
240-241	6.45	6.35	6.40	+ .34	+58
241-242	7.50	6.55	7.02	+ .46	+154
242-243	5.10	5.70	5.40	- .66	+88
243-244	6.10	6.30	6.20	+ .14	+102
244-245	5.75	5.75	5.75	- .31	+71
245-246	5.10	5.10	5.10	- .96	-25
246-247	6.75	6.40	6.58	+ .52	+27
247-248	6.30	6.00	6.15	+ .09	+38
248-249	5.50	5.25	5.38	- .68	-30
249-250	6.05	6.90	6.48	+ .42	+12
250-251	6.75	6.20	6.47	+ .41	+53
251-252	5.45	5.60	5.52	- .54	-01
	91.33	90.40	90.87		
	+ 6.089	+6.027	+6.058		

I	II	mean		Σ	Σ ~~ly~~
+ 7.80	7.00	7.40	+ .77	+77	+21
6.38 ⁰⁷	5.70	5.88	- .76	+01	+06
6.40	5.95	6.18	- .45	-44	+10
7.55	6.95	7.25	+ .61	+17	+38
6.35	5.95	6.15	- .48	-31	+61
6.95	6.65	6.80	+ .16	-15	+36
5.95	6.75	6.35	- .28	-43	+30
7.00	6.05	6.52	- .12	-55	+08
6.90	6.55	6.72	+ .09	-46	-35
6.25	6.45	6.35	- .29	-75	-24
7.80	6.90	7.35	+ .72	-13	+17
6.70	6.40	6.55	- .09	-12	-21
6.75	6.90	6.82	+ .19	+07	+10
6.55	7.50	7.02	+ .38	+45	+49
5.95	6.45	6.20	- .43	+00	+00
100.97	98.15	99.54			
+6.731	+6.543	+6.636			

$\bar{I}$	$\bar{II}$	$\bar{Oman}$	Σ
+ 6.25	5.30	5.78	-46 -46
5.12	5.05	5.08	-1.16 -1.62
6.10	6.15	6.12	-12 -1.74
7.00	6.60	6.80	+56 -1.18
6.95	6.10	6.52	+28 -90
6.75	6.05	6.40	+16 -24
6.10	5.80	5.95	-29 -1.03
6.45	5.95	6.10	-14 -1.17
6.10	6.70	6.40	+16 -1.01
6.05	6.10	6.08	-16 -1.17
7.05	7.15	7.10	+86 -31
6.05	6.70	6.38	+14 -1.7
6.75	5.95	6.35	+11 -0.6
6.50	6.85	6.68	+44 +38
6.00	5.75	5.88	-36 +02
5.22	200	362	
+6.348	6.133	6.235 ⁴¹	

$\bar{I}$	$\bar{II}$	$\bar{Oman}$	Σ
6.85	6.17	6.51	+08 -19 ¹⁶
5.95	5.70	5.82	-61 -55
6.20	5.90	6.05	-38 -25
6.80	6.65	6.72	+29 +42
6.40	6.15	6.28	-15 +06
6.05	5.95	6.00	-43 -13
6.05	6.55	6.30	-13 -21
6.45	5.95	6.20	-23 -18
7.05	6.50	6.78	+35 +25
6.30	6.55	6.42	-01 -08
6.85	6.40	6.62	+19 +52
7.35	7.40	7.38	+95 +54
7.35	7.30	7.32	+69 +50
6.00	6.25	6.12	-31 +06
5.75	6.15	5.95	-48 -40
7.40	557	647	
+6.493	6.371	6.431	

May 18 1865
Single degrees from 252° - 267°

Microscope E.

	I	II	Mean	Σ	
252-253	+6.93	5.42	6.18	-16	-16
253-254	7.50	5.45	6.48	+18	-03
254-255	7.65	6.80	7.22	+88	+85
255-256	7.30	5.00	6.15	-20	+65
256-257	5.45	4.28	4.86	-148	-83
257-258	6.80	6.20	6.50	+15	-68
258-259	7.20	5.55	6.38	+04	-64
259-260	7.05	5.75	6.40	+05	-59
260-261	6.60	6.15	6.38	+04	-55
261-262	7.15	6.35	6.75	+40	-15
262-263	6.40	6.65	6.52	+18	+03
263-264	6.10	6.30	6.20	-15	-12
264-265	6.85	6.90	6.88	+54	+42
265-266	6.15	6.25	6.25	-10	+32
266-267	5.90	6.15	6.02	-32	00
	101.03	89.30	95.17		
	6.435	5.953	6.345		

	I	II	Mean	Σ	$\Sigma + \frac{g}{2}$
7.33	6.30	+6.82	+37	+37	+10
6.90	4.70	5.80	-65	-28	-15
7.60	6.15	6.88	+44	+16	+50
7.50	5.10	6.30	-15	+01	+33
6.90	5.62	6.26	-19	-18	-50
7.00	5.80	6.40	-04	-22	-45
7.40	6.28	6.64	+39	+17	-23
7.80	6.35	7.08	+63	+60	+10
7.20	6.10	6.65	+21	+1.01	+23
6.60	5.85	6.22	-23	+78	+31
6.20	5.75	5.98	-47	+31	+17
6.75	5.90	6.32	-12	+19	+03
6.50	6.15	6.32	-13	+06	+24
6.45	6.10	6.28	-14	-11	+10
6.60	6.55	6.58	+13	+02	+00
104.73	88.70	96.73			
6.542	5.913	6.447			

$\frac{1}{2}$				Σ
I	II			
6.97	4.85	5.91	-42	-42
6.700	5.35	6.03	-30	-72
7.40	5.20	6.30	-03	-75
7.25	5.20	6.23	-10	-85
7.10	4.62	5.86	-47	-132
6.70	6.20	6.45	+13	-119
7.60	5.68	6.64	+31	-88
7.00	6.10	6.55	+22	-66
6.15	5.75	5.95	-38	-104
6.60	6.60	6.60	+27	-77
6.35	5.70	6.02	-31	-108
6.95	6.50	6.72	+40	-68
6.70	7.00	6.85	+52	-16
6.80	6.55	6.67	+34	+18
<u>5.95</u>	<u>6.35</u>	<u>6.15</u>	-18	60
102.92	87.65	94.52		
6.75	5.743	6.328		

$\frac{1}{2}$				Σ	$\frac{1}{2}(F+G)$
I	II				
6.60	5.25	5.93	-32	-32	-37
5.70	4.55	5.13	-113	-145	-108
7.25	5.20	6.23	-02	-147	-111
6.35	4.15	5.25	-1.01	-248	-166
6.90	5.45	6.17	-08	-256	-194
6.90	5.35	6.13	-13	-269	-194
6.90	4.88	5.89	-36	-305	-196
6.95	5.75	6.35	+09	-256	-181
7.45	6.45	6.95	+70	-226	-165
6.45	5.25	5.85	-49	-267	-172
6.10	5.90	6.00	-25	-292	-200
6.70	6.95	6.83	+57	-235	-151
7.55	6.75	7.15	+50	-145	-80
6.55	6.55	6.55	+29	-116	-49
<u>7.40</u>	<u>7.45</u>	<u>7.43</u>	+118	+00	00
101.75	85.88	93.84			
6.70	5.725	6.255			

Single degrees 267°-282°

Microscope E

	May 4		May 5		May 6		Σ		+ 5 + 22	
	I	II	I	II	I	II				
267-268	+603	643	532	563	560	460	5.72	-04	-04	
268-269	663	650	670	560	623	5.35	6.17	+35	+31	
269-270	600	723	623	557	567	5.10	6.13	+32	+63	
270-271	647	590	640	517	447	6.15	5.76	-06	+57	
271-272	660	630	584	607	567	5.65	6.04	+21	+78	
272-273	727	717	616	483	600	5.35	6.14	+33	+117	
273-274	620	693	585	514	557	4.30	5.67	-14	+97	
274-275	623	601	630	527	512	5.90	5.80	-02	+95	
275-276	603	633	548	590	467	6.20	5.77	-04	+91	
276-277	567	530	527	390	483	477	4.96	-86	+05	
277-278	643	653	567	503	487	440	5.49	-32	-27	
278-279	687	660	617	487	520	5.62	5.89	+07	-20	
279-280	620	573	520	478	467	5.40	5.33	-48	-68	
280-281	740	701	643	603	520	545	6.25	+43	-25	
281-282	673	710	550	640	567	490	6.05	+24	-01	
							1221			
							5.814			

g

May 4	8	May 5	May 6	mean	Σ			
I	II	I	II					
+8.13	7.10	6.60	6.33	5.73	5.03	6.49	-06	-06
8.13	7.10	6.08	6.70	6.10	6.05	6.68	+14	+08
7.63	6.83	6.48	6.17	6.10	6.15	6.56	+02	+10
7.83	7.43	7.60	6.43	6.53	5.65	6.92	+36	+46
7.73	6.37	5.84	6.07	5.57	5.70	6.21	-34	+12
7.60	7.13	6.02	5.40	6.13	6.10	6.40	-14	-02
7.37	6.20	5.68	5.48	5.37	5.55	5.94	-61	-63
8.27	7.16	6.90	6.77	6.28	5.55	6.82	+27	-36
7.53	6.87	6.16	5.60	5.77	5.60	6.16	-38	-74
8.10	7.10	6.63	6.15	6.50	6.62	6.85	+30	-44
8.53	7.67	7.30	5.70	6.30	4.95	6.74	+19	-25
7.57	7.30	6.63	4.93	5.63	7.00	6.57	-03	-28
7.77	7.90	6.70	6.08	6.33	6.15	6.98 ⁸²	+27	-07
7.13	7.33	6.93	6.77	6.50	5.50	6.69	+14	+13
6.50	7.23	5.73	5.90	6.53	6.57	6.41	-13	00

820
6.547

Single degrees 267°-282°
Microscope F

	May 4	8.	May 5	May 6	Mean	Σ	
	I	II	I	II			
267-268	740	6.23	6.57	5.51	6.13	5.77	6.27 +01 +01
268-269	767	6.57	6.58	5.97	6.03	5.75	6.43 +17 +18
269-270	720	6.83	6.82	6.33	6.33	5.50	6.50 +24 +42
270-271	710	7.57	7.33	6.67	6.63	5.60	6.82 +56 +98
271-272	687	6.53	5.56	4.93	4.93	5.65	5.74 -52 +46
272-273	823	7.90	6.58	6.70	6.70	6.05	7.03 +77 +123
273-274	787	7.07	6.18	5.62	5.70	5.00	6.24 -02 +121
274-275	763	6.34	6.37	6.20	5.54	5.90	6.33 +07 +128
275-276	743	6.87	6.12	5.87	4.83	5.70	6.14 -12 +116
276-277	763	7.07	5.60	5.25	6.13	5.97	6.28 +02 +118
277-278	750	6.87	6.30	4.80	6.00	5.00	6.08 -18 +100
278-279	6.13	6.10	5.90	4.43	5.17	5.60	5.56 -70 +30
279-280	6.40	7.00	5.67	4.56	4.97	5.80	5.73 -53 -23
280-281	5.90	7.07	6.97	6.70	5.65	5.15	6.24 -02 -25
281-282	7.03	7.87	6.20	6.87	6.00	4.97	6.47 ⁹ +23 -02
					388		
					6.259		

H

May 4.8	May 5		May 6		Mean	Σ	
I	II	I	II	I	II		
7.70	5.50	5.60	5.73	5.70	5.50	5.96	-19 -19
7.70	6.07	5.58	5.80	6.63	6.00	6.30	+14 -05
6.93	5.83	6.10	5.63	5.53	5.85	5.98	-17 -22
7.67	6.83	6.17	5.83	5.23	6.00	6.29	+13 -09
7.17	6.43	6.42	6.13	6.07	5.80	6.34	+19 +10
8.37	7.97	6.92	6.63	6.20	5.90	7.00 ~~6.98~~	+84 +94
8.37	8.07	6.68	6.87	6.90	5.55	7.07	+92 +186
7.57	6.72	6.43	5.77	5.34	6.10	6.32	+16 +202
7.57	7.50	6.56	6.27	5.50	6.15	6.59	+44 +246
7.20	6.27	5.27	5.35	5.03	5.73	5.81	-35 +211
7.67	6.93	5.27	4.63	5.73	6.10	6.06	-09 +202
6.27	6.60	5.93	4.23	5.07	4.95	5.51	-65 +137
6.33	6.27	5.17	4.54	5.33	5.30	5.49	-66 +71
6.73	6.97	6.03	6.23	5.28	4.75	6.00	-16 +55
6.10	7.20	5.40	5.10	5.63	4.23	5.61	-54 +01
						233	
						6.154	

May 19 1885
Purple Blagreen 282° - 297°

Microscope		I	II	Mean	Σ	
282-283	+4.22	3.95	4.08	+0.3	+0.3	
283-284	3.95	3.85	3.90	-1.5	-1.2	
284-285	4.90	4.50	4.70	+6.5	+5.3	
285-286	3.50	3.40	3.45	-60	-07	
286-287	3.80	3.65	3.72	-33	-40	
287-288	4.90	4.35	4.63	+58	+18	
288-289	3.95	3.95	3.95	-10	+08	
289-290	4.40	4.30	4.35	+30	+38	
290-291	3.45	3.45	3.45	-60	-22	
291-292	4.65	4.65	4.65	+60	+38	
292-293	4.20	3.70	3.95	-10	+28	
293-294	3.50	3.75	3.62	-43	-15	
294-295	4.65	4.10	4.37	+32	+17	
295-296	5.05	5.10	5.07	+102	+119	
296-297	2.80	2.98	2.89	-1.16	+0.3	
61.92		59.78	60.78			
4.128		3.979	4.052			

I	II	Mean	Σ	$\frac{\Sigma + II}{2}$	
5.60	5.20	5.40	+1.19	+1.19	+6.1
4.65	3.70	4.17	-0.5	+1.14	+5.1
4.15	3.80	3.97	-2.4	+9.0	+7.1
3.75	3.45	3.60	-6.2	+28	+10
5.00	4.85	4.92	+7.1	+9.9	+2.9
3.60	4.20	3.90	-3.2	+6.7	+4.2
3.35	3.30	3.32	-8.9	-2.2	-0.7
3.90	3.90	3.90	+3.2	-5.4	-0.8
4.25	3.80	4.02	-1.9	-7.3	-4.7
6.25	5.70	5.97	+1.75	+10.2	+9.0
4.05	3.70	3.87	-3.4	+6.8	+4.8
3.80	4.15	3.98	-2.4	+4.4	+1.4
4.70	5.00	4.85	+6.4	+10.8	+6.2
3.50	3.20	3.35	-8.7	+2.1	+7.0
4.35	3.70	4.02	-1.9	+0.2	+0.2
64.90	61.65	63.24			
4.327	4.110	4.216			

<i>J</i>		Σ	
I	II	mean	
3.88	4.05	3.96	+29 -29
4.25	4.55	4.40	+15 -14
4.85	3.60	4.22	-03 -17
3.80	3.30	3.55	-.70 -87
4.95	4.80	4.85	+63 -24
5.30	4.40	4.85	+60 +36
4.25	3.60	3.93	-32 +04
3.35	3.40	3.37	-.88 -84
4.30	3.50	3.90	-.35 -119
5.10	5.05	5.07	+82 -37
4.50	4.10	4.30	+05 -32
4.20	4.50	4.35	+10 -22
4.10	4.60	4.35	+10 -12
4.70	4.85	4.77	+52 +40
3.62	4.08	3.85	-.40 00
65.15	62.38	63.75	
4.343	4.159	4.250	

<i>H</i>		Σ		$\frac{1}{2} \Delta I$
I	II	mean		
4.20	3.70	3.95	+04 +04	-12
5.35	4.90	5.13	+1.22 +1.26	+51
3.80	3.20	3.50	-.41 +.85	+34
4.10	3.75	3.93	+02 +.87	+40
4.60	4.60	4.60	+69 +15.6	+66
4.70	4.55	4.62	+71 +2.27	+131
3.45	3.05	3.25	-.66 +1.61	+82
3.60	3.15	3.37	-.54 +1.07	+11
3.60	4.00	3.80	-11 +.96	-12
4.30	4.40	4.35	+44 +1.40	+51
3.40	3.40	3.40	-.51 +.89	+28
2.30	3.10	2.70	-1.21 -32	-27
3.75	4.00	3.88	-.03 -35	-23
4.30	3.80	4.05	+14 -21	+10
4.02	4.15	4.09	+18 -03	+00
59.47	57.75	58.62		
3.965	3.850	3.908		

May 20
Single degrees. 297° - 312°

Microscope E	Σ
I II mean	
297-298 5.24 460 4.92 +.37 +37	
298-299 445 4.25 4.35 -.21 +16	
299-300 3.95 3.52 3.74 -.81 -65	
300-301 550 360 4.70 +1.6 -49	
301-302 545 445 4.95 +40 -09	
302-303 470 445 4.58 +02 -07	
303-304 545 430 4.88 +.33 +26	
304-305 455 3.70 4.12 -.44 -18	
305-306 590 522 5.56 +1.01 +83	
306-307 515 470 4.94 +.38 +121	
307-308 420 390 405 -.50 +71	
308-309 3.85 3.90 3.88 -.68 +.03	
309-310 475 420 4.48 -.07 -04	
310-311 420 552 ⁵ 4.88 +.32 +28	
311-312 450 410 430 ²⁶ -.35 +02	
7214 6444 6833	
4.809 4.296 4.554	

ef	Σ	$\frac{\Sigma}{n}$
I II mean		
572 398 485 +.08 +08 +23		
575 445 480 +02 +10 +13		
465 398 432 -.45 -35 -50		
555 420 488 +.10 -25 -38		
480 405 442 -.35 -60 -34		
480 450 465 -.13 -23 -40		
575 500 538 +.61 -12 +07		
525 465 495 +.17 +05 -.06		
480 390 435 -.42 -34 +28		
525 480 502 +.24 -13 +54		
435 475 455 -.22 -35 +78		
520 570 545 +.68 +33 +18		
490 475 482 +.05 +38 +17		
460 450 455 -.23 +5 +22		
500 425 462 -.15 +00 +01		
757 6746 71.61		
5.051 4.498 4.774		

J

I	II	Mean		
568	4.25	4.96	+0.5	+0.5
545	5.10	5.28	+37	+12
550	4.12	4.81	-09	+33
540	4.30	4.85	-06	+27
555	~~4.90~~	5.22	+31	+58
505	4.55	4.80	-10	+48
550	4.75	5.12	+21	+69
545	4.35	4.90	-01	+68
490	3.95	4.42	-48	+20
560	5.13	5.36	+45	+65
435	4.55	4.45	-96	+19
515	5.10	5.12	+22	+41
470	5.10	4.90	-01	+40
430	47.0	4.50	-41	-01
<u>480</u>	<u>500</u>	<u>4.90</u>	<u>+00</u>	<u>00</u>
773.8	708.5	735.9		
5.158	4.657	4.907		

H.

I	II	Mean		$\frac{1}{2}(7+16)$
5.22	4.42	4.82	+18	+18
4.55	4.00	4.28	-37	-19
5.90	4.72	5.31	+69	+50
4.75	4.10	4.42	-23	+27
4.80	3.55	4.18	-46	-19
505	4.35	4.70	+05	-19
52.5	4.85	5.10	+46	+32
5.20	4.35	4.77	+12	+44
5.15	4.20	4.67	+03	+47
4.35	3.80	4.07	-58	-11
420	4.35	4.27	-30	-46
5.65	5.40	5.52	+87	+39
415	4.70	4.43	-21	+18
5.25	4.80	5.02	+36	+54
<u>415</u>	<u>4.05</u>	<u>4.00</u>	<u>-54</u>	<u>+00</u>
737.2	65.64	696.87		
4.914	4.376	4.645		

May 22
Single Degree 312°-327°

Microscope E

	I	II	mean		
312-313	415	3.50	3.82	+17	+17
313-314	410	295	3.68	+03	+20
314-315	460	375	4.18	+53	+73
315-316	485	390	4.38	+83	+156
316-317	345	375	3.60	-06	+150
317-318	410	350	3.80	+15	+165
318-319	495	400	4.48	+83	+248
319-320	310	340	3.25	-40	+208
320-321	395	405	4.00	+35	+243
321-322	365	295	3.80	-36	+207
322-323	285	295	2.90	-75	+132
323-324	380	345	3.62	-03	+129
324-325	280	255	2.68	-97	+32
325-326	375	370	3.72	+06	+38
326-327	330	332	3.31	-34	+54

5770 5772 5772
3.647 3.648 3.648

	I	II	mean		
520	505	512	+108	+09	+65
475	422	448	+45	+184	+67
465	365	415	+12	+106	+69
410	450	430	+29	+193	+174
410	350	380	-23	+170	+160
360	355	358	-45	+125	+145
430	390	410	+07	+182	+190
475	465	470	+67	+195	+203
370	380	375	-28	+191	+207
440	425	432	+19	+200	+203
540	430	495	+52	+292	+224
260	410	335	-68	+224	+176
290	275	282	-121	+103	+67
380	335	358	-45	+88	+48
310	380	345	-58	00	+00
6135	5957	6045			
4090	3994	4030			

$\mathcal{J}$					$\bar{Z}$	
I	II	Mean				
4.68	3.75	4.21	+04	+00		
4.45	4.60	4.52	+35	+39		
5.05	4.25	4.65	+48	+87		
3.65	4.10	3.88	-28	+55		
4.20	4.90	4.55	+38	+97		
4.65	4.55	4.60	+43	+40		
4.50	4.65	4.58	+42	+82		
4.15	4.00	4.08	-08	+173		
4.70	3.90	4.30	+13	+186		
4.90	4.40	4.65	+49	+235		
3.85	3.45	3.65	-52	+183		
4.10	3.15	3.62	-55	+128		
4.10	4.20	4.15	-01	+127		
3.20	3.55	3.38	-75	+48		
3.40	3.97	3.68	-49	-01		
63.63	61.42	62.51				
4.242	4.095	4.167				

$\mathcal{H}$					$\frac{1}{2}(F+10)$	
I	II	Mean				
4.85	4.15	4.50	+83	+13	+44	
4.00	3.02	3.51	-16	+67	+53	
3.65	3.05	3.35	-33	+34	+60	
4.50	3.75	4.12	+44	+78	+68	
4.40	4.50	4.45	+78	+156	+126	
4.55	4.05	4.30	+62	+218	+179	
4.55	3.95	4.25	+58	+276	+229	
4.00	3.55	3.78	+10	+286	+229	
2.90	3.25	3.08	-59	+227	+206	
4.00	3.75	3.88	+20	+247	+241	
3.75	3.70	3.72	+05	+252	+217	
3.55	3.05	3.30	-38	+214	+171	
2.30	2.70	2.50	-117	+97	+162	
3.90	3.55	3.72	+05	+102	+75	
2.65	2.67	2.66	-102	+1000	+100	
57.55	52.69	55.12				
3.837	3.512	3.674				

48

May 25
Single depress

327°-342°

Microscope E Σ

327-328	310	335	322	-70	-70
328-329	420	480	450	+57	-13
329-330	305	335	320	-72	-85
330-331	460	445	452	+59	-26
331-332	400	410	405	+13	-13
332-333	450	380	415	+22	+09
333-334	315	325	320	-72	-63
334-335	395	360	378	-15	-78
335-336	420	330	375	-18-23	-96
336-337	270	370	320	-73	-169
337-338	435	475	455	+63	-106
338-339	425	450	438	+45	-61
339-340	333	410	372	-20	-81
340-341	505	495	500	+07	+26
341-342	363	375	369	-23	+03
	6				

3.926

g $\Sigma \frac{1}{2}(\Sigma + g)$

346	415	385	-71	-71	-70
423	420	421	-35	-106	-60
425	430	427	-29	-135	-110
460	475	467	+11	-124	-75
470	450	460	+04	-120	-66
435	470	452	-05	-125	-58
460	430	445	-11	-136	-100
450	415	432	-24	-160	-119
425	470	447	-09	-169	-132
510	460	485	+29	-140	-154
465	560	513	+56	-84	-95
480	525	502	+46	-38	-50
563	490	527	+71	+33	-24
450	450	450	-6	+29	-28
437	425	431	-25	-04	00
6794	6885	6844			
4.530	4.590	4.562			

$\frac{1}{2}$	I	II	Mean	Σ
	428	420	424	-25 -25
	413	445	429	-20 -45
	445	425	435	-14 -59
	470	455	462	+13 -46
	440	440	440	-09 -55
	475	475	475	+26 -29
	395	445	420	-29 -58
	440	400	420	-29 -87
	415	440	428	-21 -108
	430	435	432	-17 -125
	515	465	500	+51 -74
	415	435	425	-24 -98
	403	415	409	-40 -138
	560	575	568	+119 -19
	460	480	470	+21 +02
	6704	6770	6737	
	+4.469	4513	4.491	

$\frac{1}{2}$	I	II	Mean	Σ	$\frac{1}{2}(\frac{1}{2} + \frac{1}{2})$
	526	370	3.48	-62 -62	-44
	5.20	5.45	5.32	+1.22 +60	+08
	3.95	4.65	4.30	+20 +80	+10
	4.55	5.15	4.85	+75 +155	+54
	4.20	3.80	4.05 ⁰	-10 +1.45	+45
	3.85	4.30	4.08	-02 +1.43	+57
	3.70	4.05	3.88	-22 +1.21	+32
	4.60	4.10	4.35	+25 +1.46	+30
	3.45	3.30	3.38	-72 +74	-17
	3.55	4.00	3.78	-32 +42	-42
	4.10	4.10	4.10	00 +92	-16
	3.05	3.15	3.10	-100 -58	-78
	3.70	4.25	3.98	-12 -70	-104
	4.60	4.30	4.45	+35 -35	-27
	5.00	3.88	4.44	+34 -08	00
	6076	6218	6154 ₄₉		
	+4.051	4.145	4.099		

May 26
 Single degrees 342°-357°

Microscope E. Σ

	Σ	Σ	Σ	Σ
342-343	4.68	4.12	4.40	+31 +31
343-344	3.78	3.90	3.84	-25 +06
344-345	3.90	3.40	3.65	-44 -38
345-346	3.35	3.60	3.47	-62 -100
346-347	4.25	4.90	4.57	+48 -52
347-348	3.70	4.05	3.87	-22 -74
348-349	5.30	5.40	5.35	+1.26 +52
349-350	3.35	4.20	3.77	-32 +20
350-351	2.80	3.55	3.18	-91 -71
351-352	4.30	4.25	4.27	+18 -53
352-353	4.17	3.85	4.01	-08 -61
353-354	4.05	4.15	4.10	+01 -60
354-355	4.67	4.68	4.37	+28 -32
355-356	4.10	4.50	4.30	+21 -11
356-357	4.30	4.10	4.20	+11 00
	60.10	62.65	61.35	
	4.007	4.177	4.090	

$\Sigma \frac{1}{2}(\Sigma + e_f)$

Σ	Σ	Σ	Σ	Σ
4.15	3.72	3.93	-39 -39	-04
4.22	3.70	3.96	-36 -75	-34
4.40	4.75	4.57	+25 -50	-44
3.50	3.70	3.60	-72 -122	-1.11
3.80	3.80	3.80	-52 -1.74	-1.13
3.75	4.00	3.87	-46 -220	-1.47
4.15	4.60	4.37	+05 -2.15	-82
4.30	4.25	4.27	-05 -220	-1.00
4.45	4.45	4.45	+13 -207	-1.39
3.65	3.80	3.73	-59 -2.66	-1.60
4.07	4.55	4.31	-01 -2.67	-1.64
4.70	5.30	5.00	+67 -200	-1.30
5.04	5.32	5.18	+86 -1.14	-73
4.35	4.50	4.43	+11 -1.03	-57
5.40	5.20	5.30	+98 -05 -02	
63.93	65.64	64.77		
4.262	4.376	4.318		

I	II	Mean	Σ
428	438	433 +05	-05
410	345	388 -60	-66
525	495	510 +12	+06
405	370	388 -50	-45
440	490	465 +27	-18
390	385	388 -50	-69
475	535	505 +67	-02
545	480	512 +73	+71
450	480	465 +27	+98
435	415	425 -14	+84
380	415	398 -40	+44
360	365	362 -77	-33
457	485	471 +33	+00
453	460	458 +29	+21
415	420	418 -20	+01
6570	6578	6576	
4.380	4.385	4.384	

I	II	Mean	Σ	$\frac{1}{2}(I+II)$
455	378	416 +22	+22	+08
455	400	428 +33	+55	-05
395	400	398 +04	+59	+33
455	415	435 +40	+49	+27
285	385	310 -84	+15	-02
290	350	320 -75	-60	-64
480	485	458 +64	+04	+01
405	450	428 +33	+37	+54
360	385	372 -22	+15	+56
395	385	390 -05	+10	+47
337	300	318 -76	-66	-11
475	445	460 +65	-01	-171
453	480	466 +72	+71	+36
400	385	392 -03	+68	+44
345	310	328 -66	+02	+01
5935	5893	5919		
3.956	3.929	3.946		

May 27
Single degrees $357^{\circ}12'$

Microscope E

	I	II	mean	Σ	
357-358	5.45	5.13	5.29	+12	+12
358-359	4.80	4.50	4.65	-52	-40
359-360	5.25	4.95	5.10	-07	-47
0-1	5.70	6.00	5.85	+68	+21
1-2	5.35	4.90	5.12	-05	+16
2-3	5.00	5.30	5.15	-02	+14
3-4	6.15	5.35	5.75	+58	+72
4-5	5.25	5.50	5.52	+35	+107
5-6	5.16	5.90	5.53	+36	+143
6-7	5.80	5.95	5.88	+71	+214
7-8	5.35	4.85	5.10	-07	+207
8-9	4.00	4.35	4.18	-99	+108
9-10	4.80	4.45	4.62	-55	+53
10-11	5.00	5.60	5.30	+13	+66
11-12	4.50	4.55	4.52	-65	+01
	77.56	77.58	77.56		
	+5.171	5.172	5.171		

	I	II	mean	Σ	$\frac{1}{2}(\Sigma + \Sigma')$
	4.30	4.20	4.25	-1.01	-1.01
	5.10	4.45	4.77	-49	-150
	5.30	4.95	5.13	-12	-162
	5.15	5.35	5.25	-01	-163
	5.70	5.70	5.70	+44	-119
	5.75	5.55	5.65	+40	-79
	6.45	6.45	6.45	+119	+40
	5.90	6.25	6.07	+81	+121
	6.05	5.60	5.84	+59	+180
	5.35	5.30	5.32	+06	+186
	5.45	5.90	5.67	+42	+228
	4.80	4.35	4.57	-69	+159
	5.00	4.55	4.78	-48	+111
	4.50	5.05	4.77	-48	+63
	5.00	4.25	4.62	-64	-01
	79.80	77.93	78.84		
	+5.320	5.196	5.257		

$\mathcal{H}$	I	II	mean	Σ
500	4.55	4.78	-56	-56
585	5.55	5.70	+36	-20
475	5.00	4.88	-46	-66
465	5.15	4.90	-44	-110
525	4.75	5.00	-34	-144
525	5.45	5.35	+01	-143
520	5.70	5.45	+11	-132
580	5.15	5.38	+04	-128
570	6.13	5.92	+58	-70
640	6.15	6.28	+94	+24
590	5.25	5.58	+24	+48
545	5.05	5.25	-09	+39
655	6.20	6.38	+104	+143
420	4.45	4.32	-102	+41
470	5.15	4.92	-42	-01
8055	7968	8009		
5370	5.312	5.339		

$\mathcal{H}$	I	II	mean	Σ	$\frac{1}{2}(\mathcal{H} + \mathcal{H})$
420	3.97	4.08	-90	-90	-73
528	4.52	4.90	-08	-98	-59
535	4.60	4.98	00	-98	-82
515	4.95	5.05	+07	-91	-100
500	4.95	4.98	00	-91	-118
540	5.45	5.45 ²	+44	-47	-95
545	5.30	5.38	+40	-07	-69
550	5.00	5.45	+47	+40	-44
535	5.60	5.48	+50	+90	+10
550	5.05	5.28	+30	+120	+72
465	4.80	4.72	-26	+94	+71
480	4.75	4.78	-20	+74	+56
510	4.85	4.98	00	+74	+108
420	4.85	4.52	-46	+28	+34
4565	4.85	4.75	-23	+05	+02
75.58	7389	7475			
5039	4.926	4.983			

May 28
Single degrees 12°-27°

Microscope E.

	I	II	Mean.	Σ
12-13	622	638	6.30	+1.89 +89
13-14	590	520	5.55	+1.8 +104
14-15	505	525	5.15	-26 +78
15-16	635	565	6.00	+60 +138
16-17	525	560	5.42	+01 +139
17-18	575	595	5.85	+45 +184
18-19	580	565	5.72	+31 +215
19-20	455	505	4.80	-60 +155
20-21	460	440	4.50	-91 +64
21-22	470	465	4.68	-72 -08
22-23	580	605	5.92	+51 +43
23-24	535	565	5.50	+10 +53
24-25	460	500	4.80	-61 -08
25-26	562 ~~580~~	510	5.36	-04 -12
26-27	530	580	5.55	+14 +02
	8084	8138	8110	
	5.389	5.425	5.407	

	I	II	Mean	Σ	$\frac{1}{2}(\Sigma + \Sigma)$
	595	535	5.63	+16 +16	+52
	565	515	5.40	-07 +09	+56
	602	650	6.26	+79 +88	+83
	625	610	6.18	+71 +159	+148
	550	580	5.65	+18 +177	+158
	560	605	5.82	+35 +212	+198
	480	540	5.10	-37 +175	+195
	490	510	5.00	-47 +128	+141
	580	510	5.35	-12 +116	+90
	515	560	5.38	-09 +107	+50
	565	530	5.48	+01 +108	+175
	495	450	4.72	-75 +33	+43
	490	585	5.72	-35 -02	-05
	628 ~~620~~	510	5.59	+12 +10	-01
	540	530	5.35	-12 -02	+00
	8240	8167	8203		
	+5493	5.445	5.469		

Σ	Σ	Mean		Σ
618	615	6.18	+72	+72
635	625	6.30	+83	+155
488	510	4.99	-47	+108
570	515	5.42	-05	+103
645	635	6.40	+94	+197
445	465	4.55	-92	+105
510	495	5.02	-44	+61
490	530	5.10	-37	+24
575	570	5.72	+26	+50
520	580	5.50	+08	+53
600	590	5.95	+49	+102
535	530	5.32	-15	+87
505	485	4.95	-51	+36
~~540~~ ⁶⁰	535	5.48	+01	+87
495	520	5.08	-38	-01
8191	8203	8196		
+ 5461	5469	5464		

Σ	Σ	Mean		Σ	$\frac{1}{2}(\Sigma + H)$
478	545	5.12	-15	-15	+28
595	562	5.78	+50	+35	+95
530	565	5.48	+21	+56	+82
530	540	5.35	+07	+63	+84
545	555	5.50	+23	+86	+142
585	580	5.82	+54	+140	+1.22
520	530	5.25	-02	+138	+1.00
530	615	5.72	+44	+182	+103
445 ⁰	415	4.28	-99	+83	+66
495	520	5.08	-20	+63	+58
605	485	5.45	+18	+81	+92
500	530	5.15	-13	+68	+78
500	565	5.32	+05	+73	+54
530 ²	480	5.06	-22	+51	+44
495	460	4.78	-49	+02	+00
7880	7947	7914			
+ 5.253	5.299	5.276			

May 29
Single degress $27^{\circ}42^{\circ}$

	Microscope E			Σ	
	I	II	Mean		
27-28	+7.10	6.00	6.55	-1.22	-1.22
28-29	9.10	8.15	8.62	+1.84	-3.8
29-30	8.10	6.95	7.52	-2.5	-6.3
30-31	7.45	6.20	6.82	-9.6	-15.9
31-32	7.60	6.65	7.12	-6.5	-2.24
32-33	7.65	7.25	7.45	-3.3	-2.57
33-34	7.65	7.05	7.35	-4.2	-2.99
34-35	7.70	8.25	7.98	+2.0	-2.79
35-36	8.40	8.00	8.20	+4.3	-2.36
36-37	7.90	7.60	7.75	-.03	-2.39
37-38	7.40	6.95	7.18	-.59	-2.98
38-39	9.40	9.30	9.35	+1.57	-1.41
39-40	9.00	8.25	8.62	+1.85	-5.6
40-41	7.70	7.45	7.58	-2.0	-7.6
41-42	8.20	8.85	8.52	+2.5	-0.1
	120.35	102.90	116.61		
	8.023	7.527	7.774		

	G			Σ		$\frac{1}{2}(\Sigma + G)$
	I	II	Mean			
	7.83	6.40	7.12	-7.5	-7.5	-9.8
	8.12	6.95	7.54	-3.4	-1.09	-7.4
	8.25	6.25	7.25	-6.2	-1.71	-1.17
	7.50	6.55	7.02	-8.6	-2.57	-2.08
	8.80	7.80	8.05	+1.8	-2.39	-2.32
	8.15	7.30	7.72	-1.6	-2.55	-2.56
	7.35	7.05	7.20	-.67	-3.22	-3.10
	8.25	8.60	8.42	+5.4	-2.68	-2.74
	8.25	7.85	8.05	+1.8	-2.50	-2.43
	7.65	7.15	7.40	-.48	-2.98	-2.68
	8.10	8.50	8.30	+4.3	-2.55	-2.76
	8.85	8.45	8.65	+7.7	-1.78	-1.60
	9.05	8.60	8.82	+9.5	-8.3	-.70
	8.10	8.00	8.05	+1.7	-.66	-.71
	8.50	8.55	8.52	+6.5	-.01	-.01
	122.25	114.00	118.11			
	8.150	7.600	7.874			

$\mathcal{J}$	$\mathcal{H}$	η_{mean}	Σ	
7.98	7.15	7.56	-21	-21
8.55	7.25	7.90	+12	-09
7.55	6.70	7.12	-65	-74
6.60	6.20	6.40	-1.38	-2.12
7.92	7.05	7.48	-29	-241
7.85	6.95	7.40	-38	-2.79
8.20	7.60	7.90	+13	-2.66
7.45	7.50	7.48	-30	-296
7.80	7.65	7.72	-05	-3.01
8.05	7.45	7.75	-03	-304
8.20	8.00	8.10	+33	-2.71
8.65	9.05	8.85	+1.07	-1.64
9.05	9.10	9.08	+1.31	-3.3
7.90	8.15	8.02	+24	-09
8.10	7.60	7.85	+08	-01
119.85	113.40	116.61		
+7.990	7.580	7.774		

$\mathcal{H}$	$\mathcal{H}$	η_{mean}	Σ	$\frac{1}{2}(\mathcal{H} + \mathcal{H})$
7.47	6.20	6.84	-.59	-59
7.70	7.05	7.38	-.05	-64
6.95	6.20	6.58	-.65	-149
6.75	6.15	6.45	-.98	-247
7.78	7.75	7.76	+33	-2.14
7.70	6.70	7.20	-23	-2.37
6.90	6.75	6.82	-.61	-298
7.95	7.75	7.85	+42	-2.56
8.85	8.85	8.85	+1.42	-1.14
7.40	7.60	7.50	+07	-1.07
7.30	6.95	7.12	-.31	-1.38
7.20	7.10	7.15	-.28	-1.66
8.10	7.80	7.95	+52	-1.14
7.45	7.85	7.65	+22	-92
8.40	8.25	8.32	+89	-0.3
113.90	108.95	111.42		
7.593	7.263	7.428		

June 1
Simple deprec $42^{\circ} - 57^{\circ}$

	Microscope E			Σ
	I	II	Mean	
42-43	605	545	5.75	-47 -47
43-44	640	595	6.15	-07 -54
44-45	715	670	6.92	+70 +16
45-46	625	565	5.95	-27 -11
46-47	700	685	6.92	+71 +60
47-48	655	625	6.40	+18 +78
48-49	555	600	5.77	-45 +33
49-50	595	575	5.85	-37 -04
50-51	670	720	6.95	+73 +69
51-52	635	555	5.95	-26 +43
52-53	602	660	6.31	+09 +52
53-54	575	585	5.80	-42 +10
54-55	575	545	5.60	-62 -02
55-56	630	690	6.60	+38 -14
56-57	645	625	6.35	+14 00
			9327	
			6.218	

	g			Σ	$\frac{1}{2}(E+g)$
	I	II	Mean		
620	570	595	-44 -49	-46	
660	680	670	+30 -14	-34	
640	590	615	-24 -38	-11	
670	635	652	+12 -26	-18	
710	685	698	+59 +33	+46	
670	660	665	+25 +58	+68	
635	635	635	-04 +54	+44	
635	690	663	+23 +77	+36	
695	660	677	+38 +115	+92	
580	645	613	-26 +89	+66	
595	625	610	-30 +59	+56	
605	635	620	-19 +40	+25	
560	605	682	-58 -18	-35	
673	690	681	+42 +24	+05	
590	640	615	-25 -01	00	
			9591		
			6.394		

I	II	Mean	Σ	
685	620	6.52	+30	+30
705	620	6.62	+40	+70
670	615	6.42	+21	+91
615	525	5.70	-52	+39
690	635	6.62	+40	+79
590	630	6.10	-11	+68
580	550	5.55	-67	+01
656	660	6.58	+36	+37
635	635	6.35	+14	+51
555	625	5.90	-32	+19
682	770	7.26	+104	+123
520	500	5.10	-111	+12
620	610	6.15	-07	+05
613	645	6.29	+07	+12
665	555	6.10	-11	+01
461	195	3.26		
6307	6.130	6.217		

I	II	Mean	Σ	$\frac{1}{2}(I+II)$	
605	560	5.82	-36	-03	
610	605	6.08	-11	-47	+11
710	635	6.72	+54	+07	+49
580	525	5.42	-77	-70	-16
660	650	6.55	+37	-33	+23
610	650	6.30	+11	-22	+23
570	600	5.85	-33	-55	-27
615	670	6.42	+23	-32	+02
635	655	6.45	+27	+05	+23
615	685	6.50	+31	+26	+22
545	645	5.95	-23	+03	+63
555	605	5.80	-39	-36	-12
615	545	5.80	-38	-74	-34
560	600	5.80	-39	-113	-50
725	735	7.30	+112	-01	00
92.90	926.5	92.76			
6.193	6.177	6.184			

June 2
Single degrees 57°-72°

Microscope E Σ

	I	II	Mean		
57-58	5.58	6.90	6.95	+67	+67
58-59	5.80	5.30	5.55	-73	-06
59-60	6.95	7.30	7.12	+84	+78
60-61	5.50	5.40	5.45	-83	-05
61-62	6.65	6.20	6.42	+14	+09
62-63	6.20	6.50	6.35	+07	+16
63-64	6.30	5.80	6.05	-23	-07
64-65	6.75	6.40	6.58	+30	+23
65-66	5.65	6.65	6.15	-13	+10
66-67	6.22	5.65	5.94	-34	-24
67-68	5.70	6.60	6.15	-13	-37
68-69	6.23	6.17	6.20	-08	-45
69-70	6.65	6.85	6.75	+47	+02
70-71	6.35	6.45	6.40	+12	+14
71-72	5.97	6.37	6.17	-11	+03
	392	454	423		
	+ 6.261	6.303	6.282		

	I	II	Mean	Σ	$\frac{1}{2}(E+G)$	
	6.78	6.15	6.46	+20	+20	+44
	6.60	5.90	6.25	-01	+19	+06
	6.85	7.15	7.00	+73	+92	+85
	5.95	5.75	5.85	-41	+51	+23
	6.40	6.20	6.30	+04	+55	+32
	5.70	6.05	5.88	-39	+16	+16
	7.45	6.90	7.18	+92	+108	+50
	6.75	6.35	6.55	+29	+134	+80
	5.25	5.85	5.55	-72	+65	+38
	6.25	6.05	6.15	-11	+54	+15
	5.30	6.45	5.88	-38	+16	-10
	6.07	5.87	5.97	-30	-14	-30
	6.65	6.75	6.70	+44	+30	+16
	6.85	6.40	6.62	+36	+66	+40
	5.50	5.73	5.61	-66	00	+01
	435	3.55	395			
	6.290	6.237	6.263			

f	I	II	mean	Σ
	+6.62	6.20	6.41	-11
	5.80	5.50	5.65	-86
	6.85	6.90	6.88	+38
	6.25	5.65	5.95	-56
	6.70	6.65	6.68	+18
	6.25	6.25	6.25	-26
	7.10	6.05	6.58	+08
	6.75	7.20	6.98	+47
	6.35	6.30	6.32	-18
	6.72	5.90	6.31	-20
	6.05	6.60	6.32	-18
	6.87	7.63	7.25	+74
	7.85	7.80	7.82	+132
	6.05	6.20	6.12	-39
	<u>6.03</u>	<u>6.10</u>	<u>6.06</u>	-44
	8.24	6.93	7.58	-01
	6.563	6.462	6.505	

H	I	II	mean	Σ	$\frac{1}{2}(f+H)$
	5.75	5.65	5.70	-27	-27
	4.85	4.25	4.55	-139	-166
	6.10	6.80	6.45	+52	-114
	5.45	5.45	5.45	-49	-163
	6.30	6.30	6.30	+36	-127
	5.70	5.15	5.42	-51	-178
	6.85	6.00	6.42	+48	-130
	6.20	6.85	6.52	+58	-72
	5.65	5.95	5.80	-13	-85
	6.25	6.50	6.38	+44	-41
	5.35	5.85	5.60	-34	-75
	6.30	6.60	6.45	+52	-23
	6.45	6.65	6.55	+61	+38
	5.85	6.30	6.08	+14	+52
	<u>5.27</u>	<u>5.50</u>	<u>5.38</u>	-55	-03
	8.32	8.80	8.905		-02
	5.888	5.987	5.937		

June 4
Single degrees $\frac{1}{2}^{\circ}$ - $\frac{8}{1}$

Microscope E Σ

	I	II	Mean		
72-73	+6.73	6.60	+6.66	-27	-27
73-74	6.82	6.70	6.76	-47	-44
74-75	7.45	7.20	7.32	+39	-05
75-76	6.22	5.40	5.81	-112	-117
76-77	7.10	7.25	7.18	+25	-92
77-78	7.85	7.45	7.65	+72	-20
78-79	7.15	7.15	7.15	+22	+02
79-80	7.87	7.65	7.76	+83	+85
80-81	6.80	7.70	7.25	+32	+117
81-82	6.05	6.55	6.30	-63	+54
82-83	7.80	7.85	7.82	+89	+143
83-84	6.45	6.65	6.55	-38	+105
84-85	6.80	7.20	7.00	+07	+112
85-86	6.10	6.80	6.45	-48	+64
86-87	6.30	6.30	6.30	-63	+01
	13.49	14.45	13.96		
	6.879	6.963	6.931		

Σ	$\frac{1}{2}(\Sigma + g)$
6.80 7.22 7.01 +05 +05 -11	
7.52 7.30 7.41 +44 +49 +02	
7.35 7.35 7.35 +39 +88 +42	
5.85 5.60 5.72 -125 -37 -77	
6.30 6.35 6.32 -.64 -101 -96	
6.35 6.50 6.42 -.55 -1.56 -88	
7.40 7.50 7.45 +119 -107 -52	
7.77 7.50 7.64 +67 -40 +22	
7.30 7.10 7.20 +24 -16 +50	
6.35 7.50 6.92 -.05 -.21 +16	
6.95 6.95 6.95 -.01 -.22 +60	
6.95 7.90 7.42 +45 +23 +64	
6.85 7.70 7.28 +32 +55 +84	
6.60 6.75 6.68 -.29 +.26 +45	
<u>6.70</u> <u>6.75</u> <u>6.72</u> -.24 +02 +01	
14.04 15.97 14.49	
6.869 7.065 6.966	

$\bar{H}$	$\bar{I}$	$\bar{II}$	$\bar{Mean}$	Σ
688	662	675	-27	-27
710	685	698	-05	-32
658	625	642	-60	-92
592	575	554	-149	-241
670	705	688	-14	-255
720	690	705	+02	-253
630	655	642	-60	-313
770	760	765	+62	-251
635	685	660	-42	-293
650	700	675	-28	-321
795	805	800	+98	-223
710	750	730	+27	-196
725	760	742	+40	-156
760	765	762	+59	-97
805	790	798	+96	-01
10518	.52	36		
7012	7035	7024		

$\bar{CH}$	$\bar{I}$	$\bar{II}$	$\bar{Mean}$	Σ	$\frac{1}{2}(\bar{I} + \bar{CH})$
6.92	6.75	6.84	-15	-15	-21
7.25	7.00	7.12	+13	-02	-17
6.85	6.80	6.82	-18	-20	-56
5.98	5.45	5.72	-127	-147	-194
7.65	7.15	7.40	+41	-106	-180
7.10	7.15	7.12	+12	-94	-174
7.90	6.90	7.40	+41	-53	-183
6.90	7.15	7.02	+03	-50	-150
5.60	7.05	6.32	-68	-118	-206
7.25	7.65	7.45	+46	-72	-196
7.65	7.50	7.58	+59	-13	-118
7.10	7.20	7.15	+15	+02	-97
7.30	7.60	7.45	+46	+48	-54
6.70	7.65	7.18	+19	+67	-15
6.35	6.30	6.32	-68	-01	-01
104.50	105.30	104.89			
6.967	7.020	6.993			

June 12 1885 (copied from Mr R's sheet)

Investigation of five degree spaces 87-102
1st Set

Microscope E

	I	II	Mean	Σ
87-92	15.1	18.9	17.00	-1.33
92-97	15.0	18.8	14.80	-93
97-102	17.6	17.6	17.60	+1.77
			15.83	

2nd Set

-135 -
-23
0.01

	I	II	Mean	Σ
87-92	13.8	15.0	14.90	-1.95
92-97	15.5	15.7	15.60	-43
97-102	17.2	17.9	17.55	+1.52
			15.5	
			16.03	

	I	II	Mean	Σ
14.3	14.1	14.20	-58	
14.5	14.2	14.85	-151	
16.3	16.3	16.40	+01	
			14.76	
14.3	14.1	14.20	-57	
14.5	14.2	14.85	-133	
15.3	15.3	15.30	+00	
			14.45	

	I	II	Mean	Σ
14.2	14.6	14.30	-11	
14.9	14.2	14.55	-03	
15.8	16.0	15.90	+82	
			14.08	
14.0	14.6	14.30	-10	
13.9	14.2	14.00	-40	
14.0	16.0	14.50	+20	
			14.40	

June 12 from both
From 102-117

	I	II	Mean	Σ
102-107	15.00	14.65	14.82	+18
107-112	15.10	14.35	14.72	+08
112-117	14.30	14.45	14.38	-26
			14.64	

	I	II	Mean	Σ
14.30	14.15	14.28	-72	
15.70	15.15	15.42	-30	
14.95	15.60	15.28	-02	
			15.00	

Σ	(10+5) 673	7 (110+7) 8	8 (110+9) 1	7 (110+7) 6
+18	-12	-02	+106	-53
+26	+09	+08	+83	-56
-00	+01	+00	+00	+00

$\frac{1}{2}(5+9)$
-12
+15
+00

$\frac{1}{2}(7+9)$
+23
+17
+00

$$\frac{1}{2} \begin{array}{r} \text{I} \\ +15.2 \\ 16.2 \\ 14.0 \\ \hline 14.90 \end{array} \quad \begin{array}{r} \text{II} \\ 14.6 \\ 15.4 \\ 14.0 \\ \hline 14.90 \end{array} \quad \begin{array}{r} \text{Mean} \\ 14.90 \\ 15.80 \\ 14.00 \\ \hline 14.90 \end{array} \quad \begin{array}{r} \Sigma \\ 00 \\ +90 \\ -90 \\ \hline 00 \end{array}$$

-30

+0.92

+0.00

$$\begin{array}{r} \text{I} \\ 14.0 \\ 16.5 \\ 13.8 \\ \hline 14.80 \end{array} \quad \begin{array}{r} \text{II} \\ 14.4 \\ 16.2 \\ 13.9 \\ \hline 14.80 \end{array} \quad \begin{array}{r} \text{Mean} \\ 14.20 \\ 16.35 \\ 13.85 \\ \hline 14.80 \end{array} \quad \begin{array}{r} \Sigma \\ -60 \\ +150 \\ -95 \\ \hline 00 \end{array}$$

$$\frac{1}{2} \begin{array}{r} \text{I} \\ 15.0 \\ 14.8 \\ 14.5 \\ \hline 14.57 \end{array} \quad \begin{array}{r} \text{II} \\ 14.2 \\ 14.4 \\ 14.5 \\ \hline 14.57 \end{array} \quad \begin{array}{r} \text{Mean} \\ 14.60 \\ 14.60 \\ 14.50 \\ \hline 14.57 \end{array} \quad \begin{array}{r} \Sigma \\ +03 \\ +03 \\ -07 \\ \hline 00 \end{array}$$
 $\frac{1}{2}(\text{I} + \text{II})$

-16 -23

-07 +42

+00 +00

$$\begin{array}{r} \text{I} \\ 14.1 \\ 15.0 \\ 14.4 \\ \hline 14.80 \end{array} \quad \begin{array}{r} \text{II} \\ 14.8 \\ 14.9 \\ 15.6 \\ \hline 14.80 \end{array} \quad \begin{array}{r} \text{Mean} \\ 14.45 \\ 14.95 \\ 15.00 \\ \hline 14.80 \end{array} \quad \begin{array}{r} \Sigma \\ -35 \\ +15 \\ +20 \\ \hline 00 \end{array}$$

$$\frac{1}{2} \begin{array}{r} \text{I} \\ 15.20 \\ 13.65 \\ 13.45 \\ \hline 13.89 \end{array} \quad \begin{array}{r} \text{II} \\ 14.70 \\ 13.70 \\ 12.65 \\ \hline 13.89 \end{array} \quad \begin{array}{r} \text{Mean} \\ 14.95 \\ 13.68 \\ 13.05 \\ \hline 13.89 \end{array} \quad \begin{array}{r} \Sigma \\ +106 \\ +83 \\ -84 \\ \hline 00 \end{array}$$

$$\frac{1}{2} \begin{array}{r} \text{I} \\ 15.70 \\ 15.65 \\ 15.85 \\ \hline 15.39 \end{array} \quad \begin{array}{r} \text{II} \\ 14.90 \\ 15.35 \\ 14.90 \\ \hline 15.39 \end{array} \quad \begin{array}{r} \text{Mean} \\ 15.30 \\ 15.50 \\ 15.38 \\ \hline 15.39 \end{array} \quad \begin{array}{r} \Sigma \\ -09 \\ +11 \\ -01 \\ \hline 00 \end{array} \quad \frac{1}{2}(\text{I} + \text{II})$$

$$\begin{array}{r} \frac{1}{2}(\text{I} + \text{II}) \\ -27 \\ -02 \\ +00 \end{array} \quad \begin{array}{r} \frac{1}{2}(\text{I} + \text{II}) \\ -20 \\ +19 \\ +00 \end{array} \quad \begin{array}{r} \text{Mean} \\ -23 \\ +08 \\ +00 \end{array} \quad \begin{array}{r} \frac{1}{2}(\text{I} + \text{II}) \\ +18 \\ +12 \\ +00 \end{array} \quad \begin{array}{r} \frac{1}{2}(\text{I} + \text{II}) \\ -53 \\ -56 \\ +01 \end{array} \quad \begin{array}{r} \text{Mean} \\ +08 \\ -07 \\ +00 \end{array}$$

June 15 1885

Five degree spaces 87°-102 Series I forward, II reversed order.

Microscope E.

	I	II	III		
87-92	17.25	14.70	15.70	15.87	-56
92-97	16.98	15.15	16.10	16.08	-35
97-102	18.75	16.15	17.15	17.35	+92
				16.43	

	I	II	III		
87-92	17.25	14.55	15.10	15.63	+01
92-97	16.52	14.55	14.65	15.24	-38
97-102	17.30	15.05	15.65	16.00	+38
				15.62	

J.

	I	II	I		
87-92	17.15	14.80	15.50	15.82	+20
92-97	17.50	15.80	17.30	16.87	+125
97-102	15.55	13.15	13.85	14.18	-144
				15.62	

H.

	I	II	I		
87-92	17.55	15.00	15.55	16.03	+55
92-97	17.38	14.95	15.75	16.03	+55
97-102	15.75	13.45	13.95	14.38	-110
				15.48	

E

mm

-56 -44 -56 -65 -65
 -35 -39 -61 -45 -10
 +52 +60 +56 +11 +00

Σ 18+2

-65 -85 -75
 -100 -172 -136
 +01 +60 +00

 $\frac{1}{2}(5+5)$

-38
 -75
 +60

B

mean =

+01 +12 -44 -10 -10
 -38 +27 -34 -15 -25
 +38 -38 +79 +26 +01

B +51

-10 +09 -01
 -25 -03 -14
 +01 +00 +00

F

+20 +24 -66 -07 -07
 +125 +179 +178 +160 +153
 -144 -203 -110 -152 -01

F

-07 -37 -22
 +153 +83 +118
 +01 +00 +00

 $\frac{1}{2}(7+7)$

-10
 +76
 +00

N

mm

+20 +24 -66 -07 -07
 +125 +179 +178 +160 +153
 -144 -203 -110 -152 -01

N

+24 -22 +02
 +69 +39 +54
 +00 +00 +00

+000

June 15

267° - 282° Series I forward, II reversed order.

Σ

	I	II	
267-272	14.80	14.50	14.65 +0.2
272-277	14.00	14.75	14.37 -0.26
277-282	14.42	15.35	14.88 +0.25
			14.63

Σ

	I	II	
18.20	14.60	14.90	-1.13
15.00	15.15	15.07	-0.96
18.02	18.25	18.13	+2.10
		16.03	

Σ

	I	II	
267-272	14.55	14.33	14.59 -0.39
272-277	15.90	15.65	15.77 +0.79
277-282	14.35	14.80	14.57 -0.41
			14.58

Σ

	I	II	
14.75	14.60	14.67	-0.64
16.30	17.00	16.65	+1.34
14.02	15.20	14.61	-0.70
		15.31	

Σ

+0.2	+2.6	+4.4	-8.7	+0.9	+0.9
-2.6	-4.4	-4.3	-1.2	-0.3	
+2.5	-0.1	+0.0	-0.7	+0.4	+0.0

Σ

-1.13	-0.1	-8.0	-8.2	-8.5	-8.5
-9.6	-9.4	-5.9	-9.5	-8.7	-1.72
+2.10	+1.56	+1.38	+1.53	+1.72	0.0

Σ

-3.5	-0.1	-4.0	-4.0	-2.2	-2.2
+7.5	+4.3	+6.7	+5.7	+6.1	+3.9
-4.1	-4.3	-5.6	-4.7	-3.9	+0.0

Σ

-6.4	-1.9	-1.6	-4.9	-2.7	-3.7
+1.34	+5.2	+5.7	+1.58	+1.20	+8.3
-7.0	-7.2	-8.0	-1.10	-8.3	+0.0

Σ

+3.8
-5.7
+0.0

Σ

-2.9
+6.1
+0.0

June 16 1865

Two degree Spauls 267°-282° I forward II Reversed order
1st Set.

Microscope E

	I	II	
267°-272°	15.00	14.45	14.77 +26

272-277	14.75	13.80	14.27 -24
---------	-------	-------	-----------

277-282	14.60	14.40	14.50 -01
			14.51

2nd Set

	I	II	
267°-272°	14.15	14.80	14.47 +44

272-277	13.05	14.15	13.60 -43
---------	-------	-------	-----------

277-282	13.75	14.30	14.03 +00
			14.03

3 Set.

267°-272°	14.55	12.95	13.75 -55
-----------	-------	-------	-----------

272-277	14.75	14.35	14.55 +43
---------	-------	-------	-----------

277-282	14.05	14.05	14.05 -00
			14.12

1 Set.

J

	I	II	
267°-272°	15.35	15.10	15.22 -01

272-277	15.90	15.42	15.66 +43
---------	-------	-------	-----------

277-282	14.80	14.80	14.80 -43
			15.73

2nd Set

	I	II	
267°-272°	14.42	14.70	14.56 -10

272-277	15.55	15.10	15.33 +67
---------	-------	-------	-----------

277-282	13.70	14.50	14.10 -56
			14.66

3 Set.

267°-272°	13.50	14.10	13.80 -40
-----------	-------	-------	-----------

272-277	14.50	15.05	14.77 +57
---------	-------	-------	-----------

277-282	14.30	13.75	14.03 -17
			14.20

J

	I	II	
15.85	14.95	15.40	-61

15.60	14.55	15.07	-94
-------	-------	-------	-----

17.80	17.35	17.57	+156
		16.01	

	I	II	
14.68	14.80	14.74	-80

15.05	14.85	14.95	-59
-------	-------	-------	-----

16.80	17.05	16.92	+138
		15.54	

14.50	14.80	14.65	-84
-------	-------	-------	-----

14.25	14.75	14.50	-9
-------	-------	-------	----

17.65	17.00	17.32	+183
		15.19	

H

	I	II	
15.10	15.00	15.05	-19

16.60	15.72	16.16	+52
-------	-------	-------	-----

14.95	14.10	14.52	-72
		15.24	

	I	II	
14.78	14.00	14.39	-16

15.55	15.50	15.52	+97
-------	-------	-------	-----

14.25	13.25	13.75	-80
		14.55	

14.05	14.85	14.45	-47
-------	-------	-------	-----

16.45	16.55	16.50	+158
-------	-------	-------	------

13.65	14.00	13.82	-110
		14.92	

June 16
Five degree spaces $87^{\circ}-102^{\circ}$
1st Set

Microscope 2

87-92	16.80	16.15	16.47 - .44
92-97	16.40	16.65	16.52 - .39
97-102	17.45	18.05	17.75 + .84
			16.91

ly

16.80	16.50	16.65 + .12
16.05	17.55	16.80 + .27
16.20	16.10	16.15 - .38
		16.53

2nd Set.

87-92	16.40	16.50	16.45 - .96
92-97	17.35	16.25	16.80 - .61
97-102	18.00	18.95	18.97 + 1.56
			17.41

15.95	15.30	15.82 - .44
16.40	15.40	15.92 - .34
17.30	16.60	17.05 + .79
		16.26

fi

1st Set.

H

87-92	16.40	16.00	16.40 + .24
92-97	17.50	18.00	17.55 + .79
97-102	14.15	14.10	14.13 - .03
			16.16

16.80	17.05	+ .30
16.05	17.45	+ .70
14.80	15.75	- 1.00
		16.75

2nd Set.

15.25	15.67	15.46 - .66
16.40	17.35	17.87 + 1.75
15.40	14.65	15.02 - 1.10
		16.12

16.55	16.63	16.59 - .12
17.20	16.40	16.82 + .11
17.10	16.35	16.73 + .02
		16.71

June 22

Prime degree spaces

117°-132° Series I forward

Microscope E

	I	II	I	II					
117°-122°	+1550	1665	1615	1640	+16.65	-1.65	-16.15	-65	-65
122-127	1710	1680	1695	1690	+16.94	-0.36	-2.01	-36	-101
127-132	1830	1860	1810	1820	+18.30	+2.00	-0.00	+1.00	0.00
					17.30				

	I	II	I	II			
117°-122°	+1745	1655	1615	1695	16.78	-0.72	-72
122-127	1710	1695	1680	1710	16.99	-0.57	-103
127-132	1925	1830	1895	1845	18.74	+1.24	+01
					17.50		

Σ $\frac{160}{2} + 2.1674$

-055 -05

-104 -07

+00 +0

-30

-55

+00

-112 -17

+25 +58

+00 +00

-65 -75

+42 -31

+00 +00

-72 -45

-123 -101

+01 +00

-58 -17

-112 -38

+00 -00

76

-65 +30

-56 -20

+01 +00

 $\frac{1}{2} 7.110$

-37

-45

+00

II, reversed order 117⁰ 132⁰

cf

	I	II	I	II			
117-122	+16.25	16.25	16.40	16.65	+16.39	-0.96	-1.12
122-127	18.70	18.60	18.60	18.60	+18.63	+1.38	+1.25
127-132	17.50	16.90	16.85	16.85	+17.02	-0.33	+0.1
					17.35		

H

	I	II	I	II			
117-122	+17.50	16.25	16.40	17.35	+16.88	-1.65	-6.5
122-127	17.85	17.85	17.35	17.45	+17.62	+1.09	-5.6
127-132	19.05	17.95	17.80	17.60	+18.10	+1.57	+0.1
					17.53		

72

June 22

Time degree Spaces 132-147 I forward, II reversed order

Microscope E

	I	II	I	mean	Σ
132-137	+17.20	16.75	16.50	16.82	-53 -53
137-142	18.15	18.10	18.15	18.13	+78 +25
142-147	17.10	16.95	17.35	<u>17.10</u>	-25 00
				17.35	

	I	II	I	mean	Σ
	17.40	16.75	16.30	16.82	-44 -44
	17.80	17.95	17.65	17.80	+54 +10
	17.10	16.80	17.60	<u>17.17</u>	-09 +01
				17.26	

F1

	I	II	I	mean	Σ
132-137	+17.10	17.40	16.95	17.15	+23 +23
137-142	18.05	17.90	17.40	17.78	+86 +109
142-147	16.00	15.80	15.70	<u>15.83</u>	-1.09 00
				16.92	

H

	I	II	I	mean	Σ
	18.45	18.30	18.65	18.47	+19 +19
	18.60	18.60	18.80	18.67	+39 +58
	17.40	17.80	17.90	<u>17.70</u>	-58 00
				18.28	

E

180+E

p.75

E

180+E

 Σ

	Σ	mean		Σ
132-137	-53	+14	-20	-44 -37 -40
137-142	+25	+23	+24	+10 +44 +27
142-147	+00	-01	+00	+01 00 +00

F

180+F

 Σ

	Σ
	+23 +46 +34
	+109 +82 +96
	00 00 00

H

180+H

 Σ

	Σ
	+19 -32 -06
	+58 -48 +05
	00 00 00

 $\frac{1}{2}(E+F)$

-30

+26

+00

 $\frac{1}{2}(F+H)$

+14

+50

+00

June 22
Five degree Spaces 282° - 297°

Microscope E

	I	II			
282° - 287°	+16.70	16.40	16.55	-.18	-.18
287 - 292	17.25	17.50	17.37	+.64	+.46
292 - 297	16.45	16.10	16.28	-.45	+.01
			16.73		

$$\begin{array}{r} 2 + 6 \\ 2 \\ -20 \\ +18 \\ +01 \end{array}$$

g

	I	II			
16.90	16.40	16.65	-22	-22	
16.65	17.35	17.00	+13	-09	
17.15	16.75	16.95	+08	-01	
		16.87			

S

	I	II			
282° - 287°	+16.90	17.30	17.10	-.01	-.01
287 - 292	16.55	17.70	17.13	+.02	+.01
292 - 297	16.85	17.35	17.10	-.01	+.00
			17.11		

$$\begin{array}{r} \frac{1}{2}(F+16) \\ -26 \\ -28 \\ +00 \end{array}$$

H

	I	II			
15.50	15.40	15.45	-.53	-.53	-.20
15.65	16.30	15.95	-.03	-.56	+.30
16.70	16.40	16.55	+.17	+.01	+.10
		15.98			
		6.5			

June 22

Three degree spaces 297° - 312°

Microscope E

	I	II	I				I	II	I			
297-302	+16.33	16.00	16.75	16.36	-17	-17	+16.70	17.00	17.05	16.92	-.05	-.05
302-307	17.10	17.35	17.40	17.28	+175	+158	17.00	16.95	16.90	16.95	-.02	-.07
307-312	16.05	15.40	16.42	15.96	-57	+01	18.50	18.45	18.18	17.04	+07	+00
				16.53						16.97		

 $\frac{1}{2}(E+G)$

-11

+26

+00

F

	I	II	I				I	II	I			
297-302	+17.70	18.00	18.10	17.93	+30	+30	+16.27	16.85	16.85	16.66	-.45	-.45
302-307	17.05	17.20	17.15	17.13	-.50	-.20	16.45	16.60	16.60	16.55	-.56	-.01
307-312	17.70	17.85	17.90	17.82	+19	-.01	18.35	17.60	18.42	18.12	+1.01	+00
				17.63						17.11		

 $\frac{1}{2}(F+H)$

-08

-60

00

June 22

Line Depn Spaces $312^{\circ}-327^{\circ}$

Microscope E

	I	II	Mean	Σ
$312^{\circ}-317^{\circ}$	+16.80	16.05	16.42	-37 -37
$317-322$	17.40	17.80	17.60	+81 +44
$322^{\circ}-327^{\circ}$	16.60	16.10	16.35	-44 00
			<u>16.79</u>	

$$\frac{1}{2}(E+G)$$

-12

+34

00

	I	II	Mean	Σ
$312^{\circ}-317^{\circ}$	+17.50	16.10	16.80	+14 +14
$317-322$	17.10	16.40	16.75	+09 +23
$322^{\circ}-327^{\circ}$	16.60	16.25	16.42	-24 -01
			<u>16.66</u>	

J

	I	II	Mean	Σ
$312^{\circ}-317^{\circ}$	+17.70	17.15	17.42	-32 -32
$317-322$	17.70	17.45	17.58	-16 -48
$322-327$	18.35	18.10	18.22	+48 00
			<u>17.74</u>	

$$\frac{1}{2}(J+K)$$

+1.07

+17.

00

K

	I	II	Mean	Σ
$312^{\circ}-317^{\circ}$	+17.50	16.85	17.18	+46 +46
$317-322$	17.05	17.10	17.08	+36 +82
$322-327$	15.95	15.65	15.80	-82 00
			<u>16.72</u>	

June 23

Five degree Spaces 147°-162°

Microscope E

	I	II	I	II	Mean	Σ
147-152	+20.55	20.20	20.50	19.85	20.28	-40-40
152-157	20.95	20.70	20.30	20.65	20.65	-03-43
157-162	20.95	20.60	20.50	21.40	21.11	+43+00
					20.68	

	I	II	I	II	Mean	Σ
147-152	+19.22	19.65	19.30	18.80	19.24	-24-24
152-157	19.75	19.45	19.00	20.05	19.56	+08-16
157-162	19.80	19.30	20.10	19.40	19.65	+17+01
					19.48	

F

	I	II	I	II	Mean	Σ
147-152	+20.98	21.25	21.00	20.30	20.88	+1.20+1.20
152-157	19.90	19.75	18.95	19.75	19.59	-0.9+1.11
157-162	18.75	18.65	18.75	18.15	18.58	-1.10+01
					19.68	

H

	I	II	I	II	Mean	Σ
147-152	+21.50	21.80	22.00	21.50	21.70	+5.8+5.8
152-157	21.30	20.95	20.90	20.90	21.01	+11+4.7
157-162	20.75	20.95	20.65	20.30	20.66	-4.6+01
					20.12	

E	180+E	h. 18
Σ		mean
-40	-40	-40
-43	-77	-60
+00	-01	-00

g	180+g
Σ	
-24	-28
-16	-76
+01	00

f	180+f
Σ	
+1.20	-31
+1.11	-100
+01	-01

H	180+H
Σ	
+5.8	-40
+4.7	-102
+01	00

$$\frac{1}{2}(E+g)$$

$$-33$$

$$-53$$

$$00$$

$$\frac{1}{2}(f+H)$$

$$+26$$

$$-12$$

$$00$$

June 23
Five Degree Spaces 162°-177°

Microscope E

	I	II	I	Mean		Σ
162-167	+17.00	17.30	17.05	17.12	-82	-82
167-172	16.40	17.05	16.00	16.48	-1.46	-2.28
172-177	19.90	20.55	20.20	20.22	+2.28	.00
				17.94		

G

	I	II	I	Mean		Σ
	+17.45	18.60	18.55	18.20	+10	+10
	18.00	18.20	17.28	17.83	-27	-17
	18.15	18.10	18.60	18.28	+18	+01
				18.10		

F

	I	II	I	Mean		Σ
162-167	+17.30	18.45	17.70	17.82	+46	+46
167-172	17.50	18.30	16.32	17.37	+01	+47
172-177	16.85	17.05	16.75	16.88	-48	-01
				17.36		

H

	I	II	I	Mean		Σ
	18.00	18.30	18.45	18.25	+19	+19
	18.80	18.60	17.55	18.32	+26	+45
	17.25	18.05	17.55	17.62	-44	+01
				18.06		

E	180+E	p79	G	180+G
Σ			Σ	
-82	+141	+30	+10	+10
-228	+302	+37	-17	-47
.00	-01	.00	+01	.00

F	180+F	H	180+H
Σ		Σ	
+46	+25	+19	+45
+47	+04	+45	+62
-01	+01	+01	-01

$$\frac{1}{2}(\Sigma + G)$$

$$+20$$

$$+04$$

$$.00$$

$$\frac{1}{2} F + H$$

$$+34$$

$$+40$$

$$.00$$

June 23

Five degree Spaces 327°-342°

Microscope C

	I	II	Mean	Σ	
327-332	+16.65	16.90	16.78	-28	-28
332-337	16.20	16.95	16.58	-48	-76
337-342	17.30	18.35	17.82	+76	00
			17.06		

$$\frac{1}{2}(E+G)$$

-34

-76

00

	I	II	Mean	Σ	
	+18.20	18.65	18.42	-40	-40
	17.80	19.10	18.45	-34	-77
	20.10	19.05	19.58	+76	-01
			18.82		

F

	I	II	Mean	Σ	
327-332	+18.00	18.75	19.38	+60	-40
332-337	17.48	18.85	18.16	-62	-102
337-342	20.15	19.45	18.80	+90	00
			18.78		

$$\frac{1}{2}(F+H)$$

-36

-1.01

00

H

	I	II	Mean	Σ	
	+17.75	17.65	17.70	+69	-31
	15.38	17.25	16.32	-69	-100
	17.00	19.00	18.00	+01	-01
			17.01		

June 23

Five degree Spaces $342^{\circ} - 357^{\circ}$

Microscope E

	I	II	Mean	Σ	
342-347	+17.60	16.97	17.28	+10	+10
347-352	16.47	16.75	16.61	-57	-47
352-357	17.50	17.80	17.65	+44	00
			<u>17.18</u>		

$$\frac{1}{2} (E + G)$$

$$+76$$

$$+1.28$$

$$00$$

	I	II	Mean	Σ	
	+16.37	15.27	15.82	+41	+141
	15.60	15.65	15.62	+1.61	+3.02
	20.13	20.40	20.26	+3.03	-01
			<u>17.23</u>		

F₁

	I	II	Mean	Σ	
342-347	+17.67	17.33	17.50	+45	+45
347-352	17.00	17.45	17.22	+17	+62
352-357	16.40	16.45	16.42	-63	-01
			<u>17.05</u>		

$$\frac{1}{2} (F_1 + H)$$

$$+35$$

$$+33$$

$$00$$

H

	I	II	Mean	Σ	
	+16.97	16.07	16.52	+25	+25
	15.53	16.60	16.06	-21	+04
	16.23	16.25	16.24	-03	+01
			<u>16.27</u>		

June 25

Five degree Spaces 177°-192°

Microscope E.

	I	II	I	II	I	Mean		Σ
177-182	+16.80	16.10	16.20	17.05	16.00	16.43	-11	-11
182-187	17.80	17.80	18.15	17.70	17.55	17.80	+1.26	+1.15
187-192	15.30	15.75	15.05	15.65	15.15	15.38	-1.16	-0.1
						16.54		

H

	I	II	I	II	I	Mean		Σ
177-182	+16.25	16.25	16.20	16.45	16.15	16.26	-19	-19
182-187	16.95	16.35	16.40	16.25	17.40	16.67	+22	+0.3
187-192	15.55	16.85	16.15	16.90	16.70	16.43	-0.2	+0.1
						16.45		

Σ	$180 + \Sigma$	10.84	Σ	$180 + \Sigma$	Σ	$180 + \Sigma$	Σ	$180 + \Sigma$	
177-182	-11	-38	-24	-53	+07	-23	-19	-40	-30
182-187	+1.15	+99	+107	+02	+78	+40	+03	-71	-34
187-192	-01	-01	-01	00	+01	+00	+01	+01	+01

 $\frac{1}{2}(\Sigma + \gamma)$

-24

+74

-0.1

 $\frac{1}{2}(\Sigma + H)$

-66

-89

00

June 25

177° - 192°

g

	I	II	I	II	I	mean		Σ
177-182	+15.80	16.00	16.65	16.35	16.05	16.17	-53	-53
182-187	17.60	17.10	17.75	16.95	16.85	17.25	+55	+02
187-192	16.30	16.90	17.05	16.75	16.40	16.68	-02	00
						<u>16.70</u>		

h

	I	II	I	II	I	mean		Σ
177-182	+16.05	16.98	16.35	16.90	16.35	16.52	-97	-97
182-187	17.00	17.30	17.40	17.15	17.25	17.22	-27	-124
187-192	18.80	18.65	18.65	18.10	18.40	18.72	+1.23	-01
						<u>17.49</u>		

82

June 25

Five degree Spaces 192° - 207° Series I forward II reversed order.

Microscope C

	I	II	I	Mean	Σ
192° - 197°	+18.45	18.35	18.50	18.43	+1.12 +112
197° - 202°	16.70	17.25	16.50	16.82	-49 +63
202° - 207°	16.85	16.25	16.90	16.67	-64 -01
				<u>17.31</u>	

	I	II	I	Mean	Σ
	+18.10	18.30	18.95	18.45	+14 +14
	17.75	18.20	17.80	17.92	-39 -25
	18.25	18.35	19.05	18.55	+24 -01
				<u>18.31</u>	

J

	I	II	I	Mean	Σ
192° - 197°	+19.00	18.75	18.50	18.75	+84 +84
197° - 202°	17.25	17.50	17.25	17.33	-58 +26
202° - 207°	17.60	17.35	18.00	17.65	-26 00
				<u>17.91</u>	

K

	I	II	I	Mean	Σ
	+18.85	18.30	18.20	18.45	+65 +65
	17.45	17.60	16.30	17.12	-68 -03
	18.00	17.95	17.55	17.83	+03 00
				<u>17.80</u>	

 Σ 180+E p.85.

	Σ
192° - 197°	+1.12 +141 +126

197° - 202°	+63 +75 +69
-------------------------------	-------------

202° - 207°	-01 -01 -01
-------------------------------	-------------

J 180+J

Σ
+14 +78 +46

-25 +58 +16

-01 +01 00

 $\frac{1}{2}(C+J)$

+66

+42

00

J 180+K

Σ
+84 +08 +46

+26 +01 +13

00 +01 00

K 180+K

Σ
+65 +13 +39

-03 -37 -20

00 +01 00

 $\frac{1}{2}(J+K)$

+42

-04

00

June 25
Five degree Spaces 207-222°

Series I + III forward II reversed order

Microscope E

	I	II	III	mean		Σ
207-212	+17.00	16.85	17.60	17.15	-06	-06
212-217	17.20	17.55	17.80	17.52	+31	+25
217-222	17.20	16.90	16.80	16.97	-24	+01
				17.21		

	I	II	III	mean		Σ
	+18.15	18.50	18.30	18.32	+05	+30
	17.85	17.75	18.70	18.17	+10	+45
	17.05	17.00		17.57		+15
	17.05	17.00	18.65	18.33	+06	00
	8	8		18.22		-45
				.27		
				18.02		

	I	II	III	mean		Σ
207-212	+17.55	18.50	18.20	18.08	+58	+91
	17.55	18.50	18.20	18.08	+24	+91
212-217	17.55	16.55	16.70	16.93	-57	+67
	17.55	16.55	16.70	16.93	+09	-24
217-222	18.05	18.30	17.15	18.50	-00	-34
	18.05	18.30	17.15	18.50	-67	-67
				17.17		
				16.84		

	I	II	III	mean		Σ
207-212	+17.35	17.00	17.70	17.35	-77	-77
	+17.35	17.00	17.70	17.35	-77	-77
212-217	17.80	19.00	20.20	19.00	+88	+11
	17.80	19.00	20.20	19.00	+88	+11
217-222	18.85	17.80	17.35	18.00	-12	-01
	18.85	17.80	17.35	18.00	-01	-01
				18.12		

E 150+2 1586

Σ -06 -51 -28

+25 -82 -28

+01 -01 00

E 180+4

Σ +30 -47 -08

+45 -75 -15

+00 +01 +00

J. 180+7

Σ +91 -59 +16

+67 +68 +68

00 +01 +00

H 180+4

Σ -77 -31 -54

+11 -82 -36

-01 00 00

$\frac{1}{2}(2+9)$

-18

-22

00

$\frac{1}{2}(7+14)$

-19

+16

00

June 26
Five degree Spaces $357^{\circ}-12^{\circ}$

Microscope E

	I	II	III	Mean	Σ
$357^{\circ}-362^{\circ}$	1872	1755	1760	1779	+07 +07
2-7	1830	1815	1885	1843	+71 +78
7-12	1690	1765	1630	1695	-77 +01
				1772	

$$\frac{1}{2}(E+G)$$

-15

+88

00

G

	I	II	III	Mean	Σ
$357^{\circ}-362^{\circ}$	1821	1690	1740	1750	-38 -38
2-7	1950	1905	1920	1925	+137 +99
7-12	1725	1735	1605	1688	-100 -01
				1788	

F

	I	II	III	Mean	Σ
$357^{\circ}-362^{\circ}$	1760	1710	1670	1747	-109 -109
2-7	1840	1725	1835	1800	-56 -165
7-12	2060	2060	1940	2020	+164 -01
				1856	

$$\frac{1}{2}(F+H)$$

-74

-1.18

00

H

	I	II	III	Mean	Σ
$357^{\circ}-362^{\circ}$	1765	1670	1720	1718	-40 -46
2-7	1805	1735	1640	1727	-31 -71
7-12	1840	1890	1760	1830	+72 +01
				1758	

June 26
True degree Spaces $12^{\circ} - 27^{\circ}$

Microscope C

	I	II	mean		Σ
12-17	+17.70	18.10	17.90	+78	+78
17-22	16.80	17.05	16.92	-20	+58
22-27	16.30	16.80	16.55	-57	+01
			<u>17.12</u>		

$$\frac{1}{2} (\Sigma + \gamma)$$

$$+1.10$$

$$+66$$

$$00$$

ef

	I	II	mean		Σ
	+17.15	18.15	17.15	+141	+141
	15.35	14.80	15.08	-66	+75
	14.75	15.20	14.98	-76	-01
			<u>15.74</u>		

A

	I	II	mean		Σ
12-17	+16.60	16.10	16.35	+13	+13
17-22	15.90	15.55	15.72	-50	-37
22-27	16.70	16.50	16.60	+38	+01
			<u>16.22</u>		

$$\frac{1}{2} (\Sigma + A)$$

$$+1.10$$

$$-18$$

$$+01$$

H

	I	II	mean		Σ
	+17.10	16.10	16.60	+08	+08
	16.50	16.40	16.45	-07	+01
	16.50	16.55	16.52	00	+01
			<u>16.52</u>		

June 26

Five degree Spaces $27^{\circ}-42^{\circ}$

Microscope E

	I	II	III	Mean	Σ
$27^{\circ}-32^{\circ}$	+17.15	16.50	15.85	16.50	-47 -47
$32-37$	16.35	17.25	16.47	16.69	-28 -75
$27-42$	18.45	17.40	17.35	17.73	+76 +01
				<u>16.97</u>	

$$\frac{1}{2}(\Sigma + \gamma)$$

- 49

- 78

00

G

	I	II	III	Mean	Σ
	+16.65	16.20	16.15	16.33	-51 -51
	16.60	17.20	15.80	16.53	-31 -82
	18.00	17.55	17.40	17.65	+81 -01
				<u>16.84</u>	

H

	I	II	III	Mean	Σ
$27^{\circ}-32^{\circ}$	+17.75	16.30	15.65	16.57	-31 -31
$32-37$	16.20	16.90	16.00	16.37	-51 -82
$37-42$	16.25	17.90	16.95	17.70	+82 00
				<u>16.88</u>	

$$\frac{1}{2}(\gamma + H)$$

- 40

- 07

00

H

	I	II	III	Mean	Σ
	+16.85	15.75	15.90	15.50	-59 -59
	17.35	17.20	17.53	17.36	+127 +68
	15.65	15.25	15.35	15.42	-67 +01
				<u>16.09</u>	

June 30

Series I + III: forward
" II + IV: reversed orderFive degree spaces $222^{\circ} - 237^{\circ}$

Microscope E

	I	II	III	IV	Mean	Σ
$222^{\circ} - 227^{\circ}$	+17.53	17.90	17.87	17.55	17.79	+67 +67
$227^{\circ} - 232^{\circ}$	17.50	16.80	17.50	16.70	17.12	00 +67
$232^{\circ} - 237^{\circ}$	16.10	16.00	16.50	17.20	16.45	-67 00
					17.12	

	I	II	III	IV	Mean	Σ
$222^{\circ} - 227^{\circ}$	+18.43	19.25	18.63	19.35	18.92	+41 +57
$227^{\circ} - 232^{\circ}$	17.30	18.10	18.00	17.90	17.82	-0.69 -46
$232^{\circ} - 237^{\circ}$	18.50	19.00	18.95	18.75	18.80	+29 -01
					18.35	51

F

	I	II	III	IV	Mean	Σ
$222^{\circ} - 227^{\circ}$	+17.68	17.10	17.33	17.15	17.32	-37 -37
$227^{\circ} - 232^{\circ}$	18.05	17.60	17.25	17.65	17.64	-05 -42
$232^{\circ} - 237^{\circ}$	18.25	18.00	18.10	18.05	18.10	+41 -01
					17.69	

H

	I	II	III	IV	Mean	Σ
$222^{\circ} - 227^{\circ}$	+17.18	17.20	17.17	17.25	17.20	-36 -36
$227^{\circ} - 232^{\circ}$	17.80	18.00	17.60	18.25	17.91	+35 -01
$232^{\circ} - 237^{\circ}$	18.00	17.70	17.15	17.45	17.58	+02 +01
					17.56	

 Σ 180 + E p90

Σ	Mean
+67 -28 +20	
+67 +48 +58	
00 00 00	

cf 180 + G

Σ	Mean
+57 +12 +34	
-46 +15 -15	
-01 00 00	

F 180 + F

Σ	Mean
-37 -26 -32	
-42 -01 -21	
-01 00 00	

H 180 + H

Σ	Mean
-36 -19 -28	
-01 -11 -06	
+01 00 00	

 $\frac{1}{2}(E+G)$

+27

+22

00

 $\frac{1}{2}(F+H)$

-30

-14

00

June 30 + July 1
Five degree spaces

237-252

Microscope E

	I	II	July 1	Mean	Σ
237-242	16.70	16.75	15.27	16.24	+78 +78
242-247	14.50	15.05	15.10	14.88	-58 +20
247-252	15.60	15.60	14.60	<u>15.27</u>	-19 +01
				15.46	

	I	II	July 1	Mean	Σ
237-242	16.80	18.15	16.60	17.18	+23 +23
242-247	16.75	17.05	17.65	17.15	+20 +43
247-252	16.30	16.40	16.90	<u>16.53</u>	-42 +01
				16.95	

L

	I	II	July 1	Mean	Σ
237-242	+15.20	14.95	14.30	14.82	-32 -32
242-247	14.45	15.05	15.00	14.83	-31 -63
247-252	15.55	15.70	15.10	<u>15.78</u>	+64 +01
				15.14	

H

	I	II	July 1	Mean	Σ
237-242	+16.70	16.45	15.80	16.32	-65 -65
242-247	16.00	16.40	17.00	16.47	-50 -115
247-252	17.40	17.30	16.65	<u>17.12</u>	+115 00
				16.97	

E	Σ	180+E	180+E
+78	+89	+83	+23 -29 -03
+20	+79	+50	+43 -32 +06
+01	+01	+01	+01 -01 00

$\frac{1}{2}(E+G)$

+40

+28

00

H	Σ	180+H	180+H
-32	-21	-26	-65 -49 -57
-63	+14	-24	-115 -78 -96
+01	-01	00	00 +01 00

$\frac{1}{2}(H+H)$

-42

-60

00

June 30
Five degree Spaces $252^{\circ} - 267^{\circ}$

Microscope E

	I	II	Mean	Σ
$252^{\circ} - 257^{\circ}$	+16.30	16.40	16.35	+12 +12
$257^{\circ} - 262^{\circ}$	15.65	16.05	15.85	-38 -26
$262^{\circ} - 267^{\circ}$	17.20	15.80	<u>16.50</u>	+27 +01
			16.23	

g

	I	II	Mean	Σ
$252^{\circ} - 257^{\circ}$	17.90	17.65	17.78	+65 +65
$257^{\circ} - 262^{\circ}$	17.45	17.00	17.22	+09 +74
$262^{\circ} - 267^{\circ}$	16.10	16.70	<u>16.40</u>	-73 -01
			17.13	

f

	I	II	Mean	Σ
$252^{\circ} - 257^{\circ}$	+17.20	17.10	17.15	-09 -09
$257^{\circ} - 262^{\circ}$	16.85	17.00	16.92	-32 -41
$262^{\circ} - 267^{\circ}$	17.55	17.75	<u>17.65</u>	+41 00
			17.24	

H

	I	II	Mean	Σ
$252^{\circ} - 257^{\circ}$	16.10	16.20	16.15	-115 -115
$257^{\circ} - 262^{\circ}$	16.15	16.30	16.22	-108 -222
$262^{\circ} - 267^{\circ}$	19.50	19.55	<u>19.52</u>	+222 +00
			17.30	

E 180+E 192

Σ Mean

+12 +02 +07

-26 +44 +09

+01 00 00

g 180+g

Σ

-165 +06 +36

+74 -08 +33

-01 00 00

$\frac{1}{2}(E+g)$

+22

+21

00

f 180+f

Σ

-09 -32 -20

-41 -04 -22

00 -01 00

H 180+H

-115 -146

-222 -275

00 -01

$\frac{1}{2}(f+H)$

-83

-1.48

00

July 1

Five degree Spaces $42^{\circ}-57^{\circ}$

Microscope E

	I	II	I	II	Mean	Σ
$42^{\circ}-47^{\circ}$	+17.55	17.02	17.40	17.40	17.34	+12 +12
$47^{\circ}-52^{\circ}$	17.20	17.35	17.15	17.30	17.25	+03 +15
$52^{\circ}-57^{\circ}$	16.95	17.22	16.95	17.15	<u>17.07</u>	-15 00
					17.22	

	I	II	I	II	Mean	Σ
	+16.00	16.45	16.00	16.20	16.16	-28 -28
	17.10	17.35	17.55	16.80	17.20	+76 +48
	15.85	15.82	16.20	15.95	<u>15.96</u>	-48 00
					16.44	

F1

	I	II	I	II	Mean	Σ
$42^{\circ}-47^{\circ}$	+17.10	17.42	16.45	16.20	16.79	-19 -19
$47^{\circ}-52^{\circ}$	17.35	16.80	17.00	17.10	17.06	+08 -11
$52^{\circ}-57^{\circ}$	17.30	16.95	17.25	16.85	<u>17.09</u>	+11 00
					16.98	

H

	I	II	I	II	Mean	Σ
	+17.25	16.60	16.50	16.50	16.71	-26 -26
	17.15	17.30	17.00	17.45	17.22	+25 -01
	17.05	16.95	16.95	16.95	<u>16.98</u>	+01 00
					16.97	

July 1
Five degree Spaces 57°-72°

Microscope E

	I	II	III	Mean		Σ
57°-62°	+1790	1700	1840	1777	-29	-29
62-67	1825	1670	1915	1803	-03	-32
67-72°	1845	1815	1850	<u>1837</u>	+31	-01
				1806		

	I	II	III	Mean		Σ
	+1810	1750	1800	1787	+89	+89
	1690	1680	1695	1688	-10	+79
	1640	1590	1630	<u>1620</u>	-78	+01
				1698		

Y

	I	II	III	Mean		Σ
57-62	+1760	1710	1750	1740	-49	-49
62-67	1735	1750	1795	1760	-29	-78
67-72	1910	1815	1880	<u>1868</u>	+79	+01
				1789		

Y

	I	II	III	Mean		Σ
	1615	1610	1670	1632	-21	-21
	1700	1685	1680	1688	+35	+14
	1595	1590	1730	<u>1638</u>	-15	-01
				1653		

July 1

Five degree Spaces $72^{\circ} - 87^{\circ}$

Microscope E

	I	II	III	Mean	Σ
$72^{\circ} - 77^{\circ}$	+19.25	18.70	18.25	18.73	+06 +06
$77^{\circ} - 82^{\circ}$	19.10	18.60	17.90	18.53	-14 -08
$82^{\circ} - 87^{\circ}$	19.60	19.25	17.40	<u>18.75</u>	+08 00
				18.67	

	I	II	III	Mean	Σ
$72^{\circ} - 77^{\circ}$	+18.75	17.50	18.00	18.08	+02 +02
$77^{\circ} - 82^{\circ}$	18.65	18.70	18.10	18.48	+42 +44
$82^{\circ} - 87^{\circ}$	17.90	18.05	16.90	<u>17.62</u>	-44 00
				18.06	

F

	I	II	III	Mean	Σ
$72^{\circ} - 77^{\circ}$	+17.30	17.15	16.85	17.10	-1.46 -1.46
$77^{\circ} - 82^{\circ}$	17.35	17.40	17.05	17.27	-1.29 -2.75
$82^{\circ} - 87^{\circ}$	21.55	21.50	20.85	<u>21.30</u>	+2.74 -01
				18.56	

H

	I	II	III	Mean	Σ
$72^{\circ} - 77^{\circ}$	+19.15	17.95	18.30	18.47	-32 -32
$77^{\circ} - 82^{\circ}$	19.65	19.10	18.45	19.07	+28 -04
$82^{\circ} - 87^{\circ}$	19.30	18.80	18.35	<u>18.82</u>	+0.3 -01
				18.79	

July 2 Re-investigation of certain Spaces
Five degrees Spaces $102^{\circ}-117^{\circ}$

Microscope E

	I	II	Mean	Σ
$102^{\circ}-107^{\circ}$	+19.45	18.05	18.75	+20 +20
$107^{\circ}-112^{\circ}$	18.40	18.25	18.32	-23 -03
$112^{\circ}-117^{\circ}$	18.40	18.75	18.58	+03 00
			18.55	

	I	II	Mean	Σ
	+19.45	18.80	19.12	-35 -35
	19.90	20.45	20.18	+71 +36
	19.45	18.80	19.12	-35 +01
			19.47	

H

	I	II	Mean	Σ
$102^{\circ}-107^{\circ}$	+20.05	19.90	19.98	+1.55 +1.55
$107^{\circ}-112^{\circ}$	18.30	18.20	18.25	-18 +1.37
$112^{\circ}-117^{\circ}$	17.00	17.10	17.05	-1.38 -01
			18.43	

H

	I	II	Σ	Σ
	+19.55	19.65	19.60	+28 +28
	18.90	19.85	19.38	+06 +34
	19.25	18.70	18.98	-34 00
			19.32	

Σ	Mean	Σ	Mean
+20 +19 +20	-35 -74 -54		
-03 -18 -10	+36 -65 -15		
00 -01 00	+01 +01 +01		

Σ	Mean	Σ	Mean
+1.55 +76 +116	+28 -48 -10		
+137 +61 +99	+34 -77 -31		
-01 +01 00	00 +00 00		

$\frac{1}{2}(\Sigma + \text{I})$	Pintsen's Mean
-17	-12 -20
-12	+15 +02
00	+00 +00

$\frac{1}{2}(\Sigma + \text{II})$	Mean
+57 +23 +40	
+34 +17 +25	
00 +00 +00	

July 2

Five degree Spaces 282°-297°

Microscope E

	II	I	Mean	Σ
282-287	+19.88	19.50	19.69	-74 -74
287-292	19.85	21.20	20.52	+09 -65
292-297	21.38	20.80	21.09	+66 +01
			20.43	

	II	I	Mean	Σ
282-287	+20.62	20.55	20.58	+19 +19
287-292	20.05	20.00	20.02	-37 -18
292-297	20.82	20.30	20.56	+17 -01
			20.39	

J

	II	I	Mean	Σ
282-287	+20.50	19.70	20.10	-24 -48
287-292	19.88	20.30	20.09	-42 -113 -97
292-297	21.65	21.45	21.55	+14 +01 +00
			20.47	+97
			58	

H

	II	I	Mean	Σ
282-287	+20.70	20.30	20.50	+76 +76
287-292	19.78	19.40	19.59	-15 +61
292-297	19.28	19.00	19.14	-60 +01
			19.74	

July 2
Live depre Spaces 297°-312°

Microscope E

	I	II	Mean	Σ	
297°-302°	+19.25	19.10	19.18	-79	-79
302°-307°	21.05	20.70	20.88	+91	+12
307°-312°	20.00	19.70	19.85	-12	00
			<u>1997</u>		

G

	I	II	Mean	Σ	
	+20.45	20.60	20.52	-56	-56
	20.80	20.60	20.70	-38	-94
	21.75	22.30	22.02	+94	00
			<u>2108</u>		

F

	I	II	Mean	Σ	
297°-302°	+21.05	20.75	20.90	-33	-33
302°-307°	21.70	21.35	21.52	+29	-04
307°-312°	21.05	21.50	21.28	+05	+01
			<u>2123</u>		

H

	I	II	Mean	Σ	
	20.15	19.80	19.98	-1.12	-112
	21.20	20.15	20.68	-42	-154
	22.75	22.55	22.65	+155	+01
			<u>2110</u>		

96

July 2
Line depu Spaces 117-132

Microscope E

	I	II	I	II	Mean	Σ
117-122	+21.00	21.20	21.10	19.95	20.81	-88-88
122-127	21.60	21.65	20.80	20.90	21.24	-45-133
127-132	22.80	22.85	22.75	23.70	23.02	+133 00
					<u>21.69</u>	

g

	I	II	I	II	Mean	Σ
	+21.55	20.95	21.10	19.80	20.85	-45-45
	23.40	22.85	22.90	21.80	22.74	+144+99
	20.55	19.60	20.45	20.65	20.31	-99 00
					<u>21.30</u>	

J

	I	II	I	II	Mean	Σ
117-122	+22.10	22.30	22.30	20.75	21.86	+21+21
122-127	20.85	21.00	20.75	20.70	20.82	-63-62
127-132	22.25	22.10	22.20	22.50	22.26	+61-01
					<u>21.65</u>	

H

	I	II	I	II	Mean	Σ
	+22.65	22.65	22.20	21.25	22.18	+12+12
	22.55	22.30	22.05	22.30	22.30	+24+36
	22.00	21.50	21.25	22.10	21.71	-36-00
					<u>22.06</u>	

E. 180+E	1095	G 180+G	
Σ Mean		Σ Mean	
-88-56-72		-45-79-62	
-133-94-114		+99+12+56	
00 00 00		00 00 00	

$$\frac{1}{2}(\Sigma+G)$$

- 67

- 29

00

F. 180+F

Σ Mean	
+21-112-46	

-62-154-108

-01+01 00

H. 180+H

Σ Mean	
+12-33-10	

+36-04 +16

00+01 00

$$\frac{1}{2}(F+H)$$

- 28

- 46

00

July 3
 Two degree Spaces 147-162

Microscope E

	I	II	I	Mean	Σ
147-152	+2177	22.05	21.05	2162	+11 +11
152-157	21.55	21.60	20.95	2137	-14 -03
157-162	21.50	21.58	21.50	2153	+02 -01
				<u>21.51</u>	

G

	I	II	I	Mean	Σ
147-152	+2090	21.55	20.55	2100	+50 +50
152-157	20.20	20.65	20.50	2045	-05 +45
157-162	20.05	20.02	20.10	2006	-44 +01
				<u>20.50</u>	

H

	I	II	I	Mean	Σ
147-152	+2220	22.85	22.05	2237	+173 +173
152-157	2030	2020	20.05	2018	-46 +127
157-162	19.20	19.95	18.95	19.37	-127 00
				<u>20.64</u>	

H

	I	II	I	Mean	Σ
147-152	+2277	23.05	22.30	2271	+98 +98
152-157	21.55	21.95	21.60	2170	-03 +95
157-162	21.00	20.92	20.45	20.79	-94 +01
				<u>21.73</u>	

$\Sigma 150 + \Sigma p100$

Σ Mean
 +11 -47 -18

-03 -104 -54

-01 +01 00

$\frac{1}{2}(\Sigma + G)$

+12

-30

00

$\Sigma 150 + \Sigma$

Σ Mean
 +50 +35 +42

+45 -56 -06

+01 +01 +01

$\Sigma 150 + \Sigma$

Σ Mean
 +173 +115 +144

+127 +58 +92

00 -01 00

$\frac{1}{2}(\Sigma + H)$

+1.10

+69

00

$\Sigma 150 + \Sigma$

Σ Mean
 +98 +56 +87

+95 -04 +46

+01 -01 00

July 3

Five degree Spans 207°-222°

Microscope E

	II	I	II	Mean	Σ
207°-212°	+19.40	19.25	19.20	19.28	-1.13 -1.13
212°-217°	20.60	20.70	19.65	20.32	-0.9 -1.22
217°-222°	21.25	21.05	22.60	21.63	+1.22 0.0
				20.41	

	II	I	II	Mean	Σ
	+19.45	19.65	20.35	19.82	-55 -55
	20.80	20.95	20.75	20.83	+46 -0.9
	20.60	20.20	20.60	20.47	+10 +0.1
				20.37	

J

	II	I	II	Mean	Σ
207°-212°	+20.05	20.15	20.05	20.08	-14 -14
212°-217°	21.80	21.00	20.70	21.17	+9.5 +8.1
217°-222°	19.30	19.05	19.90	19.42	-8.0 +0.1
				20.22	

H

	II	I	II	Mean	Σ
	+20.60	18.85	19.95	19.80	-9.0 -9.0
	21.15	20.50	20.05	20.57	-1.3 -10.3
	21.25	21.75	22.15	21.72	+1.02 -0.1
				20.70	

 Σ 180+E

-1.13 -2.7 -7.0

-1.22 -9.4 -10.8

0.0 -0.1 +0.0

 Σ 180+G

-5.5 -4.9 -5.2

-0.9 -8.3 -4.6

+0.1 0.0 0.0

 $\frac{1}{2}(\Sigma + G)$

-6.1

-7.7

0.0

 Σ 180+H

-1.4 -1.0 -1.2

+8.1 +3.0 +5.6

+0.1 0.0 0.0

 Σ 180+H

-9.0 -0.9 -5.0

-1.03 -1.16 -1.10

-0.1 -0.1 -0.1

 $\frac{1}{2}(\Sigma + H)$

-3.1

-2.7

+0.0

July 3

Five degree Spaces 27°-42

Microscope E

	I	II	Mean	Σ
27-32	+21.65	+19.75	20.70	-49-49
32-37	21.40	20.80	20.85	-34-83
37-42	22.40	21.65	<u>22.02</u>	+83 00
			21.19	

E

	I	II	Mean	Σ
27-32	+21.85	19.70	20.78	-27-27
32-37	21.10	19.65	20.38	-67-94
37-42	22.45	21.50	<u>21.98</u>	+93-01
			21.05	

F

	I	II	Mean	Σ
27-32	+21.80	+20.35	21.08	-09-09
32-37	21.05	19.15	20.10	-1.07-1.16
37-42	22.70	21.95	<u>22.32</u>	+1.15-01
			21.17	

H

	I	II	Mean	Σ
27-32	+21.65	19.85	20.75	-10-10
32-37	21.55	20.95	21.25	+40+30
37-42	20.90	20.20	<u>20.55</u>	-30 00
			20.85	

July 3

Five degree Spaces 327-342

Microscope E

	I	II	I	Mean	Σ
327-332	+19.03	19.40	18.20	18.88	+35+35
332-337	17.95	17.50	17.40	17.62	-91-56
337-342	18.75	19.80	18.75	<u>19.10</u>	+57+01
				18.53	

G

	I	II	I	Mean	Σ
	+18.90	20.15	19.25	19.43	-47-47
	19.70	19.50	18.80	19.33	-57-104
	20.70	22.05	20.10	<u>20.95</u>	+1.05+01
				19.90	

F1

	I	II	I	Mean	Σ
327-332	+20.47	20.60	20.00	20.36	+56+56
332-337	19.40	19.20	19.00	19.20	-60-04
337-342	20.25	20.35	18.90	<u>19.83</u>	+03-01
				19.80	

H

	I	II	I	Mean	Σ
	+20.13	20.55	19.45	20.04	+1.15+1.15
	17.60	19.25	18.10	18.32	-57+58
	18.50	19.40	17.00	<u>18.30</u>	-59-01
				18.89	

Five degree Spectra

87°-102°	see pp 64-65 66.69	267°-282°	pp 67-68
102-117	pp 64-65.93.	282-297	pp 73.94
117-132	pp 70-71.96	297-312	pp 74.95
132-147	pp 72	312-327	p 75
147-162	pp 76.97.	327-342	pp 78.100
162-177	p 77	342-357	p 79
177-192	pp 80-81	357-12	p 84
192-207	p 82	12-27	p 85
207-222	pp 83 98	27-42	pp 86 99
222-237	p 87	42-57	p 90
237-252	p 88	57-72	p 91
252-267	p 89	72-87	p 92

E

July 7, 7, 8, 8

87-117 15.78 15.15 16.18 16.40
 16.80 15.95 16.40 18.00
 18.35 17.80 18.75 20.25
 12.65 12.62 12.75 14.80
 13.03 13.50 14.60 15.25
 11.97 12.20 13.55 13.10
 13.50 12.30 13.75 13.40
 13.87 13.65 13.75 13.40
 12.60 11.95 13.00 13.90
 13.73 14.45 14.20 14.90
 18.55 18.80 19.35 19.85
 17.13 16.40 16.75 17.15

18.55 18.80

E

18.41 18.70

July 7, 7, 8, 8

87-117 13.41 12.70 13.52 13.92
 14.70 13.80 14.15 15.25
 15.35 15.55 15.40 16.40
 14.65 14.80 15.35 16.75
 16.87 15.40 18.65 17.75
 18.30 17.30 19.50 18.65
 17.35 14.00 16.75 16.75
 16.87 14.92 15.90 15.15
 16.30 14.10 16.30 16.65
 10.37 9.95 11.45 10.55
 14.05 12.10 14.45 13.50
 11.87 15.00 12.05 11.60

F July 7, 88

87-117 11.15 10.15 11.40 11.60
 16.43 13.70 14.90 16.20
 12.90 11.75 13.50 15.30
 13.65 12.85 13.30 16.30
 12.17 12.25 14.50 15.25
 12.90 12.70 13.30 12.70
 14.95 12.48 15.00 14.95
 18.93 18.62 18.90 19.20
 16.00 15.65 18.15 17.00
 14.70 15.00 14.85 15.90
 14.85 14.60 15.65 15.50
 14.53 15.00 16.70 16.50

H July 7

87-117, 15.17 14.10 14.30 14.90
 19.93 18.25 19.30 19.85
 20.40 19.50 19.75 21.15
 16.85 16.92 16.65 18.40
 16.27 14.25 15.75 16.55
 18.80 17.65 18.95 18.05
 13.15 20.18 12.45 11.85
 14.73 13.85 14.25 14.50
 12.30 9.10 12.65 11.60
 12.73 12.85 12.75 13.70
 13.65 11.30 15.00 14.95
 13.10 12.10 12.90 13.60

1885 photo, p. 159, 1709.