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KG
11366
v.564

Zone Observations + Reductions

6 2

From December 18, 1870 to Jan. 17, 1871.

Charles W. Sever, University Bookstore, Cambridge.

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62

Dec 1st 1870 to Jan 7th 1871.

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											

Value of the Inclination from Dec 18 1870 to Jan 17 1871 = 4° 40′

Constant for declination

log tan i = 8.91185

log 15 1.17609

log 15 tan i = 0.08794

d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											

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Date$_1$ = 1870 Dec 18 Observer W. A. B. Date$_2$ = 1870 Dec 22 Observer 5° to 5°
n = +.27 c = .0060° Recorder A. M. n = +.33 c = .00 Recorder

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
0 1	51 27.5	−0.5	9.0	51 24.8	34.1	42.0	45.7	49.5	54.4	22.57	45.14	10.79	34.35
	50 32.0	−5.8	9.2							−7.93		10.79	51 34.35
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .32
													− 2
												−0 7.93	51 26.42
	α_1												−2.87
										51 40.68			51 23.55
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												
	52 42	41.3	8.7	52 37.3	49.0	57.0	0.9	4.7	8.7	30.03	60.06	10.94	49.12
	51 47.2	36.0	8.5							−7.92		10.64	52 49.12
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .33
													− 2
												7.92	52 41.20
	α_1												−2.90
										52 55.52			52 38.30
			9.0	52 33.6	48.6	56.3	0.X	4.2	8.0	29.72	59.44	10.94	48.50
	κ									−7.16		10.54	52 48.50
	((δ) − D) $\frac{\kappa'}{100}$												− 7.54
													+ .40
													− 2
	α_2											7.16	52 41.34
										52 55.70			−2.82
													52 38.52
	57 20	20.9	8.2	54	14.4	27.0	34.8	38.7	42.8	46.5	187.90	10.87	27.03
	53 24.5	15.6	8.3							−7.93		10.87	54 27.03
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .32
													− 2
												7.93	54 19.10
	α_1												−2.92
										54 33.49			54 16.18
			8.6	54	14.8	26.8	34.2	38.1	41.8	45.8	187.44	10.87	26.41
	κ									−7.16		10.87	54 26.41
	((δ) − D) $\frac{\kappa'}{100}$												− 7.54
													+ .40
													− 2
	α_2											7.16	54 19.25
										54 33.63			−2.83
													54 16.42
12	0 50	46.5	9.7	0	47.5	58.7	6.6	10.5	14.3	18.3	34.84	6.968	10.96	38.72
	59 κ 54.7	41.2	9.4							−7.92		10.96	0 58.72
	((δ) − D) $\frac{\kappa'}{100}$												− 8.23
													+ .33
													− 2
	α_1											7.92	0 50.80
										5.29			−3.02
													0 47.78
			9.5	0	40.4	58.2	5.5	10.0	13.7	17.6	30.50	6.904	10.96	58.04
	κ									−7.16		10.96	0 58.04
	((δ) − D) $\frac{\kappa'}{100}$												− 7.54
													+ .40
													− 2
	α_2											7.16	0 50.88
										5.46			−2.83
													0 47.95
	7 39	57.8	8.8	7	52.0	9.0	16.7	20.5	24.3	28.5	1980	10.99	8.81
	7. 2.6	46.5	9.2							−7.92		10.99	8 8.81
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .33
													− 2
	α_1											7.92	8 0.89
										8 15.54			−3.11
													7 57.78
10 11			9.2	7	52.5	8.0	16.0	19.7	23.7	27.7	1902	10.99	8.03
	κ									−7.15		10.99	8 8.03
	((δ) − D) $\frac{\kappa'}{100}$												− 7.54
													+ .41
													− 2
	α_2											7.15	8 0.88
										8 15.62			−3.02
													7 57.86

0.68

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Runs – 15 R 22 8 4.20 6.26 R. +.13 R. +.16

Dec 18 – 7' 49.24

– 15 R

δ = 5° – 51°

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ'
	s 93 +9.5	1 45.5	42.5	87.8	1 43.90	+.02	–4.76	–.25	15	16 36.42	49 –2.06
d	0.977372					61 44.6				16' 36.42	58 22.69
((δ) – D) $\frac{d'}{100}$	9.980837 0.87403					49 58 15.21 + 7.48	7.08 – 0 + 40 – 7.48				– 9 2 +8.66 + 22 + 8.16 + .30 – 9 27.10
+17.13 δ_1 +1 37.75									0	40.7 42.0	58 4.25
d											– 2.06
((δ) – D) $\frac{d'}{100}$											
δ_2											50
	117 +11.8	3 55.2	37.2	1063	3 53.15	+.021	–.698	–.58	30	33 43.6	41 15.11
d	1.071885				33	48 55.20				33. 43.99	– 4 +9.74
((δ) – D) $\frac{d'}{100}$	9.980182 0.96164					50 41 5.96 + 9.15	8.66 – 13 + 63 – 9.16				+ 51 + 8.92 + .35 – 27.20
+17.22 δ_1 +1 37.60									42	35.2	40 57.65
	150 +14.9	3 40.3	36.8	771	3 38.55	+.06	–.136	–.55	30	33 26.7	41 17.16
d	1.176819				33	49 9.80				33 26.99	– 6 +10.08
((δ) – D) $\frac{d'}{100}$	9.980182 1.06295					50 41 5.60 + 17.56	11.02 – 16 + 70 11.56				+ .58 + 9.21 + .35 – 27.30
+17.22 δ_2 +1 37.60									42	35.4	40 54.78 50 54.44
	96 +9.6	4 7.3	3.3	106	4 5.30	+.03	–.741	–.61	57	53 57.3	21 1.31
d	0.982274				54	28 43.05				53 57.80	– .3 +9.411
((δ) – D) $\frac{d'}{100}$	9.980489 0.87510					50 20 5381 + 7.50	7.08 – 5 + 47 – 7.50				+ .53 + 8.56 + .35 – 27.00
+17.25 δ_1 +1 37.45									22	21.7	20 43.72
	117 +11.6	3 57.5	46.4	988	3 48.95	+.04	–.908	–.58	30	53 39.3	21 4.26
d	1.064446				53	28 39.40				53 39.88	– .3 +9.71
((δ) – D) $\frac{d'}{100}$	9.980489 0.95429					50 20 5520 + 9.06	8.66 – 6 + 47 – 9.07				+ .61 + 8.78 + .35 – 27.20
+17.25 δ_2 +1 37.45									22 22.06		4.71 20 46.71 50
	112 +11.2	3 57.2	36.9	1011	3 50.55	+.04	–.856	–.58	25	28 41.4	46 17.23
d	1.049225				28	53 57.80				28 41.87	– 3 +9.87
((δ) – D) $\frac{d'}{100}$	9.980105 0.93821					50 46 8.56 + 8.67	8.66 – 14 + 16 – 8.68				+ .49 + 9.01 + .40 – 26.80
+17.51 δ_1 +1 36.75									47	37.0	46 00.30
	178 +17.6	3 41.0	36.9	779	3 38.95	+.09	–.1358	–.55	25	28 24.0	46 18.83
d	1.245515				28	54 9.40				28 25.83	– 8 +10.14
((δ) – D) $\frac{d'}{100}$	9.980105 1.13450					50 46 5.20 + 13.63	13.38 – 22 + 46 – 13.62				+ .58 + 9.24 + .40 – 27.10
+17.51 δ_2 +1 36.75									47	8.6	5.98.1 48.5 +57 50
	170 +16.8	3 24.3	19.1	434	3 21.70	+.05	–.1320	–.57	20	23 8.1	51 30.39
d	1.225315				23	59 26.65				23 8.72	– 8 +9.87
((δ) – D) $\frac{d'}{100}$	9.980012 1.11337					50 51 37.41 + 12.98	12.59 – 23 + 62 – 12.98				+ .44 + 9.11 + .40 – 26.50
+17.76 δ_1 +1 35.85									53	9.6	51 33.76
	155 +15.5	3 5.5	1.7	72	3 3.60	+.07	–.1203	–.47	20	22 5.1	51 52.53
d	1.190335				28	59 44.75				22 57.63	– 7 +10.18
((δ) – D) $\frac{d'}{100}$	9.980012 1.07839					50 51 40.55 + 11.98	11.80 – 22 + 39 – 11.97				+ .50 + 9.35 + .40 – 26.80
+17.76 δ_2 +1 35.85									53	9.7	3385 51 33.91

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Date$_1$ = 1870 Dec 18. Observer WAR Recorder AM Date$_2$ = Dec 22 Observer WAR Recorder AM.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
	m s	° ′ ″		m s	s	s	s	s	s		s	s	m s
	9 44	0 15 8	9.8	9 30.9	52.2	59.4	3.3	7.1	11.2	3132	6264	1085	51.79
	8. 46.9	10.5	9.5							−7.93		10.85	9 51.79
κ													− 8.23
													+ .32
((δ) − D) $\frac{\kappa'}{100}$													− .2
c_1												7.93	9 43.86
													− 3.17
										9 58.51			9 40.74
			9.7	9 33.0	51.7	~~2.7~~ 58.6	6.5 2.7	10.4 6.5	10.4	3099	61,98	1085	51.13
										−7.16		10.85	9 51.13
κ													− 7.54
													+ .40
((δ) − D) $\frac{\kappa'}{100}$													− .2
c_2												7.16	9 43.97
													− 3.03
										9 58.71			9 40.94
	10 58	56.6	8.1	11 4.0	17.0	24.9	28.8	32.7	36.5	1396	2798	1100	16.98
	10 8.9	51.3	9.0							−7.92		11.01	11 16.97
κ	11												− 8.23
													+ .33
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_1												7.92	11 9.05
													− 3.15
										11 23.78			11 5.90
			8.6	10 55.8	16.3	24.0	28.0	32.0	35.8	1361	2722	1100	16.22
										−7.15		11.01	11 16.21
κ													− 7.54
													+ .41
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_2												7.15	11 9.06
													− 3.07
										11 23.87			11 5.99
	12 57	55.8	7.0	12 46.2	1.1	8.8	12.9	16.8	20.7	603	1206	1100	106
	11 56.6	50.9	6.9							−7.92		11.00	13 1.06
κ													− 8.23
													+ .33
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_1												7.92	12 53.14
													− 3.17
										13 7.91			12 49.97
			7.8	12 46.2	0.1	8.0	12.1	15.9	19.9	560	1120	1100	0.20
										−7.15		11.00	13 0.20
κ													− 7.54
													+ .41
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_2												7.15	12 53.05
													− 3.09
										13 7.90			12 49.96
	14 16	−4.9	8.8	14 13.5	24.0	31.7	35.7	39.5	43.5	1744	3488	1077	2411
	13 18.8	− 9.2	9.0							−7.93		10.77	14 2411
κ													− 8.23
													+ .32
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_1												7.93	14 16.18
													− 3.16
										14 30.92			14 13.02
			9.0	14 7.0	23.4	31.2	34.9	38.6	42.4	1708	3416	1077	2339
										−7.17		10.77	14 2339
κ													− 7.54
													+ .39
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_2		49 42										7.17	14 16.22
													− 3.08
										14 31.04			14 13.14
	16 22	~~−3.7~~	9.7	16 11.5	24.3	37.0	40.8	44.7	48.6	2014	4028	1080	3957
	15. 24.9	+ 5.1	9.0							−7.93		10.80	16 2928
κ													− 8.23
													+ .32
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_1												7.93	16 21.35
													− 3.19
										16 36.14			16 18.16
			9.5	16 12.7	28.7	36.1	40.1	43.7	48.0	1966	3932	1080	28.55
										−7.17		10.80	16 28.52
κ													− 7.54
													+ .39
((δ) − D) $\frac{\kappa'}{100}$													− .2
α_2												7.17	16 21.35
													− 3.11
										16 36.22			16 18.24

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Runs 15 R
15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	213	4 42.0	39.3	813	4 4065	+12	−1649	−70	53	59 23.6	15 34.82
	+209				59 40.65	123 7.70				59 24.29	− .12
d	1.32015					50 15 18.46	15.74−9+71				+ .61
	9.80 580					+ 16.36	−16.36				+ 8.45
((δ) − D) $\frac{d'}{100}$	1.21 389										+ .30
											− 26.30
+17.77 δ_1									16 53.4		15 17.76
+1 35.65											− 2.06
	187	4 23.8	19.7	435	4 2175	+10	−1449	−66	55	59 7.57	15 36.57
	+181				59 21.75	23 26.60				59	− 9
d	1.25768					50 15 22.40	14.16−8+8				+ .69
	9.80 580					+ 14.17	−14.16				+ 8.64
((δ) − D) $\frac{d'}{100}$	1.15142										+ .30
											− 26.60
+17.77 δ_2									16 53.1	50	13 17.48
+1 35.65											+9.54
	130	3 36.5	31.7	682	3 3410	+05	−997	−54	15	18 23.6	56 35.04
	+130				18 34.10	4 14.25				18 24.07	− 5
d	1.11394					50 56 25.01	10.24−21+0				+ .47
	9.79950					+ 10.03	−10.03				+ 9.13
((δ) − D) $\frac{d'}{100}$	1.00138										+ .40
											− 26.40
+17.88 δ_1									57 54.0		56 18.59
+1 35.45											
	205	3 25.8	19.0	448	3 2240	+11	−1565	−51	15	18 6.4	56 37.49
	+214				18 22.40	4 25.95				18 6.67	− .11
d	1.30963					50 56 21.75	15.74−32+31				+ .54
	9.79950					+ 15.74	−15.73				+ 9.35
((δ) − D) $\frac{d'}{100}$	1.19707										+ .40
											− 26.60
+17.88 δ_2									57 54.5	50	56 19.04
+1 35.45											21.07
	149	0 14.4	10.0	244	0 1220	+06	−1138	−04	20	20 0.8	54 58.11
	+149				20 12.20	2 36.15				20 0.71	− 6
d	1.17319					50 54 46.91	11.02−22+69				+ 3
	9.79965					+ 11.50	−11.49				+ 9.16
((δ) − D) $\frac{d'}{100}$	1.06078										+ .40
											− 26.30
+17.94 δ_1									56 16.8		54 41.64
+1 35.20											
	139	4 58.3	52.2	1105	4 5525	+05	−1062	−74	15	19 43.9	54 59.71
	+140				19 55.25	2 53.10				19 44.45	− 5
d	1.14613					50 54 48.90	11.112−22				+ .48
	9.79965					+ 10.81	−10.80				+ 9.39
((δ) − D) $\frac{d'}{100}$	1.03372										+ .40
											− 26.50
+17.94 δ_2									56 16.9	49	54 41.67
+1 35.20											41.50
	106	4 24.0	24.8	488	4 2440	+07	−819	−66	15	19 15.6	55 38.66
	+106				18 24.40	3 21.45				19 17.04	− 7
d	1.10 2531				26.90	49 55 30.31	7.87+1+48				+ .57
	9.80 867					+ 8.35	−7.36				+ 8.10
((δ) − D) $\frac{d'}{100}$	0.92192										+ .30
											− 26.00
+17.90 δ_1									56 58.5		55 23.46
+1 35.00											
	164	4 16.1	10.9	270	4 1350	+07	−1278	−64	15	19 0.2	55 43.58
	+164				19 13.50	3 34.85				19 (0.57)	− 9
d	1.21484					49 55 30.65	12.57+2+32				+ .67
	9.80 867					+ 12.93	−12.93				+ 8.32
((δ) − D) $\frac{d'}{100}$	1.11145										+ .30
											− 26.20
+17.90 δ_2									56 57.5		55 24.52
+1 35.00											
	178	2 55.1	57.1	1061	2 5305	+09	−1380	−44	15	17 38.8	57 20.08
	+178				17 53.05	4 55.30				17 39.01	− 9
d	1.25042					49 57 6.06	13.38+2+64				+ .38
	9.80 852					+ 14.02	−14.04				+ 8.13
((δ) − D) $\frac{d'}{100}$	1.14688										+ .30
											− 25.90
+17.98 δ_1									58 37.6		57 2.90
+1 34.75											
	160	2 37.9	33.8	717	2 3585	+07	−1241	−40	15	17 23.0	57 20.75
	+158				17 35.85	5 12.50				17 23.39	− 7
d	1.19866					49 57 8.30	11.80+2+64				+ .46
	9.80 852					+ 12.45	−12.46				+ 8.34
((δ) − D) $\frac{d'}{100}$	1.09512										+ .30
											− 26.10
+17.98 δ_2									58 36.4		57 1.62
+1 34.75											

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Date$_1$ = Dec 18 12 — Observer HR — Recorder A.M. — Date$_2$ = Dec 22 14 — Observer HR — Recorder A.M. — Ru

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
κ	1h 20m 30s 19. 31.7	2.5 -2.5	8.7 8.9	20m 24.4s	38.1s	45.8s	~~53.5~~ 49.5	~~57.5~~ 53.5	57.5	24.47 -7.93	4894	10.80 10.80	38.14 20 38.14 -8.23 +.32 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.93	20 30.21 -3.24
c_1										20m 45.08s			20 26.97
κ			8.5	20 49.5	37.3	45.0	48.7	52.8	56.5	2405 -7.17	48.10	10.80 10.80	37.30 20 37.30 -7.54 +.39 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.17	30.13 -3.16
c_2										20 45.08			20 26.97
κ	22 53 21 54.8	0.2 -4.8	8.1 8.3	22 44.7	0.1	7.8	11.6	15.5	19.3	542 -7.93	1086	10.79 10.79	0.07 23 0.08 -8.23 +.32 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.93	22 52.15 -3.27
a_1										23 7.06			22 48.88
κ			8.0	22 43.4	57.3	7.0	10.8	14.8	18.7	3506 -7.17	70.12	10.79 10.79	59.33 22 59.33 -7.54 +.39 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.17	52.46 -3.19
a_2										23 7.15			22 48.97
κ	24 36 23. 38.0	9.6 4.7	8.6 8.7	24 26.4	44.2	52.0	55.8	59.8	3.6	2754 -7.93	55.06	10.83 10.83	44.25 22 44.25 -8.23 +.32 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.93	24 36.32 -3.30
a_1										24 51.28			24 33.02
κ			8.6	24 26.6	43.5	51.0	53.0	58.9	2.8	2712 -7.17	54.24	10.83 10.83	43.41 24 43.41 -7.54 +.39 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.17	24 36.24 -3.22
a_2										24 51.28			24 33.02
κ	28 45 27 47.3	60.7 55.8	8.7 9.0	28 39.5	54.7	2.6	6.4	10.4	14.3	3284 -7.92	65.68	11.02 11.02	34.66 28 34.66 -8.23 +.33 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.92	28 46.74 -3.38
a_1										29 1.84			28 43.36
κ			8.9	28 40.1	53.7	1.6	5.7	9.8	13.8	3246 -7.85	64.92	11.02 11.02	53.90 28 53.90 -7.54 +.41 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.15	28 46.75 -3.30
a_2										29 1.93			28 43.45
κ	29 55 28. 56.6	-3.3 -8.2	8.6 8.9	29 53.5	2.9	10.6	14.5	18.3	22.2	6855 -7.93	137.0	10.78 10.80	2.92 30 2.90 -8.23 +.32 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.93	29 54.97 -3.35
a_1										30 10.02			29 51.62
κ			9.0	29 50.0	2.1	9.8	18.7	17.4	~~26.8~~ 21.4	6441 -7.17	128.8	10.78 10.80	2.16 30 2.08 -7.54 +.39 -.2
$((\delta) - D)\frac{\kappa'}{100}$												7.17	29 54.91 -3.28
a_2										30 10.03			29 51.63

0.80

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Runs −15R
−15R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	13.7	2′ 37.9	31.9	69.8	2′ 34.90	+05	−10.64	−39	10	12 23.6	2 34.99	
	+13.7				12 34.90	10 13.45				12′ 24.11	− 5	+8.80
d	1.13692					50 2 24.21	10.24−1+56				+ 34	
	9.80777					+ 10.78	−10.79				+ 8.21	
((δ) − D) $\frac{d'}{100}$	1.03243										+ 30	
											− 25.70	
+18.11 δ_1											2 18.09	
+1 34.10									3′	52.2″	− 2.06	
	12.2	1 59.8	57.0	113.8	1 56.90	+02	+9.50	−30	10	12 6.1	2 37.66	
	−12.2				11 56.80	10 51.45				12 6.42	− 4	+9.00
d	1.08636					50 2 47.25	8.45−1+8				+ 30	
	9.80762					− 9.57	+9.52				+ 8.44	
((δ) − D) $\frac{d'}{100}$	0.98192										+ 30	
											− 26.00	
+18.11 δ_2											2 18.60	
+1 34.10									3′	52.7″	50	
	15.4	0 7.8	4.0	11.8	0 5.90	+06	−11.96	−02	15—	14 54.0	0 5.33	
	+15.4				15 5.90	7 42.45				14 53.78	− 6	+8.43
d	1.18752					49 59 53.21	11.80+32				+ 1	
	9.88807					+ 12.12	−12.12				+ 8.18	
((δ) − D) $\frac{d'}{100}$	1.08353										+ 30	
											− 25.60	
+18.18 δ_1											59 48.16	
+1 33.75									6′	24.9″		
	15.9	4 50.8	46.3	97.1	4 48.55	+07	−12.38	−62	10	14 35.6	0 8.11	
	+15.9				14 48.55	7 59.80				14 36.04	− 7	+9.39
d	1.20140					49 59 55.60	11.80+71				+ 7.74	
	9.88807					+ 12.51	−12.51				+ 8.34	
((δ) − D) $\frac{d'}{100}$	1.09741										+ 30	
											− 25.90	
+18.18 δ_2											59 49.54	
+1 33.75									0′	28.3″	50	
	17.3	0 43.4	38.3	81.7	0 40.85	+08	−13.42	−11	5—	5 27.4	9 31.83	
	+17.3				5 40.85	17 7.50				5 27.28	− 8	+8.65
d	1.23805					50 9 18.26	13.38−5+24				+ 9	
	9.80671					+ 13.57	−13.57				+ 8.34	
((δ) − D) $\frac{d'}{100}$	1.13270										+ 30	
											− 25.50	
+18.26 δ_1											9 14.98	
+1 33.45									10′	48.4″		
	16.9	0 25.8	23.0	48.8	0 24.40	+08	−13.10	−06	5—	5 11.3	9 32.93	
	+16.8				5 24.40	17 23.95				5 11.21	− 8	+8.83
d	1.22531					50 9 19.45	12.89−4+64				+ 6	
	9.80671					+ 13.18	−13.17				+ 8.55	
((δ) − D) $\frac{d'}{100}$	1.11996										+ 30	
											− 25.80	
+18.26 δ_2											9 13.90	
+1 33.45									10′	47.4″	51	
	15.2	4 41.3	37.2	78.5	4 39.25	+06	−11.58	−70	10	14 27.0	0 31.57	
	+15.2				14 39.25	8 9.10				14 27.54	− 6	+10.22
d	1.18184					51 0 19.86	11.55+16				+ 6.1	
	9.79887					+ 11.71	−11.71				+ 9.27	
((δ) − D) $\frac{d'}{100}$	1.06865										+ 40	
											− 25.40	
+18.48 δ_1											0 16.39	
+1 32.95									4′	49.3″		
	13.6	4 23.2	19.9	43.1	4 21.55	+04	−9.61	−66	10	14 11.3	0 33.23	
	+13.8				14 21.55	8 26.80				14 10.92	− 5	+10.55
d	1.13988					51 0 22.60	10.01+62				+ 9.70	
	9.79887					+ 10.63	−10.63				+ 50	
((δ) − D) $\frac{d'}{100}$	1.02669										+ 40	
											− 25.80	
+18.48 δ_2											0 15.92	
+1 32.95									4′	48.9″	49	
	9.4	3 18.1	15.2	33.3	3 16.65	+02	−7.33	−49	15—	18 8.8	56 49.87	
	+9.4				18 16.65	4 33.70				18 9.24	− 2	+8.84
d	0.97313					49 56 42.46	7.08+1+32				+ 43	
	9.88852					+ 7.41	−7.41				+ 8.13	
((δ) − D) $\frac{d'}{100}$	0.86959										+ 30	
											− 25.20	
+18.40 δ_1											56 33.51	
+1 32.60									5′	8.1″		
	12.1	3 3.9	0.1	4.0	3 2.00	+04	−9.43	−46	15—	17 52.20	56 53.3	
	+12.1				18 2.00	4 46.35				17 52.46	− 4	+9.08
d	1.08279					49 56 42.15	9.45+1+8				+ 53.4	
	9.88852					+ 9.53	−9.54				+ 8.34	
((δ) − D) $\frac{d'}{100}$	0.97925										+ 30	
											− 25.50	
+18.40 δ_2											56 33.20	
+1 32.60									5′	5.8″		

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Date$_1$ = 1870 Dec 18 12h Observer MKR Recorder A.M.

Date$_2$ = 1870 Dec 22 11h Observer MKR Recorder A.M.

Ru

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
	h m s	° ′		m s	s	s	s	s	s	s	s	s	m s
	32 40	21.1	8.3	32 31.2	47.2	55.1	57.0	2.8	6.8	29.06	5818	10.87	4731
	31 41.0	16.2	8.5							−7.93			32 47.31
κ													−8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .32
													− 2
a_1												7.93	32 39.38
													−3.40
										32 54.51			32 35.98
			8.5	32 31.5	46.6	54.5	58.1	2.0	6.0	28.72	5744	10.87	4657
κ										−7.17			32 46.57
((δ) − D) $\frac{\kappa'}{100}$													+ .40
													− 2
a_2												7.17	32 39.40
													−3.32
										32 54.61			32 36.08
	34 28	14.6	8.9	34 29.3	46.3	54.0	57.8	1.7	5.5	28.53	5706	10.85	4621
	33 38.8	9.7	9.0							−7.93			34 46.21
κ													−8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .32
													− 2
a_1												7.93	34 38.28
													−3.42
										34 53.45			34 34.86
			8.9	34 28.2	45.5	53.2	57.2	57.2 / 1.0	4.8	28.16	5634	10.85	4547
κ										−7.18			34 45.47
((δ) − D) $\frac{\kappa'}{100}$													−7.85
													+ .39
													− 2
a_2												7.18	34 38.29
													−3.34
		49 57.6								34 53.54			34 34.95
	35 35	3.5	3.0	35 32.1	42.9	50.6	54.5	58.2	2.4	26.86	5372	10.80	4292
	34 36.0	−2.4	4.1							−7.93			35 42.92
κ													−8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .32
													− 2
a_1												7.93	35 34.99
													−3.42
										35 50.15			35 31.57
			3.5	35 29.4	42.0	49.9	53.7	57.4	1.2	26.42	5284	10.80	4204
κ										−7.18			35 42.04
((δ) − D) $\frac{\kappa'}{100}$													−7.55
													+ .39
													− 2
a_2												7.18	35 34.86
													−3.35
										35 50.09			35 31.51
	36 22	27.2	9.8	36 46.7	302	38.2	42.0	45.7	49.7	20.58	4116	10.89	4027
	35 22.5	23.3	9.4							−7.92			36 30.22
κ													−8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .33
													− 2
a_1												7.92	36 22.30
													−3.45
										36 37.52			36 18.85
			9.5	36 22.5	29.4	37.3	41.2	44.9	48.9	20.17	4034	10.89	9946
κ										−7.17			36 29.45
((δ) − D) $\frac{\kappa'}{100}$													−7.55
													+ .40
													− 2
a_2												7.17	36 22.28
													−3.37
										36 37.58			36 18.91
	38 57	53.8	8.4	38 53.6	5.8	13.6	17.6	21.6	25.5	5.41	5682	11.00	5382
	37 57.9	48.9	8.6							−7.92			39 53.82
κ													−8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .33
													− 2
a_1												7.92	38 57.90
													−3.50
										39 13.21			38 54.40
			8.8	38 47.7	5.0	13.0	16.8	20.8	24.7	8.03	1606	11.00	506
κ										−7.06			39 5.06
((δ) − D) $\frac{\kappa'}{100}$													−7.55
													+ .41
													− 2
a_2												7.16	38 57.90
													−3.42
										39 13.29			38 54.48

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Runs −15 C
−15 B

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	160	3′ 11″ 56.9	53.1	1100	3′ 11″ 55.00	+07	−123	−55	50′	53′ 42.43	21 16.69	+9.35
	+1.61				53 55.00	28 53.35					− 7	
d	1.20683					50 21 4.11	12.59−10+8				+ 51	
((δ) − D) $\frac{d'}{100}$	9.80489					+ 12.58	−12.57				+ 8.56	
	1.09966										+ .35	
											− 25.10	
+18.53′ δ_1									22′ 33.1″		21 09.94	
+1′ 32.15											− 2.06	
	151	3 40.4	35.4	758	3 37.90	+06	−1168	−54	50	48 254	21 18.05	+9.63
	+1.51				53 37.50	29 10.45				53 26.11	− 6	
d	1.17898					50 21 6.25	11.80−9+8				+ 58	
((δ) − D) $\frac{d'}{100}$	9.80489					+ 11.80	−11.79				+ 8.76	
	1.07181										+ .35	
											− 25.40	
+18.53 δ_2									22 32.4	50	21 02.2	
+1′ 32.15												
	168	0 38.5	35.3	738	0 36.90	+08	−1301	−09	0	0 239	14 35.45	
	+16.9				0 36.90	22 11.45				0 23.66	− 8	+8.73
d	1.22789					50 14 22.21	12.09−6+71				+ 8	
((δ) − D) $\frac{d'}{100}$	9.80595					+ 13.24	−13.24				+ 8.43	
	1.12178										+ .30	
											− 24.90	
+18.59 δ_1									15 51.1		14 19.28	
+1′ 31.80												
	173	0 21.3	16.2	405	0 20.25	+08	−1340	−05	0	0 69	14 37.45	
	+17.8				0 20.25	22 28.10				0 4.69	− 8	+8.94
d	1.23805					50 14 23.90	13.38−6+24				+ 5	
((δ) − D) $\frac{d'}{100}$	9.80595					+ 13.55	−13.56				+ 8.47	
	1.13194										+ .30	
											− 25.20	
+18.57 δ_2									15 50.9	50	14 19.13	
+1′ 31.80												
	108	2 56.1	53.0	1091	2 54.55	+03	−840	−44	10	12 457	2 13.05	
	+10.8				12 54.55	9 53.80				12 46.05	− 3	+8.86
d	1.03342					50 2 4.56	7.87−1+64				+ 38	
((δ) − D) $\frac{d'}{100}$	9.80777					+ 8.49	−8.50				+ 8.21	
	0.92913										+ 30	
											− 24.80	
+18.58 δ_1											57.11	
+1′ 31.65									3 28.8		1 57.05	
	126	2 39.8	35.0	748	2 37.40	+04	−980	−40	10	12 293	2 16.66	
	+12.6				12 37.40	10 10.95				12 27.445	− 5	+9.09
d	1.10037					50 2 6.75	9.45−1+48				+ 42	
((δ) − D) $\frac{d'}{100}$	9.80777					+ 9.91	−9.95				+ 8.42	
	0.99608										+ 30	
											− 25.20	
+18.58 δ_2												
+1′ 31.65									3 30.1	50	1 57.49	
	−165	2 36.2	31.1	673	2 33.65	+07	+1273	−39	45	47 461	27 12.60	
	−16.5				47 33.65	35 14.70				47 46.152	− 8	+9.28
d	1.21748					50 27 2.46	12.59−12+40				+ 34	
((δ) − D) $\frac{d'}{100}$	9.80397					− 12.86	+12.87				+ 8.67	
	1.10939										+ 35	
											− 24.80	
+18.67 δ_1									24 28.6		27 57.08	
+1′ 31.50												
	9	2 37.1	32.3	644	2 34.70	+01	−532	−39	45	47 290	27 14.91	
	+.90				47 34.70	35 13.65				47 29.24	− 2	+9.64
d	0.84510					50 27 9.45	5.52−6				+ 42	
((δ) − D) $\frac{d'}{100}$	~~0.84615~~					+ 5.46	−5.46				+ 8.89	
	0.73701										+ 35	
											− 25.20	
+18.67 δ_2									28 28.8	50	26 57.29	
+1′ 31.50												
	122	1 49.3	45.7	950	1 47.50	+04	−932	−27	20	21 380	53 21.03	
	+12.2				21 47.50	1 0.85				21 38.07	− 4	+9.73
d	1.08636					50 53 11.61	9.45−18+16				+ 23	
((δ) − D) $\frac{d'}{100}$	9.79996					+ 9.42	−9.43				+ 9.14	
	0.99426										+ 40	
											− 24.80	
+18.81 δ_1									50 ~~37.0~~ 37.6		53 57.96	
+1′ 31.05												
	178	1 35.2	31.1	663	1 33.15	+08	−1323	−24	20	21 198	53 24.44	
	+17.4				21 33.15	1 15.20				21 19.71	− 8	+9.96
d	1.24055					50 53 11.60	13.38−25+31				+ 26	
((δ) − D) $\frac{d'}{100}$	9.79996					+ 13.44	−13.44				+ 9.38	
	1.12845										+ 40	
											− 25.10	
+18.81 δ_2									54 38.3		53 7.24	
+1′ 31.05												

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Date$_1$ = Dec 18 — Observer / Recorder: H. & R. / A. M.

Date$_2$ = Dec 22 — Observer / Recorder: H. & R. / A. M.

Ru

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
1	h m s	50° ′ ″		m s	s	s	s	s	s		s	s	m s
	40 21	28.7	9.4	40 12.8	29.6	37.4	41.3	45.1	49.2	2026	40 52	1090	29 62
	39 21.4	23.8	9.2							−7.92		10.90	40 29.62
κ													− 8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .33
													− .2
												7.92	40 21.70
c_1													− 3.50
										m s			40 18.20
										40 37.00			
			9.7	40 16.3	29.0	36.7	40.5	44.3	48.2	1987	39,74	1090	28.84
κ										−7.17		10.90	40 28.84
													− 7.55
((δ) − D) $\frac{\kappa'}{100}$													+ .40
													− .2
												7.17	40 21.67
c_2													− 3.42
										40 37.05			40 18.25
	43 30	12.1	9.4	43 16.3	38.5	46.1	50.0	53.9	57.7	2462	49,24	1083	38.41
	42. 29.9	7.3	9.5							−7.93		10.83	43 38.41
κ													− 8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .32
													− .2
												7.93	43 30.48
a_1													− 3.53
										43 45.81			43 26.95
			~~9.5~~	~~44~~	~~31.8~~	~~44.4~~	~~52.3~~	~~56.0~~	~~0.8~~	4.0	2421	48,42	1083	37.59
			9.5	43 18.0	37.5	~~45.4~~	~~49.3~~	52.9	57.0	−7.18		10.83	43 37.59
κ													− 8.55
((δ) − D) $\frac{\kappa'}{100}$													+ .39
													− .2
												7.18	43 30.41
a_2													− 3.46
										43 45.82			43 26.96
	44 36	50.3	5.5	44 31.8	44.4	52.3	56.0	0.8	4.0	2765	55,30	1098	44.32
	43 36.1	45.5	6.6					59.8		−7.92		10.98	44 44.32
κ													− 8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .33
													− .2
												7.92	44 36.40
a_1													− 3.56
										44 51.82			44 32.84
			6.5	44 33.7	43.5	51.5	55.3	59.1	3.1	2725	54,50	1098	43.52
κ										−7.17		10.98	44 43.52
													− 7.55
((δ) − D) $\frac{\kappa'}{100}$													+ .40
													− .2
												7.17	44 36.35
a_2													− 3.49
										44 51.84			44 32.86
	46 26	28.3	~~8.8~~	46 19.0	~~42.0~~ 34.3	~~46.0~~ 42.0	~~49.9~~ 46.6	~~53.8~~ 49.9	53.8	2260	45,20	1089	34.31
	45 25.8	23.5	9.0							−7.92		10.90	46 34.30
κ													− 8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .33
													− .2
												7.92	46 26.38
a_1													− 3.57
										46 41.80			46 22.81
			8.9	46 17.2	33.7	41.3	45.3	49.1	52.7	2221	44,42	1089	33.53
κ										−7.07		10.90	46 33.62
													− 7.55
((δ) − D) $\frac{\kappa'}{100}$													+ .40
													− .2
												7.17	46 26.35
a_2													− 3.50
										46 41.84			46 22.85
	48 20	−0.3	8.8	48 11.9	28.8	36.3	40.3	44.2	48.0	1978	39,56	1079	28.77
	47 19.8	−5.1	8.8							−7.93		10.79	48 28.77
κ													− 8.23
((δ) − D) $\frac{\kappa'}{100}$													+ .32
													− .2
												7.93	48 20.84
a_1													− 3.58
										48 36.25			48 17.26
			8.9	48 11.7 (38.3)	(28.0)	35.7	39.7	43.5	47.5	1978	38,80	1079	28.09
κ										−7.18		10.79	48 28.09
													− 7.55
((δ) − D) $\frac{\kappa'}{100}$													+ .39
													− .2
												7.18	48 20.91
a_2													− 3.50
										48 36.40			48 17.41

0.77

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Runs −15 R
−15 2

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	168	1 37.8	34.0	718	1 35.90	+.08	−1.294	−.25	45	46 22.4	50 28 36.31
	+4.8				46 35.90	.36 12.45				46 22.80	− 8 +9.17
d	1.22531					50 28 23.21	12.59−12+63.				+ 21
	9.80382					+ 13.10	−13.10				+ 8.69
((δ) − D) $\frac{d'}{100}$	1.11417										+ .35
											− 24.60
+18.80 δ_1											28 20.86
+1 30.80											− 2.06
									29 54.7		
	129	1 16.2	12.1	288	1 14.15	+.05	−.980	−.19	45	46 42	28 39.74
	+12.5				46 14.45	36 34.20				46 41.40	− 4 +9.43
d	1.09691					50 28 38.00	9.45−10+40				+ .19
	9.80382					+ 9.74	−9.75				+ 8.93
((δ) − D) $\frac{d'}{100}$	0.98877										+ .35
											− 25.70
+18.80 δ_2											
+1 30.80									29 52.9	50	28 22.31
	222	3 19.3	15.2	345	3 17.25	+.12	−.721	−.50	0	2 59.7	11 59.18
	+22.1				3 17.25	19 31.10				2 59.92	− .13 +9.00
d	1.34439					50 11 41.86	17.32−7+8				+ .13
	9.80625					+ 17.32	−17.33				+ 8.40
((δ) − D) $\frac{d'}{100}$	1.23858										+ .30
											− 24.90
+18.86 δ_1											
+1 30.20									13 14.0		11 43.78
	195	2 58.8	57.8	1136	2 56.80	+.10	−1.512	−.44	0	2 41.3	12 ~~44~~ 0.65
	+18.6				2 56.80	19 51.55				2 41.443	− .11 +9.26 ✓
d	1.29226					50 11 ~~49.35~~	14.95−6+48				+ .46
	9.80625					+ 15.36	−15.37				+ 8.61
((δ) − D) $\frac{d'}{100}$	1.18645										+ .30
											− 24.70
+18.86 δ_2											
+1 30.20									13 18.4	50	11 ~~45.31~~ 47.27 45.21
	126	0 48.8	58.8	1236	2 61.80	+.04	−.964	−.01	25	24 52.2	50 6.98
	+13.5				20 1.80	57 46.55				24 52.13	− 5 +9.43
d	1.09691					50 49 57.31	9.45−17+39				+ 0
	9.80043					+ 9.67	−9.67				+ 9.08
((δ) − D) $\frac{d'}{100}$	0.98528										+ .40
											− 24.40
+18.98 δ_1											
+1 29.98									51 22.0		49 52.01
	98	4 45.0	40.4	884	4 47.70	+.08	−.743	−.70	20	24 39.6	50 9.03
	+9.8				24 47.70	58 5.65				24 35.72	− 3 +10.44
d	0.99123					50 50 1.45	7.08−12+62				+ .75
	9.80043					+ 7.58	−7.58				+ 9.32
((δ) − D) $\frac{d'}{100}$	0.87960										+ .40
											− 24.80
+18.98 δ_2											
+1 29.95									51 22.6	50	49 52.61
	153	1 52.1	46.8	984	1 49.45	+.06	−1.180	−.28	45	46 37.4	28 21.58
	+15.3				46 49.45	35 58.90				46 37.53	− 6 +9.22
d	1.18469					50 28 9.66	11.80−12+24				+ .23
	9.80382					+ 11.92	−11.92				+ 8.70
((δ) − D) $\frac{d'}{100}$	1.07645										+ .35
											− 24.30
+18.99 δ_1											
+1 29.60									29 86.1		28 6.50
	165	1 33.8	28.7	625	1 31.25	+.08	−1.273	−.22	45	46 18.4	28 25.60
	+16.3				46 31.25	36 17.10				46 18.52	− 7 +9.46
d	1.27219					50 28 12.90	12.59−12+24				+ .24
	9.80382					+ 12.70	−12.71				+ 8.94
((δ) − D) $\frac{d'}{100}$	1.10395										+ .35
											− 24.60
+18.99 δ_2											
+1 29.60									29 88.0	49	28 8.40
	169	0 42.0	40.1	821	0 41.05	+.08	−1.316	−.10	15	15 27.7	59 31.37
	+16.9				15 41.05	7 4.30				15 27.70	− 8 +8.49
d	1.22759					49 59 18.06	12.59+71				+ 9
	9.80822					+ 13.31	−13.30				+ 8.18
((δ) − D) $\frac{d'}{100}$	1.12405										+ .30
											− 24.00
+18.99 δ_1											
+1 29.20									0 45.1		59 15.86
	168	0 25.6	21.4	478	0 23.90	+.07	−1.269	−.06	15	15 10.8	59 33.56
	+16.4				(15) 23.90	7 24.85				(15) 10.59	− 7 +8.68
d	1.21484					49 59 20.65	12.59+32				+ 6
	9.80822					+ 12.91	−12.91				+ 8.39
((δ) − D) $\frac{d'}{100}$	1.11100										+ .30
											− 24.40
+18.99 δ_2											
+1 29.20									0 45.0		59 15.78

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Date$_1$ = Dec 18 12 Observer ZAR Recorder A.M. Date$_2$ = Dec 22 14 Observer ZAR Recorder A.M. Ru

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
1	49m 28s	−0.9	8.9	49m	22.6s	35.2	42.9	46.7	50.5	22.98	45.96	10.79	35.18
	48 27.0	−5.7	9.0						54.5	−7.93		10.79	49 85.17
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .32
													− 2
	a_1											7.93	49 27.24
										49 42.67			− 3.59 +19
													49 23.65 +1
			9.0	49	19.1	34.4	42.0	45.7	49.6	53.6	22.53	45.06	10.79	34.28
											−7.18		10.79	49 84.27
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .39
														− 2
	a_2											7.18	49 27.09
										49 42.59			− 3.52 +19
													49 23.57 +1
	51 8	−1.7	9.2	51	03	15.8	23.5	27.3	31.2	35.0	1328	2656	10.79	15.78
	50 7.0	−6.5	9.0								−7.93		10.79	51 15.77
	κ													− 8.23
	((δ) − D) $\frac{\kappa'}{100}$													+ .32
														− 2
	a_1											7.93	51 7.84
										51 23.31			− 3.60 +19
													51 4.24 +1
	full ?		9.2	51	4.0	15.2	22.9	26.8	(30.4)	34.6	1299	2598	10.79	15.20
											−7.18		10.79	51 15.19
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .39
														− 2
	a_2											7.18	51 8.01
										51 23.54			− 3.54 +19
													51 4.47 +1
	51 38	−1.2	8.7	51	6.2	28.2	35.7	39.5	43.4	47.2	1940	3880	10.79	28.02
	50 26.7	−6.0	8.4								−7.93		10.79	51 28.01
	κ 18.9													− 8.23
	((δ) − D) $\frac{\kappa'}{100}$													+ .32
														− 2
	a_1											7.93	51 20.08
										51 35.55			− 3.61 +19
													51 16.47 +1
			8.7	51	5.5	27.3	34.6	38.8	42.5	46.5	1899	3794	10.79	27.16
											−7.18		10.79	51 27.15
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .39
														− 2
	a_2											7.18	51 19.97
										51 35.51			− 3.54 +19
													51 16.43 +1
	52 53	1.5	8.9	52	47.0	0.1	7.8	11.7	15.6	19.4	546	1092	10.79	0.13
	51 52.4	−4.3	9.0								−7.93		10.79	53 0.13
	κ													− 8.23
	((δ) − D) $\frac{\kappa'}{100}$													+ .32
														− 2
	a_1											7.93	52 52.20
										53 7.71			− 3.62 +19
													52 48.58 +1
			9.0	52	39.7	59.2	6.9	10.8	14.6	18.6	3561	7002	10.79	59.23
											−7.18		10.79	52 59.23
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .39
														− 2
	a_2											7.18	52 52.05
										53.7.62			− 3.56 +19
													52 48.49 +1
	54 3	40.4	8.9	53	59.8	11.6	19.3	23.3	27.2	31.3	1127	2254	10.44	11.60
	53 1.8	35.7	9.1								−7.93		10.44	54 11.60
	κ													− 8.23
	((δ) − D) $\frac{\kappa'}{100}$													+ .32
														− 2
	a_1											7.93	54 3.67
										54 19.26			− 3.67 +19
													54 0.00 +1
			9.0	53	57.6	11.0	18.6	22.4	26.3	30.5	1088	2176	10.44	10.82
											−7.17		10.44	54 10.82
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .40
														− 2
	a_2											7.17	54 3.65
										54 19.31			− 3.60 +1
													54 0.05 +1

0.80

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Runs -15R -15R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	12.6	1 21.9	18.5	404	1 2020	+04	−981	−19	13	16 10.2	58 48.83	
	+12.6				16 20.20	6 28.15				16 10.27	− 5	+8.50
d	1.16034					49 58 38.91	9.45+48				+ 8	
	9.80822					+ 9.92	−9.93				+ 8.17	
((δ) − D) $\frac{d'}{100}$	0.99653										+ .30	
											− 23.90	
+1902 δ_1									1	"	58 33.43	
+1 29.00									0	2.4	− 2.06	
	16.3	1 7.0	2.8	98	490	+06	−1191	−17	13	15 52.9	58 51.22	
	+15.2				16 4.90	6 48.45				15 52.94	− 6	+8.80
d	1.18164					49 58 39.25	11.80+16				+ .18	
	9.80822					+ 11.97	−11.98				+ 8.38	
((δ) − D) $\frac{d'}{100}$	1.07800										+ .30	
											− 24.40	
+1902 δ_2									0	2.6	49 58 33.36	
+1 29.00												
	12.5	1 58.1	54.8	1129	1 5645	+04	−973	−24	13	16 46.5	58 12.50	
	+12.5				16 56.45	5 51.90				16 46.59	− 4	+8.68
d	1.09691					49 58 2.66	9.45+1+40				+ .25	
	9.80837					+ 9.84	−9.86				+ 8.17	
((δ) − D) $\frac{d'}{100}$	0.99322										+ .30	
											− 23.80	
+19.07 δ_1									58	26.0	57 57.38	
+1 28.65												
	11.2	1 40.6	37.0	776	1 3880	+03	−872	−25	13	16 29.8	58 14.17	
	+11.2				16 38.80	6 9.55				16 29.97	− 3	+8.91
d	1.04922					49 58 5.35	8.66+1+16				+ .26	
	9.80837					+ 8.82	−8.83				+ 8.38	
((δ) − D) $\frac{d'}{100}$	0.94653										+ .30	
											− 24.20	
+19.07 δ_2												
+1 28.65									59	25.5	49 57 56.82	
	22.0	1 58.1	54.8	1129	1 5645	+12	−1712	−24	13	16 34.1	58 19.88	
	+21.8				16 56.40	5 51.95				16 34.27	− 13	+8.59
d	1.33846					49 58 2.71	16.53+1+64				+ .25	
	9.80837					+ 17.17	−17.18				+ 8.17	
((δ) − D) $\frac{d'}{100}$	1.23477										+ .30	
											− 23.80	
+19.08 δ_1												
+1 28.55									59	33.2	58 46.7	
	21.8	1 40.6	37.0	776	1 3880	+12	−1697	−25	13	16 21.7	58 ~~22.44~~ 20.36	
	+21.7				16 38.80	6 9.55				16 21.70	− 13	+8.81 ✓
d	1.33646					49 58 ~~5.35~~ 2.79	16.53+1+56				+ .26	
	9.80837					+ 17.09	−17.10				+ 8.38	
((δ) − D) $\frac{d'}{100}$	1.23247										+ .30	
											− 24.20	
+1908 δ_2									59	~~55.6~~ 55.5	50 58 ~~509~~ 7.05 4.99	
+1 28.55												
	13.1	4 54.2	50.0	1042	4 5240	+05	−1020	−73	10	14 41.2	0 17.32	
	+13.1				14 62.10	7 56.25				14 41.79	− 5	+9.07
d	1.11727					50 0 7.01	10.24−1+8				+ .64	
	9.80807					+ 10.31	−10.31				+ 8.18	
((δ) − D) $\frac{d'}{100}$	1.01328										+ .30	
											− 23.70	
+19.13 δ_1									1	31.0	0 26.9	
+1 28.30												
	19.5	4 40.5	37.1	776	4 3880	+10	−1518	−70	10	14 23.1	0 20.70	
	+19.5				14 38.80	8 9.55				14 23.46	− 10	+9.33
d	1.29003					50 0 5.35	14.95−1+40				+ .74	
	9.80807					+ 15.35	−15.34				+ 8.39	
((δ) − D) $\frac{d'}{100}$	1.18604										+ .30	
											− 24.10	
+19.13 δ_2												
+1 28.30									1	32.2	50 0 38.7	
	11.8	4 36.1	32.1	682	4 3410	+03	−907	−69	30	34 24.4	40 34.17	
	+11.8				34 34.10	48 14.25				34 24.93	− 4	+9.81
d	1.07188					50 40 25.01	8.66−12+63				+ .60	
	9.80197					+ 9.16	−9.17				+ 8.90	
((δ) − D) $\frac{d'}{100}$	0.96179										+ .35	
											− 23.70	
+19.26 δ_1												
+1 28.05									41	48.3	40 20.28	
	13.2	4 20.8	16.9	1357	4 1885	+05	−1070	−74	30	34 8.0	40 35.54	
	+13.2				34 18.85	48 29.50				34 8.57	− 5	+10.11
d	1.12057					50 40 25.30	10.24−14+16				+ .48	
	9.80197					+ 10.24	−10.26				+ 8.12	
((δ) − D) $\frac{d'}{100}$	1.01048										+ .35	
											− 24.10	
+19.26 δ_2												
+1 28.05									41	47.6	40 19.54	

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Date$_1$ = Dec 14 12 — Observer MAR. — Recorder A.M.

Date$_2$ = Dec 21 — Observer MAR — Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
	h m s	° ′ ″		m s	s	s	s	s	s	s	s	s	m s
	55 22 5	61.9	8.3	55 0.4	12.9	20.7	24.6	28.6	32.5	1193	2386	1103	12.73
	54. 3.7	57.2	7.6							−7.92		11.03	55 12.88
	κ												− 8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											−0 7.92	55 4.91
													− 3.69
				55	20.56								55 1.22
			8.2	55 2.8	12.0	20.0	23.8	27.7	31.6	11.57	2302	1103	11.99
										−7.16		11.03	55 11.99
	κ												− 7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .41
													− .2
	a_2											7.16	55 4.83
													− 3.63
				55	20.54								55 1.20
	56 34	38.7	9.4	56 29.5	42.5	50.1	54.0	58.0	2.0	2166	5332	1094	42.38
	55 32.2	34.0	9.3							−7.92		10.94	56 42.38
	κ												− 8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											7.92	56 34.46
													− 3.69
				56	50.10								56 30.77
			9.3	56 25.0	41.5	49.3	53.3	57.0	1.2	2623	5246	1094	41.52
										−7.17		10.94	56 41.52
	κ												− 7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .40
													− .2
	a_2											7.17	56 34.35
													− 3.63
				56	50.05								56 30.72
	58 18	52.6	8.6	58 8.0	24.5	32.4	36.2	40.1	44.2	1744	3548	1099	24.49
	57 16.1	47.9	8.8							−7.92		10.99	58 24.49
	κ												− 8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											7.92	58 16.57
													− 3.73
				58	32.26								58 12.84
			8.7	58 8.5	23.6	31.7	35.5	39.5	43.4	1737	3474	1099	23.75
										−7.16		10.99	58 23.75
	κ												− 7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .41
													− .2
	a_2											7.16	58 16.59
													− 3.67
				58	32.34								58 12.92
2	1 29	63.2	9.0	1 21.5	37.5	45.5	49.5	53.5	57.5	2435	4870	1103	37.67
	0 27.2	58.5	9.0							−7.92		11.03	1 37.67
	κ												− 8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											7.92	1 29.75
													− 3.78
				1	45.51								1 25.97
			8.6	1 27.4	3 (36.7)	44.9	48.8	52.6	56.7	2397	4794	1103	36.91
										−7.16		11.03	1 36.81
	κ												− 7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .41
													− .2
	a_2											7.16	1 29.65
													− 3.71
				1	45.48								1 25.94
	2 42	60.0	8.5	2 36.5	51.0	59.0	62.8	66.7	70.8	3103	6206	1102	51.04
	1 40.5	55.3	8.7							−7.92		11.02	2 51.04
	κ												− 8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											7.92	2 43.12
													− 3.78
				2	58.92								2 39.34
			8.5	2 37.5	30.3	58.3	2.2	6.0	10.0	3068	6136	1102	50.34
										−7.16		11.02	2 50.34
	κ												− 7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .41
													− .2
	a_2											7.16	2 43.18
													− 3.72
				2	57.04								2 39.46

0.80

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Runs −15R
−15R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	51	δ′	
	1.25	3 30.9	27.4	583	3 29.15	+.51	−.957	−.52	10	13 19.61		1 39.51	
	+.14				13 29.15	9 19.20				13 14.61		− .04	+10.10
d	1.09342					51 1 29.96	9.24 −1 +.31					+ .46	
	9.99856					+ 9.55	−9.52					+ 9.28	
((δ) − D) $\frac{d'}{100}$	0.97992											+ .40	
												− 23.70	
+19.34 δ_1												1 25.91	
+1 27.85												− 2.06	
	0.2	3 11.1	7.3	184	3 9.20	+.02	−.701	−.48	10	13 2.11		1 42.03	
	+.2				13 9.20	9 39.15				13		− .03	+10.40
d	0.96379					51 1 34.95	6.93 +.16					+ .51	
	9.99856					+ 7.08	−7.09					+ 9.52	
((δ) − D) $\frac{d'}{100}$	0.85029											+ .40	
												− 24.10	
+19.34 δ_2									2 54.1		50	1 26.27	
+1 27.85													
	13.0	1 13.9	9.7	236	1 11.80	+.05	−.998	−.18	35	36 1.78		38 57.33	
	+.29				36 11.80	46 36.55				36		− .05	+9.32
d	1.11059					50 38 41.31	9.45 −.13 +.70					+ .16	
	9.80213					+ 10.02	−10.02					+ 8.86	
((δ) − D) $\frac{d'}{100}$	1.00066											+ .35	
												− 23.50	
+19.33 δ_1									38 40	10.6		38 43.15	
+1 27.50													
	16.5	0 54.3	53.4	1147	0 57.35	+.07	−1.268	−.14	35	35 44.54		38 59.61	
	+.16.5				35 57.35	46 51.00				35		− .07	+9.52
d	1.21748					50 38 46.80	12.09 −.17 +.39					+ .14	
	9.80213					+ 12.81	−12.81					+ 9.10	
((δ) − D) $\frac{d'}{100}$	1.10755											+ .35	
												− 23.50	
+19.33 δ_2									38 40	10.7	50	38 43.17	
+1 27.50													
	16.5	2 50.3	45.9	989	2 48.45	+.07	−1.269	−.39	20	22 35.70		52 23.41	
	+16.5				22 48.45	59 59.90				22		− .07	+9.82
d	1.21748					50 52 10.66	12.89 −.23 +.39					+ .36	
	9.80012					+ 12.75	−12.75					+ 9.13	
((δ) − D) $\frac{d'}{100}$	1.10554											+ .40	
												− 23.50	
+19.42 δ_1									53 36.9			52 9.73	
+1 27.15													
	15.1	2 30.7	29.3	600	2 30.00	+.06	−1.151	−.37	20	22 18.26		52 25.97	
	+15.73				22 30.00	0 18.35				22		− .06	+10.10
d	1.08469					50 52 14.15	11.80 −.22 +.16					+ .40	
	9.80012					+ 11.82	−11.74					+ 9.36	
((δ) − D) $\frac{d'}{100}$	1.07276											+ .40	
												− 23.90	
+19.42 δ_2									53 37.3		51	52 10.11	
+1 27.15													
	16.0	2 11.3	5.7	170	2 8.50	+.07	−1.220	−.32	10	12 11.04		3 2.98	
	+16.2				12 8.50	.10 39.85				11		− .07	+9.92
d	1.20952					51 2 50.61	12.32 −.2 +.16					+ .24	
	9.79480					+ 12.37	−12.46					+ 9.22	
((δ) − D) $\frac{d'}{100}$	1.09226											+ .40	
												− 23.30	
+19.54 δ_1									4 16.0			2 49.60	
+1 26.45													
	9.8	1 48.9	45.0	939	1 46.95	+.02	−.708	−.26	10	11 39.72		3 4.38	
	+9.4				11 46.95	.11 1.40				11		− .03	+10.22
d	0.97313					51 3 57.20	6.93 −1 +.31					+ .29	
	9.79480					+ 7.18	−7.23					+ 9.56	
((δ) − D) $\frac{d'}{100}$	0.86587											+ .40	
												− 23.70	
+19.54 δ_2									4 15.8 4		51	2 48.84	
+1 26.45													
	14.5	0 13.5	—	235	0 11.75	+.06	−1.107	−.03	15	15 0.58		59 58.53	
	+14.5				15 11.75	7 36.60				15		− .05	+9.65
d	1.16137					50 59 47.36	10.78 +.39					+ .03	
	9.79887					+ 11.17	−11.17					+ 9.27	
((δ) − D) $\frac{d'}{100}$	1.04818											+ .40	
												− 23.20	
+19.58 δ_1					+60				1 11.2		51	59 44.98	
+1 26.20													
	12.8	4 53.0	51.1	1041	4 52.05	+.05	−.975	−.73	10	14 42.19		0 1.36	
	+12.8				14 52.05	4 55.70				14		− .05	+10.64
d	1.10721					50 59 51.50	9.24 +.62					+ .78	
	9.79887					+ 9.86	−9.86					+ 9.51	
((δ) − D) $\frac{d'}{100}$	0.99402											+ .40	
												− 23.60	
+19.58 δ_2									1 12.5			59 46.34	
+1 26.20													

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Date$_1$ = Dec 18 16 12 Observer NAR. Recorder A.M.

Date$_2$ = Dec 22 14 Observer NAR Recorder A.M.

Run

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2 5 1	28.1	4.5	4	10.3	17.7	21.9	25.7	29.7	105.3	21.06	10.90	10.16
3 59.4	23.4	6.1							−7.92		10.90	−8.23
κ												+.33
((δ) − D) $\frac{\kappa'}{100}$												−2
a_1											−0 7.92	5 2.24
												−3.78
						21.2	7	8	5 18.03	9		4 58.46
		6.0	4	9.2	16.9	20.2	24.7	28.7	98.7	19.74	10.90	(5 8.8 9.26
κ									−7.17		10.90	−7.55
((δ) − D) $\frac{\kappa'}{100}$												+.40
a_2												−2
											7.17	5 1.67
												−3.72
									5 17.94			4 57.95
6 57	8.1	9.2	6	44.7	57.8	2.3	11.2	15.1	18.9	70.46	10.82	6 59.64
5 48.8	3.3	9.0							−7.93		10.82	−8.23
κ												+.32
((δ) − D) $\frac{\kappa'}{100}$												−2
a_1											7.93	6 51.71
												−3.79
									7 7.50			6 47.92
		9.0	6	47.0	(59.2)	6.6	10.5	14.3	18.2	69.76	10.82	6 58.94
κ									−7.18		10.82	−7.55
((δ) − D) $\frac{\kappa'}{100}$												+.39
a_2												−2
											7.18	6 51.76
												−3.72
									7. 7.62			6 48.04
? G 8	57.4	8.8	8	8.0	23.3	31.2	35.4	39.1	43.0	34.8	10.78	8 23.59
8. 8.3	−4.8	9.0							−7.93		10.81	−8.23
κ	−9.4											+.32
((δ) − D) $\frac{\kappa'}{100}$												−2
a_1											7.93	8 15.66
												−3.79
									8 31.45			8 11.87
see ? on copy		8.9	7	49.7	3.2	11.4	15.0	19.0	22.6	71.2	14.24	8 3.46
κ									−7.18		10.81	−7.55
((δ) − D) $\frac{\kappa'}{100}$												+.39
a_2												−2
											7.18	7 56.25
												−2.73
									8 12.09			7 52.52
10 25	−5.1	8.6	10	24.0 26.0	32.8	40.5	44.0	48.0	51.67	216.72	43.34	10 32.59
Double 9 22.5	−9.7	9.2		25.9	32.8	40.5	44.1	48.1	51.7	27.72	43.44	−8.23
κ									−7.93	−7.93		+.32
((δ) − D) $\frac{\kappa'}{100}$											7.93	−2 10
a_1											7.93	10 24.66
												−3.81
									14 40.59			10 20.85
		9.0										
κ		10 46										
((δ) − D) $\frac{\kappa'}{100}$												
a_2												
12 52	41.9	8.1	12	47.4	0.7	8.6	12.7	16.5	20.5	59.0	11.80	10.95
11 49.4	37.3	8.3							−7.92		10.95	0.85
κ												−8.23
((δ) − D) $\frac{\kappa'}{100}$												+.33
a_1												−2
											7.92	12 52.93
												−3.88
									13 8.89			12 49.05
		8.5	12	48.0	0.2	7.8	11.9	16.7	19.8	55.4	11.08	10.95
κ									−7.17		10.95	0.13
((δ) − D) $\frac{\kappa'}{100}$												−7.55
a_2												+.40
												−2
											7.17	12 52.96
												−3.82
									13 8.98			12 49.14
												0.72

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Runs -15 R
-15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
d	15 8	2′ 23.1	18.1	41.2	2 20.60	+04	−12.16	−35	45	47 82	27 5082
	+15.8				47 20.60	35 27.75				47′ 8.29	− 7 +9.26
	1.19866					50 27 38.51	11.80 − 12 + 63				+ .30
	9.80382					+12.31	− 12.31				+ 8.68
((δ) − D) $\frac{d'}{100}$	1.09042										+ .35
											− 22.50
+19.57 δ_1									29′	2.8″	27. 37.18
+1 25.65											− 2.06
d	18 3	2 0.3	57.9	118.2	2 59.10	+04	−9.03	−45	43	46 49.7	27 5286
	1.05308				46 59.10	35 49.25					− 54.23 +9.53
	9.80382	11.8				50 27 45.05					+ .32
	0.94484	1.07188				+ 8.81					+ 8.89
((δ) − D) $\frac{d'}{100}$		9.80382				9.20					+ .35
		0.96364									− 23.30
+19.57 δ_2											42
+1 25.65											27 3 85
d	15	2 27.0	23.0	50.0	2 25.00	+06	−11.73	−37	5	7 130	7 4580
	+15.9				7 25.00	15 23.35				7 13.30	− 6 +8.86
	1.17319					50 7 34.11	11.02 − 3 + 71				+ .31
	9.80686					+ 11.69	− 11.70				+ 8.38
((δ) − D) $\frac{d'}{100}$	1.06499										+ .30
											− 22.70
+19.58 δ_1									8	57.2	7. 31.96
+1 25.25											
d	122	2 6.1	3.2	9.3	2 4.65	+04	−9.46	−41	5	6 548	7 4884
	+11.9				7 4.60	15 43.70				6 55.30	− 4 +9.12
	1.07555					50 7 39.50	8.66 − 2 + 71				+ .34
	9.80686					+ 9.34	− 9.35				+ 8.52
((δ) − D) $\frac{d'}{100}$	0.97035										+ .30
											− 23.10
+19.58 δ_2									8	58.0	7 32.80
+1 25.25											49
d	153	0 17.0	13.0	30.0	0 15.00	+06	−11.93	−04	20	20 31	54 5641
	+15.6				20 15.00	2 33.35				20 2.70	− 7 +8.34
	1.19312					49 54 44.11	11.80 + 2 + 48				+ 4
	9.80882					+ 12.30	− 12.30				+ 8.07
((δ) − D) $\frac{d'}{100}$	1.08988										+ .30
											− 22.60
δ_1											54 42.15
d	135	4 41.5	36.8	78.3	4 39.15	+05	−10.53	−71	15	19 28.0	55 1580
	+13.7				19 39.15	3 9.20				19 28.33	− 5 +9.27
	1.13642					49 55 5.00	10.24 + 2 + 56				+ .74
	9.80882					+ 10.80	− 10.82				+ 8.28
((δ) − D) $\frac{d'}{100}$	1.03348										+ .30
											− 23.00
δ_2											55 0.01
	32.59 +8.6	+6.6	0 17.0	13.0	30.0	0 15.00	+02	−6.86	−071	20	20 8.7	54 4439 5089
3263	0.93450	46.7				20 15.00	2 33.35				20 9.78	− 2 +8.39
− 823	9.80 88 2	0.82607					49 54 44.11	4.73 + 1 + 48				+ 4
9.7 02	0.83126	9.80882					+ 5.28	− 5.22				+ 8.07
3 — 2	((δ) − D) $\frac{d'}{100}$	0.72283					6.78				20 9.70	+ .30
24.70												− 22.50
3.61	+19.64 δ_1							4.73 + 1 + 56				.50
20.89	+1 24.40							− 5.30				
		4 55.3	51.5	106.8	4 53.40	+01	−5.37	−73	15	19 47.3	54 3525
					19 53.40	2 54.95					36.78
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											
											50
d	138	3 28.1	23.9	52.0	3 26.00	+05	−10.20	−52	30	33 15.3	41 4350
	+13.4				33 26.00	49 22.35				33 16.60	− 5 +9.72
	1.12710					50 41 33.11	10.24 − 15 + 31				+ .44
	9.80166					+ 10.39	− 10.40				+ 8.93
((δ) − D) $\frac{d'}{100}$	1.01670										+ 40
											− 22.40
+19.84 δ_1											41 30.82
+1 23.80									42	54.6	
d	122	3 7.0	4.4	11.4	3 5.70	+021	−9.36	−58	30	32 55.8	41 4783
	+12.1				33 5.70	49 42.65				32 56.31	− .4 +10.01
	1.08249					50 41 38.45	9.45 − 14 + 8				+ .50
	9.80166					+ 9.38	− 9.39				+ 9.15
((δ) − D) $\frac{d'}{100}$	0.97239										+ .40
											− 22.80
+19.84 δ_2											
+1 23.80									42	56.8	41 3298

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Date$_1$ = Dec 18 12 — Observer / Recorder W.A.R. A.M. — Date$_2$ = Dec 22 14 — Observer / Recorder W.A.R. A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2 ~	14m 20s	26.7	8.8	14m 15.7s	24.6	37.1	41.0	45.0	49.2	2029 −7.92	4038	10.89	29.49
	13 17.1	22.1	8.6									10.89	14 29.49
	κ												−8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ 33
													− 2
	a_1											−0 7.92	14 21.57
													− 3.88
										14m 37.53			14 17.69
			8.7	14	15.2	29.0	36.4	40.4	44.2	48.3	1983 −7.17	3966	10.89	28.77
													14 28.77
	κ												−7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ 40
													− 2
	a_2											7.17	14 21.60
													− 3.82
										14 37.62			14 17.78
15	11	18.7	8.7	15	13.0	20.6	28.5	32.2	36.2	40.1	1576 −7.93	3152	10.86	20.66
	14 7.9	14.1	8.5										10.86	15 20.66
	κ													−8.23
	((δ) — D) $\frac{\kappa'}{100}$													+ 32
														− 2
	a_1											7.93	15 12.73
														− 3.89
										15 28.69			15 8.84
			8.5	15	6.4	20.0	27.8	31.7	35.5	39.5	1542 −6.17	3084	10.86	19.98
														15 19.98
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ 40
														− 2
	a_2											7.17	15 12.81
														− 3.83
										15 28.83			15 8.98
16	45	39.3	8.8	16	36.3	53.7	1.5	5.4	9.3	13.3	3232 −7.92	6464	10.94	53.70
	15 41.7	34.8	9.0										10.94	16 53.70
	κ													−8.23
	((δ) — D) $\frac{\kappa'}{100}$													+ 33
														− 2
	a_1											7.92	16 45.98
														− 3.93
										17 1.79			16 41.85
			8.8	16	36.7	53.0	1.0	4.8	8.7	12.6	3201 −7.07	6402	10.94	53.88
														16 53.08
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ 40
														− 2
	a_2											7.17	16 45.91
														− 3.87
										17 1.98			16 42.04
19	2	52.1	9.0	18	57.4	15.3	23.1	27.0	31.0	34.9	1313 −7.92	2626	10.99	15.27
	18 3.8	47.6	9.0										10.99	19 15.27
	κ													−8.23
	((δ) — D) $\frac{\kappa'}{100}$													+ 33
														− 2
	a_1											7.92	19 7.35
														− 3.96
										19 23.44			19 3.39
			8.9	19	31.7	14.6	22.3	26.3	30.3	34.0	1275 −7.17	2550	10.99	14.51
														19 14.51
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ 40
														− 2
	a_2											7.17	19 7.34
														− 3.90
										19 23.49			19 3.44
21	18	52.3	9.0	21	7.4	27.6	35.5	39.4	43.1	47.5	1931 −7.92	3862	10.99	27.63
	20 14.7	47.9	9.0										10.99	21 27.63
	κ													−8.23
	((δ) — D) $\frac{\kappa'}{100}$													+ 33
														− 2
	a_1											7.92	21 19.71
														− 3.98
										21 35.84			21 15.73
			9.0	21	11.9	26.9	34.9	(35.0)	42.6	46.5	1895 −7.17	3790	10.99	26.91
														21 26.91
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ 40
														− 2
	a_2											7.17	21 19.74
														− 3.93
										21 35.92			21 15.81

0.70

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Runs —13R
—15R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
119	139	3′ 31.3	28.7	600	3 30.00	+04	−9.19	−52	45	48 203 50	26 39.87
	+138				48 30.00	34 1835				48 1.23	− 5
d	1.13988					50 26 29.11	10.24 −10+63				+ 46
	9.80397					+ 10.76	−10.77				+ 8.65
((δ) − D) $\frac{d'}{100}$	1.03179										+ .35
											− 22.20
+19.84 δ_1											26 27.08
+1 23.45											−2.04
									27	50.5	
c	135	3 14.1	9.8	239	3 11.95	+05	−1064	−48	45	26 009	26 42.80
	+136				48 11.95	34 3640				48 1.34	− 5
d	1.13354					50 26 32.20	10.24 −10 +47				+ 51
	9.80397					+ 10.60	−10.61				+ 8.87
((δ) − D) $\frac{d'}{100}$	1.02545										+ .35
											− 22.60
+19.84 δ_2											
+1 23.45									27	54.3	50 26 27.82
	76	1 21.0	17.7	387	1 19.35	+01	−588	−20	55	56 133	18 45.78
	+77				86 19.35	26 2900				56 13.30	− 2
d	0.88649					50 18 39.76	5.62 −8 + 56				+ .17
	9.80519					+ 602	−6.05				+ 8.51
((δ) − D) $\frac{d'}{100}$	0.77962										+ .35
											− 22.20
+19.85 δ_1											
+1 23.25									19	55.8	18 32.59
	136	1 5.2	5.0	102	1 5.10	+05	−1052	−16	55	55 54.5	18 49.68
	+136				56 5.10	26 4325				55 54.44	− 5
d	1.13354					50 18 39.05	10.24 −6 + 48				+ .18
	9.80519					+ 1063	−10.66				+ 8.73
((δ) − D) $\frac{d'}{100}$	1.02667										+ .35
											− 22.60
+19.85 δ_2											
+1 23.25									19	57.5	50 18 34.23
	174	0 40.9	37.1	784	0 39.00	+08	−1337	−11	35	35 256	39 33.62
	+174				35 39.00	47 9.35				35 25.40	− 8
d	1.24055					50 39 20.11	13.38 −19 + 31				+ 9
	9.80213					+ 1351	−13.60				+ 8.88
((δ) − D) $\frac{d'}{100}$	1.13062										+ .35
											− 22.00
+19.94 δ_1											
+1 22.90									40	43.8	39 20.86
	163	0 23.9	18.0	419	0 20.90	+07	−1252	−05	35	35 64	39 35.99
	+164				35 20.90	47 27.45				35 8.08	− 7
d	1.21184					50 39 23.25	12.89 −15 + 31				+ .35
	9.80213					+ 1274	−12.82				+ 9.12
((δ) − D) $\frac{d'}{100}$	1.10491										+ .35
											− 22.50
+19.94 δ_2											
+1 22.90									40	43.8	50 39 20.88
	179	3 27.1	23.9	510	3 25.50	+09	−1368	−51	20	23 114	51 47.44
	+179				23 25.50	59 22.85				23 11.67	− 9
d	1.25285					50 51 33.61	13.38 −24 + 69				+ .44
	9.80012					+ 1383	−13.83				+ 9.10
((δ) − D) $\frac{d'}{100}$	1.14091										+ .40
											− 21.90
+20.05 δ_1					+1						
+1 22.25									50	57.6	51 35.39
	—17	2 43.8	39.3	831	2 41.55	+06	+1307	−40	20	22 543	51 48.31
	—172				22 41.55	0 680				22 54.85	− .8
d	1.23553					50 52 2.60	13.38 −24 + 16				+ .43
	9.80012					− 1329	+ 1330				+ 9.34
((δ) − D) $\frac{d'}{100}$	1.12359										+ .40
											− 22.40
+20.05 δ_2											
+1 22.25									50	56.2	50 51 33.94
	202	2 42.3	37.7	800	2 40.00	+11	−1544	−40	20	22 213	52 34.72
	+202				22 40.00	0 835				22 24.39	− .11
d	1.30535					50 52 19.11	15.74 −29 + 16				+ .35
	9.80012					+ 1561	−15.61				+ 9.13
((δ) − D) $\frac{d'}{100}$	1.19341										+ .40
											− 21.70
+20.11 δ_1											
+1 21.75									53	44.5	52 22.79
	150	2 20.1	15.7	355	2 17.75	+06	−1146	−34	20	22 60	52 37.99
	+150				22 17.75	0 30.60				22 8.17	− 6
d	1.17609					50 52 26.40	11.80 −22				+ .37
	9.80012					+ 1159	−11.58				+ 9.36
((δ) − D) $\frac{d'}{100}$	1.06415										+ .40
											− 22.20
+20.11 δ_2											
+1 21.75									53	45.5	52 23.80

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20 12

Date$_1$ = Dec 18 — Observer W. A. R. / Recorder A. M. — 50°

Date$_2$ = Dec 22 — Observer W. A. R. / Recorder A. M.

Run

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	22 36 / 21 30.7	44.5 / 40.2	8.8 / 8.6	22 24.8	42.0	49.7	53.8	57.6	1.6	26 47 / −7.92	5 294	10 96 / 10.96	22 41.98 / −8.23 / +.33 / −.2
	κ											−0 7.92	22 34.06 / −3.99
	((δ) − D) $\frac{\kappa'}{100}$												22 30.07
	α_1									22 50.20			
			8.9	22 24.8	41.4	49.2	53.0	56.9	0.8	26 13 / −7.17	52.26	10 96 / 10.96	41.30 / 22 41.30 / −7.55 / +.40 / −.2
	κ											7.17	22 34.13 / −3.93
	((δ) − D) $\frac{\kappa'}{100}$												22 30.20
	α_2									22 50.33			
26	26 / 23 21.8	37.3 / 33.0	9.0 / 9.0	26	21.3	34.4	42.5	46.4	50.0	54.0	22 73 / −7.92	45.46	10 93 / 10.93	34.53 / 26 34.53 / −8.23 / +.33 / −.2
	κ											7.92	26 26.61 / −4.02
	((δ) − D) $\frac{\kappa'}{100}$												26 22.59
	α_1									26 42.81			
			9.0	26	16.2	33.8	40.9	46.5	49.6	53.4	22 82 / −7.17	44.64	10 93 / 10.93	33.91 / 26 33.91 / −7.55 / +.40 / −.2
	κ											7.17	26 26.74 / −3.97
	((δ) − D) $\frac{\kappa'}{100}$												26 22.77
	α_2									26 42.98			
29	28 / 28 23.9	−4.5 / −8.8	6.8 / 6.6	29	21.0	35.5	43.3	47.0	51.0	54.8	23 16 / −7.93	46.32	10 78 / 10.77	35.54 / 29 35.55 / −8.23 / +.32 / −.2
	κ											7.93	29 27.62 / −4.01
	((δ) − D) $\frac{\kappa'}{100}$												29 23.61
	α_1									29 43.79			
			6.5	29	21.7	34.9	42.6	46.4	50.2	54.0	22 81 / −7.18	45.62	10 78 / 10.77	34.84 / 29 34.85 / −7.55 / +.39 / −.2
	κ											7.18	29 27.67 / −3.96
	((δ) − D) $\frac{\kappa'}{100}$												29 23.71
	α_2									29 43.89			
30	51 / 29 46.3 / 38.5	10.9 / 6.6 / 4.9 / 9.5	9.5 / 8.9	30	35.2	51.9	57.6	3.4	7.2	11.1	31 32 / −7.93	62.64	10 83 / 10.83	51.81 / 30 51.81 / −8.23 / +.32 / −.2
	κ											7.93	30 43.88 / −4.05
	((δ) − D) $\frac{\kappa'}{100}$												30 39.83
	α_1									31 0.23			
			9.7	30	36.1	51.0	58.6	2.5	6.5	10.2	30 88 / −7.18	61.76	10 83 / 10.83	50.93 / 30 50.93 / −7.55 / +.39 / −.2
	κ											7.18	30 43.75 / −3.99
	((δ) − D) $\frac{\kappa'}{100}$												30 39.76
	α_2									31 0.16			
32	16 / 31 11.8	57.3 / 53.1	9.2 / 9.0	32	6.0	25.1	33.0	36.9	40.8	45.0	18 08 / −7.92	36.16	11 01 / 11.01	25.05 / 32 25.15 / −8.23 / +.33 / −.2
	κ											7.92	32 17.23 / −4.10
	((δ) − D) $\frac{\kappa'}{100}$												32 13.13
	α_1									32 33.57			
			9.0	32	8.1	24.4	32.3	36.1	40.1	44.0	17 61 / −7.16	35.22	11 01 / 11.01	24.21 / 32 24.37 / −7.55 / +.41 / −.2
	κ											7.16	32 17.21 / −4.05
	((δ) − D) $\frac{\kappa'}{100}$												32 13.16
	α_2									32 33.60			

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Runs −15 R
−15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	s	° ′ ″	″		° ′ ″								
	172	0 35.9	32.2	681	0 34.05	+08	−1317	−09	30	30 20.9		44 38.39	
	+7.2				30 34.05	5.2 1430				30′ 20.72		− 8	+9.32
d	1.23553					58 44 2506	13.38 −21 + 16					+ 8	
	9.80136					+ 1333	−13.33					+ 8.91	
$((\delta) - D)\ \frac{d'}{100}$	1.12483											+ 35	
												− 21.60	
+20.13 δ_1									′ ″			44 26.11	
+1 21.40									45 47.5			− 2.06	
	166	0 17.0	11.7	287	0 14.35	+07	−1273	−04	30	30 1.6		44 42.59	
	+16.5				30 14.35	5.2 3400				30 1.57		− 8	+9.50
d	1.22748					58 44 2980	12.87 −20 + 39					+ 9.20	
	9.80136					+ 12.79	−12.78					+ 35	
$((\delta) - D)\ \frac{d'}{100}$	1.10678											− 22.10	
+20.13 δ_2									45 49.3		50	44 27.93	
+1 21.40													
	131	2 58.0	57.2	1122	2 56.10	+05	−1008	−43	35	37 4.56		37 13.27	
	+13.2				37 56.10	44 52.25				37 45.84		− 5	+9.53
d	1.12057					58 37 3.01	10.24 −14 + 16					+ 38	
	9.80244					+ 10.26	−10.26					+ 8.85	
$((\delta) - D)\ \frac{d'}{100}$	1.01095											+ 35	
												− 21.30	
+20.22 δ_1									38 21.9			37 1.50	
+1 20.445													
	176	2 44.7	40.4	651	2 42.55	+08	−1354	−40	35	37 28.7		37 15.35	
	+17.7				37 42.55	45 5.80				37 28.80		− 9	+9.77
d	1.24797					58 37 1.60	13.38 −18 + 55					+ 43	
	9.80244					+ 13.75	−13.75					+ 9.08	
$((\delta) - D)\ \frac{d'}{100}$	1.13835											+ 35	
												− 21.80	
+20.22 δ_2									38 21.7		49	37 12.6	
+1 20.445													
	145	4 24.9	28.3	532	4 26.60	+06	−1130	−67	15	19 14.7		55 43.94	
	+14.5				19 26.60	3 21.75				19 15.16		− 5	+8.92
d	1.16137					49 55 32.51	11.02 +2 + 42					+ 57	
	9.80864					+ 11.43	−11.44					+ 8.10	
$((\delta) - D)\ \frac{d'}{100}$	1.05498											+ 30	
												− 20.90	
+20.18 δ_1									56 51.6			55 ~~29.96~~ 31.96	
+1 19.60													
	132	4 10.3	7.8	181	4 9.05	+05	−1029	−62	15	18 5.82		55 45.42	
	+13.1				19 9.05	3 39.30				18 38.71		− 5	+9.23
d	1.11424					49 55 35.10	10.24 +2 + 8					+ 67	
	9.80864					+ 10.32	−10.34					+ 8.31	
$((\delta) - D)\ \frac{d'}{100}$	1.01388											+ 30	
												− 21.40	
+20.18 δ_2									56 50.8		50	55 31.19	
+1 19.60													
	169	1 36.7	33.1	698	1 34.90	+07	−1296	−20	5	6 21.8		8 37.24	
	+16.6				6 34.90	116 13.45				6 21.87		− 8	+8.735
d	1.22011					50 8 24.21	12.89 −4 + 48					+ 21	
	9.80686					+ 13.03	−13.03					+ 8.32	
$((\delta) - D)\ \frac{d'}{100}$	1.11491											+ 30	
												− 20.80	
+20.40 δ_1									9 41.4			8 25.19	
+1 19.25													
	149	1 16.9	12.8	297	1 14.85	+06	−1156	−17	5	6 3.2		8 40.92	
	+14.8				6 14.85	16 33.50				6 3.23		− 6	+8.98
d	1.17026					50 8 29.30	11.02 −4 + 64					+ 18	
	9.80686					+ 1.162	−11.62					+ 8.55	
$((\delta) - D)\ \frac{d'}{100}$	1.06506											+ 30	
												− 21.30	
+20.40 δ_2					2								
+1 19.25									9 45.8		50	8 26.34	
	191	2 54.5	50.2	1047	2 52.35	+10	−1458	−28	15	16 3.76		58 ~~7~~ 21.57	
	+19.2				16 52.30	4 56.00				16 37.55		− 7 .10	+9.79
d	1.28330					50 58 6.76	14.95 −31 + 16					+ 25	
	9.79918					+ 14.81	−14.80					+ 9.24	
$((\delta) - D)\ \frac{d'}{100}$	1.17042											+ 40	
												− 20.80	
+20.44 δ_1					2								
+1 18.85									59 29.4			58 ~~7~~ 10.56	
	163	2 35.1	30.1	652	2 32.60	+07	−1214	−23	15	16 20.0		58 ~~7~~ 24.12	
	+16.3				~~16~~ 17 32.60	~~4~~ 5 15.75				16 20.19		− 7	+10.05
d	1.21219					50 58 11.55	12.89 −26 + 8					+ 24	
	9.79918					+ 7 12.57	−12.41					+ 9.48	
$((\delta) - D)\ \frac{d'}{100}$	1.09931											+ 40	
												− 21.40	
+20.44 δ_2									59 29.6			58 10.71	
+1 18.85												7	

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Date$_1$ = Dec 18 12 — Observer / Recorder W.A.R. A.M. — Date$_2$ = Dec 22 14 — Observer / Recorder W.A.R. A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	33 38	50 51.1	8.5	33 27.2	45.0	52.7	56.7	0.5	4.3	27 92	55.84	10.81	45.03
	32 32.7	0.9	8.2							−7.93		10.81	33 45.03
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .32
													− .2
	a_1											7.93	33 37.10
													− 4.07
										33 53.35			33 33.03
			8.5	33 25.8	44.3	52.0	55.7	59.7	3.5	27 52	55.04	10.81	44.23
										−7.18		10.81	33 44.23
	κ												− 7.55
	((δ) − D) $\frac{\kappa'}{100}$												+ .39
													− .2
	a_2											7.18	33 37.05
													− 4.01
		55.1								33 53.36			33 33.04
	34 38	55.3	8.7	34 33.2	48.9	56.7	0.6	4.5	8.5	29 92	59.64	11.02	48.82
	33 34.5	55.7	8.4							−7.92		11.02	34 48.82
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											7.92	34 40.90
													− 4.13
							58	39	7.9	34 57.29			34 36.77
			8.5	34 32.1	~~48.0~~ 48.2	56.0	57.7	4.0	~~8.0~~		59.22	11.02	
								end		−7.16		11.02	34 48.20
	κ												− 7.55
	((δ) − D) $\frac{\kappa'}{100}$												+ .41
													− .2
	a_2											7.16	34 41.04
													− 4.08
										34 57.48			34 36.96
	35 57	−1.1	9.7	35 51.0	10.8	18.5	22.4	26.2	30.0	10 79	21 58	10.78	1.080
	34 57.7	−5.3	9.4							−7.93		10.78	36 14.80
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .32
													− .2
	a_1											7.93	36 2.87
													− 4.09
										35 19.15			35 58.78
			9.0	35 51.5	10.0	18.0	21.7	25.3	29.0	10 40	20.80	10.78	1.002
										−7.18		10.78	36 1.002
	κ												− 7.55
	((δ) − D) $\frac{\kappa'}{100}$												+ .39
													− .2
	a_2											7.18	36 2.84
													− 4.03
										35 19.18			35 58.81
	36 50	3.6	8.6	36 49.1	58.7	6.5	10.4	14.0	18.0	34 76	69 52	10.80	58.72
	35 45.1	−06	9.0							−7.93		10.80	36 58.72
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .32
													− .2
	a_1											7.93	36 50.79
													− 4.10
										37 7.09			36 46.69
			8.5	36 45.3	58.3	5.7	9.3	13.3	17.2	34 38	68 76	10.80	57.96
										−7.18		10.80	36 57.96
	κ												− 7.55
	((δ) − D) $\frac{\kappa'}{100}$												+ .39
													− .2
	a_2											7.18	36 50.78
													− 4.05
										37 7.13			36 46.73
	38 31	52.9	9.0	38 22.2	39.4	47.1	51.1	54.8	58.9	25 13	50 26	10.99	39.27
	37 25.5	49.8	9.0							−7.92		10.99	38 39.27
	κ												− 8.23
	((δ) − D) $\frac{\kappa'}{100}$												+ .33
													− .2
	a_1											7.92	38 31.35
													− 4.16
										38 47.80			38 27.19
			8.7	38 20.0	38.5	46.3	50.3	54.3	58.2	24 76	49.52	10.99	38.53
										−7.16		10.99	38 38.53
	κ												− 7.55
	((δ) − D) $\frac{\kappa'}{100}$												+ .41
													− .2
	a_2											7.16	38 31.37
													− 4.11
										38 47.87			38 27.26

0.77

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Runs −15 R
−15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′
	178	0′ 17.6	13.3	309	0′ 15.45	+08	−138	−04	10	10 16		4 57.65
	+178				10 15.45	12 32.90				10′ 1.46		− 9 +8.50
d	1.255042					504 43.66	13.38−3+64					+ 4
	9.80731					+ 13.99	−13.99					+ 8.25
((δ) − D) $\frac{d'}{100}$	1.14567											+ .30
												− 20.60
+2032 δ_1									6 4.0			4. 45.55
+1 18.50												− 2.06
	185	0 0.2	55.7	1154	0 57.95	+09	−1438	−14	10	9 43.5		4 6846 5860
	+184				9 57.95	12 50.40				9 43.50		− 9 +8.66 ✓
d	1.264832					5034 48.20	14.16−3+32					+ 2
	9.80731					+ 14.46	−14.45					+ 8.47
((δ) − D) $\frac{d'}{100}$	1.16007											+ .30
												− 21.00
+2032 δ_2												10
+1 18.50									6 6647		50	4 6618 46.16
	187	1 21.3	16.9	382	1 19.10	+06	−1198	−19	15	16 7.0		58 52.04
	+186				16 19.10	6 29.25				16 7.09		− 7 +9.75
d	1.19312					5058 40.01	11.55+46					+ .17
	9.79903					+ 12.03	−12.01					+ 9.25
((δ) − D) $\frac{d'}{100}$	1.08009											+ .40
												− 20.60
+2052 δ_1												
+1 18.25									59 59.4			58 41.19
	147	1 5.1	59.5	1146	D 57.30	+06 46	−1122	−14	15	15 46.0		58 54.26
	+161				16 57.30	6 54.05				15 44.90		− 7 +9.98
d	1.20683				2.30	5058 48.85	12.32+8					+ .16
	9.79903					+ 12.41	−12.40					+ 9.49
((δ) − D) $\frac{d'}{100}$	1.09380											+ .40
												− 21.20
+2052 δ_2												
+1 18.25									59 59.2		49	58 40.98
	198	1 24.7	26.0	554	1 27.85	+11	−1534	−22	15	16 12.4		58 46.85
	+198				16 27.65	6 20.50				16 12.25		− .11 +8.53
d	1.29667					4958 31.26	14.95+1+64					+ .18
	9.80822					+ 15.59	−15.60					+ 8.16
((δ) − D) $\frac{d'}{100}$	1.19283											+ .30
												− 20.30
+20.37 δ_1												
+1 17.85									59 52.9			58 33.08
	185	1 10.0	8.0	180	1 9.00	+09	−1440	−17	15	15 54.5		58 49.72
	+185				16 9.00	76 39.35				15 54.43		− 9 +9.76
d	1.26717					4958 35.15	14.16+1+20					+ .18
	9.80822					+ 14.57	−14.57					+ 9.37
((δ) − D) $\frac{d'}{100}$	1.16333											+ .30
												− 20.90
+20.37 δ_2												
+1 17.85									59 54.4		50	58 36.52
	96	1 32.7	28.6	613	1 30.65	+02	−746	−22	10	11 23.0		3 36.01
	+96				11 30.65	11 17.70				11 23.10		− 3 +8.69
d	0.98224					503 28.46	7.08−1+48					+ .19
	9.80762					+ 7.55	−7.55					+ 8.23
((δ) − D) $\frac{d'}{100}$	0.87483											+ .30
												− 20.30
+2040 δ_1												
+1 17.60									4 42.0			3 24.40
	130	1 16.9	12.7	296	1 14.80	+05	−1011	−18	10	11 4.6		3 39.34
	+127				11 14.80	11 33.55				11 4.80		− 5 +8.89
d	1.10380					503 29.35	9.45−1+56					+ .19
	9.80762					+ 9.99	−10.00					+ 8.45
((δ) − D) $\frac{d'}{100}$	0.99936											+ .30
												− 20.80
+2040 δ_2												
+1 17.60									4 43.0		50	3 23.37
	172	1 32.8	27.9	607	1 30.35	+08	−1315	−22	20	21 17.0		53 41.99
	+171				21 30.35	1 18.00				21 17.13		− 8 +9.65 ✓
d	1.23300					5053 28.76	13.38−24+8					+ .19
	9.79981					+ 13.21	−13.22					+ 9.14
((δ) − D) $\frac{d'}{100}$	1.12075											+ .40
												− 20.30
+2061 δ_1												
+1 17.15									54 48.5			53 31.32
	185	1 17.3	12.9	302	1 15.10	+09	−1414	−19	20	21 0.9		53 43.34
	+185				21 15.10	1 33.25				21 0.81		− 9 +9.88
d	1.26717					5053 29.05	14.16−26+39					+ .19
	9.79981					+ 14.29	−14.29					+ 9.38
((δ) − D) $\frac{d'}{100}$	1.15492											+ .40
												− 20.80
+2061 δ_2												
+1 17.15									54 47.5			53 30.36

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24 12

Date$_1$ = Dec 18 — Observer W.A.R. — Recorder A.M.

Date$_2$ = Dec 22 — Observer W.A.R. — Recorder A.M.

Star.	α	δ	Mag.	T_a	T_m	T_o	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	39 36	20.8	7.5	39	44.5	51.4	56.0	59.8	3.8	2765	5530	10.87	4443
	38 30.2	16.7	7.8	33.4						−7.93		10.87	39 4443
	κ												−8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .32
	a_1												− 2
												−0 7.93	39 36.50
										39 52.90			−4.14
													39 32.36
			6.8	39	43.8	51.4	55.2	59.2	3.0	2726	5452	10.87	4365
				32.8						−7.17		10.87	39 43.65
	κ												−7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .40
	a_2												− 2
												7.17	39 36.48
										39 51.93			−4.09
													39 32.39
	42 14	16.4	8.9	42	7.3	21.7	29.5	33.3	37.1	41.0	1626	3252	10.85	2167
	43 8.6 41 8.0	12.3	8.6							−7.93		10.85	42 21.67
	κ												−8.23
	((δ) — D) $\frac{\kappa'}{100}$												+ .32
	a_1												− 2
												7.93	42 13.74
										42 30.17			−4.16
													42 9.58
			—	42	11.0	21.0	28.8	32.8	36.4	40.3	1593	3186	10.85	2101
											−7.17		10.85	42 21.01
	κ												−7.55
	((δ) — D) $\frac{\kappa'}{100}$												+ .40
	a_2												− 2
												7.17	42 13.84
													−4.11
										42 30.32			42 9.73
	44 14	30.4	8.0	44								10.90	
	43.8 6	26.3	8.3									10.90	
	κ												
	((δ) — D) $\frac{\kappa'}{100}$												
	a_1												
	43 13.9		8.3	44	10.0	27.3	35.2	39.0	43.0	46.7	1914	3828	10.90	2736
		26.0									−7.17		10.90	44 27.38
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ .40
	a_2													− 2
												7.17	44 20.21
										44 36.75			−4.15
													44 16.06
	45 14	38.1	6.5	45	21.0	31.9	39.7	43.5	47.4	51.3	2138	4276	10.93	3183
	44 17.8	34.0	6.5								−7.92		10.93	45 31.83
	κ													−8.23
	((δ) — D) $\frac{\kappa'}{100}$													+ .33
	a_1													− 2
												7.92	45 23.91
										45 40.45			−4.21
													45 19.70
			6.5	46 27.1	36.5	44.4	48.1	52.1	56.0	2104	4208	10.93	3115
				45 20.0	31.1	39.0	42.9	46.7	50.7	−7.17		10.93	45 31.15
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ .40
	a_2													− 2
												7.17	45 23.98
										45 40.56			−4.17
													45 19.81
	46 28	32.8	8.3	46	27.1	36.5	44.4	48.1	52.1	56.0	2371	4742	10.92	3650
	45 22.7	28.7	8.0								−7.92		10.92	46 36.50
	κ													−8.23
	((δ) — D) $\frac{\kappa'}{100}$													+ .33
	a_1													− 2
												7.92	46 28.58
										46 45.13			−4.21
													46 24.37
			8.0	46	23.1	36.0	43.6	47.5	51.4	55.4	2339	4678	10.92	3586
											−7.17		10.92	46 35.86
	κ													−7.55
	((δ) — D) $\frac{\kappa'}{100}$													+ .40
	a_2													− 2
												7.17	46 28.69
										46 45.28			−4.17
													46 24.52

0.69

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Runs −15R
−15R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z 50	δ′
	111	3′ 53.2	52.0	1072	3′ 53.60	+03	−858	−58	50	53 445	21 14.10
	+1.0				53 53.60	28 54.75				53 48.00	− 3
d	1.04139					50 21 8.51	8.66 −6				+ .51
	9.80489					+ 8.59	−8.80				+ 8.58
((δ) − D) $\frac{d'}{100}$	0.93422										+ .35
											− 20.10
+20.54 δ_1											21 3.41
+1 16.85											− 2.06
	110	3 37.1	34.8	719	3 35.95	+03	−850	−54	50	53 269	21 16.66
	+10.8				53 35.95	29 12.40				53 27.61	− 3
d	1.03342					50 21 8.20	7.87−6+63				+ .58
	9.80489					+ 8.46	−8.44				+ 8.79
((δ) − D) $\frac{d'}{100}$	0.92725										+ .35
											− 20.60
+20.54 δ_2											
+1 16.85											21 3.69
	144	3 22.2	19.2	414	3 20.70	+05	−1115	−49	55	58 91	16 49.68
	+14.4				58 20.70	24 27.65				58 9.42	− 5
d	1.15836					50 16 38.41	11.02−6+32				+ .43
	9.80550					+ 11.27	−11.28				+ 8.47
((δ) − D) $\frac{d'}{100}$	1.05180										+ .35
											−19.80
+20.59 δ_1											
+1 16.10											16 39.08
	100	3 3.3	58.1	1214	3 6070	+02	−775	−45	55	57 525	16 51.27
	+10.0				58 0.70	24 47.65				57 52.87	− 3
d	1.00000					50 16 43.45	7.87−4				+ .48
	9.80550					+ 7.82	−7.83				+ 8.40
((δ) − D) $\frac{d'}{100}$	0.89344										+ .35
											− 20.40
+20.59 δ_2											
+1 16.10											16 38.31
		4 53.3	52.1	1074	4 5370			−73	40		
					44 53.70	37 54.65					
d						30 5.41					
((δ) − D) $\frac{d'}{100}$											
δ_1											
	173	0 1.0	56.7	1187	0 5885	+04	+333	−14	45	45 455	28 58.86
	+17.4				44 54.45	36 49.50				45 48.24	− 8
d	1.24055				50 28 45.30	1.38−14+32					+ .0
	9.80366					+ 13.56	−13.56				+ 8.92
((δ) − D) $\frac{d'}{100}$	1.13215										+ .35
											− 20.20
+20.69 δ_2											
+1 15.55											28 45.79
	109	1 59.8	55.6	1154	1 5770	+03	−838	−29	35	36 491	38 9.80
	+10.8				36 57.70	45 50.65				36 49.30	− 3
d	1.03342					50 38 1.41	7.87−10+63				+ .26
	9.80228					+ 8.39	−8.40				+ 8.86
((δ) − D) $\frac{d'}{100}$	0.92364										+ .35
											−19.60
+20.75 δ_1											
+1 15.20											37 59.64
	111	1 42.0	37.0	770	1 3950	+03	−853	−24	35	36 305	38 13.35
	+11.2				36 39.50	46 08.85				36 20.30	− 3
d	1.04922					50 38 4.65	8.66−12+16				+ .27
	9.80228					+ 8.70	−8.70				+ 9.09
((δ) − D) $\frac{d'}{100}$	0.93944										+ .35
											− 20.10
+20.75 δ_2											
+1 15.20											38 08.7
	94	2 41 5.1		150	2 750	+02	−724	−32	40	42 60	32 58.92
	+9.4				42 7.50	40 40.85				42 0.19	− 3
d	0.94313					50 32 51.61	7.08−8+31				+ .27
	9.80305					+ 7.31	−7.31				+ 8.78
((δ) − D) $\frac{d'}{100}$	0.86412										+ .35
											− 19.50
+20.76 δ_1											
+1 14.90											32 48.79
	129	1 54.7	51.7	1064	1 5320	+02	−972	−28	40	41 430	33 0.88 32 58.85
	+12.8				41 53.20	40 55.12				41 43.23	− 5
d	1.10721					50 32 6.92	9.45−11+63				+ .30
	9.80305					+ 9.96	−9.97				+ 9.00
((δ) − D) $\frac{d'}{100}$	0.99820										+ .35
											− 20.00
+20.76 δ_2											
+1 14.90											32 48.42

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26

Date$_1$ = 1870 Dec 18 Observer W.A.R Recorder A.M

Date$_2$ = 1870 Dec 14 Observer W.A.R Recorder A.M

Ru

Star.	α	δ	Mag.	T_s	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	47m 49s	44.3	5.8	47	45.0	56.8	1.6	8.5	12.5	16.4	3388	6776	1096	56.80
	46 43.0	40.3	6.5								−7.92		10.96	47 56.80
	κ													−8.23
	((δ) − D) $\frac{\kappa'}{100}$													+ .33
														− 2
													−0 7.92	47 48.88
	α_1													− 4.33
										48m 5.38				47 44.55
			6.0	47	43.0	56.0	3.8	7.9	11.8	15.8	3353	6706	1096	56.10
											−7.17		10.96	47 56.10
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .40
														− 2
													7.17	47 48.93
	α_2													− 4.33
										48 5.47				47 44.60
	4	26.7	9.7	48	57.5	13.8	21.6	25.5	29.2	33.4	1235	2470	1089	13.81
	47 58.5	22.7	9.2								−7.92		10.89	49 13.81
	κ													−8.23
	((δ) − D) $\frac{\kappa'}{100}$													+ .33
2 50 35														− 2
	α_1												7.92	49 5.89
										47 2.37				− 4.33
														49 1.56
			9.0	48	56.3	13.0	20.7	24.5	28.7	32.8	1197	2394	1089	13.05
											−7.17		10.89	49 13.05
	κ													− 7.55
	((δ) − D) $\frac{\kappa'}{100}$													+ .40
														− 2
													7.17	49 5.88
	α_2	3	23 4											− 4.29
										49 2.40				49 1.59
	κ													
	((δ) − D) $\frac{\kappa'}{100}$													
3 25 24	α_1													
		3	32.0											
	κ		33 45											
	((δ) − D) $\frac{\kappa'}{100}$		34 48											
	α_2		37 8											
			39 6											
	κ		40 10											
	((δ) − D) $\frac{\kappa'}{100}$		41 36											
	α_1		42 52											
			44 8											
	κ		45 14											
	((δ) − D) $\frac{\kappa'}{100}$		47 43											
	α_2		50 13											
			52 14											
	κ		54 7											
	((δ) − D) $\frac{\kappa'}{100}$		55 29											
	α_1	3	57 8											
	κ													
	((δ) − D) $\frac{\kappa'}{100}$													
	α_2													

W.A.R 3
0.68
75
80
78
77
80
80
72
70
67
77
69
73
0.74

0.73

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Runs 15R
15R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	118	0′ 59.9	55.5	1154	0′ 57.70	+04	−905	−14	30′	30 486	44 10.55
	+178				30 57.70	51 50 65				30′ 48.57	− 4 +9.41
d	1.07188					50 44 1.41	866 −13 +63				+ .13
	9.80136					+ 9.14	−9.16				+ 8.97
((δ) − D) $\frac{d'}{100}$	0.96118										+ 35
											− 19.20
+20.83 δ_1											44 0.76
+1 14.50									45′	15.3″	− 2.06
	130	0 43.9	35.9	.798	0 39.90	+05	−996	−10	30	30 294	44 14.40
	+13.1				30 39.90	52 845				30 29.74	− 5 +9.60
d	1.11424					50 44 4.25	10.24 −16 +8				+ 10
	9.80136					+ 10.15	−10.16				+ 9.20
((δ) − D) $\frac{d'}{100}$	1.90657										+ 35
											−19.70
+20.83 δ_2											50 44 22.4
+1 14.50									45	16.7	
	143	3 38.0	35.1	731	3 36.55	+06	−1104	−54	45	48 250	26 33.71
	+14.3				48 36.55	34 11.80				48 250	− 5 +9.42
d	1.15534					50 26 22.56	11.02 −11 +24				+ 47
	9.80412					+ 11.15	−11.15				+ 8.65
((δ) − D) $\frac{d'}{100}$	1.04740										+ 35
											− 19.20
+20.81 δ_1											26 23.93
+1 14.10									27	38.0	
	167	3 24.2	20.1	443	3 22.15	+07	−1289	−52	45	48 81	26 35.02
	+16.7				48 22.15	34 26.20				48 9.12	− 8 +9.70
d	1.22242					50 26 22.60	12.59 −11 +35				+ 54
	9.80412					+ 13.02	−13.03				+ 8.89
((δ) − D) $\frac{d'}{100}$	1.11478										+ 35
											− 19.80
+20.81 δ_2											26 22.86
+1 14.10									27	37.0	
d											
((δ) − D) $\frac{d'}{100}$											
δ_1											
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											
d											
((δ) − D) $\frac{d'}{100}$											
δ_1											
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											
d											
((δ) − D) $\frac{d'}{100}$											
δ_1											
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											

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28 13

Date$_1$ = Dec 18 1870 n = +.27 c = +.00 Observer A.M. Recorder W.H.R.

Date$_2$ = Dec 22 1871 n = +.33 c = +.00 Observer A.M. Recorder W.H.R.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4	1m 24s	−18	8.3	1m 12.1	31.9	39.9	43.6	47.5	51.3	2 142	42.84	10 78	3206
+	0 12.2	−4.6	8.6							−7.93		10.78	1 3206
	κ												−8.23
													+ 32
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												−0 7.93	1 24.13
	c_1									1 41.66			− 4.75
													1 19.38
			7.8	1 4.8	31.4	39.0	43.0	46.7	50.7	21 08	42.16	10 78	3138
										−7.20		10.78	1 3138
	κ												− 7.57
													+ 34
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.20	1 24.18
	α_2	~~+~~								1 41.71			− 4.75
													1 19.43
2	5 54	3 56.8	8.5	2 46.9	1.8	+36	13.7	17.5	21.6	64	12.88	11 01	187
1	42.2	3 4.1	9.0			9.8				−7.92		11.01	3 187
	κ												− 8.23
													+ 33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	2 53.95
	α_1									3 11.61			− 4.80
													2 49.15
			8.3	2 39.4	1.0	9.0	12.8	16.5	20.8	601	12.02	11 01	1.01
										−7.19		11.01	3 101
	κ												− 7.57
													+ 40
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.19	2 53.82
	α_2												− 4.80
										3 11.48			2 49.02
4	5 54	21.9	5.4	4 37.3	3.3	11.2	15.0	19.0	23.0	716	14.32	10 87	3.45
3	42.6	19.2	9.4							−7.93		10.87	5 345
	κ												− 8.23
													+ 32
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.93	4 55.52
	α_1												− 4.80
										5 13.16			4 50.72
			8.0	4 39.7	2.9 ±.2	10.7	14.5	18.2	22.1	684	13.68	10 87	2.81
										−7.09		10.87	5 2.81
	κ												− 7.57
													+ 40
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.19	4 55.62
	α_2												− 4.80
										5 13.26			4 50.82
6	16	30.9	8.7	6 1.0	24.6	32.5	36.3	40.1	43.9	1774	35.48	10 91	24.57
5	4.2	28.2	9.2							−7.92		10.91	6 2457
	κ												− 8.23
													+ 33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	6 16.65
	α_1												− 4.81
										6 34.34			6 11.84
			8.8	6 8.2	24.0	31.4	35.4	39.4	43.7	1739	34.78	10 91	2387
										−7.19		10.91	6 2387
	κ												− 7.57
													+ 40
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.19	6 16.68
	α_2												− 4.82
										6 34.36			6 11.86
7	28	32.6	7.5	7 16.5	36.5	44.3	48.3	52.1	56.0	2372	47.44	10 91	36.53
6	16.8	29.9	7.0							−7.92		10.82	7 36.52
	κ												−8.23
													+ 33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	7 28.60
8	34												− 4.82
	α_1									7 46.30			7 23.78
9	30		7.5										
10	25												
12	8												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												

0.72

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Dec 18 – 7 49.00 m. +1.3 Rs.
22 8 5.20 m. +1.6

Runs ~15~ R
~15~ R

29

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	198	2′ 23.7	2′ 22.0	457	2′ 22.85	+11 2550	−15.42	−.35	15~	17 7.2	57 52.25	
	~~+1.9~~ 200				17 22.47	5 ~~4607~~	+ .01			17 7.18	− .11	+8.63
d	1.30103					49 57 ~~57.0~~ 36.50	4.95+1+71				+ .31	
	4.80837					+ 15.75	−15.67				+ 8.13	
$((\delta) - D)\ \frac{d'}{100}$	1.19734										+ .30	
											− 11.70	
+2228 δ_1									58 38.7		57 49.18	
+49.50												
	266	2 12.0	10.2	222	2 11.10	~~+1.8~~	−20.71	−.33	15~	16 50.3	57 53.00	
	+26.6				17 11.10	5 37.25	−.02			16 50.15	− .20	+8.79
d	1.42488					49 57 32.05	+ 20.46+1+48				+ .35	
	9.80837					+ 20.95	−20.95				+ 8.34	
$((\delta) - D)\ \frac{d'}{100}$	1.32119										+ .30	
											− 12.40	
+2228 δ_2									58 38.9	50	57 49.39	
+49.50												
	149	3 ~~32.3~~ 43.0	30.6 47.6	846	3 42.30	+06	−11.60	−.55	35~	38 30.71	36 28.71	
	+15.0				38 42.30	1 44 6.05	+ .21			38 20.74	− .06	+9.60
d	1.17609					50 36 17.05	11.80−24.				+ .48	
	9.80257					+ 11.66	−11.66				+ 8.83	✓
$((\delta) - D)\ \frac{d'}{100}$	1.06662										+ .35	
											− 11.60	
+2246 δ_1									37 15.6		36 ~~27.7~~ 26.71	
+48.90												
	216	3 ~~41.7~~ 32.3	~~38.7~~ 30.6	624	3 31.45	+12	−16.82	−.53	35~	38 14.5	36 28.49	
	21.6				38 31.45	1 44 16.90	+ .33			38 14.77	− .13	+9.85
d	1.33445					50 36 11.70	16.53−33+46				+ .56	
	9.80259					+ 16.99	−16.66				+ 9.07	
$((\delta) - D)\ \frac{d'}{100}$	1.22498										+ .35	
											− 12.30	
+2246 δ_2									37 14.9	50	36 26.04	
+48.90												
	260	3 41.7	38.7	804	3 40.20	+18	−20.24	−.55	50~	53 19.7	21 39.62	
	+26.2				53 40.20	29 8.15	+ .15			53 19.74	− .18	+9.21
d	1.41830					50 21 19.15	20.46−16+16				+ .48	
	9.80489					+ 20.47	−20.46				+ 8.56	
$((\delta) - D)\ \frac{d'}{100}$	1.31113										+ .35	
											− 11.30	
+2244 δ_1									22 25.7		21 37.53	
+48.15												
	232	3 21.3	18.2	395	3 19.75	+13	−18.06	−.50	50~	53 1.4	21 41.45	
	~~+23.1~~				58 19.75	29 2860	+ .14			53 1.70	− .14	+9.52
d	1.36361					50 21 23.40	18.11−14+8				+ .53	
	9.80489					+ 18.05	−18.05				+ 8.78	
$((\delta) - D)\ \frac{d'}{100}$	1.25644										+ .35	
											− 12.00	
+2244 δ_2									22 27.1	50	21 38.97	
+48.15												
	236	4 23.8	21.9	455	4 22.75	+14	−18.37	−.65	40~	44 4.0	30 54.97	
	+23.6				44 22.75	38 2560	+ .19			44 4.36	− .15	+9.49
d	1.37291					50 30 36.60	18.11−19+47				+ .57	
	9.80336					+ 18.37	−18.39				+ 8.72	
$((\delta) - D)\ \frac{d'}{100}$	1.26421										+ .35	
											− 11.20	
+2250 δ_1									31 40.9		30 53.26	
+47.60												
	156	4 1.7	−1.3	0.4	4 0.10	+07	−12.30	−.60	40~	43 47.5	30 55.17	
	+15.7				44 0.20	38 4815	+ .13			43 47.98	− .07	+9.87
d	1.19590					50 30 42.95	11.58−13+55				+ .64	
	9.80336					+ 12.22	−12.22				+ 8.95	
$((\delta) - D)\ \frac{d'}{100}$	1.08420										+ .35	
											− 11.90	
+2250 δ_2									31 40.7	50	30 53.14	
+47.60												
	200	2 35.7	33.7	109.4	2 54.70	+12	−15.52	−.44	40~	42 39.0	32 20.22	
	+20.0				42 54.70	34 5365	+ .18			42 39.11	− .11	+9.37
d	1.30103					50 32 4.65	15.74−18				+ .38	
	9.80320					+ 15.57	−15.56				+ 8.75	
$((\delta) - D)\ \frac{d'}{100}$	1.19217										+ .35	
											− 11.10	
+2252 δ_1									33 5.6		32 18.49	
+47.15												
		2 38.8	34.0	72.0	2 36.00			−.33	40~			
					42 36.00	40 1235						
d						50 32 7.15						
$((\delta) - D)\ \frac{d'}{100}$												
δ_2												

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Date$_1$ = Dec 18 30 13 Observer A.M. Recorder N.W.R. Date$_2$ = Dec 22 15 Observer A.M. Recorder W.P.R. Ru

Star. α	δ	Mag.	T_δ	T_m	T_a	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
h m s	° ′ ″		m s	s	s	s	s	s	s	s	s	m s
13 33.4	28 8	8.0	13 24.2	43.0	51.0	54.9	58.8	6.26	2703	5406	10.90	43.16
12 22.3	26.2	8.8							−7.92		10.90	13 43.16
κ												− 8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											−0 7.92	13 35.24
									13 53.00			−4.85 +22
												13 30.39 +43
		8.0	13 20.5	42.5	50.3	54.1	58.0	62.1	2670	53.40	10.90	42.50
κ									−7.19		10.90	13 42.50
((δ) − D) $\frac{\kappa'}{100}$												− 7.57
												+ .46
												− .2
a_2											7.19	13 35.31
									13 53.06			−4.86 +22
												13 30.45 +43
14 4.5	8 28	7.5	14 4.3	54.0	61.8	65.7	69.6	73.5	3246	64.92	10.92	54.01
13 32.9	30.2	6.9							−7.92		10.92	14 54.00
κ												− 8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.92	14 46.08
									15 3.86			−4.86 +22
												14 41.22 +43
		7.5	14 36.0	53.1	60.9	64.8	68.8	72.8	3204	64.08	10.92	53.17
κ									−7.19		10.92	14 53.16
((δ) − D) $\frac{\kappa'}{100}$												− 7.57
												+ .40
												− .2
a_2											7.19	14 45.97
									15 3.75			−4.86 +22
												14 41.11 +43
15 5.9	6 23	8.8	15 50.2	9.5	17.1	21.4	25.3	29.0	1023	2046	11.03	9.48
14 47.2	5 9.7	8.8							−7.92		11.03	16 9.43
κ												− 8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.92	16 1.51
									16 19.39			−4.91 +22
												15 56.60 +43
		8.3	15 51.3	8.8	16.6	20.6	24.5	28.5	990	1980	11.03	8.77
κ									−7.18		11.03	16 8.77
((δ) − D) $\frac{\kappa'}{100}$												− 7.57
												+ .40
												− .2
a_2											7.17	16 1.59
									16 19.41			−4.91 +22
												15 56.68 +43
17 8	5 50	7.6	17 1.0	17.7	25.5	29.5	33.5	37.5	1437	2872	11.00	17.72
15 56.3	52.4	7.9							−7.92		11.00	17 17.72
κ												− 8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.92	17 9.80
									17 27.68			−4.90 +22
												17 4.90 +43
		7.0	17 6.4	17.0	24.8	28.7	32.8	36.6	1399	2798	11.00	16.98
κ									−7.18		11.00	17 16.98
((δ) − D) $\frac{\kappa'}{100}$												− 7.57
												+ .41
												− .2
a_2											7.18	17 9.80
									17 27.68			−4.90 +22
												17 4.90 +43
18 8.1	23 7	8.0	18 16.5	38.5	46.6	50.7	53.8	58.3	2473	49.46	10.88	38.56
17 17.4	18.31	9.0							−7.92		10.88	18 38.58
κ												− 8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.92	18 30.66
									18 48.45			−4.87 +22
												18 25.79 +43
		8.0	18 18.6	38.0	45.6	49.3	53.5	57.2	2436	48.72	10.88	37.84
κ									−7.19		10.88	18 37.84
((δ) − D) $\frac{\kappa'}{100}$												− 7.57
												+ .40
												− .2
a_2											7.19	18 30.65
									18 48.44			−4.87 +22
												18 25.78 +43

0.73

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Runs −15 L
−15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	8′
	186	1 407	381	786	1 3940	+10	−14.64	−25	45	46 24.8	28 34.6
	+190				46 39.40	36 8.95	+ .14			46 24.60	− .10 +9.16
d	1.27875					50 28 19.95	14.35 −15				+ .22
	9.80382					+ 14.81	−14.80				+ 8.69
((δ) − D) $\frac{d'}{100}$	1.14051										+ .35
											− 10.30
+2261 δ_1											
+44.80											
									29	18.4	28 33.62
	220	1 261	228	489	1 2445	+12	−17.13	−21	45	46 7.4	28 33.85
	+220				46 24.45	36 23.90	+.18			46 7.30	− 13 +9.36
d	1.34242					50 28 18.70	17.32 −17				+ .22
	9.80382					+ 17.15	−17.15				+ 8.92
((δ) − D) $\frac{d'}{100}$	1.23418										+ .35
											− 11.10
+2261 δ_2											
+44.80											
									29	18.9	50 28 34.11
	137	2 464	433	897	2 4485	+05	−10.67	−41	40	42 33.9	32 25.16
	+137				42 44.85	40 3.50	+.12			42 34.18	− 5 +9.40
d	1.13672					50 32 14.50	10.24−12 +55				+ .35
	9.80320					+ 10.66	−10.67				+ 8.75
((δ) − D) $\frac{d'}{100}$	1.02786										+ .35
											− 10.20
+2264 δ_1											
+44.35											
									33	8.7	32 24.36
	171	2 313	293	606	2 3030	+08	−13.31	−36	40	42 16.8	32 26.24
	+172				42 30.30	40 18.05	+.15			42 16.91	− 8 +9.65
d	1.23553					50 32 12.85	13.38−15 +16				+ .40
	9.80320					+ 13.39	−13.39				+ 8.98
((δ) − D) $\frac{d'}{100}$	1.12667										+ .35
											− 11.00
+2264 δ_2											
+44.35											
									33	9.2	51 32 24.89
	193	3 160	127	289	3 1445	+10	−16.03	−47	10	12 5.93	1 59.68
	+192				13 14.45	9 33.90	+ .31			12 59.67	− .10 +10.02
d	1.28330					51 1 44.90	1463−1 + 16				+ .42
	9.79856					+ 14.78	−14.78				+ 9.30
((δ) − D) $\frac{d'}{100}$	1.16980										+ .40
											− 10.10
+2279 δ_1											
+43.85											
									2	43.4	1 5.961
	175	2 547	528	1075	2 5375	+08	−13.63	−44	20	12 40.0	2 2.88
	+175				12 53.75	9 54.60	+ .30			12 40.28	− 8 +10.32
d	1.24304					51 1 49.10	13.07−1 + 39				+ .46
	9.79856					+ 13.48	−13.47				+ 9.54
((δ) − D) $\frac{d'}{100}$	1.12954										+ .40
											− 10.90
+2279 δ_2											
+43.85											
									2	46.1	50 2 28.90 2.30
	167	0 499	469	968	0 4840	+08	−13.00	−12	20	20 35.6	54 23.85
	+167				20 48.40	1 59.95	+ .24			20 35.51	− 8 +9.58
d	1.22272					50 54 10.95	12.89−24 + 54				+ .10
	9.79981					+ 12.90	−12.89				+ 9.16
((δ) − D) $\frac{d'}{100}$	1.11047										+ .40
											− ~~10.10~~ 10.80
+2278 δ_1											
+43.35											
									55	6.8	54 23.43
	106	0 277	267	544	0 2720	+03	− 8.25	−07	20	20 19.1	54 24.14
	+10.6				20 27.20	2 21.15	+ .15			20 19.03	− 3 +9.85
d	1.02531					50 54 15.95	7.87−16 + 46				+ 8
	9.79981					+ 8.19	−8.17				+ 9.40
((δ) − D) $\frac{d'}{100}$	0.91306										+ 40
											− 10.70
+2278 δ_2											
+43.35											
									55	6.6	50 54 23.29
	220	1 570	537	1107	1 5535	+12	−17.13	−26	50	51 38.2	23 21.26
	+221				51 55.35	30 5.90	+ .14			51 38.09	− .13 +9.07
d	1.34439					50 23 4.60	17.32−17 +8				+ .25
	9.80458					+ 17.26	−17.26				+ 8.60
((δ) − D) $\frac{d'}{100}$	1.23691										+ .35
											− 9.80
+2266 δ_1											
+42.85											
									24	3.4	23 20.53
	224	1 380	351	731	1 3650	+13	−17.44	−25	50	51 19.1	23 23.98
	+222				51 36.50	31 11.85	+ .14			51 19.16	− .13 +9.31
d	1.34635					50 23 6.65	17.32−14 +16				+ .26
	9.80458					+ 17.33	−17.34				+ 8.83
((δ) − D) $\frac{d'}{100}$	1.23887										+ .35
											− 10.50
+2266 δ_2											
+42.85											
									24	3.6	23 22.79

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Date$_1$ = Dec 13 — Observer A.M. — Recorder W.R.K. — Date$_2$ = Dec 15 — Observer A.M. — Recorder W.R.K. — Run

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
19 43^s	19 3	7.8	19 34^s.5	52.0	60.1	63.9	67.7	71.6	315.3	63.06	10.86	52.20
18 30.1	16.8	8.6							−7.93		10.86	19 52.20
κ												−8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .32
												− .2
α_1												19 44.27
												−4.87
									20 2.06			19 39.40
		7.8	19 32.9	51.6	59.1	63.1	67.1	71.0	311.9	62.38	10.86	51.52
									−7.19		10.86	19 51.52
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .40
												− .2
α_2												19 44.33
												−4.87
									20 2.12			19 39.46
20 49	−35	8.0	20 46.0	57.4	65.1	68.8	73.0	76.7	340	68.20	10.78	57.42
19 36.4	54.1	7.1							−7.93		10.78	20 57.42
κ												−8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .32
												− .2
α_1												20 49.51
												−4.85
									21 2.24			20 44.64
		9.0	20 41.2	58.8	64.2	68.2	72.2	(76.0)	337.4	67.48	10.78	56.70
									−7.20		10.78	20 56.70
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .39
												− .2
α_2												20 49.50
												−4.85
									21 7.23			20 44.65
23 23	4 6 3	8.0	23 15.0	32.1	40.0	43.9	47.7	51.9	216	48.12	10.96	32.16
22 10.7	43.9	7.5							−7.92		10.96	23 32.16
κ												−8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
α_1												23 24.24
												−4.94
									23 12.13			23 19.30
		8.2	23 ~~15.0~~ 14.5	31.5	39.2	43.3	47.4	51.2	212.6	42.52	10.96	31.56
									−7.19		10.96	23 31.56
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .40
												− .2
α_2												23 24.34
												−4.94
									23 12.26			23 19.43
24 47	4 3.5	9.5	24 36.4	55.4	63.1	67.0	71.0	75.1	331.6	66.82	10.95	55.37
23 34.0	41.2	7.5							−7.92	sp	10.95	24 55.37
κ												−8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
25 α_1 59												24 47.45
												− 4.93
									25 5.36			24 42.52
		7.3	24 37.4	54.~~4~~ 8	62.~~7~~ 6	6~~7~~.8 6.9	70.~~6~~ 5	(~~74.0~~)	329.6	65.92	10.95	54.97
									−7.19	sp.	10.95	24 ~~54.97~~ 54.81
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .40
												− .2
α_2												24 47.78
												− 4.94
									25 5.52			24 42.~~84~~ 68
29 46	5 7	8.6	~~25 44.5~~	~~68~~	~~14.4~~	67.8	71.6	75.5	334.3	66.86	11.01	55.85
28 32.8	54.9	8.1	29 ~~33.7~~	55.7	63.8				−7.92		11.01	29 55.85
κ												−8.23
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
α_1												29 47.93
												− 4.96
									30 5.94			29 42.97
		8.0	29 32.2	55.0	63.0	67.1	71.0	75.0	331.1	66.22	11.01	55.21
									−7.18		11.01	29 55.21
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .41
												− .2
α_2												29 48.03
												−4.98
									30 6.03			29 43.06

0.66

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Runs −15 R
−15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z 50	δ′
	175	1′ 11.2	9.8	21.0	1′ 10.50	+.08	+13.63	−18	55	55 56.9	19 26.9
	+17.7				56 10.50	26 3785	+.09			55 56.66	− 9 +8.96
d	1.24497					50 18 4885	13.38-9+55				+ .16
	9.80519					+ 13.84	−13.84				+ 8.54
((δ) − D) $\frac{d'}{100}$	1.14100										+ .35
											− 9.70
+2266 δ_1									19 44.3		19 19.25
+42.40											
	187	0 56.4	54.5	110.9	0 55.45	+.10	−14.56	−14	55	55 41.0	19 22.4
	+18.6				55 55.45	26 52.90	+.09			55 41.92	− .10 +9.14
d	1.26951					50 18 44.70	14.16-10+47				+ .14
	9.80519					+ 14.54	−14.53				+ 8.45
((δ) − D) $\frac{d'}{100}$	1.16264										+ .35
											− 10.40
+2266 δ_2									19 43.4	49	19 0.98
+42.40											
	114	3 52.6	51.1	103.7	3 51.85	+.03	−8.88	−58	15	18 42.4	56 16.48
	+11.4				18 51.85	3 56.50	+.01			18 42.88	− 3 +8.88
d	1.05690					49 56 4.50	8.66-1+32				+ .51
	9.80867					+ 8.98	−8.99				+ 8.10
((δ) − D) $\frac{d'}{100}$	0.95851										+ .30
											− 9.40
+2258 δ_1									56 57.9		56 15.96
+41.95											
	156	3 39.5	38.0	77.5	3 38.75	+.08	−12.15	−55	15	18 26.1	56 16.61
	+15.5				18 38.70	4 9.60	+.01			18 26.57	− 6 +9.13
d	1.19033					49 56 4.40	11.80-2+40				+ .58
	9.80867					+ 12.21	−12.18				+ 8.31
((δ) − D) $\frac{d'}{100}$	1.08694										+ .30
											− 10.10
+2258 δ_2									56 57.6	50	56 15.64
+41.95											
	171	4 10.3	9.1	19.4	4 9.70	+.08	−13.31	−62	25	28 56.1	46 29.7
	+17.2				29 9.70	53 3865	+.22			28 56.38	− 8 +9.89
d	1.23553					50 45 49.65	13.38-22+16				+ .55
	9.80105					+ 13.32	−13.32				+ 9.02
((δ) − D) $\frac{d'}{100}$	1.12452										+ .40
											− 9.20
+2283 δ_1									46 44.6		46 3.66
+40.90											
	170	3 54.5	53.0	107.5	3 53.75	+.05	−13.24	−56	25	28 40.2	46 26.4
	+18.1				28 53.75	53 5460	+.22			28 40.51	− 8 +10.18
d	1.23300					50 45 49.40	13.38-22+8				+ .62
	9.80105					+ 13.24	−13.24				+ 9.24
((δ) − D) $\frac{d'}{100}$	1.12199										+ .40
											− 9.90
+2283 δ_2									46 43.8	50	46 2.92
+40.90											
	190	1 39.2	35.9	75.1	3 37.55	+.10	−14.79	−25	30	31 22.8	43 36.53
	+19.0				31 37.55	51 10.80	+.22			31 22.83	− .10 +9.42
d	1.27875					50 43 21.80	14.95-23				+ .21
	9.80151					+ 14.73	−14.72				+ 8.96
((δ) − D) $\frac{d'}{100}$	1.16820										+ .35
											− 9.00
+2284 δ_1									44 17.3		43 36.95
+40.35											
	175	1 21.1	19.2	40.3	1 20.15	+.09	−13.63	−21	35	31 6.6	43 36.49
	+17.6				31 20.15	51 28.20	+.19			31 6.57	− 9 +9.67
d	1.24551	+17.4				50 43 23.00	13.38-21+47				+ .21
	9.80151	1.24055				+ 13.64	−13.64				+ 9.20
((δ) − D) $\frac{d'}{100}$	1.13496	9.80151				49					+ .35
		1.13000									− 9.80
+2284 δ_2									44 16.7	50	43 36.51
+40.35											
	220	3 32.0	31.3	64.3	3 32.15	+.12	−17.13	−53	15	18 14.9	56 44.25
	+22.1				18 32.10	14 16.20	+.34			18 15.11	− .13 +9.52
d	1.34439					50 56 27.80	17.32-36+8				+ .46
	9.79950					+ 14.05	−17.04				+ 9.19
((δ) − D) $\frac{d'}{100}$	1.23183										+ .40
											− 8.40
+2297 δ_1									57 24.1		56 45.77
+38.35											
	228	3 15.7	13.2	28.9	3 14.45	+.13	−17.35	−48	15	17 5.67	56 46.45
	+23.0				18 14.45	4 33.90	+.35			17 56.71	− .14 +10.30
d	1.36173					50 56 28.70	18.11-37				+ .31
	9.79950					+ 17.75	−17.74				+ 9.43
((δ) − D) $\frac{d'}{100}$	1.24917										+ .40
											− 9.20
+2297 δ_2									57 25.6		56 47.25
+38.35											

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Date$_1$ = Dec 18 — Observer A.M. / Recorder M.A.K. — Date$_2$ = Dec 20 — Observer A.M. / Recorder M.A.K. — Run

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
32 8.4	29.6	8.9	33 4.9	30.6	38.7	42.5	46.4	50.4	2086 −7.93	41.72	1091 10.91	8081
κ												33 3081
((δ) — D) $\frac{\kappa'}{100}$												−8.24
												+ .33
												− 2
											−0 7.93	33 22.88
α_1												− 4.95
									33 40.83			33 17.93
		8.4	33 ~~5.7~~	(29.9)	37.9	41.9	45.7	49.6	2050 −7.18	41.0	1091 10.91	3009
κ												33 3009
((δ) — D) $\frac{\kappa'}{100}$												− 7.56
												+ .40
												− 2
											7.18	33 22.91
α_2												− 4.96
									33 40.85			33 17.95
33 26.2	3.1	8.4	34 28.4	47.1	54.9	58.8	62.7	66.4	2899 −7.94	5.798	1082 10.82	4716
κ												34 4716
((δ) — D) $\frac{\kappa'}{100}$												−8.24
												+ .32
												− 2
											7.94	34 39.22
α_1												− 4.92
									34 57.11			34 34.30
		8.5	34 28.1	46.2	54.1	58.0	61.9	65.7	2859 −7.14	5718	1082 10.82	4636
κ												34 4636
((δ) — D) $\frac{\kappa'}{100}$												− 7.56
												+ .39
												− 2
											7.19	34 39.17
α_2												− 4.93
									34 57.05			34 34.24
35 15.8	49.4	7.7	36 14.6	38.0	46.0	50.0	53.8	58.0	2458 −7.93	4916	1099 10.99	3818
κ												36 3817
((δ) — D) $\frac{\kappa'}{100}$												− 8.24
												+ .33
												− 2
											7.93	36 30.24
α_1												− 4.98
									36 48.29			36 25.26
		7.6	36 14.4	37.4	45.2	49.2	53.2	57.2	2422 −7.18	4844	1099 10.99	3746
κ												36 3745
((δ) — D) $\frac{\kappa'}{100}$												− 7.56
												+ .40
												− 2
											7.18	36 30.27
α_2												− 4.99
									36 48.31			36 25.28
36 28.9	17.5	7.8	37 38.0	51.8	59.0	2.9	6.8	10.9	3111 −7.94	6222	1086 10.86	5136
κ												37 5136
((δ) — D) $\frac{\kappa'}{100}$												− 8.24
												+ .32
												− 2
											7.94	37 43.42
α_1												− 4.95
									38 1.38			37 38.47
		8.0	37 28.6	50.6	58.1	62.0	66.0	70.0	3067 −7.18	6134	1086 10.86	5048
κ												37 5048
((δ) — D) $\frac{\kappa'}{100}$												− 7.56
												+ .40
												− 2
											7.18	37 43.30
α_2												− 4.96
									38 1.25			37 38.34
37 28.8	21.6	8.0	38 34.2	50.6	58.3	2.2	5.9	10.0	3070 −7.93	6140	1088 10.88	5052
κ												38 5052
((δ) — D) $\frac{\kappa'}{100}$												− 8.24
												+ .33
												− 2
											7.93	38 42.59
α_1												− 4.96
									39 0.57			38 37.63
full #2		8.0	38 40.9	50.0	57.8	61.6	65.5	69.2	3038 −7.18	6076	1088 10.88	4988
κ												38 4988
((δ) — D) $\frac{\kappa'}{100}$												− 7.56
												+ .40
												− 2
											7.18	38 42.70
α_2												− 4.97
									39 0.67			38 37.73

0.75

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Runs −15 −15 R R

35

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ'
	s 257	8′ 43.0	40.8	838	3′ 41.90	+18	−20.01	−55	40	3 218		31 37.62
	+289				43 41.90	39 645	+.23			43′ 21.75		− .18 +9.39
d	1.41330					50 31 17.45	19.67−22+70					+ .18
	9.80336					+ 20.17	−20.15					+ 8.74
((δ) − D) $\frac{d'}{100}$	1.30460											+ .35
												− 7.90
+2290 δ_1									′ 32	″ 16.0		31 39.11
+36.90												
	+244	8 26.7	24.0	507	3 25.35			−51	40		31	36.80
	1.38739				43 25.35	39 23.00						− .15 +9.71
d	9.80336					31 17.80						+ .54
	1.27869					+ 19.00						+ 8.97
((δ) − D) $\frac{d'}{100}$												+ .35
												− 8.80
+2290 δ_2									32 14.0		50	31 37.71
+36.90												
	187	3 5.4	2.8	85	3 4.25	09	−14.56	−55	5	8	492	7 9.86
	+188				8 4.25	14 44.10	+.03			7	49.49	− .10 +8.91
d	1.27416					50 6 55.10	14.16−4+64					+ .40
	9.80701					+ 14.76	−14.76					+ 8.31
((δ) − D) $\frac{d'}{100}$	1.16911											+ .30
												− 7.70
+2281 δ_1									7 47.4			7 11.07
+36.35												
	181	2 48.2	48.5	937	2 46.85	+09	−14.09	−51	5	7	883	7 10.66
	+183				7 46.85	15 1.50	+.03			7	32.49	− .9 +9.18
d	1.26245					50 6 56.30	14.16−4+24					+ .45
	9.80701					+ 14.36	−14.36					+ 8.52
((δ) − D) $\frac{d'}{100}$	1.15740											+ .30
												− 8.60
+2281 δ_2									7 47.6		50	7 ~~10.8~~ 11.24
+36.35												
	234	4 7.1	5.1	122	4 6.10	+14	−18.22	−61	20	23	477	51 11.49
	+23.6				24 6.10	58 42.25	+.32			23	47.86	− .15 +0.89
d	1.37291					50 50 53.25	18.11−33+46					+ .53
	9.80027					+ 18.24	−18.24					+ 9.11
((δ) − D) $\frac{d'}{100}$	1.26112											+ .40
												− 7.60
+23.03 δ_1									51 49.4			51 13.78
+35.60												
	230	3 52.2	4.9.1	1013	3 50.65	+14	−17.91	−57	20	23	326	51 10.36
	+23.1				23 50.65	58 57.70	+.31			23	32.79	− .14 +10.21
d	1.36361					50 50 52.50	18.11−33+8					+ .61
	9.80027					+ 17.86	−17.86					+ 9.34
((δ) − D) $\frac{d'}{100}$	1.25182											+ .40
												− 8.40
+2303 δ_2									51 47.8		52	51 12.17
+36.60												
	135	0 28.6	25.0	538	0 26.80	+05	−10.51	−60	53	55	160	19 43.02
	+13.4				55 26.80	27 21.55	+.07			55	16.31	− .5 +8.88
d	1.12710					50 19 32.55	10.24−7+32					+ .5
	9.80504					+ 10.47	−10.49					+ 8.53
((δ) − D) $\frac{d'}{100}$	1.02008											+ .35
												− 7.40
+2291 δ_1									20 19.6			19 44.50
+35.10									~~51 47.8~~			
	220	0 17.7	14.0	319	1 15.85	+12	−17.13	−41	53	54	589	19 44.42
	+21.9				55 15.85	27 32.50	+.11			54	58.74	− .13 +9.0x3
d	1.34044					50 19 27.30	16.53−12+70					+ .5
	9.80504					+ 17.12	−17.11					+ 8.76
((δ) − D) $\frac{d'}{100}$	1.23342											+ .35
												− 8.20
+2291 δ_2									20 20.3		50	19 45.25
+35.10												
	164	1 49.1	45.2	943	1 47.15	+07	−12.77	−24	50	51	843	23 ~~34.93~~
	+16.3				51 47.15	31 1.20	+.10			51	34.43	− 7 +9.11
d	1.21219					50 23 ~~32.20~~	12.59−11+24					+ .23
	9.80458					+ 12.73	−12.72					+ 8.60
((δ) − D) $\frac{d'}{100}$	1.10471											+ .35
												− 7.30
+22.94 δ_1									24 1.4			23 ~~36.74~~
+34.70												
	91	1 29.4	25.0	53.44	1 27.20	+02	−7.08	−23	50	51	200	23 22.98
	+9.0				51 27.20	31 21.15	+.06			51	20.18	− 2 +9.40
d	0.95424					50 23 15.95	7.08−6					+ .24
	9.80458					+ 7.03	−7.02					+ 8.83
((δ) − D) $\frac{d'}{100}$	0.84676											+ .35
												− 8.10
+22.94 δ_2									23 59.0			23 24.28
+34.70												

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Date$_1$ = Dec 18 13 — Observer A.M. — Recorder W.H.R.

Date$_2$ = Dec 22 15 — Observer A.M. — Recorder W.H.R.

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
39 5-6	11 7	8.4	39 51.5	3.3	11.0	15.0	18.8	22.9	710	1420	1083	337
38 41.6	9.3	9.0							-7.94		10.83	40 337
κ												-8.24
((δ) − D) $\frac{\kappa'}{100}$												+.32
												−.2
α_1											-0 7.94	39 55.43
									m s			−4.95
									40 13.37			39 50.48
		9.2	39 48.4	2.9	10.4	14.2	18.0	21.9	674	1348	1083	2.65
κ									-7.19		10.83	40 2.65
((δ) − D) $\frac{\kappa'}{100}$												−7.56
												+.39
												−.2
α_2											7.19	39 55.46
												−4.96
									40 13.39			39 50.50
40 47	10 8	2.8	40 41.5	54.7	6.2.2	66.1	70.0	74.0	3270	6540	1083	54.57
39 32.9	8.9	8.0							-7.94		10.83	40 54.57
κ												-8.24
((δ) − D) $\frac{\kappa'}{100}$												+.32
												−.2
α_1											7.94	40 46.63
41 34												−4.95
									41 4.58			40 41.68
		7.5	4									
κ												
((δ) − D) $\frac{\kappa'}{100}$												
α_2												
43 46	23 4	8.3	43 43.1	54.0	1.5	5.5	9.4	13.3	3237	6474	1088	53.86
42 31.8	21.8	8.7							-7.93		10.88	43 53.86
κ												-8.24
((δ) − D) $\frac{\kappa'}{100}$												+.33
												−.2
α_1											7.93	43 45.93
												−4.98
									44 3.95			43 40.95
		8.7	43 34.8	53.0	6.0.8	6.4.6	8.8	12.6	3798	6396	1088	53.08
κ									-7.18		10.88	43 53.08
((δ) − D) $\frac{\kappa'}{100}$												-7.56
												+.40
												−.2
α_2											7.18	43 45.90
												−5.00
									44 3.90			43 40.90
43 59	23 3	8.3	43 33.7	7.0	14.8	18.7	22.8	26.6	899	1798	1088	7.10
42 44.9	21.7	8.8							-7.93		10.88	44 7.10
κ												-8.24
((δ) − D) $\frac{\kappa'}{100}$												+.33
												−.2
α_1											7.93	43 59.17
												−4.98
									44 17.19			43 54.19
		8.7	43 29.0	6.4	14.2	18.0	21.9	25.7	862	1724	1088	6.36
κ									-7.18		10.88	44 6.36
((δ) − D) $\frac{\kappa'}{100}$												-7.56
												+.40
												−.2
α_2											7.18	43 59.18
												−5.00
									44 17.18			43 54.18
45 26	18 9	8.9	45 10.9	33.7	41.1	45.0	48.9	52.7	2214	4428	1086	33.42
44 11.9	17.2	8.9							-7.93		10.86	45 33.42
κ												-8.24
((δ) − D) $\frac{\kappa'}{100}$												+.33
												−.2
α_1											7.93	45 25.49
												−4.97
									45 43.51			45 20.52
		9.0	45 ~~11.5~~ 14.3	32.8	40.6	44.4	48.1	52.9	2182	4364	1086	32.78
κ									-7.18		10.86	45 32.78
((δ) − D) $\frac{\kappa'}{100}$												-7.56
												+.40
												−.2
α_2											7.18	45 25.60
												−5.00
									45 43.59			45 20.60

0.71

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Runs -15 R
-15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	8′
	118	4′ 6.2	4.2	104	4′ 5.20	+04	−9.19	−61	0′	8 55.5	11 3.48
	+11.9				4 8.20	18 43 15	+.03			3′ 55.84	− 4 +9.17
d	1.07555					50 10 54.15	3.66 −4 +7				+ 53
	9.80641					+ 9.33	−7.33				+ 838
$((\delta) - D)\frac{d'}{100}$	0.96990										+ .30
											− 7.10
+2289 δ_1									11 ″		
+34.25									11 39.8		11 5.55
	14	3 57.7	4.84	1001	8 50.05	+05	−11.29	−57	0	3 38.3	11 4.23
	+142				8 50.05	18 58 30	+.04			3 38.92	− 5 +9.45
d	1.15229					50 10 53.10	11.02 −5 +16				+ .61
	9.80641					+ 11.13	−11.13				+ 859
$((\delta) - D)\frac{d'}{100}$	1.04664										+ .30
											− 7.90
+22.89 δ_2											
+34.25									11 40.0	50	11 5.78
	132	4 24.0	29.0	580	4 29.00	+05	−11.28	−67	0	4 17.1	10 40.62
	+131				4 29.00	18 19 35	+.04			4 18.72	− 5 +9.19
d	1.11727					50 10 30.35	10.24 −4 +8				+ 58
	9.80641					+ 10.27	−10.28				+ 8.36
$((\delta) - D)\frac{d'}{100}$	1.01162										+ .30
											− 7.10
+22.90 δ_1											
+33.85									11 16.6		10 42.71
		4 14.0 —		260	4 13.00			−63	0		
					4 13.00	18 35.35					
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2										50	
	109	1 54.7	57.7	1064	1 53.20	+03	−8.49	−28	60	61 44.5	23 14.58
	+10.8				51 53.20	30 55.15	+.07			51 44.77	− 3 +9.17
d	1.03342					50 23 6.15	7.87 −7 +63				+ 25
	9.80458					+ 8.43	−8.43				+ 8.60
$((\delta) - D)\frac{d'}{100}$	0.92594										+ 35
											− 6.70
+23.00 δ_1											
+32.50									23 49.6		23 17.05
	132	1 42.0	38.2	802	1 40.10	+05	−10.28	−25	60	51 29.4	23 13.43
	+13.3				51 40.10	31 8.26	+.08			51 29.71	− 5 +9.40
d	1.12385					50 23 3.05	10.24 −9 +24				+ 27
	9.80458					+ 10.38	−10.39				+ 8.83
$((\delta) - D)\frac{d'}{100}$	1.01637										+ 35
											− 7.50
+23.00 δ_2											
+32.50									23 47.8	50	23 15.33
	233	1 54.7	51.7	1064	1 53.20	+29	−	−28	60		23 32.23
	+334				51 53.20	30 55.15	+25.98 −22 +32			51 27.12	− .25 +8.95
d	1.52375					50 23 6.15	−26.08				+ 25
	9.80458					+ 2608					+ 8.60
$((\delta) - D)\frac{d'}{100}$	1.41627										+ 35
											−6.70
+23.000 δ_1											
+32.50									24 7.0		23 34.48
	374	1 42.0	38.2	802	1 40.10	+08	−13.55	−25	50	51 26.5	23 32.25
	+374				51 40.10	31 8.25	+.10			51 10.91	− .30 +9.15
d	1.54287					50 23 3.05	29.12 −28 +32				+ .27
	9.80458					+ 29.20	−29.19				+ 8.83
$((\delta) - D)\frac{d'}{100}$	1.46539										+ 35
											− 7.40
+23.00 δ_2											
+32.50									24 6.8	50	23 34.00
	228	1 8.1	6.0	141	1 7.05	+13	−17.75	−17	55	55 49.4	19 9.89
	+22.5				56 7.05	26 41.30	+.12			55 49.44	− .38 +8.64
d	1.35218					50 18 52.30	17.32 −11 +40				+ .14
	9.80519					+ 17.59	−17.61				+ 8.53
$((\delta) - D)\frac{d'}{100}$	1.24531										+ 35
											− 6.50
+2299 δ_1											
+31.90									19 48.9		19 12.03
	165	0 50.1	46.2	963	0 48.15	+09	−14.40	−13	55	55 34.3	19 14.46
	+185				55 48.15	27 0.20	+.09			55 33.68	− 9 +9.62
d	1.26917					50 18 5.30	14.16 −9 +40				+ .61
	9.80519					+ 14.46	−14.47				+ 8.75
$((\delta) - D)\frac{d'}{100}$	1.16030										+ 35
											− 7.30
+22.99 δ_2											
+31.90									19 43.7 45.7		19 11.78

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38 13

Date$_1$ = Dec 18 — Observer A.M. — Recorder W.R.

Date$_2$ = Dec 22 15 — Observer A.M. — Recorder W.R.

Runs

Star. α	δ 50°	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4 47 7.5	57'	9.0	46 56.5	16.1	23.7	27.9	31.8	35.4	13.52	2.704	10.93	16.11
4 5 53.2	56.3	9.0							−7.93		10.93	47 16.11
κ												−8.24
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											−0 7.93	47 8.18
									47 26.34			−.503
												47 3.15
		8.8	46 54.8	15.0	23.0	26.9	31.0	35.0	13.09	2.618	10.93	15.25
κ									−7.17		10.93	47 15.25
((δ) − D) $\frac{\kappa'}{100}$												−7.56
												+ .41
a_2											7.17	− .2
												47 8.08
												−.506
												47 3.02
50 48	57.2	9.0	50 33.1	56.2	64.5	68.6	72.4	76.5	38.82	6.764	11.01	56.63
49 34.0	55.5	9.0							−7.93		11.01	50 56.63
κ												−8.24
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.93	50 48.70
												−.505
												50 43.65
		8.8	50 37.2	55.7	63.7	67.6	71.6	75.8	33.43	6.686	11.01	55.85
κ									−7.17		11.01	50 55.85
((δ) − D) $\frac{\kappa'}{100}$												−7.56
												+ .41
a_2											7.17	− .2
												50. 48.68
												−.507
												50 43.61
51 54	48.0	8.9	51 47.7	2.7	10.1	14.1	18.0	22.0	6.69	1338	10.98	2.40
50 40.4	47.3	8.9							−7.93		10.98	52 2.40
κ												−8.24
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.93	51 54.47
												−.504
												51 49.48
		8.6	51 47.6	1.7	9.6	13.7	17.4	21.5	6.39	1278	10.98	1.80
κ									−7.18		10.98	52 1.80
((δ) − D) $\frac{\kappa'}{100}$												−7.56
												+ .40
a_2											7.18	− .2
												51 54.62
												−.506
												51 49.56
5 2 57	24.9	8.5	52	46.7	54.0	66.8	70.6	74.6	34.98	6.988	10.88	59.06
51 36.6	23.3	8.2							−7.93		10.88	5-2 59.00
κ												−8.24
((δ) − D) $\frac{\kappa'}{100}$												+ .33
												− .2
a_1											7.93	52 51.07
												−.501
												52 46.06
		8.5	52 47.9	58.0	66.1	69.9	73.9	77.8	34.57	6.914	10.88	58.26
κ									−7.18		10.88	52 58.26
((δ) − D) $\frac{\kappa'}{100}$												−7.56
												+ .40
a_2											7.18	− .2
												52 51.08
												−.503
												52 46.05
54 16	18.7	8.4	5 40.0	25.8	33.7	37.5	41.2	45.1	18.33	3.666	10.86	25.80
53 2.7	17.2	9.0							−7.94		10.86	54 25.80
κ												−8.24
((δ) − D) $\frac{\kappa'}{100}$												+ .32
												− .2
a_1											7.94	54 17.86
												−.500
												54 12.86
		8.5	54 9.4	25.4	32.7	36.7	40.6	44.8	18.01	3.602	10.86	25.16
κ		55 35							−7.18		10.86	54 25.16
((δ) − D) $\frac{\kappa'}{100}$												−7.56
												+ .40
a_2											7.18	− .2
												17.98
												−.503
												54 12.95

v.72

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Runs −15 R
−15 R

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	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	19.56	2′ 24.40	23.0	47.0	2′ 23.50	+11	−15.36	−36	5″	17 8.2	57 50.96
	+19.6				17 23.50	.5 24.85	+ .19			17′ 8.28	− .11 +9.82
d	1.29226					50 57 35.85	14.95−20+47				+ .31
	9.79918					+ 15.11	− 15.22				+ 9.22
((δ) − D) $\frac{d'}{100}$	1.17938										+ .40
											− 6.40
+23.19 δ_1		m s 47 26.34		′ ″ 58 25.6							
+31.20											57 54.08 38
	20.2	2 10.0	6.7	16.7	2 8.35	+11	−15.73	−32	15″	16 52.6	57 50.53
	+20.4				17 8.35	.5 40.00	+ .20			16 52.51	− .11 +10.08
d	1.30963					50 57 34.80	15.74−21+31				+ .34
	9.79918					+ 15.73	− 15.84				+ 9.45
((δ) − D) $\frac{d'}{100}$	1.19675										+ .40
											− 7.10
+23.19 δ_2		47 26.21		58 24.7							
+31.20										50	57 53.51
	23.1	3 5.0	1.7	6.7	3 3.35	+13	−17.99	−130	15″	17 45.3	57 14.13
	+23.5				18 8.35	.4 45.00	+ .35			17 48.23	− .14 +9.88
d	1.37107					50 56 56.00	18.11−38+39				+ .40
	9.79934					+ 18.13	− 18.12				+ 9.22
((δ) − D) $\frac{d'}{100}$	1.25835										+ .40
											− 6.90
+23.22 δ_1		51 6.87		57 47.8							
+29.65											57 18.11
	18.5	2 46.3	44.4	90.7	2 45.35	+09	−14.40	−42	15″	17 30.9	57 12.15
	+18.6				17 45.35	.5 3.00	+ .28			17 31.02	− .10 +10.20
d	1.26951					50 56 57.80	14.16−29+46				+ .45
	9.79934					+ 14.35	− 14.33				+ 9.45
((δ) − D) $\frac{d'}{100}$	1.15679										+ .40
											− 6.70
+23.22 δ_2		51 6.83		57 45.3							
+29.65										50	57 15.65
	15.0	1 31.4	28.7	60.1	1 30.05	+06	−11.68	−22	25″	26 18.4	48 40.67
	+14.7				26 30.05	.56 18.30	+ .20			26 18.66	− .6 +9.59
d	1.16732					50 48 29.30	11.02−19+26				+ .20
	9.80058					+ 11.37	− 11.39				+ 9.05
((δ) − D) $\frac{d'}{100}$	1.05584										+ .40
											− 5.80
+23.20 δ_1		52 12.60 3		49 13.7							
+29.25											48 ~~47.46~~ 44.46
	14.1	1 15.7	12.5	28.2	1 14.10	+05	−11.98	−18	25″	26 2.2	48 40.04
	+14.2				26 14.10	.56 34.25	+ .17			26 3.11	− .5 +9.82
d	1.15229					50 48 29.05	11.02−19+16				+ .19
	9.80058					+ 10.99	− 10.99				+ 9.28
((δ) − D) $\frac{d'}{100}$	1.04081										+ .40
											− 6.50
+23.20 δ_2		52 12.76		49 12.6							
+29.25										50	48 43.36
	13.2	0 29.1	26.1	55.2	0 27.60	+04	−10.28	−07	50″	50 17.4	24 41.35
	+ 12.3				50 27.60	32 20.75	+ .09			50 17.99	− .4 +8.99
d	1.08991					50 24 31.45	9.45−8+24				+ .6
	9.80428					+ 9.60	− 9.61				+ 8.62
((δ) − D) $\frac{d'}{100}$	0.98213										+ .35
											− 5.60
+23.10 δ_1		53 9.16		25 13.6							
+28.85											24 44.74
	10.4	0 11.3	8.9	20.2	0 10.10	+03	−7.86	−03	50″	50 2.3	24 41.16
	+10.4				50 10.10	32 38.25	+ .07			50 1.98	− .3 +9.19
d	1.01403					50 24 33.05	7.87−7+32				+ .3
	9.80428					+ 8.11	− 8.12				+ 8.84
((δ) − D) $\frac{d'}{100}$	0.90925										+ .35
											− 6.40
+23.10 δ_2		53 9.15		25 12.8							
+28.85											50 24 43.7 ~~95~~
	7.8 ~~7.8~~	1 11.7	8.8	20.5	1 10.25	+84	−29.44	−18	53″	55 41.4	19 3.02
	+17.8				56 10.25	26 38.10	+ .20			55 56.32	− .9 8.95
d	1.25042					50 18 49.10	13.38−8+63				+ .16
	9.80519					+ 13.92	− 13.93				+ 8.53
((δ) − D) $\frac{d'}{100}$	1.14355										+ .35
											− 5.50
+23.09 δ_1		54 35.95		19 34.7							
+28.20											19 6.47
	16.0	0 55.1	52.1	107.2	0 53.60	+07	−12.46	−14	65″	55 41.1	19 1.90
	+15.8				55 53.60	26 54.75	+ .08			55 41.24	− .7 +9.17
d	1.19864					50 18 49.55	11.80−7+63				+ .14
	9.80519					+ 12.35	− 12.36				+ 8.75
((δ) − D) $\frac{d'}{100}$	1.09149										+ .35
											− 6.20
+23.09 δ_2		54 36.04		19 33.1							
+28.20											19 4.87

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Date$_1$ = Dec 18 — Observer A. M. — Recorder M+R

Date$_2$ = Dec 22 — Observer A. M. — Recorder M+R

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
55	47.3	22.4	6.8	56	50.5	9.3	17.3	21.0	35.0	29.0	1016	20.32	10.87
	55	21.0	9.1									10.87	57 9.45
	κ												−8.24
	((δ) − D) $\frac{\kappa'}{100}$												+ 33
													− 2
												−0 7.93	57 1.52
	α_1												−502
													56 56.50
			7.5	56	49.7	9.0	16.5	20.4	24.5	28.3	987 −7.18	19.74	10.87
	κ												57 8.87
	((δ) − D) $\frac{\kappa'}{100}$												−7.56
													+ .40
													− 2
	α_2											7.18	57 1.69
													−504
													56 56.65
57	14.4	.361	8.0	58	20.0	3.74	46.3	49.0	53.1	57.1	2429	48.58	10.93
58	28	34.7	9.3									10.93	58 37.45
	κ												−8.24
	((δ) − D) $\frac{\kappa'}{100}$												+ 33
													− 2
												7.93	58 29.52
	α_1												−504
					6.0								58 24.48
			8.2	58	14.5	3.80	44.9	48.6	52.8	56.7	2390 −7.18	47.80	10.93
	κ												58 37.07
							Mod. bad						−456
	((δ) − D) $\frac{\kappa'}{100}$												+ 40
													− 2
												−7.18	58 29.69
	α_2												−506
													58 24.83
5	47.1	33.1	7.5	8	55.3	10.4	18.1	3.20	3.58	29.5	1058	2116	10.92
7		31.8	8.9									10.92	9.025
	κ												9.024
	((δ) − D) $\frac{\kappa'}{100}$												−8.24
													+ 33
													− 2
												7.93	9 2.31
	α_1												−505
													8 57.26
			8.0	8	53.6	9.8	17.5	21.4	25.2	29.2	1031 −7.18	2062	10.92
	κ												9.971
													9.970
	((δ) − D) $\frac{\kappa'}{100}$												−7.56
													+ .40
													− 2
												7.18	9 2.52
	α_2												−509
													8 57.43
10	47	29.5	8.2	10	38.7	5.68	64.8	68.7	72.3	76.4	3390	6780	10.90
9	34.9	28.2	8.5									10.90	10 56.90
	κ												−8.24
	((δ) − D) $\frac{\kappa'}{100}$												+ 33
													− 2
13												7.93	10 48.97
	α_2 30												−506
													10 43.91
14	5	perhaps diff. **	9.3	10	29.7	56.8	64.0	68.8	72.0	76.3	3371 −7.18	6742	10.90
16	1							7.32				10.90	10 56.32
	κ												−456
	((δ) − D) $\frac{\kappa'}{100}$												+ .40
													− 2
												−7.18	10 49.14
	α_2												−570
													10 44.04
21	47	54.8	7.5	21	32.4	54.7	2.5	6.3	10.2	14.2	3279	6558	14.60
20	31.7	53.9	7.0									14.60	21 54.58
	κ												−8.24
	((δ) − D) $\frac{\kappa'}{100}$												+ 33
													− 2
												7.93	21 46.65
	α_1												− 5.11
													21 41.54
			7.8	21	31.8	53.9	61.6	65.6	69.6	73.4	32.41 −7.17	6482	14.60
	κ												53.82
													21 53.82
	((δ) − D) $\frac{\kappa'}{100}$												−4.56
													+ .41
													− 2
												7.17	21 46.65
	α_2												− 5.15
													21 41.50

0.53

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Runs -15 R
-15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	s	′ ″	″		′ ″						50
	188	2 27.5	27.0	549	2′ 27.45	+10	+14.64	−37	50	52 126	22 46.73
	+90				52 27.45	30 20.90	+ .11			52′ 12.62	− .10 +9.16
d	1.27875					50 22 31.90	14.95−12				+ .32
	9.84578					+ 14.83	− 14.83				+ 8.59
((δ) − D) $\frac{d'}{100}$	1.17127										+ .35
											− 5.20
+23.13 δ_1		57 19.63	23 17.8								
+27.10											22 5069
	193	2 12.7	10.0	227	2 11.35	+10	+15.03	−33	50	51 56.2	22 46.79
	+19.2				52 11.35	30 37.00	+ .11			51 56.36	− .10 +9.42
d	1.28330					50 22 31.80	14.95−12+16				+ .35
	9.80458					+ 14.99	− 14.99				+ 8.82
((δ) − D) $\frac{d'}{100}$	1.17582										+ .35
											− 5.90
+23.13 δ_2		57 19.78	23 17.4								
+27.10											50 22 5031
	174	4 49.0	47.1	96.1	4 48.05	+08	+13.55	−72	35	39 84.0	35 24.91
	+17.5				39 48.05	43 0.30	+ .16			39 34.45	− .8 +9.70
d	1.24304					50 35 11.30	13.38−17+39				+ .62
	9.80274					+ 13.61	− 13.60				+ 8.87
((δ) − D) $\frac{d'}{100}$	1.13372										+ .35
											− 5.00
+23.21 δ_1		58 47.69	35 56.1								
+26.45											35 29.61
	225	4 34.7	34.3	69.0	4 34.50	+12	+17.51	−68	35	39 16.7	35 26.~~2~~07
	+22.4				39 34.50	43 13.85	+ .22			39 16.93	− .14 +9.99
d	1.35~~411~~025					50 35 8.65	17.32−22+47				+ .74
	9.80274					+ 17.57	− 17.57				+ 9.04
((δ) − D) $\frac{d'}{100}$	1.24~~479~~ 093					42					+ .35
											− 5.70
+23.21 δ_2		58 47.84	35 56.8								
+26.45											50 35 30.5~~1~~36
	151	2 11.5	8.7	20.2	2 10.10	+06	+11.46	−33	40	41 58.2	33 0.84
	+14.9				42 10.10	40 38.25	+ .13			41 58.52	− .6 +9.35
d	1.17319					50 32 49.25	11.12−14+70				+ .29
	9.80305					+ 11.59	− 11.58				+ 8.77
((δ) − D) $\frac{d'}{100}$	1.06418										+ .35
											− 3.70
+23.28 δ_1		9 ~~28.54~~ 0	33 28.5								
+22.00											33 6.49
	162	1 55.0	50.2	105.2	1 52.60	+07	+12.61	−29	40	41 39.9	33 30.8
	+16.1				41 52.60	40 55.75	+ .14			41 39.98	− .7 +9.58
d	1.20683					50 32 58.55	12.89−15+8				+ .30
	9.80305					+ 12.53	− 12.62				+ 9.00
((δ) − D) $\frac{d'}{100}$	1.09782										+ .35
			3								− 4.40
+23.28 δ_2		9 20.71	33 30.3								
+22.00											50 33 8.26
	181	1 42.1	41.2	83.3	1 41.65	+09	+14.09	−25	45	46 27.4	28 31.89
	+18.2				46 41.65	43 86.70	+ .14			46 27.48	− 9 +9.18
d	1.26007					50 28 17.10	14.16−15+16				+ .22
	9.80382					+ 14.19	− 14.17				+ 8.70
((δ) − D) $\frac{d'}{100}$	1.15183										+ .35
											− 3.40
+23.28 δ_1		11 7.19	28 58.9								
+21.20											28 37.67
	268	1 34.3	29.7	64.0	1 32.00	+19	+20.87	−71	45	46 11.3	28 ~~32.04~~ 3.188
	+26.~~8~~6				46 32.00	136 16.35	+ .21			46 11.76	− .20 +9.31
d	1.2~~8~~13488					50 28 11.15	20.46−22				+ .24
	9.80382					+ 20.89	− 20.24				+ 8.92
((δ) − D) $\frac{d'}{100}$	1.31 ~~689~~ 664					73					+ .35
											− 4.20
+23.28 δ_2		11 7.32	28 58.2								36.99
+21.20											50 28 ~~37.15~~
	223	4 59.7	58.2	117.9	4 58.95	+12	+17.36	−74	15	19 41.4	55 17.54
	+22.2				19 58.95	2 49.40	+ .33			19 41.79	− .13 +10.10
d	1.~~34~~6~~35~~					50 55 0.40	17.32−32+16				+ .65
	9.79965					+ 17.14	− 17.16				+ 9.18
((δ) − D) $\frac{d'}{100}$	1.23394										+ .40
											− 2.10
+23.47 δ_1		22 5.01	55 42.0								
+16.50											55 25.54
	221	4 41.4	34.8	81.2	4 40.60	+12	+17.21	−70	15	19 23.0	55 19.53
	+22.0				19 40.60	3 77.5	+ .23			19 23.60	− .13 +10.43
d	1.34242					50 55 2.55	17.32−32				+ .75
	9.79965					+ 16.98	− 17.00				+ 9.41
((δ) − D) $\frac{d'}{100}$	1.23001										+ .40
											− 2.80
+23.47 δ_2		22 4.97	55 43.7								
+16.50											55 27.16

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Date$_1$ = Dec 18 (13) Observer A.M. Recorder W.H.R.

Date$_2$ = Dec 22 (15) Observer A.M. Recorder W.H.R.

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
22 54 s	24 0	7.5	~~22 32.4~~	~~54.4~~	~~62.5~~	~~66.4~~	~~70.2~~	~~74.2~~				
21 39.3	26.2	8.5	22 44.4	1.0	8.8	12.8	16.5	20.4	545	1190	1089	101
K									-7.93		10.89	23 1.01 -8.24
((δ) — D) $\frac{\kappa'}{100}$												+ .33
α_1											-0 7.93	22 53.08
												- 508
												22 48.00
		7.8	22 40.0	0.1	4.8	11.8	15.8	19.7	552	1104	1086	0.15
K									-7.18		10.89	23 .015
((δ) — D) $\frac{\kappa'}{100}$												- 7.56
												+ .40
α_2											7.18	- 2
												22 52.97
												- 5.12
												22 47.85
23 43	1 0	~~8.5~~	~~23 47.4~~	~~1.0~~	(59.8)	3.6	~~7.4~~	11.4	3142	6284	1079	5205
22 28.2	0.2	9.2	23 41.5	5.20		(4.4)	(7.2)		-7.93		10.79	23 5.205
K												- 8.24
((δ) — D) $\frac{\kappa'}{100}$												+ .33
												- .2
α_1											7.93	23 44.12
												- 5.04
												23 39.08
		8.3	23 39.5	5.18	59.2	3.0	6.8	10.6	3144	6288	1079	5143
K									-7.19		10.79	23 57.43
((δ) — D) $\frac{\kappa'}{100}$												- 4.56
												+ .39
α_2											7.19	- 2
												23 44.24
												- 5.08
												23 39.16
28 12	2 6	8.0									1088	
26. 36.8	25.6	8.10									10.88	
K												
((δ) — D) $\frac{\kappa'}{100}$												
α_1												
		7.8									1088	
											10.88	
K												
((δ) — D) $\frac{\kappa'}{100}$												
α_2												
Dec 18 ~~24 9~~	~~-1.6~~	~~8.5~~	~~28~~ 58.3	16.6	24.3	28.3	32.2	36.1	~~1378~~	~~2758~~	1078	1672
21 54.2	-2.2	9.2							-7.94		10.78	29 16.72
K												- 8.24
((δ) — D) $\frac{\kappa'}{100}$												+ .32
α_1											7.94	- 2
												29 8.78
												- 5.01
												29 3.77
		8.0									1076	
K											10.78	
((δ) — D) $\frac{\kappa'}{100}$												
α_2												
K												A.M.
((δ) — D) $\frac{\kappa'}{100}$												0.72
α_1												.73
												.66
												.75
												.71
												.72
K												(5.3)
((δ) — D) $\frac{\kappa'}{100}$												14
α_2												0.73
												0.74

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Runs −15 R
−15 R

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	136	7 47.2	46.1	9.33	2 46.65	+05	−10.59	−42	45	47 35.8	27 23.30
	+13.56				47 46.65	35 1.70	+ .10			47 36.12	− 5 +9.33
d	1.133554					50 27 12.70	10.24 −11 +41				+ .36
	9.80397					+ 10.60	− 10.53				+ 8.67
((δ) − D) $\frac{d'}{100}$	1.025451										+ .35
											− 2.00
+2335 δ_1		23 11.35		27 46.6							27 30.63
+16.00											
	201	2 35.7	38.2	6.89	2 34.45	+11	−15.65	−38	45	47 18.7	27 24.45
	~~209~~				47 34.45	35 13.90	+ .14			47 18.90	− .11 +9.55
d	+202					50 27 8.70	15.74 −15 +16				+ .42
	1.130535					+ 15.75	− 15.75				+ 8.89
((δ) − D) $\frac{d'}{100}$	9.80397										+ .35
	1.19426										− 2.70
+2335 δ_2		23 11.20		27 47.3							50 27 31.30
+16.00											
	105	4 8.2	6.7	1.49	4 7.45	+03	−8.18	−62	10	13 56.7	1 0.24
	+10.6				14 7.45	8 40.90	+ .00			13 59.10	− 3 +9.00
d	1.025231					50 0 51.90	7.87 +48				+ .53
	9.80792					+ 8.34	− 8.35				+ 8.20
((δ) − D) $\frac{d'}{100}$	0.92117										+ .30
											− 1.90
+2322 δ_1		24 2.30		1 23.0							1 7.34
+15.70											
	120	3 53.7	50.7	1.04	3 52.24	+02	−9.34	−58	10	13 42.3	1 0.31
	+1.9				13 52.20	1 8 56.15	+ .00			13 42.83	− 4 +9.29
d	1.075555					50 0 50.95	8.66 +71				+ .62
	9.80792					+ 9.36	− 9.37				+ 8.41
((δ) − D) $\frac{d'}{100}$	1.97141										+ .30
											− 2.60
+2322 δ_2		24 2.38		1 22.7							1 7.00
+15.70											
		3 25.7	23.7	4.94	8 24.70				45		
					48 24.70	34 23.65					
d											
((δ) − D) $\frac{d'}{100}$											
δ_1											
		3 10.2	8.0	1.82	8 9.10				45		
					48 9.10	34 39.25					
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											
	183	0 52.0	51.1	1.03	0 51.55	+09	−14.25	−13	15	15 37.3	59 22.29
	+8.4				15 51.55	6 56.80	+ .01			15 37.06	− 9 +8.48
d	1.264822					49 59 4.80	14.16 +1 +32				+ .10
	9.80822					+ 14.49	− 14.49				+ 8.17
((δ) − D) $\frac{d'}{100}$	1.16098										+ .38
δ_1											− 1.20
											59 29.57
		0 20.3	20.1	5.84	0 29.20				15		
					15 29.20	7 19.15					
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											
d											
((δ) − D) $\frac{d'}{100}$											
δ_1											
d											
((δ) − D) $\frac{d'}{100}$											
δ_2											

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44

Date$_1$ = Dec 18 1870 Observer NSR
n = +27 c = .00 Recorder A.M.

Date$_2$ = Dec 22 1870 Observer
n = +.33 c = .00 Recorder

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
	h m s	° ′ ″		m s	s	s	s	s	s			s	m s
	5 5 11	19 7	9.0	5 5	18.5	26.0	30.0	33.9	37.7	1461	292	10 87	18 36
	54 15.5	14.4	9.1	16.1						−7.93		10.87	55 18 35
	κ												− 8.23
Dre 18													+ .32
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												−0 7.93	55 10.42
	a_1												− 2.93
													55 7.49
	5 7 14	14 1	7.0									10.86	
	56 18.7	13.8	6.8									10.87	
	κ												
Dre 18													
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
	5 8 17	38 1	9.0	58 15.0	24.1	32.1	36.0	39.8	43.8	1758	3516	10 93	24 23
	57 21.3	32.8	8.8							−7.92		10.93	58 24 23
	κ												− 8.23
Dre 18													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	58 16.31
	a_1												− 2.98
													58 13.33
	1 1 35 1	5 23	8.4	1 50.0	2.3	11.2	15.2	19.0	23.0	717	1434	10 99	8 35
	0 59.5	48.2	8.5							−7.92		10.99	2 3 35
	κ												− 8.23
Dre 18													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	1 55.43
	a_2												− 3.03
#													1 52.40
	12 5 57	19 6	9.5	2 53.0	5.0	12.8	16.6	20.4	24.3	791	1582	10 87	4 96
	2 1.3	14.3	9.1							−7.93		10.87	+ 3 .495
	κ												− 8.23
Dre 18													+ .32
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.93	2 57.02
	a_1												− 3.03
													2 53.99
	1 8 57	50 8	9.4	3 52.5	5.0	13.0	17.0	20.8	24.7	805	1610	10 99	5 12
	3 0.9	45.5	9.5							−7.92		10.99	4 5.11
	κ												− 8.23
Dre 18													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	3 57.19
	a_2												− 3.06
													3 54.13
	1 5 8	24 5	8.5	5 28.1	41.6	49.5	53.2	57.1	61.2	2626	5252	10 88	41.64
	4 34.9	19.2	8.9							−7.92		10.88	5 4 1.64
	κ												− 8.23
Dre 18													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	5 33.72
	a_1												− 3.07
													5 30.65
	2 50 38	57 5	8.9	50 32.8	46.9	54.7	58.7	2.7	6.7	2697	5394	10 99	46.96
	49. 31.6	4.76	8.9							−7.92		10.99	50 46.95
	κ												−8.23
Dre 18													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.92	50 39.08
	a_2												− 4.28
													50 34.95
	0 56 4	27 7	9.0	56 2.4	16.0	23.8	27.6	31.4	35.7	1345	2690	10 89	16 01
	55 1.39	22.4	9.2				Dec 22 1870			−7.16		10.90	56 16.00
	κ												− .54
Dre 22													+ .10
	((δ) − D) $\frac{\kappa'}{100}$												− 2
												7.16	56 8.84
	a_1												− 2.85
													56 5.99
	(2 7 55	54 4)	9.0									How	
	2 10 46	−5 3		11 48.8	57.2	7.2	11.0	14.8	18.0	3512	7024	1077	59 4 5.947
	9 4 3.8	−9.9	9.5							−7.18			11 59.47
	Dre 22												− 7.55
	((δ) − D) $\frac{\kappa'}{100}$												+ .39
													− 2
	a_2												11 52.29
													− 3.77
													11 48.52

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Dec 18 - 7 Reg 49.24 R.
22 8 ~~4.30~~ R.
6.26

Runs -15 R

45

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
+22	s 105	δ 2′80	25.2	5.32	δ 5660	+03	−8.18	−13	55	55 1821	19 3423
0.34242	+10.4				55 2660	27 21.75	+.05			55 18.47	4664
9.80504	1.01403					58 19 32.51	7.87−6+32				− .3
0.23540	9.80504					+ ~~8.13~~	=8.13				+ 5 +8.90
((δ) − D) $\frac{d'}{100}$	0.91001					+ 1.72					+ 8.53
											+ .35
											− 27.00
+1728 δ_1		55 24.77		20 43.5							
+1 27.35											19 ~~2254~~
											16.13
		1 8.2	5.8	140	1 700				55		
d					56 7.00	26 41.35					
						58 18 52.11					
((δ) − D) $\frac{d'}{100}$											
δ_2											
											50
	91	1 54.3	55.1	1144	1 5720	+02	−7.04	−29	35	36 4994	38 9.05
	92				36 57.20	45 51.15	+.09			36 50.06	− 3 +9.44
d	0.96379					58 38 1.91	7.08−10+16				+ .26
	9.80228					+ 7.14	−7.14				+ 8.86
((δ) − D) $\frac{d'}{100}$	0.85401										+ .35
											− 26.90
+17.31 δ_1		58 30.64		39 28.6							
+1 37.00											50 37 51.59
	133	1 54.1	50.0	1041	1 5205	+05	−10.35	−28	20	21 416	53 17.33
	+13.3				21 52.05	0 56.30	+.18			21 14.77	− 5 +9.74
d	1.12385					58 53 7.06	10.24−20+24				+ .25
	9.79996					+ 10.27	−10.28				+ 9.14
((δ) − D) $\frac{d'}{100}$	1.01175										+ .40
											+ − 26.70
+17.56 δ_2		2 9.96		54 37.0							
+1 36.60											50 53 037
	120	0 43.0	39.0	620	0 4102	+04	−9.34	−10	53	55 3147	19 27.41
	+11.9				55 41.00	27 7.35	+.07			55 31.70	− 4 +8.93
d	1.07555					58 19 18.11	8.66−6+70				+ 9
	9.80519					+ 9.30	−9.30				+ 8.53
((δ) − D) $\frac{d'}{100}$	0.96868										+ .35
											− 26.60
+17.55 δ_1		3 11.54		20 46.2							
+1 36.50											50 19 9.74
	125	4 36.4	32.2	686	4 3430	+04	−9.73	−68	20	24 2311	50 34.55
	+12.6				24 34.30	58 14.05	+.23			24 24.86	− 5 +10.04
d	1.10037					58 50 24.81	9.48−17+46				+ 60
	9.80043					+ 9.74	−9.74				+ 9.09
((δ) − D) $\frac{d'}{100}$	0.98874										+ .40
											− 26.70
+17.62 δ_2		4 11.75		51 54.2							
+1 36.35											50 50 1789
	135	0 39.6	85.6	1752	0 8760	+05	−10.51	−10	50	50 2711	24 32.05
	+13.5				50 37.60	32 10.75	+.09			50 27.05	− 5 +9.04
d	1.13033					58 24 21.51	10.24−9+40				+ 8
	9.80443					+ 10.54	−10.55				+ 8.62
((δ) − D) $\frac{d'}{100}$	1.02270										+ .35
											− 26.50
+17.64 δ_1		~~45~~ 46.29		22 50.7							
+1 36.15											50 24 ~~1457~~
	141	3 48.4	45.1	938	3 4690	+05	−14.98	−57	20	23 2356	51 33.11
	+14.1				23 46.90	59 1.45	+.19			23 36.00	− 2 5 +9.95
d	1.14922					58 51 12.21	11.02−20+8				+ .49
	9.80027					+ 10.90	−10.90				+ 9.11
((δ) − D) $\frac{d'}{100}$	1.03743										+ .40
											− ~~19.00~~ 18.50
+20.93 δ_2		50 55.6		52 28.2							
+1 13.65											50 51 ~~2456~~ 14.56
	136	2.21.8	16.9	385	2 1925	+05	−10.59	−35	45	47 24	27 35.50 −206
	+13.6				47 19.25	35 29.10	+.10			47 8.65	− 5 +9.56
d	1.13354					58 27 24.90	10.24−11+47				+ 37
	9.80397					+ 10.60	−10.60				+ 8.84
((δ) − D) $\frac{d'}{100}$	1.02543										+ .35
											− 27.20
+17.32 δ_1		56 23.31		28 53.6							Omitted in copy.
+1 37.25											49 27 ~~1756~~ 15.80
	104	(0 45.0	41.0)	860	0 4300	+03	−8.80	−10	20	20 346	54 59.47 −206
	+10.4	4 55.3	51.5	1068	4 53.40		8.14		15	84	− 3 +9.35
d	1.02938				~~20 53.20~~	(2 5.35)					+ .48
	9.80882				19 53.40	2 54.95					+ 8.30
((δ) − D) $\frac{d'}{100}$	0.92614					49 54 50.75					+ .30
						+ 8.44					− 22.88
δ_2											+28
											54 ~~4554~~
											43.78

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Date$_1$ = Dec 18 — Observer A.M. — Recorder H.S.R. — Date$_2$ = Dec 18 — Observer A.M. — Recorder H.S.R. — Run

$n = +27$ $c = +00$ — $50°$

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3	2h 25m 24s	17.4	9.0	25m 24.7s	33.1s	40.9s (44.8)	48.6s	5.24	56.2s	−7.93	43.96s	10.85s	25 33.11
	24 15.0 K	14.0	9.0									10.85	−8.23
													+ .32
													− .2
	((δ) − D) $\frac{\kappa'}{100}$											−0 7.93	25 25.18
													−4.53
	α_1												25 20.65
4	8 34	−1.3	7.0	8	24.5	41.4	49.3	53.0	56.8	60.7	24.12	5.224	10.78	41.46
	7 22.2 K	−4.8	4.8								−7.93		10.79	8 41.45
														−8.23
														+ .32
	((δ) − D) $\frac{\kappa'}{100}$													− .2
												7.93	8 33.52
	α_2												−4.79
													8 28.73
4	9 30	6.24	7.8	9	25.0	38.2	46.2	50.0	54.0	57.8	24.62	4.924	11.03	38.21
	8 17.9 K	5.9.7	8.2								−7.92		11.03	9 38.21
														−8.23
														+ .33
	((δ) − D) $\frac{\kappa'}{100}$													− .2
												7.92	9 30.29
	α_1												−4.87
													9 25.42
4	10 25	3.64	7.0	10	21.6	34.3	41.6	45.7	49.6	53.6	22.48	4.496	10.93	34.03
	9 13.5 K	33.7	6.1								−7.92		10.93	10 34.03
														−8.23
														+ .33
	((δ) − D) $\frac{\kappa'}{100}$													− .2
												7.92	10 26.11
	α_2												−9.85
													10 21.26
4	12 8	3.88	9.5	11	57.0	1.6	25.4	29.3	33.1	37.0	14.24	2.848	10.94	17.54
	10 56.8 K	36.2	9.5								−7.92		10.94	12 17.54
														−8.23
														+ .33
	((δ) − D) $\frac{\kappa'}{100}$													− .2
												7.92	12 9.62
	α_1												−4.86
													12 4.76
4	25 54	2.54	8.0	25m 49.8	6.8	14.4	18.5	22.2	26.3	8.82	1.764	10.87	6.78
	24 45.8 K	18.1	8.9							−7.92		10.89	26 6.77
													−8.23
													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− .2
												7.92	25 58.85
	α_2												−4.90
													25 53.95
4	41 54	1.77	8.5	41 57.4	2.1	10.2	14.0	17.8	21.8	6.59	1.318	10.86	2.32
	40 40.0 K	15.9	9.2							−7.93		10.86	42 2.32
													−8.24
													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− .2
												7.93	41 54.39
	α_1												−4.96
													41 49.43
5	13 30	6.1	8.2	13 15.0	39.0	46.9	50.8	54.7	58.5	24.99	4.998	10.81	39.17
	12 16.1 K	4.9	8.2							−7.94		10.81	13 39.17
													−8.24
													+ .32
	((δ) − D) $\frac{\kappa'}{100}$												− .2
												7.94	13 38.23
	α_2												−5.03
													13 26.20
5	14 50	5.15	8.4	14 43.2	57.7	6.5.5	69.5	73.5	77.5	34.39	6.874	10.99	57.76
	13 35.3 K	50.4	8.3							−7.93		10.99	14 57.75
													−8.24
													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− .2
												7.93	14 49.82
	α_1												−5.10
													14 44.72
5	16 1	5.40	8.5	15 52.9	10.0	18.0	21.8	25.8	29.8	10.54	2.108	11.00	10.08
	14 46.5 K	53.0	9.2							−7.93		11.00	16 10.08
													−8.24
													+ .33
	((δ) − D) $\frac{\kappa'}{100}$												− .2
												7.93	16 2.15
	α_2												−5.10
													15 57.05

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Dre 18 -7° Ry 49.00 M.

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Runs -15-R

50°

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ'	
	s'	2' 46ᵖ	4' 40	9 0.6	2' 45.30	+02	−6.57	−41	55'	57 38.71		17 2062	
	84				57 45.30	1 25 3.05	+ .03					− .2	+9.18
	+84					50 17 14.05	6.30−3+32					+ 36	
d	0.92428					+ 6.57	−6.57					+ 8.49	
((δ) − D) $\frac{d'}{100}$	9.80550											+ .35	
	0.81772											− 1560	
+21.65 δ₁		25 42.30		18 16.8							49	17 1420	
+1 2.55													
	119	1 44.4	41.3	1 85.7	1 42.85	+01	−9.22	−25	151	16 33.4		58 2587	
	+119				16 42.85	1 6 5.50	+ .00			16 33.39		− 4	+8.64
d	1.07555					49 58 16.50	8.66+1+79					+ .22	
((δ) − D) $\frac{d'}{100}$	9.80837					+ 9.37	−9.46					+ 8.16	
	0.97186											+ .30	
+22.40 δ₂		8 51.13		59 10.3								−11.00	
+46.75											51	58 23.51	
	132	3 2.9	0.6	3.3	3 1.65	+05	−10.28	−45	120	12 51.7		2 7.87	
	+132				13 1.65	1 9 46.70	+ .22			12 51.55		− 5	+8.95
d	1.12057					51 1 57.40	10.01−1+8					+ .39	
((δ) − D) $\frac{d'}{100}$	9.79856					+ 10.17	−10.08					+ 8.21	
	1.00707											+ .40	
+22.69 δ₁		9 48.11		2 52.3								− 10.90	
+46.35											50	2 5.92	
	127	4 1.9	−1.0	0.7	4 0.35	+06	−11.44	−60	351	38 48.5		36 864	
	+12.4				39 0.35	1 43 48.00	+ .14			38 50.71		− 4	+9.66
d	1.09342					50 35 57.00	9.45−12+31					+ .52	
((δ) − D) $\frac{d'}{100}$	9.80259					+ 9.64	−9.64					+ 8.83	
	0.98395											+ .35	
+22.59 δ₂		10 43.85		36 53.6								− 10.70	
+46.05											50	36 7.60	
	236	1 49.1	44.8	93.9	1 46.95	+14	−18.37	−27	351	36 28.6		38 3065	
	+23.5				36 46.95	1 46 1.40	+ .35			36 28.69		− .14	+9.31
d	1.37107	−				50 38 12.40	18.11−24+39					+ .23	
((δ) − D) $\frac{d'}{100}$	9.80228					+ 18.25	−18.26					+ 8.87	
	1.26129											+ .35	
+22.63 δ₁		12 27.39		39 14.8								− 10.50	
+45.35											50	38 29.46	
	170	0 8.8	6.0	13.8	0 6.90	+08	−13.23	−02	55	54 53.8		20 5.74	
	+17a				55 6.90	1 27 41.45	+ .09			54 53.61		− 8	+8.82
d	1.23045					50 19 52.45	13.38−9					+ 1	
((δ) − D) $\frac{d'}{100}$	9.80504					+ 13.29	−13.29					+ 8.54	
	1.12343											+ .35	
+22.75 δ₂		26 16.70		20 45.7								− 8.80	
+39.90											50	20 5.76	
	107	2 4.8	1.6	6.4	2 3.20	+03	− 8.33	−38	55	56 54.6		18 4.68	
	+10.9				57 3.20	1 25 45.15	+ .05			56 54.68		− 3	+9.10
d	1.03743					50 17 56.15	7.87−5+70					+ .27	
((δ) − D) $\frac{d'}{100}$	9.80534					+ 8.53	−8.52					+ 8.51	
	0.93071											+ .35	
+22.95 δ₁		42 12.38		18 40.2								− 7.00	
+33.40											50	18 6.78	
	240	0 1.9	0.9	2.8	0 1.20	+14	−18.68	−03	10	9 42.19		~~45~~ 17.17	
	+24.2				10 1.20	12 47.15	+ .04					− .15	+8.41
d	1.38382					50 4 58.15	18.89−4+16					+ 0	
((δ) − D) $\frac{d'}{100}$	9.80731					+ 19.02	−19.01					+ 8.26	
	1.27907											+ .30	
+23.19 δ₂		13 48.39		5 42.6								− 3.10	
+20.10											50	5 ~~4~~ 22.48	
	140	3 58.9	56.3	115.0	3 57.50	+05	−10.90	−59	20	23 46.68		51 1267	
	+140				23 57.50	1 58 50.85	+ .19					− 5	+9.98
d	1.14613					50 51 1.85	11.02−20					+ .52	
((δ) − D) $\frac{d'}{100}$	9.80027					+ 10.82	−10.82					+ 9.11	
	1.03434											+ .40	
+23.41 δ₁		15 8.13		51 39.2								− 3.00	
+19.50											50	51 1965	
	171	1 41.1	38.7	79.8	1 39.90	+08	−13.31	−25	20	21 26.55		53 3284	
	+17.2				21 39.90	1 53 8.55	+ .25					− 8	+9.69
d	1.23553					50 53 19.55	13.38−25+16					+ .22	
((δ) − D) $\frac{d'}{100}$	9.79996					+ 13.29	−13.29					+ 9.15	
	1.03549											+ .40	
+23.43 δ₂		16 20.48		53 58.7								− 2.80	
+19.00												53 39.73	

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Date$_1$ = Dec 22 UT Observer A.M. Recorder W.A.C. Date$_2$ = Observer Recorder Ru

n = +.33 C = .00

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2 28 4	134	92	3 22 54	12.0	19.1	23.8	27.8	31.7	1147	2:29.4	10.84	12 10
21 54.5	10.0	9.0							−7.20		10.84	23 12.10
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .39
												− .2
a_1											−0 7.20	23 4.90
												−4.49
												23 0.41
3 32 00	80	80	31	44.0	2.2	15.0	18.7	22.7	26.6	902	1804	10.87	7.18
30 9.8	20.7	7.8							−7.19		10.87	32 7.17
30.6												−7.57
κ												+ .40
((δ) − D) $\frac{\kappa'}{100}$												− .2
											7.19	31 59.98
a_2												−4.57
												31 55.41
3 33 45	052	44	33	33.0	53.8	1.3	5.6	9.2	13.4	3233	6466	10.88	53.78 52
32 35.5	21.7	9.0							−7.19		10.88	33 53.78
κ							5.2		13.1			−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .40
												− .2
a_1											7.19	33 46.54 33
												−4.59
												33 42.80 41.74
3 34 48	−67	90	35	5.0	51.4	58.9	3.0	7.0	11.3	31.16	6232	10.76	51.56
33 38.0	−10.0	9.0							−7.20		10.76	34 51.56
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .39
												− .2
a_2											7.20	34 44.36
												−4.56
												34 39.80
3 37 8	483	92	36	49.0	16.4	24.1	28.1	32.0	36.3	1369	2738	10.98	16.41
36 38.4	45.0	9.0							−7.19		10.98	37 16.40
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .40
												− .2
a_1											7.19	37 9.21
												−4.64
												37 4.57
3 39 6	54.0	80	38	57.4	13.0	20.9	24.8	28.8	32.6	1241	2402	11.02	13.90
37 55.5	55.8	7.0							−7.18		11.02	39 13.90
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .41
												− .2
a_2											7.18	39 5.82
												−4.67
												39 1.15
3 40 10	44.0	88	39	57.5	(14.3	17.7	34.9)	34.7	39.0	1450	2980	10.98	(18.82)
38 59.8	44.9	8.8		24.8					−7.18		10.98	40 −7.57
κ												+ .41
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1											7.18	40 11.64
												−4.66
												40 6.98
3 41 36	576	90	41	45	45.8	53.5	57.6	61.5	65.3	2537	5074	11.02	45.73
40 25.3	54.5	9.0							−7.18		11.02	41 45.73
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .41
												− .2
a_2											7.18	41 38.54
												−4.70
												41 33.84
3 42 52	54.0	78	42	42.6	0.4	8.0	12.0	16.1	20.2	567	1134	11.02	0.32
41 41.9	56.0	8.8							−7.18		11.02	43 0.32
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .41
												− .2
a_1											7.18	42 53.14
												−4.70
												42 48.44
3 44 8	338	76	44	6.9	16.0	23.7	27.8	31.7	35.6	1348	2696	10.92	16.04
42 57.5	30.8	8.3							−7.19		10.92	44 16.04
κ												−7.57
((δ) − D) $\frac{\kappa'}{100}$												+ .40
												− .2
a_2											7.19	44 8.85
												−4.68
												44 4.17

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Dec 22 -8 Rep 5.20 m

Runs -15R

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	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ'
	5	141.2	37.0	7.82	1 3910	+08	-13.55	-25	0°	1 2554	13 17.76
	174				1 39.10	.21 9.25	+ .06			1' 25.38	− 9 +9.11
d	+1.75					50 13 4.05	13.38-6+40				+ .27
	1.243704					+ 13.71	− 13.72				+ 863
((δ) − D) $\frac{d'}{100}$	9.80610										+ .30
	1.13408										− 16.50
+21.58 δ_1		23 21.99	14 13.7								50 13 10.37
+1 3.35											
	232	1 12.2 7.2		19.4	1 9.70	+13	-18.06	-16	50	50 5.17	23 41.56
	+2.32				51 9.70	38 38.65	+ .12			50 57.56	− .14 +9.23
d	1.365449					50 23 33.45	18.11-13+16				+ .19
	9.80443					+ 18.11	-18.14				+ 883
((δ) − D) $\frac{d'}{100}$	1.25786										+ .35
											− 15.80
δ_2											50 23 35.19
	208	0 26.8 23.6		50.4	0 25.20	+12	-16.99	-06	30	50 9.2	24 34.18 33.95
	+20.85				50 25.20	.32 23.15	+ .14			50 8.97	− .12 +9.15
d	1.318506 175					50 24 17.95	15.74-14+6.3				+ 6
	9.80443					+ 16.23	-16.23				+ 886
((δ) − D) $\frac{d'}{100}$	1.21043										+ .35
	1.20412										− 15.40
+21.86 δ_1		34 3.60	25 27.4								49 24 27.93 70
+59.65											
	−134	1 44.0 45.0		94.0	1 4700	+04	+9.03	-27	20	21 6.38	58.2 34.49 45.57
	1.127110				21 47.00	1 135	− .02			22 25.83	− .64 +6.23
	9.80927					49 52 56.15	37.77+8+48				+ .29
	1.024231					+ 38.34	+38.33				+ 8.28
((δ) − D) $\frac{d'}{100}$	1.68664					− 10.58					+ .30
	4.80912										− 15.30
	1.58370										38.50
+21.76 δ_2		35 1.56	53 37.6								50 58.2 27.47
+59.25											
	274	2 26.4 22.2		48.4	2 2420	20	-21.33	-36	25	27 9.1	47 40.16
	+2.74				27 24.20	55 24.15	+ .36			29 3.00	− .20 +9.85
d	1.437775					50 47 18.95	+2125-36 31				+ .38
	9.80089					+ 21.21	− 21.21				+ 9.27
((δ) − D) $\frac{d'}{100}$	1.32658										+ .40
											− 15.20
+22.02 δ_1		37 26.59	48 33.3								50 47 34.81
+58.45											
	216	1 38.2 34.8		73.0	1 3650	+12	-16.82	-24	15	16 19.9	58 23.31
	+2.16				16 36.50	.6 11.85	+ .34			16 19.86	− .12 +10.01
d	1.334445					50 58 6.65	16.18+46				+ .26
	9.79918					+ 16.66	− 16.64				+ 9.47
((δ) − D) $\frac{d'}{100}$	1.22157										+ .40
											− 15.00
+22.10 δ_2		39 23.25	59 16.2								50 58 18.37
+57.85											
	+ 540	2 11	2 45.2 4.8		27.0 2 1857		-16.42	-33	25	26 5.71	19 41.46
	1.732391	24 +9.0			27 69.50	55 34.85	+ .22			26 5.880	− .10 +9.91
	9.80089	1.27875				50 46 5.65	14.95-25				+ .35
	1.62122	9.80089				+ 14.71	-14.70				+ 9.26
((δ) − D) $\frac{d'}{100}$		1.16758				+ 41.81					+ .40
						47 25.65					− 14.80
+22.08 δ_1		40 29.06	48 33.9								47 9.47
+57.35											36.57
		2 14.1 18.0		32.1 2 1695					15		
					17 16.95	5 32.30					
d						50 57 27.10					
((δ) − D) $\frac{d'}{100}$											−4.50
+22.15 δ_2		41 55.99	- - -								50
+56.85											
12.8	12.8	1 54.4 0.6		6.0 1 800		+05	-9.92	-15	15	15 58.1	58 49.94
	+1.27				16 8.00	6 45.35	+ .19			15 53.22	− 5 +10.02
d	1.103380					50 58 40.15	9.24 +54				+ .19
	9.79903					+ 9.79	− 9.78				+ 9.48
((δ) − D) $\frac{d'}{100}$	0.99077										+ .40
											− 14.50
+22.18 δ_1		43 10.62	59 41.8								50 58 45.46
+56.35											
9.1	9.1	1 32.8 29.1		61.9 1 3045		+02	-7.09	-23	40	41 23.7	33.19.28
	+.91				41 30.91	1841 17.40	+ .09			41 23.88	− 3 +9.58
d	0.959904					50 1833 12.20	7.08-9+8				+ .24
	9.80305					+ 7.08	− 7.07				+ 9.02
((δ) − D) $\frac{d'}{100}$	0.85003										+ .35
											− 14.40
+22.10 δ_2		44 26.27	34 10.4								33 14.46
+55.90											

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Date$_1$ = Dec 22 1870 Observer A.M. Recorder W.A.R. Date$_2$ = Observer Recorder

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	45 14	−2,3	8.0	44	59.3	21.8	29.3	33.3	36.6	40.8	1618	3236	10 78	2158
	44 3.3	−5.2	8.8								−7.20		10.78	45 21.58
	κ													−7.57
	((δ) − D) $\frac{\kappa'}{100}$													+.39
														−.2
	c_1												−0 7.20	45 14.38 +2
														−4.78 2
														45 9.66 +5
3	47 43	28.8	8.2	47	28.2	57.8	59.5	3.4	7.4	11.4	3185	6270	1090	5180
	46 32.6	25.9	9.0								−7.19		1090	47 51.80
	κ													−7.57
	((δ) − D) $\frac{\kappa'}{100}$													+.40
														−.2
	c_2												7.19	47 44.61
														−4.69 +22
														47 39.92 +5
3	50 13	31.4	9.4	49	54.4	22.3	29.4	33.9	38.0	41.9	1658	3316	1091	2225
	49 2.4	28.5	9.3								−7.19		10.91	50 22.25
	κ													−7.57
	((δ) − D) $\frac{\kappa'}{100}$													+.40
														−.2
	a_1												7.19	50 15.06
														−4.71 +2
														50 10.35 +5
3	52 14	16.4	9.8	52	3.6	21.4	29.4	33.1	37.0	41.0	1619	3238	1086	2158
	51 3.0	13.5	8.0								−7.19		10.85	52 21.53
	κ													−7.57
	((δ) − D) $\frac{\kappa'}{100}$													+.40
														−.2
	a_2												7.19	52 0.38
														−4.71 +2
														52 9.63 +5
3	54 ~~22.7~~	2.82	9.0	53	49.5	16.4	24.4	28.2	31.9	35.6	1365	2730	1090	1640
	52 ~~56.8~~ 57	25.5	9.5								−7.19		10.90	54 16.40
	κ													−7.57
	((δ) − D) $\frac{\kappa'}{100}$													+.40
														−.2
	a_1												7.19	54 9.21
														−4.74 +2
														54 4.47 +5
3	56 ~~22~~	4.81	8.8	53	4.4	18.6	26.6	30.2	34.3	38.3	1480	2960	1095	1865
	~~54 18.7~~	40.8	9.0								−7.19		10.95	55 18.65
	53 κ 57.8	1												−4.57
	((δ) − D) $\frac{\kappa'}{100}$													+.40
														−.2
	a_2												7.19	55 11.46 ~~8.38~~ +2
														−4.76 +5
														55 6.70
3	57 8	13.4	8.0	56	54.0	15.8	23.1	27.4	31.2	35.2	1327	2654	10.84	1570
	55 κ 56.8	10.6	8.9								−7.20		10.84	57 15.70
	((δ) − D) $\frac{\kappa'}{100}$													−4.57
														+.39
														−.2
	a_1												7.20	57 8.50
														−4.75 +2
														57 3.75 +5
4 2	53 35	−7.8	8.8	55	31.2	43.8	51.6	53.7	57.2	63.2	2729	5458	10.76	4386
	54 20.9	−9.3	9.1			7	9	3			−7.19		10.76	55 43.86 2
	κ													−7.56
	((δ) − D) $\frac{\kappa'}{100}$													+.37
														−.2
	a_2												7.19	55 36.63
														−5.01 +2
														55 31.62 +2

Obs. the means ~~have~~ in the two dates for have been created;

I Where the values for both dates are given by the observer that the mean of the separate differences for each star equals the difference of the mean

II Where the value is given for a single date only it has been recomputed.

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Runs -15 R

50°

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	49	δ'
	225 +22.3	2 24.5	23.8	51.3	2 25.65	+13	+17.52	-36	15	17 78	57 35.07	
					17 28.65	5 22.70	+ .01			17 8.08	− .13	+ 16.88
d	1.34830					49 54 17.50	17.32+1+24				+ .38	
	9.80852					+ 17.57	−17.57				+ 8.33	
((δ) − D) $\frac{d'}{100}$	1.86476										+ .30	
	24										− 14.20	
+24.99 δ_1		45 31.65		58 25.3							50 57 29.75	
+55.55												
	236 +23.6	1 23.3	21.0	44.3	1 22.15	+14	+18.37	−21	45	46 8.9	28 39.39	
					46 22.15	36 26.20	+ .18			46 3.74	− .15	+ 9.35
d	1.37291					50 28 21.50	18.11−17+47				+ 22	
	9.80382					+ 18.39	− 18.41				+ 8.93	
((δ) − D) $\frac{d'}{100}$	1.26967										+ .35	
											− 14.00	
+22.15 δ_2		48 2.07		29 29.3							50 28 38.74	
+54.60												
	279 +27.8	3 50.0	48.1	98.1	3 49.05	+21	−21.72	−57	40	43 27.2	31 15.74	
					43 49.05	38 59.30	+ .22			43 27.41	− .21	+ 9.72
d	1.44404					50 30 54.10	21.25−24+63				+ .61	
	9.80336					+ 21.64	−21.64				+ 8.97	
((δ) − D) $\frac{d'}{100}$	1.33534										+ .35	
											− 13.70	
+22.21 δ_1		50 32.56		32 5.5							50 31 11.76	
+53.70												
	158 +15.9	3 43.4	43.2	86.6	8 43.30	+07	−12.30	−56	55	58 30.85	16 12.29	
					58 43.30	24 6.05	+ .26				− .7	+ 9.56
d	1.20140					50 15 59.85	11.80−6+71				+ .59	
	9.80565					+ 12.44	−12.45				+ 8.69	
((δ) − D) $\frac{d'}{100}$	1.09499										+ .35	
											− 13.60	
+22.19 δ_2		52 31.82		17 1.2							50 16 8.25	
+52.95												
	269 +26.9	1 53.1	53.1	106.2	1 54.10	+19	−20.94	−28	45	46 33.14	28 10.02	
					46 54.10	35 54.25	+ .21				− .20	+ 9.37
d	1.42975					50 27 49.05	20.46−20+70				+ .30	
	9.80382					+ 20.97	−20.96				+ 8.92	
((δ) − D) $\frac{d'}{100}$	1.32151										+ .35	
											− 13.30	
+22.27 δ_1		54 26.74		28 58.3							50 28 6.09	
+52.25												
	142 +14.2	1.2	−0.9	0.3	1 0.15	+05	−11.06	−15	30	30 49.14	42 54.01	
					30 0.15	5 0.48.20	+ .16				− .5	+ 9.66
d	1.15229					50 43 43.00	11.02−17+16				+ .16	
	9.80136					+ 11.01	−11.01				+ 9.20	
((δ) − D) $\frac{d'}{100}$	1.04059										+ .35	
											− 13.20	
+22.35 δ_2		55 29.05		43 42.2							50 41 50.47	
+51.70												
	218 +21.7	1 42.8	40.2	83.0	1 41.50	+12	−16.92	−25	0	1 24.49	13 18.65	
					1 41.50	211 6.85	+ .07				− .13	+ 9.07
d	1.33646					50 13 1.65	16.53−8+56				+ .27	
	9.80610					+ 17.00	−17.01				+ 8.63	
((δ) − D) $\frac{d'}{100}$	1.23050										+ .30	
											− 12.90	
+22.27 δ_1		57 26.02		14 5.9							13 14.82	
+51.10												
	126 +12.6	2 54.5	52.8	107.3	22 53.65	459 5470	9.81		20		49 51 59.52 45	
						49 51 49.50	.02				− .05	+ 8.79
d	1.10037					+ 9.75	9.45+3+56				+ .14	
	9.80927						−10.04				+ 8.35	
((δ) − D) $\frac{d'}{100}$	0.99758										+ .35	
											− 5.60	
+22.98 δ_2		55 54.60		52 30.3							52 2.77 64	
+27.70												
d												
((δ) − D) $\frac{d'}{100}$												
δ_1												
d												
((δ) − D) $\frac{d'}{100}$												
δ_2												

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Date$_1$ = Dec 26 1870 $n = +.31$ $c = .00$
Jan 1 1871 $n = +.38$ $c = .00$

Observer W. H. K.
Recorder Am

16

Date$_2$ = Dec 31 $n = +.36$ $c = .00$

Observer Mack
Recorder Am

17

Dec 26

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T	
Dec 26 / Jan 1	35 30 / 34 30.4	52.3 / 47.4	7.0 / ~~7.8~~ 7.0	35 / 35	22.4 / 19.8	34.9 / 32.4	42.9 / 40.3	46.7 / 44.4	50.7 / 48.1	54.7 / 52.1	2299 / 2173	45.98 / 43.46	1059 3499 / 1099 −6.04 / 10.99 + .37 / 10.99 − 2 / + / − 5.69	35 32.47 / −3.81 / 3499 +.96 / 3497 − 2 / 29.10 / + 57 / 29.67	1.1 / 9.8 / 0.9 / +186 / +1 31 / +14. / +1 1
Dec 26 / Dec 31	20 44 / 22 53		7.0	35	19.5	32.7	40.6	44.6	48.5	52.5	2189 / −3.68	43.78	1099 / 10.99	35 3279 / −4.10 / + .44 / − 2 / 29.11 / − 3.19 / 25.92	+18. / +1 3
Dec 26 / Jan 1	39 6 / 38 6.5	128 / 7.9	8.5 / ~~8.8~~ 8.6	38 / 38	58.4 / 57.9	12.0 / 11.8	19.7 / 17.2	23.5 / 21.0	27.4 / 25.0	31.3 / 28.8	1139 / 1015	22.78 / 20.30	1084 1194 / 1084 −6.04 / 10.84 + .37 / 10.84 − 2 / − 6.25 / − 3.33 / 2.92	946 / −3.81 / 39 1147.45 / 39 946 − 2 / 6.08 / + 54 / 39 6.62	1. / 9. / 1. / +187 / +1 3
Dec 31			8.5	38	57.8	9.8	17.8	21.5	25.3	29.2	1036 / −3.68	20.72	1084 / 10.84	39 988 / −4.09 / + .43 / − 2 / 6.20 / −3.22 / 2.98	+14. / +1 1 / +18. / +1 31
	42 34 / 41 34.2	469 / 42.1	— / ~~8.9~~ 8.8	42 / 42	32.0 / 17.7	40.7 / 38.0	46.6 / 46.1	52.5 / 50.1	56.4 / 54.0	0.3 / 58.0	2585 / 2465	51.70 / 44.30	1097 4073 / 1097 −6.04 / 10.97 + .38 / 10.97 − 2 / + 35.05 / − 3.40 / 42 31.65	3833 / −3.81 / 42 4073 + .46 / 42 3833 − 2 / 42 34.96 / + 52 / 42 35.48	0.9 / 9. / 0. / +18.9 / +1 30 / +15. / +1 1
			8.9 / ~~8.5~~	42 / ~~42~~	~~17.7~~ 17.7	38.8	46.6	50.6	54.4	58.4	2488 / −3.67	49.76	1097 / 10.97	42 3879 / −4.09 / + .44 / − 2 / 35.12 / − 3.28 / 42 31.84	+18 / +1 1
Dec 26	46 41 / 45 40.0	139 / 8.1	8.5 / 8.6 / ~~8.8~~	46	35.1	47.0	54.7	58.4	2.2	6.3	2886 / −5.69	57.72	1084 / 10.84	4686 / 46 4688 / −6.04 / + .37 / − 2 / 41.19 / − 3.41 / 46 37.78	+18 / +1 2
Dec 31			8.7	46	26.2	44.8	52.5	56.4	0.3	4.2	2782 / − 3.68	55.64	1084 / 10.84	4480 / 46 4480 / −4.09 / + .43 / − 2 / 41.12 / − 3.32 / 46 37.80	+18 / +1
Dec 26	48 53 / 47 52.7	8.9 / 8.1	8.5 / 8.6	48	45.7	58.4	6.1	10.1	13.9	17.8	3463 / −5.69	69.26	1082 / 10.82	5844 / 48 5844 / −6.04 / + .37 / − 2 / 52.75 / − 3.44 / 48 49.31	+19 / +1.2
Dec 31			8.7	48	41.0	56.3	4.0	8.0	11.7	15.7	3357 / − 3.68	67.14	1082 / 10.82	5632 / 48 5632 / −4.09 / + .43 / − 2 / 52.64 / − 3.35 / 48 49.29	+19. / +1 2
														+2.08 −6.60	

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Dec 26 - 7 51.73 R. +19 Rys.
31 4993 R. 22
Jan 1 4950 R. 22

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Runs Dec 26 - 18 Dec 31 - 20 Jan 1 - 18

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ'
1.10037	125	3 1.48	18.0	33.5	3 16.75	+.04	-9.23	-.59	20	23 66	51 49.61
9.80012	126	3 20.3	18.0	38.5	3 19.25	+.04	9.87	-.59	20	23 9.0	− .5
0.98848 d 3	+12.6				23 16.75	59 31.60	9.45 -17 + 46		50 51 49.61	23 7.01	+ .63
	12.8	50 51 49.6	50 51 49.41		23 19.25	50 51 39.87	9.45 -17 + 54		+10.10	23 9.43	+ 9.13
((δ) − D) d'/100	1.10380	+ 10.10	+.026			+ 9.74	-9.74				+ .40
+18.69	9.80012	44				59 29.10	-9.82		50 51 49.61	50 51 49.41	− 25.60
+1 31.65 δ1	0.99186	35 54.70	53 5.8			50 51 39.60			+10.10	+.026	− 7.60
+14.95		35 44.62	53 5.4			+ 9.81					51 34.12
+1 13.32	132	3 21.3	19.8	41.0	3 20.50	+.05	-10.28	-.69	20	23 9.8	51 48.20
	+13.3				28 20.50	55 27.85	+ .18			23 10.21	− .5 +9.99
d	1.12385					50 51 37.92	10.24 -19 + 24				+ .73
	9.80012					+ 10.28	-10.29				+ 8.91
((δ) − D) d'/100	1.01191										+ .40
+18.69											− 25.90
+1 31.65 δ2		35 44.61	53 3.9								50 51 32.29
											44.45
1.13033	136	2 34.3	21.1	55.4	2 27.70	+.05	-10.59	-.44	0	2 16.8	12 39.50
9.80610	17.6	2 30.1	26.1	56.0	2 28.50	+.08	-13.70	-.54		2 14.5	− .5
1.02437	+13.5				2 27.72	20 28.650	10.24 -4 + 40			2 17.10	+ .46
	17.6	50 12 44.45	50 12 44.14		2 28.50	50 12 28.92 33.87	10.5 -10.60			2 14.70	+ 8.43
((δ) − D) d'/100	1.24551	+ 9.14	+ 9.22			+ 1058	+.06				+ .30
+18.73	9.80610					20 19.85	13.38 -6 + 48		50 12 44.45	50 12 44.14	− 25.30
+1 31.00 δ1	1.13955	39 21.65	13 59.3			50 12 30.35	- 13.80		+ 9.14	+ 9.22	
+14.98		39 21.60	13 58.8			+ 13.79					12 28.29
+1 12.80	120	2 26.2	21.9	48.1	2 24.05	+.04	-9.34	-.50	0	2 14.3	12 43.85
	+12.1				2 24.05	20 24.30	+.04			2 14.56	− .4 +9.00
d	1.08279					50 12 34.34	9.45 -4 + 8				+ .53
	9.80610					+ 9.48	-9.49				+ 8.21
((δ) − D) d'/100	0.97683										+ .30
+18.73											− 25.60
+1 31.00 δ2		39 21.71	13 58.3								50 12 27.25
0.93952	87	2 5.8	08	6.6	3 3.30	+.02	-6.77	-.63	25	27 5.60	47 0.05
9.80089	20.6	3 15.4	12.9	28.3	3 14.15	+.12	-16.04	-.58		27 5.79	− .3
0.82835	+8.7				28 3.30	54 45.05	6.30 -10 + 54			27 5.56	+ .59
	20.6	50 47 0.05	50 47 0.65		28 14.15	50 46 53.32	15.74 -26 + 62			27 5.05	+ 9.05
((δ) − D) d'/100	1.31387	+10.01	+ 10.07			+ 6.73	- 6.74		50 47 0.05	50 47 0.65	+ .40
+18.90	9.80089					54 34.20	.26 - 16.10		+10.01	+10.07	− 25.20
+1 30.35 δ1	1.20270	42 50.55	48 15.2			50 46 44.10					
+15.13		42 50.61	48 15.5			+ 15.95					46 44.86
+1 12.28	191	2 14.4	11.2	25.6	3 12.80	+.10	-14.82	-.64	25	27 5.76	47 0.41
	+19.1				28 12.80	54 35.55	+.24			27 5.81	− .10 +9.84
d	1.28103					50 46 48.62	14.95 -24 + 8				+ .70
	9.80089					+ 14.79	-14.79				+ 8.84
((δ) − D) d'/100	1.16986										+ .40
+18.90											− 25.50
+1 12.28 30.35 δ2		42 50.74	48 15.1								50 46 44.75
	119	2 21.9	19.2	41.1	2 20.55	+.02	-9.27	-.41	0	2 10.9	12 45.31
	+11.8	2 32.0	24.4	61.4	2 30.70	20 27.80	+.02	-.45	0	2 11.29	− .4 +9.14
d	1.07188				2 20.55	50 12 36.07	8.66 -4 + 64				+ .44
	9.80610				2 30.70	+ 9.24	-9.26				+ 8.44
((δ) − D) d'/100	0.96592										+ .30
+18.97											− 24.80
+1 29.55 δ1		46 56.75	13 59.2								12 29.65
	186	2 30.5	26.0	56.5	2 28.25	+.10	-14.48	-.49	0	2 13.4	12 44.74
	+18.6				2 28.25	20 20.10	+.02			2 13.68	− .10 +8.96
d	1.26951					50 12 30.17	14.16 -7 + 48				+ .55
	9.80610					+ 14.57	-14.59				+ 8.21
((δ) − D) d'/100	1.16355										+ .30
+18.97											− 25.10
+1 29.55 δ2		46 56.77	13 58.2								50 12 28.60
	130	1 20.0	17.6	37.6	1 18.80	+.05	-10.12	-.23	0	6 8.5	8 48.02
	+13.0				6 18.80	16 29.55	+.03			6 8.09	− .5 +8.89
d	1.11394					50 8 34.82	10.24 -3				+ .28
	9.80671					+ 10.20	-10.21				+ 8.36
((δ) − D) d'/100	1.00859										+ .30
+19.03											− 24.70
+1 29.10 δ1		49 8.34	10 1.3								8 32.21
	158	1 25.2	19.1	44.3	1 22.15	+.06	-11.91	-.27	0	6 10.1	8 48.27
	+15.3				6 22.15	16 12.620	+.04			6 10.14	− .6 +8.69
d	1.18469					50 8 36.27	11.80 -3 + 24				+ .31
	9.80671					+ 12.00	-12.01				+ 8.14
((δ) − D) d'/100	1.07934										+ .30
+19.03											− 25.00
+1 29.10 δ2		49 8.32	10 1.1								8 31.96

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Date$_1$ = Dec 31 1870 $n=+36$ $c=.0050$ Observer NAK Recorder AMM

Date$_2$ = Jan 7 1871 $n=+38$ $c=.00$ Jan 7 1871 $n=T_g+30$ $c=.00$ Observer NAK Recorder AMM

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2 Psc 26	6 54.8	81 3.3	9.7 9.0	7	42.8	57.4 (Dec 26 54.0)	13.4 9.0	16.4 13.4	20.6 16.4	35.68 -5.69	71.36	10.82 10.82	6 54 (60.54) 57.2 −6.04 +.37 −.2 +19.5
	κ										−0 5.69		6 51.73 −3.66 +/ 2
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
Jan 7			8.7 9.3	6	39.5	55.1	2.9	6.8	10.7	14.5	33.00	66.00	10.82 55.18 6 48.07 51.94 1.
	κ			6	43.5	52.2	59.7	3.3	7.3	11.3	31.38 -3.67 -0.61	62.76	10.82 −4.08 10.82 +.48 10.82 −.26 51.51 −3.56 +.49 6 47.95
	((δ) − D) $\frac{\kappa'}{100}$										−0 3.67 −59 59.62		6 51.33 +.36 51.94 −.2 6 51.83 +19.5 +/ 25
	a_2												
Dec 31	9 14.8 8 11.4	172 11.6	8.9 9.0	8	57.4	(Dec 31 18.3 26.0	29.8	33.5	37.5	14.57 -3.67	29.02	10.85 10.85	9 18.17 −4.08 +.43 −.2
	κ												
10 25	((δ) − D) $\frac{\kappa'}{100}$										−0 3.67		9 14.50 −3.60 +19.
	a_1												
Jan 7			9.0	8	59.7	15.0	22.8	26.5	30.3	34.1	12.87 -0.61	25.74	10.85 10.85 9 10.90 +/ 24
	κ												9 14.89 −0.95 +.36 −.2
	((δ) − D) $\frac{\kappa'}{100}$										0.60		9 14.28 +.48 +15.7
	a_2												9 14.77 +/ 7
Dec 31	11 36 10 33.0	215 16.8	6.5 7.0	11	23.3	38.1	45.8	48.8 9	53.7	57.6	24.50 -3.67	49.00	10.87 10.87 11 38.13 −4.08 +.43 −.2
	κ												
	((δ) − D) $\frac{\kappa'}{100}$										−0 3.67		11 34.46 −3.63 +19.
	a_1												11 30.83 +/ 24
Jan 7			—	11	21.0	34.9	42.7	46.4	50.4	54.3	22.87 -0.61	45.74	10.87 10.87 11 34.87 −0.95 +.36 −.2
	κ												
	((δ) − D) $\frac{\kappa'}{100}$										0.60 −59 59.68		11 34.26 +.46 +15.8
	a_2												11 34.73 +/ 7.
1 Psc 40	1 3 36.4	115 36.9	8.9 9.0									10.94 10.94	
1 40	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
Jan 7			9.2	14	27.9	41.0	48.6	52.5	56.5	60.3	25.89 -0.61	51.78	10.94 10.94 14 40.84 −0.95 +.36 −.2
	κ												
	((δ) − D) $\frac{\kappa'}{100}$										−0.60 −59 59.72		14 40.23 +.44 +15.9
	a_2												14 40.68 +/ 6.6
Dec 31	16 57 15 53.8	−52 −9.7	8.0 8.7	16	46.6	1.1	8.9	12.7	16.5	20.5	59.7 -3.66	119.4	10.77 10.77 17 1.17 −.08 +.44 −.2
	κ												
	((δ) − D) $\frac{\kappa'}{100}$										−0 3.66		17 57.51 −3.72 +19
	a_1												16 53.79 +/
Jan 7			8.6	16	41.0	58.1	57	9.4	13.3	17.3	34.38 -0.60	68.76	10.77 10.77 16 57.99 −0.95 +.37 −.2
	κ												
	((δ) − D) $\frac{\kappa'}{100}$										0.59 −54 59.45		16 57.39 +.42 +18
	a_2												16 57.82 +/ 6

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Dec 31 −7′ 49.93″ R. +.22 Ross
Jan 1 49.50 R. .22
Runs 7 Dec 26 = −.18 24 Dec 31 = −.20 Jan 1 = −.18 Jan 7 = −.23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	146 s	2 11 24.2	19.1	43.0	2 11 21.65	+06	−15.26	−.43	5	7 6.1		7 46.93	
	+.146				7 21.65	15 26.70	+.04			7 10.18		− 6	+9.02
d	1.16435					50 7 34.97	11.02 −3 +48					+ 44	
	9.80686					+ 11.46	−11.47					+ 8.34	
((δ) − D) $\frac{d'}{100}$	1.05915											+ .30	
												− 23.50	
+19.58 δ₁		7 7.65		8 57.2								7 31.95	
+/ 25.25													
1.19590	.156	2 24.9	20.4	45.6	2 22.80	+.07	−12.15	−.48	5	7 1.03		7 47.94	7 48.78
9.80686	.87	2 18.0	16.0	34.0	2 17.00	+.01	−5.22	−.41	5	7 1.14		− 7	− 2
1.09076 d	+.157				7 2.280	15 25.55	11.80 −3 +.56			7 10:47		+ 5.3	+ 55
	+.84				7 17.00	50 7 35.62	5.30 −2 +.32			7 10.40		+ 8.13	+8.52
((δ) − D) $\frac{d'}{100}$	0.92428	7 47.94	7 48.78			+ 12.32	+.03 −12.33					+ .30	+ .30
	9.80686	+8.89	+9.35			15 31.35	+.01 −6.60					− 23.90	−7.20
+19.58	0.81908	7 7.53		8 58.2		50 7 42.19					50	7 32.93	7 30.93
+/ 25.25 δ₂	+.1567	7 11.43		8 58.2		+ 6.59							
+/ 8.20		7 7.50		9 0.18	59.1								
	197	4 27.3	24.2	51.5	4 25.75	+.11	−15.46	−.76	55	59 9.7		15 48.17	
	+.198				58 25.75	23 22.60	+.09			59 10.25		− .11	+9.43
d	1.29667					50 15 32.67	14.95 −9 +.64					+ .97	
	9.80565					+ 15.50	−15.50					+ 8.27	
((δ) − D) $\frac{d'}{100}$	1.19026											+ .30	
												− 23.90	
δ₁		9 30.56		16 58.4								15 32.70	
+19.66													
+/ 24.70	153	4 23.0	22.0	45.0	4 22.50	+.06	−11.91	−.79	55	59 9.7		15 48.59	
	+.152				59 22.50	23 25.85	+.07			59 10.61		− 6	+9.97
d	1.18184					50 15 36.69	11.80 −7 +.16					+ 1.06	
	9.80565					+ 11.90	−11.89					+ 8.67	
((δ) − D) $\frac{d'}{100}$	1.07543											+ .30	
												− 7.30	
+15.73 δ₂		9 30.50		16 59.0							50	15 51.26	
+/ 7.76													
	148	3 25.4	21.9	47.1	3 23.55	+.06	−11.52	−.61	52	53 11.5		21 46.43	
	+.148				53 23.55	29 24.80	+.08			53 11.99		− 6	+9.41
d	1.17026					50 21 39.87	11.02 −9 +.63					+ .75	
	9.80473					+ 11.56	−11.56					+ 8.37	
((δ) − D) $\frac{d'}{100}$	1.06293											+ .35	
												− 23.70	
+19.74 δ₁		11 50.57		22 56.3								21 32.14	
+/ 24.15													
	139	3 24.3	22.3	46.6	3 23.30	+.05	−10.82	−.60	50	53 12.0		21 46.75	
	+.139				53 23.30	29 25.05	+.08			53 12.44		− 5	+9.58 90
d	1.14301					50 21 38.89	10.24 −8 +.70					+ .82	
	9.80473					+ 10.86	−10.86					+ 8.78	
((δ) − D) $\frac{d'}{100}$	1.03568											+ .35	
												− 7.20	
+15.80 δ₂		11 50.53		22 56.8								21 49.45	
+/ 7.32													
		3 32.1	29.0	61.1	3 30.55				30				
					53 30.55	49 17.80							
d													
((δ) − D) $\frac{d'}{100}$													
δ₁											50		
	191	3 29.2	26.4	55.6	3 27.80	+.05	−10.20	−.64	30	33 16.7		41 41.89	
	+.129				53 27.80	49 21.05	+.16			33 17.30		− 5	
d	1.11059					50 41 38.89	9.45 −14 +.69					+ .84	
	9.80166					+ 15.00	−15.00					+ 9.05	+10.19
((δ) − D) $\frac{d'}{100}$	1.00019											+ .35	
												− 7.30	
+15.92 δ₂		14 56.60		42 51.5							49 50	41 44.78	
+/ 6.68													
	145	0 24.8	20.0	44.8	0 22.40	+.05	−11.29	−.07	2.0	20 11.1		54 47.53	
	+.146				20 22.40	2 25.95	+.02			20 10.88		− 6	+9.42 0
d	1.16435					49 54 36.82	11.02 +2 +.48					+ 9	
	9.80882					+ 11.51	−11.52					+ 8.94	
((δ) − D) $\frac{d'}{100}$	1.06111											+ .40	
												− 24.10	
+19.83 δ₁		17 13.62		55 55.68								54 32.83	
+/ 22.85													
	171	0 27.0	23.7	50.7	0 25.35	+.08	−13.31	−.08	2.0	20 12.1		54 47.24	
	+.170				20 25.35	2 23.00	+.02			20 11.94		− 8	+9.83
d	1.23045					49 54 38.84	13.38 +3					+ .10	
	9.80882					+ 13.40	−13.41					+ 9.38 41	
((δ) − D) $\frac{d'}{100}$	1.12721											+ .40	
												− 7.30	
+15.87 δ₂		17 13.69		55 56.05								54 49.77	
+/ 6.28													

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Date$_1$ = Dec 31 1870 — Observer W.A.R. / Recorder A.M. — Date$_2$ = Jan 1 1871 / Jan 7 1871 — Observer W.A.R. / Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
	h m s	° ′		m s	s	s	s	s	s		s	s	m s
	2 19 14	−0 5	6.5	19 0.0	16.7	24.5	28.3	32.2	35.9	1376	27.52	10 19	
	18 10.6	−5.0	61.5							−3.67		10.79	19 16.73
	κ												−4.08
	((δ) − D) $\frac{\kappa'}{100}$												+ .43
													− .2
	α_1												19 13.06 +19.91
													19 9.35 +1 22.
Jan 7			6.5	18 57.0	13.5	21.3	25.0	28.9	32.7	1214	2428	1079	
										−0.6x0		10.79	19 13.49
	κ												−0.954
	((δ) − D) $\frac{\kappa'}{100}$												+ .36
													− .2
	α_2												19 12.89 +15.93
													+ .41
													19 13.30 +1 5.8
Dec 31	21 22	60 9	8.8	21 10.7	26.8	34.7	38.4	42.4	46.5	1868	3776	1102	
	20 19.0	56.5	8.9							−3.66		11.02	21 26.74
	κ												− 4.08
	((δ) − D) $\frac{\kappa'}{100}$												+ .44
													− .2
	α_1												21 23.08 +20.13
													21 19.30 +1 21.
Jan 7			8.4	21 6.9	23.4	31.4	35.3	39.1	43.2	1724	3448	1102	
										−0.6059		11.02	21 23.46
	κ												−0.954
	((δ) − D) $\frac{\kappa'}{100}$												+ .37
													− .2
	α_2												21 22.86 +16.11
													+ .39
													21 23.26 +1 5.3
Dec 31	30 2	11 9	8.4	29 47.0	4.7	12.6	16.3	20.4	24.2	782	1564	1083	
	28 57.0	7.6	8.2							−3.67		10.83	30 4.81
	κ												− 4.08
	((δ) − D) $\frac{\kappa'}{100}$												+ .43
33 4													− .2
	α_1												30 1.14 +20.2
													−3.84
													+1 19.
			8.6										29 57.30
			8.4										1.71
	κ												−0.964
Jan 7	((δ) − D) $\frac{\kappa'}{100}$			29 39.1 (45.1)	1.6	9.5	13.3	17.2	21.1	627 −2.620	1254	1083 10.83	+ .36
													30 −2.171
	α_2												30 1.09 −0.96
													+ .34
													30 1.445 +16.2
													+1 3.5
Dec 31	37 31	4 9	8.2	37 20.5	34.0	41.7	45.6	49.0	53.5	2238	4476	1081	
	36 25.3	0.7	8.1							−3.67		10.81	37 33.95
	κ												− 4.08
	((δ) − D) $\frac{\kappa'}{100}$												+ .43
													− .2
	α_1												37 30.28 +20.4
													−3.93
													+1 17.
Jan 1			8.8	37 16.6	33.8	41.5	45.2	49.1	52.9	2225	4450	1081	
										−3.38		10.81	37 33.69
	κ												− 3.81
	((δ) − D) $\frac{\kappa'}{100}$												+ .45
													− .2
	α_2												37 30.71 +16.3
													+ .18
													37 2.88 +1 1.
													30.49
Dec 31	39 6	6 0 8	8.0	38 57.3	9.5	17.5	21.3	25.2	29.3	1028	2056	1102	
	38 0.0	56.7	7.6							−3.66		11.02	39 9.54
	κ												− .08
	((δ) − D) $\frac{\kappa'}{100}$												+ .44
													− .2
	α_1												39 5.88 +20.6
													−3.99
													+1 17.
													39 1.89
Jan 1			8.0	38 55.0 50.3	9.2	17.1	21.0	24.9	29.0	1062 −3.37	2024	1102 11.02	9.22 −3.82 + .44 39
	κ												652 1.1
													9.22 −0.98 9.7
Jan 7	((δ) − D) $\frac{\kappa'}{100}$			39 38.2 56.8	6.6	14.3	18.3	22.3	26.2	877 −0.6159	1754	1102 −.240 11.02 5.85	+ .37 1.0
													−.2
	α_2											39 +.16	65 2.59 39
												48 6.01	+ .28
													Jan 7 6.21 +16.3
													+1

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Runs Dec 31 – 28 Jan 1 – 18 Jan 7 – 23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	8′	
	167	0 48.6	43.4	92.0	0 46.00	+08	−13.00 −15	15	15	8.29	59 25.57	
	+16.7				15 46.00	7 2.35	+ .00		15	32.55	− 8	+6.39
d	1.22272					49 59 12.92	12.59 + 56				+ .18	
	9.80822					+ 13.15	−13.15				+ 7.99	
((δ) − D) $\frac{d'}{100}$	1.11888										+ 30	
	+19.91										− 23.10	
δ_1	+1 22.25	19 29.26		0 33.1							59 10.86	
	165	0 48.0	43.8	91.8	0 45.90	+07	−12.85 −17	15	15	8.30	59 26.28	
	+16.5				15 45.90	7 2.45	+ .00		15	32.91	− 7	+8.80
d	1.21748					49 59 13.29	12.59 + 40				+ .19	
	9.88822					+ 12.99	−12.99				+ 8.38	
((δ) − D) $\frac{d'}{100}$	1.11364					59 26.28					+ 30	
	+15.93										− 7.10	
δ_2	+1 5.80	19 29.23		0 33.8							59 27.98	
											51	
	161	0 7.2	1.8	9.0	0 4.50	+07	−12.54 −15	15	14	5.21	0 6.25	
	+16.0				15 4.50	7 43.85	+ .26		14	52.18	− 7	+9.42
d	1.20412					50 59 53.92	12.32				+ 2	
	9.79887					+ 12.33	− 12.32				+ 9.07	
((δ) − D) $\frac{d'}{100}$	1.09093										+ 40	
	+20.13										− 23.20	
δ_1	+1 21.70	21 39.43		1 14.2							59 52.47	
	166	0 8.8	4.4	13.2	0 6.60	+07	−12.85 −02	15	14	5.41	0 5.38	
	+12.6				15 6.60	7 41.75	+ .26		14	53.82	− 8	+9.85
d	1.22011					50 59 52.59	12.32 + 46				+ 2	
	9.79887					+ 12.79	− 12.78				+ 9.51	
((δ) − D) $\frac{d'}{100}$	1.10692										+ 40	
	+16.11										− 7.30	
δ_2	+1 5.36	21 39.37		1 13.3							0 7.93	
											50	
	177	3 16.0	12.8	29.0	3 14.50	+08	−13.38 −65	0	3	0.2	11 5.87	
	+17.8				3 14.50	19 33.85	+ .05		3	0.54	− 9	+9.11
d	1.25042					50 11 43.92	13.38-6+64				+ .70	
	9.80625					+ 13.95	−13.96				+ 8.20	
((δ) − D) $\frac{d'}{100}$	1.14461										+ 30	
	+20.24										− 22.30	
δ_1	+1 19.45	30 17.54		13 4.1							11 4.68	
	225	~~3 18.1~~	~~14.1~~	~~32.2~~	~~3 16.10~~		−17.51	0			11 5.15	
	+22.6	3 17.0	16.5	35.5	3 17.75	+02	+ .07 −76	0	2	5.96	− .14	+9.56
d	1.35411				~~3 16.10~~		17.32-7+48		2	0.02	+ .79	
	9.80625				8 17.75	19 30.60	−17.78				+ 8.61	
((δ) − D) $\frac{d'}{100}$	1.24830					50 11 41.44					+ .30	
	+16.20					+ 17.71					+ .30	
δ_2	+1 3.56	30 17.65		13 5.4							− 6.90	
											50 12 1.81	
	135	0 57.0	52.3	109.3	0 54.65	+05	−10.51 −18	10	10	4.40	4 14.30	
	+13.4				10 54.65	11 53.70	+ .02		10	44.11	− 5	+8.52
d	1.12710					50 4 3.47	10.24-2+32				+ .20	
	9.80746					+ 10.53	−10.54				+ 8.07	
((δ) − D) $\frac{d'}{100}$	1.02250										+ 30	
	+20.43										− 21.70	
δ_1	+1 17.40	37 46.78		5 18.5							4 1.12	
	172	0 57.5	54.1	111.6	0 55.80	+08	−13.39 −16	10	14	4.24	4 16.49	
	+17.1				10 55.80	11 52.55	+ .02		10	42.36	− 6	+8.78
d	1.23302					50 4 3.05	13.38-2+8				+ .22	
	9.80746					+ 13.44	−13.44				+ 8.32	
((δ) − D) $\frac{d'}{100}$	1.12840										+ 30	
	+16.35										− 6.30	
δ_2	+1 1.92	37 46.84		5 20.9							4 18.97	
											57	
	122	4 40.5	37.0	77.5	4 38.75	+04	−9.50 −93	10	14	2.85	0 29.07	
	+12.2				14 38.75	8 9.60	+ .20		14	29.35	− 4	+10.44
d	1.40836					51 0 19.67	9.24+16				+ 1.01	
	9.79887					+ 9.40	−9.40				+ 9.07	
((δ) − D) $\frac{d'}{100}$	0.97317										+ 40	
	+20.65										− 21.80	
δ_1	+1 17.00	39 22.54		1 34.7							0 17.71	(Jan)
652	1.15229	14.2	4 42.9	41.8	84.7	4 42.35	+03	−11.06 −108	10	14 30.21	0 27.44	0 28.91
−0.984	9.79887	9.6	4			14 42.35	8 6.00	+ .22			5	− 3
+ .31	1.03910	+14.2	4 38.6	34.9			51 0 16.50	10.78+16			− 1.03	+ 1.10
− 2		+ 9.1	50 0 27.44	50 0 29.91		14 36.75	+ 10.94	6.93+54			+ 9.34	+ 9.51
2.591	(δ) − D $\frac{d'}{100}$	1.15229	+ 16.72	50.63				−10.94			+ 40	+ 40
+ 28		0.98674					8 10.60	− 7.47			− 6.50	− 7.00
6.21		0.98667					51 0 27.44				0 31.66	0 32.89
	δ_2 +16.52	9.79887	39 22.53	1 33.3			+ 7.47					
		087348	39 22.73	1 34.5								
	+1 1.60											

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Date$_1$ = Dec 31 1870 — Observer WAR — Recorder A.M.

Date$_2$ = Jan 1 1871 / Jan 7 1871 — Observer W.A.R. — Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	44 15	30 4	9 2	43	58.8	18.7	26.6	30.4	34.3	38.4	1484	29.68	1090
	43 8.6	26.3	9.3								−3.66		1090
	κ												44 18.78
	((δ) − D) $\frac{\kappa'}{100}$												−4.08
													+ .44
													− .2
	a_1												44 15.12
													−4.02
													44 11.10
		0	9 5		10.0	18.6	26.0	30.0	34.0	38.9	1465	2930	1090 1840
			9.0	44	2.3	16.4	23.4	27.4	31.5	35.5	(1330)	2666	1090 2382
	κ										−3.38 −0.62	0	10.90 + .46
	((δ) − D) $\frac{\kappa'}{100}$												10.90 − .2
													15.02
													+ .13
	a_2												44 15.15
2	44 20	30 1	8 6	44	31.1	23.6	31.8	35.3	39.3	43.1	1731	3462	1090
	43 13.9	26.0	8.1							42.8	− 3.66		10.90
	κ												44 23.72
	((δ) − D) $\frac{\kappa'}{100}$												−4.08
													+ .44
													− .2
	a_1												44 20.06
													−4.02
													44 16.04
			8.5	44	47.7	23.3	31.4	34.8	38.8	42.8	1711	3422	1090
											−3.38		10.90
	κ												44 23.32
	((δ) − D) $\frac{\kappa'}{100}$												−3.82
													+ .46
													− .2
	a_2												44 19.94
													+ .13
													44 20.07
2	45 58	27 2	8 4	45	46.6	2.3	10.1	14.0	18.0	21.9	663	1326	1089
	44 52.6	23.1	8.5								−3.67		10.89
	κ												46 2.37
	((δ) − D) $\frac{\kappa'}{100}$												−4.08
													+ .43
													− .2
	a_1												45 58.30
													−4.03
													45 54.67
			8 7	45	45.9	2.0	9.8	13.6	17.5	21.3	636	1284	1089 195
			8.2										10.89 −.382
	κ			45	46.6	59.0	7.0	10.9	14.7	18.7	3503	7086	10.89 + .46
	((δ) − D) $\frac{\kappa'}{100}$										−3.38 −0.62	0	10.89 − .2
													58.57
													+ .13
	a_2												45 58.70
													46 59.07
													1.98 −.08
													+ .36
													48 59.17 −.2
													45 58.57
													+ .24
													45 58.81
2	47 50	16 0	8 1	47	35.7	53.1	0.9	4.9	8.7	12.7	3203	6406	1085
	46 43.8	12.0	8.5								−3.67		10.85
	κ												47 53.21
	((δ) − D) $\frac{\kappa'}{100}$												−4.08
													+ .43
													− .2
	a_1												47 49.54
													−4.05
													47 45.49
			8 8	47	35.2	53.0	0.9	4.6	8.9	12.6	3200	6400	1085 5315
			8.4	47	32.5	50.2	57.8	1.7	5.6	9.6			10.85 −.382
	κ										3049	6098	10.85 + .46
	((δ) − D) $\frac{\kappa'}{100}$										−3.38 −0.63	0	10.85 − .2
													49.77
													+ .12
	a_2												47 49.89
													47 50.13
													−.09
													+ .36
													47 50.10 −.2
													47 49.50
													+ .23
													47 49.76
2	52 50	16 5	8 0	53	38.8	53.4	1.5	5.0	9.0	13.0	3219	6438	1085
	52 44.0	12.6	9.0								−3.67		10.85
	κ												53 53.53
	((δ) − D) $\frac{\kappa'}{100}$												−4.08
													+ .43
													− .2
	a_1			54.5									53 49.86
													−4.11
													53 45.75
		Cnl.	9 5	53	18.4	3	51.4	5.2	9.0	(18.7)	3282	6564	1085 5348
			9.2	53	30.1	50.4	58.0	2.1	6.0	9.7			10.85 −.382
	κ										3062	6124	10.85 + .46
	((δ) − D) $\frac{\kappa'}{100}$										−3.38 −0.63	0	10.85 − .2
													50.18
													+ .08
	a_2												53 50.18
													53 50.34
													−.09
													+ .36
													53 50.39 −.2
													49.76
													+ .19
													53 49.98

0.36 3.11

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Runs Dec31 = -.20 Jan1 = -.18 Jan7 = -.23

$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′
195 +20.0	4 576	584	1110	4 5550 44 5550	+11 37 5285 50 30 2.92 + 15.58	+15.18 + 13- 15.74-17 -15.57	-98	46	44 396 44 39.73	30 18.50 — .11 + 1.08 + 8.53 + .35 — 21.30 30 7.05	+9.85
d 1.30103 9.80351 $((\delta) - D)\frac{d'}{100}$ 1.19248											
+20.69 δ_1 +/ 15.55	44 31.78		31 22.6								
86 +8.4 +13.4 0.92428	4 486 4 578 +10.18	471 500 +10.40	957 1078	4 4785 4 5090 44 4745 44 50.90	+02 38 0.50 50 30 11.00 + 6.54 37 5745 50 30 8.29 + 10.44	-6.70 -10.67 6.30+32 10.24+32 +10.6 -6.62 +11 -10.56	-86 -1.01	50 40	44 403 44 39.94 44 41.23 44 40.34	30 17.54 — 2 + 1.06 + 8.79 + .35 — 6.30 30 21.42	30 18.73 — 5 + 1.15 + 8.95 + .35 — 6.50 30 22.33
0.92428 9.80351 $((\delta) - D)\frac{d'}{100}$ 1.12710											
+16.56 δ_2 +/ 1.01855	44 31.71 44 31.95		31 21.9 31 22.8								
75 -.4 d 0.86923n 9.80351 $((\delta) - D)\frac{d'}{100}$ 0.76068n	4 576	584	1160	4 5800 44 5800	+01 37 50.35 50 30 0.42 — 5.76	+5.84 — .06 5.52-6+32 +5.78	-99	40	45 286 45 8.78	29 54.66 — 2 + 1.10 + 8.52 + .35 — 21.30 29 43.31	29 55.10 +9.95
+20.69 δ_1 +/ 15.50	44 36.73		30 58.8								
244 -244 d 1.38739n 9.80351 $((\delta) - D)\frac{d'}{100}$ 1.27884n	446.3	43.2	895	4 4475 44 4475	+15 38 3.60 50 30 14.10 — 19.00	+19.00 — .20 18.89-20+32 +19.01	-84	40.8	45 286 45 3.76	29 55.10 — .16 + 1.03 + 8.78 + .35 — 6.30 29 58.80	+10.00
+16.56 δ_2 +/ 0.40	44 36.63		30 59.2								
157 +15.8 d 1.19866 9.80397 $((\delta) - D)\frac{d'}{100}$ 1.09057	3 074	55.1	1153	2 5775 47 5775	+17 34 50.60 50 27 0.67 + 12.32	-12.20 + .10 11.80-12+63 -12.31	-79	45	47 450 47 48.44	27 12.99 — .07 + .66 + 8.48 + .35 — 21.10 27 1.31	+9.42
+20.73 δ_1 +/ 15.05	46 15.40		28 16.4								
1.20412 9.80397 1.09603	161 184 +16.0 +18.6	2 594 3 2.9 50 27 12.98 +9.67	573 0.1 -50 27 12.29 +9.86	1167 2.8	2 5835 3 1.40 47 5835 48 1.40	+07 +09 34 50.00 50 27 0.50 + 12.48 34 46.95 50 26 59.99 + 14.50	-12.52 -14.33 12.59-12 14.16-14+47 -12.47 +12. -14.19 +.13	-52 -69 48 45	47 455 47 466 47 45.58 47 46.91	27 12.98 — .07 + .66 + 8.73 + .35 — 6.20 27 16.45	27 12.29 — .10 + .72 + 8.89 + .35 — 6.70 27 16.45
d 1.26951 9.80397 $((\delta) - D)\frac{d'}{100}$ 1.16142											
+16.58 δ_2 +/ 0.04	46 15.28 46 15.39		28 16.5 28 15.5								
174 +17.5 d 1.24304 9.80565 $((\delta) - D)\frac{d'}{100}$ 1.13663	3580	54.0	1120	3 5600 58 56.00	+08 23 52.35 50 16 2.42 + 13.70	-13.55 — .07 13.38-7+40 -13.71	-78	55	58 418 58 42.29	16 16.12 — .10 + .86 + 8.28 + .35 — 21.00 16 4.51	+9.39
+20.74 δ_1 +/ 14.50	48 6.23		17 19.0								
1.25527 9.80565 1.14886	178 177 +18.0 +17.6	3 582 3 5.78 50 16 15.64 +9.68	560 5.48 50 16 16.67 +9.89	1142 1126	3 5710 3 5630 58 57.10 58 56.30	+10 +09 23 51.25 50 16 1.75 + 14.09 23 52.05 50 16 2.89 + 13.78	-14.64 -13.78 14.16-8 13.38-7+47 -14.08 +.06 -13.78	-70 -91 55 55	58 419 58 41.8 58 43.02 58 42.52	16 15.84 — .09 + .88 + 8.54 + .35 — 6.10 16 19.42	16 16.67 — .09 + .94 + 8.69 + .36 — 6.60 16 19.86
1.25527 9.80565 1.24551 $((\delta) - D)\frac{d'}{100}$ 1.24551											
+16.59 δ_2 +59.60	48 6.48 48 6.35		17 19.0 17 19.6								
176 +17 d 1.24797 9.80565 $((\delta) - D)\frac{d'}{100}$ 1.14156	3479	43.1	910	3 4550 58 45.50	+06 24 2.85 50 16 12.92 + 13.85	-13.70 +.06 13.38-7+55 -13.56	-75	55	58 321 58 31.64	16 26.77 — .09 + .84 + 8.28 + .35 — 20.50 16 15.65	+9.38
+20.89 δ_1 +/ 12.70	54 6.64		17 28.3								
1.40140m 1.54158 -.50565 1.29493m	-188 195 +3.8 -2.5	3 147 3 48.3 50 16 25.68 +9.42	122 43.1 50 16 28.75 +9.86	269 914	3 1345 3 45.70 58 13.45 58 45.70	+10 +10 24 34.60 50 16 45.40 -19.92 24 25.68 50 16 13.49 + 15.26	+14.64 -15.18 26.76-15+63 14.78-8+40 +.06 -27.24 -15.27	-56 -86 55 55	58 295 58 29.8 58 30.43	16 25.68 — .17 + .70 + 8.54 + .35 — 6.00 16 29.10	16 28.75 — .10 + .92 + 8.69 + .35 — 6.50 16 32.11
1.24797 9.80565 1.18363 $((\delta) - D)\frac{d'}{100}$ 1.29493											
+16.72 δ_2 +0 58.16	54 6.90 54 6.70		17 27.3 17 30.3								

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60 17

Date$_1$ = Dec 31 1870 Observer NKR Recorder AM

Date$_2$ = Jan 1871 / Jan 7 1871 Observer NKR Recorder AM

19.20

Run

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	1 23	58	9.2	1	15.6	31.9	39.6	43.6	47.6	57.6	2143	4286	11.02
	0 19.8	54.9	8.7							-3.65		11.02	1 31.84
	κ												-4.07
	((δ) − D) $\frac{\kappa'}{100}$												+ 44
													− 2
	a_1												1 28.19 +21.23
													−4.23
													1 23.96 +1 10.3
Jan 7			9.0	1	20.4	28.7	36.6	40.5	44.4	48.3	1985	3970	11.02
	κ									-0.6259			1 28.68
	((δ) − D) $\frac{\kappa'}{100}$												-0.974
													+ .37
													− 2
	a_2												1 28.06 +16.99
													+ 13
													1 28.22 +0 56.7
3	2 18	35.7	8.9	2	45.2	23.0	31.0	35.0	39.0	43.0	1710	3420	10.92
	1 13.1	31.4	8.8							-3.65		10.92	2 23.28
	κ												-4.07
	((δ) − D) $\frac{\kappa'}{100}$												+ 44
													− 2
	a_1												2 19.63 +21.17
													−4.22
													2 15.41 +1 10.0
Jan 1			8.9	2	4.3	23.0	30.7	34.6	38.6	42.9	1698	3396	10.92 2304
			1										10.92 −3.82
Jan 7	κ			2	14.0	20.9	28.0	31.9	35.7	39.5	1554	3108	10.92 + 46
										-3.38	-0.630		10.92 − 22
	((δ) − D) $\frac{\kappa'}{100}$												19.66 2 19.53
													+ 03 + .13
	a_2												2 19.69 2 19.69 +16.94
													+0 56.6
3	4 1	-19	9.2	3	51.7	4.5	12.0	16.0	19.8	23.8	761	1522	10.78
	2 53.0	-5.6	9.2							-3.66		10.78	4 4.44
	κ												-4.07
	((δ) − D) $\frac{\kappa'}{100}$												+ 43
													− 2
	a_1												4 0.78 +21.09
													−4.20
													3 56.58 +1 9.5
Jan 7			9.0	3	44.0	1.3	9.3	12.9	16.8	20.8	616	1222	10.78
	κ									-0.630			4 1.44
	((δ) − D) $\frac{\kappa'}{100}$												-0.974
													+ 36
													− 2
	a_2												4 0.81 +16.87
													+ 13
													4 0.97 +0 58.6
3	6 20	26.3	8.7	6	7.3	22.9	30.5	34.5	38.4	42.3	1686	3372	10.89
	5 11.9	22.6	8.5							-3.65		10.89	6 22.83
	κ												-4.07
	((δ) − D) $\frac{\kappa'}{100}$												+ 44
													− 2
	a_1												6 19.18 +21.24
													−4.25
													6 14.93 +1 8.8
Jan 7			8.5	5	56.8	19.4	27.4	31.2	35.3	39.2	1525	3050	10.89
	κ									-0.630			6 19.61
	((δ) − D) $\frac{\kappa'}{100}$												-0.974
													+ 36
													− 2
	a_2												6 18.98 +16.99
													+ 11
													6 19.12 +0 55.9
3	6 59	27.2	7.0	6	53.4	35.2	47.2	51.2	54.9	57.0	2515	5030	10.89
	5 57.7	24.9	6.0							-3.65		10.89	6 39.41
	κ 29.2												- 4.07
	((δ) − D) $\frac{\kappa'}{100}$												+ 44
													− 2
	a_1												6 35.76 +21.25
													−4.25
													6 31.51 +1 8.9
				5	56.8								
Dec 31	Jan 7		—	6	61.0	36.2	44.2	48.0	51.8	55.8	2360	4720	10.89
3 10 50	κ		—							-0.630			(6) 36.31
	((δ) − D) $\frac{\kappa'}{100}$												-0.974
													+ 36
													− 2
	a_2												6 35.68 +17.0
													+ 11
													6 35.82 +0 5.9
													0.24 3.12

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Runs Dec 31 = -20 Jan 1 = -18 Jan 7 = -23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	163	1 11 340	28.2	627	1 3135	+07	-12.69	-30	15	16 18.7	58 39.56
	+16.2				16 31.35	6 17.00	+ 25			16 18.86	− 7 +9.71
d	1.20952					50 58 27.07	12.59-26+16				+ 33
	9.79903					+ 12.49	− 12.49				+ 9.05
((δ) − D) $\frac{d'}{100}$	1.09649										+ 40
											− 19.80
+21.23 δ₁		1 45.19		59 39.7							58 29.37
	83	1 27.5	23.3	508	1 2540	+02	− 6.46	-32	15	16 18.6	58 40.19
	+8.3				16 25.40	6 22.95	+ .12			16 18.99	− 2 +10.19
d	0.91908					50 58 33.79	6.30-13+24				+ 34
	9.79903					+ 6.40	− 6.41				+ 9.47
((δ) − D) $\frac{d'}{100}$	0.80605										+ .40
											− 6.60
+16.99 δ₂		1 45.21		59 40.1							58 43.80 78
	-22.2	4 81	8.8	11.9	4 595	+12	+17.35	-4.00	35	39 22.9	50 35 35.44
	-2.9				39 5.95	43 42.40	− .21			39 22.97	− .13 +9.75
d	1.34044m					50 35 52.47	16.57-21+70				+ 90
	9.80274					− 17.03	+17.02				+ 8.63
((δ) − D) $\frac{d'}{100}$	1.23112m										+ 35
											− 19.80
+21.17 δ₁		2 36.58		36 35.4							35 25.39
+1 10.05											Jan 7
2016 1.27 184	187	4 41.2	38.3	795	4 3975	+00	− 14.56	-.80	35	39 24.6	35 33.64 35 34.86
4.0974 980 274	63	4 31.5	26.5	583	4 2913	+01	+ 4.90	-1.41	35	39 23.3	− .10 − 1
+.36 1.16252	+187				39 39.75	43 8.60	14.16-18+35			39 23.22	+ 103 + 108
2	+6.2	50 35 33.64	50 35 34.86		39 29.15	50 35 19.10	+ .18 − 14.53			69 24.32	+ 8.89 + 9.05
19.53 (δ) − D) $\frac{d'}{100}$	1.24844	+ 10.19	+10.47			+ 1454	+ .06				+ 35 + 35
13 0.70239	0.79239					43 19.20	3.73-6+16				− 3.30 − 6.50
9.69 δ₂	9.80274	2 36.63	36 34.0			50 35 30.04	− 4.83				35 37.91 35 38.83
+16.94	0.88307					+ 482					49
+0 56.04		2 36.63	36 34.9								
	128	2 85	4.2	127	2 635	+05	-9.97	-.42	15	16 56.0	58 2.07
	+2.7				17 8.35	5 42.00	+ .01			16 56.33	− 5 +9.69
d	1.10380					49 57 52.07	9.45+1+56				+ 46
	9.80837					+ 10.00	− 11.02				+ 8.98
((δ) − D) $\frac{d'}{100}$	1.00011										+ 30
											− 19.50
+21.09 δ₁		4 17.67		59 1.8							57 52.26
+1 9.55											
	173	2 10.8	7.5	183	2 915	+08	-13.47	-.49	15	16 55.2	58 3.74
	+17.4				17 9.15	5 39.20	+ .01			16 55.44	− 8 +9.75 12
d	1.24055					49 57 53.04	13.38+1+32				+ 53
	9.80837					+ 13.70	− 13.71				+ 8.37
((δ) − D) $\frac{d'}{100}$	1.13686										+ .30
											− 6.30
+16.87 δ₂		4 17.84		59 2.2							58 6.56
+0 55.64											
	156	3 42.9	38.9	814	3 4070	+07	-12.18	-.73	45	48 28.0	26 29.81
	+15.5				48 40.70	34 7.65	+ .10			48 28.161	− 7 +9.54
d	1.19033					50 26 17.42	11.80-11+40				+ 81
	9.80412					+ 12.09	− 12.109				+ 8.45
((δ) − D) $\frac{d'}{100}$	1.08239										+ 35
											− 19.40
+21.24 δ₁		6 36.17		27 28.8							26 19.95
+1 8.80											
	226	3 49.4	43.9	933	3 4665	+13	-17.60	-.85	45	48 28.5	26 30.32
	+22.8				48 46.65	34 1.70	+ .16			48 28.86	− .14 +9.99
d	1.35793					50 26 12.54	17.32-16+63				+ 91
	9.80412					+ 17.78	− 17.79				+ 8.87
((δ) − D) $\frac{d'}{100}$	1.24999										+ 35
											− 6.30
+16.99 δ₂		6 36.11		27 29.0							26 34.01
+0 55.04											
	-16.2	1 23.1	18.5	41.6	1 2080	+07	+12.61	-.27	45	46 33.1	28 X5.15
	-16.0				46 20.80	36 27.55	− .17			46 33.27	2 7 +9.08
d	1.20412m					50 28 39.62	12.89-12				+ 29
	9.80366					− 12.47	+ 12.47				+ 8.51
((δ) − D) $\frac{d'}{100}$	1.09572m										+ 35
											− 19.40
+21.25 δ₁		6 52.76		29 22.6							28 14.83
+1 8.80		1 16.1	12.0								
Jan 1	2	1 16.1	12.0	281	1 1405				45		27 ~~13.97~~ 25.90
Jan 7	(-24.7)	~~2 35.2~~	~~30.7~~	65.9	2 3290	+~~36~~ 34.30		-.59	~~45~~		− 3.37 +9.67
d	1.39270m				~~47 2295~~	35 15.40					+ 60 +9.81
	9.80366				46 1405	50 27 ~~32.21~~ 45.14					+ 8.89
((δ) − D) $\frac{d'}{100}$	1.28430m					− 19.24					+ 35
											− 6.30
+17.00 δ₂		6 52.82		29 24.4							~~47 44.57~~
+0 55.04											28 29.41

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Date$_1$ = Dec 31 1870 Observer WAR Recorder AM

Date$_2$ = Jan 1 1871 Observer WAR Recorder AM

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3	11 44	27.9	9.0	11 41.4	47.7	53.5	59.4	5.3	7.3	29.32	5.864	10.91	11 47.3
	10 35.9									3.65			−4.09
	κ												+ 44
	((δ) − D) $\frac{\kappa'}{100}$												− 2
													11 44.08
	38 α_1 50												−4.31
													11 39.77
Jan 1			9.0										
	κ			11 57.8	44.9	52.4	56.4	0.2	4.3	27.82	5.564	10.91	11 44.73
	((δ) − D) $\frac{\kappa'}{100}$									0.63			−0.94
													+ 36
	α_2												− 2
													11 44.10
1	20 44	60.5	8.8										+ 08
	19 45.7	55.5	8.6										11 44.21
	κ			Dec 26									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
1	22 53	02	8.6										
	21 54.8	−41.8	8.5										
	κ		8.4	Dec 26									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												
1	51 38	−42	8.6										
	50 36.9	−6.0	8.4										
	κ			Dec 26									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
1	55 23	56.0	8.0										
	54 21.8	51.3	9.0										
	κ			Dec 26									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												
1	56 34	42.0	8.9										
	55 32.2	37.7	9.0										
	κ			Dec 26									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
2	1 13	26.7	8.8										
	1 10.5	22.0	7.2										
	κ			Dec 26									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												
1	33 21	53.6	—										
	32 20.2	48.7	9.0										
	κ			Jan 1									
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
1	40 11	40.9	8.6										
	39 11.2	36.0	8.9										
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												

Double comp.

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Runs Dec 31 = -20 Jan 1 = -18 Jan 7 = -23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
	63	3 46.1	42.1	882	3 4410	+01	-4.91	-74	40	43.385	31 19.22
	-6.3				43 4410	39.425	+.05			43 39.18	− 1 +9.71
d	0.179934					50 31 14.32	473 -5 +24				+ 81
$((\delta) - D)\frac{d'}{100}$	9.880336					+ 4.90	-4.92				+ 8.56
	0.690640										+ .35
+21.39 δ_1		12 1.16		32 17.1							− 18.90
+1 7.10											31 10.03
	−129	330.1	26.1	562	3 2810	+05	+10.04	-80	50	43 37.3	31 20.89
	−131				43 2810	39 20.25	− .11			43 38.30	− 5 +10.31
d	1.117277					50 31 31.09	10.24 -12 +8				+ 84
$((\delta) - D)\frac{d'}{100}$	9.883616					− 10.20	+10.20				+ 8.97
	1.000893										+ .35
+17.11 δ_2		12 1.32		32 18.5							− 6.20
+0 53.68											31 24.80
		4 34.5	31.1	65.6					10		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
		0 49.	2.0						15		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
		0 58.1	58.1						15		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
		3 55.6	50.9						15		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
		2 48.9	46.0						30		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
		2 42.7	38.8						45		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
		1 33.5	30.8						20		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
		4 33.2	30.7						80		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											

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Date$_1$ = Jan 19 1871 Observer W. K. Recorder A. M. Date$_2$ = Observer Recorder Run

Star. α	δ	Mag.	T_s	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
			m s	s	s	s	s	s		s	s	m s
1 4 43 41	33 34	9 2										
42 41.1	28.6	8.9										
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_1												
3 4 57	42 2	9 0										
6 49.9	38.6	9.2										
κ												
((δ) — D) $\frac{\kappa'}{100}$				Dec 31								
α_2												
3 10 52	29 9	7 0										
9 42.4	26.3	7.0										
κ												
((δ) — D) $\frac{\kappa'}{100}$				Dec 31								
α_1												
3 12 42	37 8	8 8										
11 34.5	34.2	8.8										
κ												
((δ) — D) $\frac{\kappa'}{100}$				Dec 31								
α_2												
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_1												
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_2												
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_1												
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_2												
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_1												
κ												
((δ) — D) $\frac{\kappa'}{100}$												
α_2												

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′
		1 42.9	39.3						40		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
		0 25.1	20.2						30		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
		0 28.8	19.8						45		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
		1 58.6	57.1						35		
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_1											
d											
$((\delta) - D)\frac{d'}{100}$											
δ_2											

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Date$_1$ = Dec 31 1870 n = +.36 c = .00 Observer A.M. Recorder W.S.R. Date$_2$ = Jan 1 1871 n = +.30 c = .00 Observer A.M. Recorder W.S.R. Run

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	39 53	21.9	7.5	39 47.6	57.0	4.9	8.8	12.6	16.6	33.99	6.798	10 61	39 57.07
	38 42.3	28.8	8.0							−3.66		10.91	−4.08
	K												+ .44
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	c_1												39 53.41
													−4.57
													39 48.84
			8.2	39 34.0	53.9	2.1	5.7	9.5	13.4	32.46	6.492	10 61	39 54.01
										−0.56 63		10.10	−0.98 7
	K											29	+ .36
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_2												39 53.45
													− .09
													39 53.29
3	41 36	57.6	9.2	41 25.3	42.2	49.8	53.8	57.8	61.8	26.57	5.308	11 0 2	41 42.06
	40 25.3	54.5	9.1							−3.66		11.02	−4.08
	K												+ .44
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_1												41 38.40
													−4.62
													41 33.78
			9.5	41 23.2	38.8	46.6	50.3	54.5	58.4	24.86	4.972	11 0 2	41 38.70
										−0.55 62		11.02	−0.98 7
	K												+ .37
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_2												41 38.15
													− .10
													41 37.98
3	42 52	59.0	9.0	42 41.7	56.5	4.7	8.6	12.6	16.4	33.89	6.778	11 0 2	42 56.76
	41 41.9	56.0	8.8							−3.66		11.02	−4.08
	K												+ .44
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_1												42 53.10
													− .63
													42 48.47
			8.8	42 32.5	53.5	1.4	5.1	9.0	13.1	32.21	6.442	11 0 2	42 53.40
										−0.56 62		11.02	−0.98 7
	K												+ .37
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_2												42 52.84
													− .11
													42 52.67
3	44 8	33.8	8.3	43 59.6	12.6	20.3	24.0	28.0	32.0	11.69	2.338	10 6 2	44 12.46
	42 57.8	30.8	8.3							−3.66		10.92	−4.08
	K												+ .44
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_1												44 8.80
													− 4.60
													44 4.20
			8.3	43 50.7	9.1	16.9	21.0	24.8	28.7	10.05	2.010	10 9 2	44 9.18
										−0.57 63		10.92	−0.98 7
	K												+ .36
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_2												44 8.61
													− .10
													44 8.45
3	45 14	−2.3	8.4	45 4.9	18.0	25.8	29.7	33.3	37.4	14.42	2.884	10 7 8	45 18.06
	44 3.3	−5.2	8.5							−3.67		10.78	−4.09
	K												+ .44
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_1												45 14.39
													− .65
													45 9.74
			8.5	45 4.4	14.9	22.7	26.3	30.4	34.3	12.86	2.572	10 7 8	45 14.94
										−0.56 62		10.78	−0.98 7
	K												+ .37
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_2												45 14.38
													− .12
													45 14.20
													3.24

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Runs Dec 31 – 1 48.94 m. +22 Rx. Jan 7 48.30 m. .24 Dec 31 – 20 Jan 7 = -.23

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	$T_m - T$	A	C	Sum	Mean +40	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	94	2 59.2	54.8	1170	2 11 58.54	+02	-7.32	-60	40	42 50.7	50 32 8.30	
	+9.5				42 58.50	39 49.85	+.08			42' 57."11	− 3	+9.54
d	0.97772					50 32 0.91	7.08-8+.39				+ 66	
	9.80320					+ 7.39	=7.39				+ 8.56	
((δ) — D) $\frac{d'}{100}$	0.86886										+ 35	
											− 16.20	
+22.01 δ₁		40 10.65		32 58.7							32 4.34	+57.45
+57.45											1.24	
	199	3 6.2	57	113	3 56.5	+11	-15.49	-67	40	42 49.8	32 9.97	
	+20.0				43 5.65	39 42.70	+.18			42 50.09	− .11	+9.96
d	1.30103					50 31 54.40	15.74 -18				+ 74	
	9.80320					+ 15.54	15.56				+ 8.98	
((δ) — D) $\frac{d'}{100}$	1.19217										+ 35	
											− 5.60	
+17.61 δ₂		40 10.90		33 0.3							32 14.33	
+0 45.96											50	
	169	2 26.3	24.6	509	2 25.45	+08	-13.16	-48	15	17 12.1	57 46.91	
	+6.8				17 25.45	5 22.90	+.26			17 12.50	− 8	+9.87
d	1.22531					50 57 33.96	12.89-26+62				+ 53	
	9.79918					+ 12.95	-12.95				+ 90.2	
((δ) — D) $\frac{d'}{100}$	1.11243										+ 40	
											− 16.00	
+22.15 δ₁		41 55.93		58 37.6							57 40.78	+56.85
+56.85												
	156	2 26.0	20.3	463	2 23.15	+07	-12.15	-54	15	17 10.8	57 48.85	
	+5.5				17 23.15	5 25.20	+.24			17 11.21	− 7	+10.35
d	1.19033					50 57 36.90	11.80-25+39				+ 58	
	9.79918					+ 11.95	-11.94				+ 9.44	
((δ) — D) $\frac{d'}{100}$	1.07745										+ 40	
											− 5.60	
+17.72 δ₂		41 55.70		58 39.1							57 53.60	
+0 45.48											50	
	150	1 22.0	18.9	407	1 20.35	+06	-11.68	-27	15	16 8.7	58 50.70	
	+1.1				16 20.35	6 28.00	+.24			16 8.72	− 6	+9.67
d	1.17898					50 58 39.06	11.55+8				+ 29	
	9.79903					+ 11.64	11.63				+ 9.04	
((δ) — D) $\frac{d'}{100}$	1.06595										+ 40	
											− 15.90	
+22.18 δ₁		43 10.65		59 40.8							58 44.47	+56.35
+56.35												
	210	1 24.8	22.5	503	1 25.15	+12	-16.35	-34	15	16 8.9	58 51.01	
	+20.9				16 25.15	6 23.20	+.34			16 9.05	− 12	+10.08
d	1.32015					50 58 34.90	16.41 +69				+ 34	
	9.79903					+ 16.11	-16.11				+ 9.46	
((δ) — D) $\frac{d'}{100}$	1.20712										+ 40	
											− 5.60	
+17.75 δ₂		43 10.42		59 40.6							58 55.49	
+0 45.08											50	
	230	1 47.5	43.3	908	1 45.40	+05	-10.12	-35	40	41 35.1	33 24.05	
	+12.9				41 45.40	41 2.95	+.12			41 35.36	− 5	+9.28
d	1.11059					50 33 14.01	9.45-11+70				+ 40	
	9.80305					+ 10.04	-10.04				+ 8.58	
((δ) — D) $\frac{d'}{100}$	1.00158										+ 35	
											− 15.70	
+22.10 δ₁		44 26.30		34 13.5							33 17.63	+55.90
+55.90												
	184	1 54.0	49.8	1038	1 51.90	+09	-14.33	-42	40	41 37.4	33 22.54	
	+18.5				41 51.90	40 56.45	+.17			41 37.52	− 9	+9.72
d	1.26717					50 33 8.15	14.16-17+39				+ 46	
	9.80305					+ 14.39	-14.38				+ 9.00	
((δ) — D) $\frac{d'}{100}$	1.15816										+ 35	
											− 5.40	
+17.69 δ₂		44 26.14		34 11.6						(49)	33 26.86	
+0 44.72										50		
	131	2 35.4	34.0	697	2 34.85	+05	-10.20	-52	15	17 24.44	57 34.96	
	+13.2				17 34.85	5 13.50	+.01				− 5	+9.94
d	1.12057					49 57 24.56	10.24+1+16				+ 57	
	9.80852					+ 16.40	-10.41				+ 9.02	
((δ) — D) $\frac{d'}{100}$	1.01703										+ 40	
											− 15.70	
+21.99 δ₁		45 31.73		58 24.7							57 29.20	+55.55
+55.55												
	105	2 38.0	34.4	724	2 36.20	+03	-8.17	-59	15	17 27.92	57 32.12	
	+10.5				17 36.20	5 12.15	+.00				− 3	+10.43
d	1.02119					49 57 23.85	7.87+1+40				+ 62	
	9.80852					+ 8.27	-8.28				+ 9.44	
((δ) — D) $\frac{d'}{100}$	0.91765										+ 40	
											− 5.50	
+17.60 δ₂		45 31.80		58 21.5							57 37.05	
+0 44.44												

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Date$_1$ = Dec 31 1870 Observer A.M. Recorder W.K.R. Date$_2$ = Jan 7 1871 Observer A.M. Recorder W.K.R.

Star.	α	δ	Mag.	T_s	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	47 43	28	9.0	47	29.0	48.3	56.0	0.0	3.8	4.9	2960	59.20	10.90
	46 32.6	25.9	9.0								−3.67		10.90
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	c_1												
			9.0	47	24.4	45.0	52.7	56.7	0.4	4.9	2797	55.94	10.90
											−0.57 63		10.90
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	c_2												
3	50 1 3	31 4	4.3	~~50~~	55.0	~~26.2~~	26.2	30.4	34.1	38.0	1474	29.48	10.91
	49 2.4	28.5	9.3	49		18.4					−3.67		10.91
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
			5.4	49	43.8	15.4	23.2	26.8	30.8	34.9	1311	26.22	10.91
											−0.58 63		10.91
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
3	51 2 1	21 4	8.8	51	46.8	4.4	12.1	15.9	19.7	23.6	1357	15.14	10.87
	50 50.8 0	18.5	9.0								−3.69		10.87
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
			9.0	51	45.0	1.0	9.0	12.7	16.7	20.4	5978	11.96	10.87
											−0.58 63		10.87
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
3	54 8	28 4	9.4	53	55.6	12.6	20.5	24.7	28.5	32.0	1183	23.66	10.89
	52 56.6	25.5	9.5								−3.68		10.90
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
			4.3	53	38.8	~~9.6~~	17.1	21.0	25.0	28.8	1015	20.30	10.89
											−0.58 63		10.90
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
3	55 30	43 1	8.6	55	14.8	34.0	41.9	45.8	49.7	53.7	2251	45.02	10.95
	54 18.4	40.3	9.0								−3.68		10.95
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
			8.8	55	13.7	30.7	38.5	42.4	~~50.5~~ 46.4	50.5	2085	41.70	10.95
											−0.57 62		10.95
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												

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Runs D4C31 = -.20 Dam f = -.23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	193	1 35.3	32.5	678	1 33.90	+10	−15.03	−31	4	46	28 40.55	
	+193				46 33.90	36 11.45	+ .15			18.86	− .10	+9.11
d	1.28556					50 28 25.51	14.95 −15 +24				+ .35	
	9.80382					+ 1504	−15.04				+ 8.51	
((δ) — D) $\frac{d'}{100}$	1.17732										+ .35	
											− 15.40	
+22.15 δ₁		48 2.15		29 28.9							28 34.26	+54.60
+54.60												
	206	1 39.4	34.9	74.6	1 37.30	+12	−16.04	−37	4	46	28 38.81	
	+20.6				46 37.30	36 11.05	+ .15			21.25	− .12	+9.54
d	1.31387					50 28 22.95	15.74 −16 +47				+ .38	
	9.80382					+ 1606	−16.05				+ 8.93	
((δ) — D) $\frac{d'}{100}$	1.20563										+ .35	
											− 5.30	
+17.72 δ₂		48 1.99		29 26.7							28 43.04	
+0 43.68												
	287	3 61.0	58.8	119.8	2 59.90	+13	−18.45	−80	40	43	31 17.88	
	+23.6				43 57.90	38 48.45	+ .20			41.51	− .15	+9.63
d	1.37291					50 30 59.51	18.11 −20 +48				+ .88	
	9.80336					+ 1837	−18.39				+ 8.55	
((δ) — D) $\frac{d'}{100}$	1.26421										+ .35	
											− 15.10	
+22.21 δ₁		50 32.45		32 6.1							31 12.41	+53.90
+53.70												
	216	4 10.4	6.5	16.9	4 8.45	+26	−24.60	−94	40	43	31 16.12	
	+31.5				44 8.45	38 39.90	+ .25			43.93	− .27	+10.03
d	1.49831					50 30 51.60	24.40 −28 +40				+ .98	
	9.80336					+ 2452	−24.52				+ 8.97	
((δ) — D) $\frac{d'}{100}$	1.38961										+ .35	
											− 5.30	
+17.77 δ₂		50 32.31		32 3.8							31 20.85	
+0 42.96												
	176	3 35.0	32.1	67.1	3 33.55	+08	−13.70	−71	50	53	21 39.53	
	+17.5				53 33.55	29 14.80	+ .09			19.87	− .08	+8.43
d	1.24304					50 21 25.86	13.38 −10 +40				+ .79	
	9.80489					+ 13.67	−13.68				+ 8.37	
((δ) — D) $\frac{d'}{100}$	1.13587										+ .35	
											− 14.90	
+22.20 δ₁		52 18.12		22 26.1							21 34.06 33.06	+53.00
+53.00												
	160	3 33.6	31.3	64.9	3 32.45	+07	−12.46	−81	50	53	21 40.18	
	+16.1				53 32.45	29 15.90	+ .09			19.88	− .07	+9.91
d	1.20683					50 21 27.60	12.59 −10 +8				+ .84	
	9.80489					+ 1258	−12.57				+ 8.79	
((δ) — D) $\frac{d'}{100}$	1.09966										+ .35	
											− 5.20	
+17.76 δ₂		52 18.07		22 27.2							21 44.89	
+0 42.40												
	170	2 8.5	1.4	4.9	2 2.45	08	−13.24	−48	45	46	28 10.37	
	+17.2				47 2.45	35 45.90	+ .13			49.04	− .08	+9.22
d	1.23553					50 27 56.96	13.38 −13 +16				+ .44	
	9.80382					+ 13.41	−13.41				+ 8.51	
((δ) — D) $\frac{d'}{100}$	1.12729										+ .35	
											− 14.70	
+22.27 δ₁		54 26.66		28 57.1							28 4.89	+62.25
+52.25												
	206	2 17.8	9.8	27.6	2 13.80	+26	−23.98	−54	45	46	28 10.11	
	+30.6				47 13.80	35 34.55	+ .23			49.96	− .25	+9.56
d	1.48572					50 27 46.25	23.61 −24 +47				+ .53	
	9.80382					+ 23.85	−23.84				+ 8.93	
((δ) — D) $\frac{d'}{100}$	1.37748										+ .35	
											− 5.20	
+17.82 δ₂		54 26.43		28 56.3							28 14.47	
+0 41.80												
	192	1 47.3	44.3	91.6	1 45.80	+10	−14.95	−35	30	31	43 28.57	
	+19.3				31 45.80	51 2.55	+ .22			30.84	− .10	+9.42
d	1.28556					50 43 13.61	14.95 −23 +24				+ .40	
	9.80151					~~35 25.31~~	−14.96				+ 8.17	
((δ) — D) $\frac{d'}{100}$	1.17501					+ 11.96					+ .35	
											− 14.60	
+22.36 δ₁		55 48.04		44 15.1							43 28.39	+54.70
+51.70												
	170	1 48.2	45.0	93.2	1 46.60	+08	−13.24	−41	80	31	43 26.63	
	+17.0				31 46.60	51 1.75	+ .15			33.33	− .08	+9.89
d	1.23045					50 43 ~~33.95~~	+ 13.38 −21				+ .43	
	9.80151					+ 13.18	−13.17				+ 9.19	
((δ) — D) $\frac{d'}{100}$	1.11990										+ .35	
											− 5.20	
+17.89 δ₂		55 47.83		44 12.7							43 31.32	
+0 41.36												

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Date$_1$ = 1870 Dec 31 16h Observer AMW, WHR. Date$_2$ = Jan 1871 21 Observer AMW WHR. Run

Star. α	δ	Mag.	T_s	T_m	T_o	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3 57 8	13 4	8.9	56 47.1	12.3	19.9	23.8	27.8	31.7	11 55	23.10	10 84	12 26
55 56.8	10.6	8.9							−3.69		10.84	57 12.26
κ												−4.10
((δ) − D) $\frac{\kappa'}{100}$												+ .43
a_1												− .2
												57 8.57
												− 4.69
												57 3.88 +22.
		8.7	56 47.8	09.1	16.8	20.6	24.5	28.7	9 97	19 94	10 84	+51.
									−0.58 63		10.84	57 9.10
κ												−0.97
((δ) − D) $\frac{\kappa'}{100}$												+ .36
a_2												− .2
												57 8.52
												− .17
												57 8.30 +17.82
												+0 40.
4 1 24	−18	8.7	4 1 8.6	27.7	35.4	39.3	43.0	47.3	19 27	38.54	10 78	1 27.76
6 12.2	−4.6	8.6							−3.69		10.78	−4.10
κ												+ .43
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1												1 24.07
3 26												− 4.71
												1 19.36 +22.
		8.0	1 1.0	24.5	32.1	36.0	39.8	44.0	17 64	35.28	10 78	+49.
									−0.58 63		10.78	1 24.50
κ												−0.97
((δ) − D) $\frac{\kappa'}{100}$												+ .36
a_2												− .2
												1 23.92
												− .19
												1 23.68 +17.82
												+0 39
4 5 10	5 47	8.4	5 6.9	28.2	36.0	39.8	43.9	47.9	19 58	39.16	11 00	5 28.16
3 28.6	52.0	8.8							−3.68		11.00	− 4.10
4 11.6												+ .44
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1												5 24.48
												− 4.80
												5 19.68 +22.
3 58.6		8.0	5 (25.7)	12.7	20.3	24.3	28.5	32.1	11 79	23.58	11 00	+48
			(20)						−0.57 62		11.00	5 12.58
κ												−0.97
((δ) − D) $\frac{\kappa'}{100}$												+ .37
a_2												− .2
												5 12.01
												− .22
												5 11.74 +18.06
												+0 38.
4 6 53	8.8	8.8	6 37.1	55.0	2.8	6.7	10.7	14.5	32 97	65.94	10 85	
5 41.4	17.5	9.5							−3.69		10.85	6 55.09
κ	14.8											−4.10
((δ) − D) $\frac{\kappa'}{100}$												+ .43
a_1												− .2
												6 51.40
												− 4.88
												6 46.52 +224.
	8.8	8.8	6 35.9	51.9	59.7	3.4	7.5	11.1	31 36	62.72	10 85	+47.
									−0.58 63		10.85	6 51.87
κ												−0.97
((δ) − D) $\frac{\kappa'}{100}$												+ .36
a_2												− .2
												6 51.29
												− .12
												6 51.02 +17.96
												+0 3.
4 7 52	33 2	7.0	7 32.2								10 92	
6 60.1	35.5	9.0									10.92	
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_1												
		6.5	7									
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_2												

3.21

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Runs Dec 31 = -.20 Jan 4 = -.23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	δ′	
	252	1 58.3	57.6	1159	1 5795	+17	+19.62	-39	0′	1 381	13 21.19	
	+25.2				1 57.95	20 60401	−.04			1 38.21	− .17	+8.80
d	1.410140					50 13 1.46	19.67-9+16				+ .44	
	9.80610					+ 19.73	−19.74				+ 8.23	
((δ) − D) $\frac{d'}{100}$	1.29504										+ .30	
											− 14.40	
δ_1		57 26.15	14 6.7								13 15.59	+51.10
+2227												
+51.10	213	1 56.3	53.0	109.3	1 5465	+12	+6.58	-43	0	1 378	13 22.09	
	+21.3				1 54.65	20 5378	−.07			1 37.96	− .12	+9.27
d	1.328 38					50 13 5.40	16.53-8+2				+ .46	
	9.80610					+ 14.69	−16.69				+ 8.63	
((δ) − D) $\frac{d'}{100}$	1.22242										+ .30	
											− 5.00	
+17.82 δ_2		57 26.12	14 7.2								13 26.36	
+0 40.88											49	
	101	2 21.2	17.2	38.4	2 1920	+10	+14.87	-46	15	40	57 55.33	
	~~+18.7~~ 19.2				17 15.20	5 29.151	−.01			4.08	− .10	+8.66
d	1.28330					49 57 40.21	14.95+1+16				+ .51	
	9.80837					+ 15.12	−15.12				+ 7.95	
((δ) − D) $\frac{d'}{100}$	1.17961										+ .30	
											− 13.80	
+2228 δ_1		1 41.64	58 39.7								57 50.19	+49.50
+49.50	235	2 24.5	22.4	47.2	2 2360	+13	+18.30	-55	15	49	57 54.96	
	+23.5				17 23.60	5 24.75	−.01			5.08	− .14	+9.08
d	1.34104					49 57 36.45	18.11+1+40				+ .58	
	9.80837					+ 18.51	−18.52				+ 8.34	
((δ) − D) $\frac{d'}{100}$	1.26738										+ .30	
											− 4.90	
+17.82 δ_2		1 41.50	58 38.7								57 59.14	
+0 39.60			19.0		2730							
	213	0 23.6	~~15.0~~	48.6	20 ~~2170~~	+13 ~~2705~~	+16.58	-14	20	20 215.0	58.4 ~~13.55~~	54.55
	+21.3		~~22~~	5	24 ~~2170~~	2 ~~2705~~	−.24			20 4.84	− .12	+9.36
d	1.32838					50 54 ~~5411~~	16.53-31+24				+ 9	
	9.77965					+ 16.44	−16.46				+ 8.99	
((δ) − D) $\frac{d'}{100}$	1.21597										+ 40	
											− 13.60	
+22.58 δ_1		5 42.26	55 38.4								55 ~~4.81~~ 50.31	+48.05
+48.05	−136	0 51.2	~~46.2~~	97.4	0 ~~4720~~	~~+ 5815~~	+10.12	-18	20	885	54 ~~1.24~~ 59.74	
	~~−130~~		49.2		20 48.70	1 ~~5805~~	−.09			58.82	− 5	+9.94
d	−131					50 54 ~~14.55~~	10.24-20+8				+ 19	
	1.11724					− 10.11	+10.12				+ 9.40	
((δ) − D) $\frac{d'}{100}$	1.00486										+ 40	
											− 5.00	
+18.06 δ_2		5 29.80	54 43.1								54 ~~6.16~~ 4.68	
+0 38.44											50	
	179	2 19.4	14.4	33.4	2 1370	+09	+13.94	-44	35	56 ~~5.95~~	17 54.79	
	+18.0				57 18.70	25 29651	−.06			57 4.63	− 9	+9.08
d	1.25524					50 17 40.71	14.16-9				+ .51	
	9.80534					+ 14.08	−14.07				+ 8.31	
((δ) − D) $\frac{d'}{100}$	1.14855										+ 35	
6 δ_1		7 9.09	18 36.0								− 13.30	
+2242											17 50.54	+47.40
+47.40	160	2 19.0	16.5	35.5	2 1775	+09	+12.46	-53	85	56 ~~4.49~~	17 54.81	
	+16.0				57 17.75	28 30601	−.07			57 5.24	− 7	+9.53
1 d	1.20412					50 17 42.30	12.89-8				+ .55	
	9.80534					+ 12.51	−12.51				+ 8.72	
((δ) − D) $\frac{d'}{100}$	1.09946										+ 35	
											− 4.80	
+17.96 δ_2		7 8.98	18 37.5								17 59.56	
+0 37.92												
		2 35.0	32.3	67.3	2 3365				40			
					42 33.61	40 14.70						
d												
((δ) − D) $\frac{d'}{100}$												
δ_1												
		2 20.9	16.3	37.2	2 1860				40			
					42 18.60	40 29.75						
d												
((δ) − D) $\frac{d'}{100}$												
δ_2												

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Date$_1$ = 1870 Dec 31 — Observer A.M. / Recorder W.R. — Date$_2$ = Jan 1871 — Observer A.M. / Recorder W.R. — Ru

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4h 10m 26s	36.4	6.0	10m 11.3s	29.7s	37.6s	41.5s	45.3s	49.4s	2037	4074	10.93	10 29.81
9 13.5	33.7	6.1							−3.69		10.93	−4.10
κ												+ .43
((δ) − D) $\frac{\kappa'}{100}$												− .2
c_1												10 26.12
												− 4.82
												10 21.30
		6.5	10 6.7	26.7	34.5	38.4	42.4	46.3	1883	3766	10.93	
									−0.5963			10 26.73
κ												− 0.937
((δ) − D) $\frac{\kappa'}{100}$												+ .36
c_2												− .2
												10 26.14
												− .24
												10 25.86
4 12 8	38.8	9.8	11 50.3	13.4	21.2	24.9	29.1	32.9	1215	2430	10.94	12 13.36
10 56.8	36.2	9.5							−3.69		10.94	− 4.10
κ												+ .43
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1												12 9.67
												− 4.83
												12 4.84
		9.8	11 ~~47.4~~ 52.6	10.0	17.8	21.8	25.4	30.2	1057	2114	10.94	12 13.28
									−0.5963			− 0.937
κ												+ .36
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_2												12 9.61
												− .25
												12 9.32
4 13 24	28.8	8.8	13 15.7	39.0	46.6	50.5	54.4	58.3	2488	4976	10.90	13 38.86
12 22.3	26.2	8.8							−3.69		10.90	− 4.10
κ												+ .43
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1												13 35.17
												− 4.83
												13 30.34
		8.6	13 18.8	35.7	43.6	47.4	51.3	55.3	2333	4666	10.90	13 35.76
									−0.5963			− 0.937
κ												+ .36
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_2												13 35.14
												− .25
												13 34.88
4 15 5	32.7	8.0	14 52.1	9.3	17.0	20.8	24.8	28.8	1007	2014	10.92	15 9.22
13 51.2	30.1	8.8							−3.69		10.92	− 4.11
κ												+ .44
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1												15 5.60
												− 4.84
												15 0.69
		8.3	14 ~~2.8~~ 53.2	~~53.2~~ 6.0	14.1	17.7	21.6	25.6	850	1700	10.92	15 6.07
									−0.5963			− 0.937
κ												+ .36
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_2												15 5.49
												− .26
												15 5.19
4 16 15	12.8	9.0	15 59.0	20.7	28.5	32.3	36.2	40.1	1578	3156	10.84	16 20.72
15 3.1	10.2	9.0							−3.70		10.84	− 4.11
κ												+ .43
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_1												16 17.02
												− 4.83
												16 12.19
		8.4	16 2.0	12.5	25.2	29.0	32.7	37.2	1412	2824	10.84	16 17.40
									−0.5963			− 0.937
κ												+ .36
((δ) − D) $\frac{\kappa'}{100}$												− .2
a_2												16 16.81
												− .26
												16 16.51

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Runs Dec 31 = -.20 Jan 1 = -.23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	184	4 43	20	6.3	4 3.15	+09	+4.33	-.81	3.5	38 48.2	36	10.64	
	+18.5				39 3.15	43 45.20	+.18			38' 48.38		− 9	+9.80
d	1.26717					50 35 56.26	14.16-18 +39					+ 90	
	9.80259					+ 14.38	-14.37					+ 8.64	
((δ) — D) $\frac{d'}{100}$	1.15770											+ .35	
												− 13.00	
+2259 δ_1		10 43.89		36 53.5							36	7.44	+46.05
+46.05	200	4 37	-0.2	3.5	4 1.75	+11	-15.57	-.92	3.5	38 45.5	36	13.84	
	+20.0				39 1.75	43 46.60	+.19			38 46.21		− .11	+10.26
d	1.30103					50 35 58.30	15.74-20					+ .96	
	9.80259					+ 15.54	-15.67					+ 9.06	
((δ) — D) $\frac{d'}{100}$	1.19156											+ .35	
												− 4.70	
+18.07 δ_2											50		
+0 36.84		10 43.93		36 56.2							36	19.40	
	231	1 45.0	40.0	8.5.0	1 42.50	+13	-17.99	-.34	3.5	36 24.5	38	34.85	
	+23.1				36 42.50	46 5.85	+.25			36 24.55		− .14	+9.26
d	1.36361					50 38 16.91	18.11-24 +8					+ .37	
	9.80228					+ 17.94	-17.95					+ 8.68	
((δ) — D) $\frac{d'}{100}$	1.25383											+ .35	
												− 12.80	
+2263 δ_1		12 27.47		39 16.7							38	31.31	+45.35
+ 45.35	+ 17.6	1 38.9	36.1	7.4.8	1 37.40	+12	-17.64	-.33	3.5	36 20.0	38	40.20 36.32	
	224				36 37.40	46 10.95	+.24			36 17.84		− .14	+9.69
1.24 55+1	+22.5					50 38 22.65	+17.32 -23 +47					+ .38	
9.80 2 d 28	1.35411					+ 17.55	-17.06					+ 9.10	
1.13573	9.87228					+ 13.67						+ .35	
((δ) — D) $\frac{d'}{100}$	1.24433											− 4.70	
+18.10 δ_2											50		
+0 36.28		12 27.42		39 17.6							38	41.31	
	233	1 40.0	36.9	7.6.9	1 38.45	+13	-18.14	-.33	3.5	46 20.6	28	39.04	
	+23.2				46 38.45	36 9.90	+.19			46 21.35		− .14	+9.07
d	1.36549					50 28 20.96	18.11-17 +16					+ .35	
	9.80382					+ 18.08	-18.10					+ 8.51	
((δ) — D) $\frac{d'}{100}$	1.25725											+ .35	
												− 12.60	
+2261 δ_1		13 52.95		29 20.3							28	35.51	+44.80
+44.80	169	1 37.1	33.5	7.0.6	1 35.30	+08	-13.16	-.37	4.5	46 22.0	28	38.80	
	+17.0				46 35.30	36 13.05	+.13			46 22.05		− 8	+9.58
d	1.23045					50 28 24.75	13.38-13					+ .38	
	9.80382					+ 13.25	-13.25					+ 8.93	
((δ) — D) $\frac{d'}{100}$	1.12221											+ .35	
												− 4.60	
+18.09 δ_2											50		
+0 35.84		13 52.97		29 18.8							28	42.38	
	172	2 46.8	43.9	9.0.2	2 45.00	+08	-13.39	-.55	4.0	42 31.4	32	27.62	
	+17.1				42 45.70	40 3.25	+.15			42 31.79		− 8	+9.46
d	1.23300					50 32 14.31	13.38-15 +8					+ .62	
	9.80320					+ 13.31	-13.31					+ 8.57	
((δ) — D) $\frac{d'}{100}$	1.12414											+ .35	
												− 12.40	
+22.65 δ_1		15 23.34		33 8.9							32	24.68	+44.20
+44.20	128	2 44.7	41.9	8.6.6	2 43.30	+05	-9.97	-.40	4.0	42 33.26	32	26.79	
	+12.9				42 43.30	40 5.05	+.11			42 33.26		− 5	+9.93
d	1.11059					50 32 16.75	9.45-11 +10					+ .65	
	9.80320					+ 10.04	-10.04					+ 8.98	
((δ) — D) $\frac{d'}{100}$	1.00173											+ .35	
												− 4.60	
+18.12 δ_2											50		
+0 35.36		15 23.31		33 7.5							32	32.12	
	217	2 49.3	46.2	9.5.5	2 47.75	+12	-16.90	-.56	6	2 30.5	12	28.67	
	+21.7				2 47.75	20 0.60	+.08			2 30.73		− .13	9.90
d	1.33646					50 12 11.66	16.53-7 +36					+ .62	
	9.80625					+ 17.01	-17.02					+ 8.21	
((δ) — D) $\frac{d'}{100}$	1.23065											+ .30	
+22.58												− 12.20	
+0 43.75 δ_1		16 34.77		13 9.2							12	25.47	
	153	2 45.1	42.3	8.7.4	2 43.70	+07	-12.07	-.62	0	2 31.1	12	28.42	
	+15.4				2 43.70	20 4.65	+.05			2 31.43		− 6	+9.51
d	1.18752					50 12 16.35	11.80-5 +32					+ .65	
	9.80625					+ 12.07	-12.07					+ 8.62	
((δ) — D) $\frac{d'}{100}$	1.08171											+ .30	
+18.06												− 4.50	
+0 35.00 δ_2		16 34.57		13 8.4							12	23.43	

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Date$_1$ = Dec 31 1870 — Observer A M — Recorder W.P.R.

Date$_2$ = Jan 7 1871 — Observer A M — Recorder W.P.R.

Ru

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4	17 17 33.0	25.6	8.8	17m 25s.0	43s.8	61s.6	55s.3	59s.3	3s.2	27.32	5s.464	10.89	17 43.75
	15 59.2	23.0	8.6							−3.70		10.89	−4.11
	16, 28 0.5												+ .43
													− .2
	((δ) — D) $\frac{\kappa'}{100}$												17 40.05
													−4.86
	c_1												17 35.19
			8.0	17	3.2	13.7	21.3	25.3	29.1	32.9	122.3	24.46	10.89
4	15 59.2	21.6									−0.693		17 13.57
	κ												−0.947
	((δ) — D) $\frac{\kappa'}{100}$												+ .36
													− .2
	c_2												17 12.97
													− .27
													17 12.67
4	18 36	59.3	8.5	18 26.5	41.5	49.3	53.0	57.1	61.3	262.2	52.44	11.02	18 41.42
	17 22.9	56.8	9.0							−3.69		11.02	−4.11
	κ												+ .44
	((δ) — D) $\frac{\kappa'}{100}$												− .2
													18 37.73
	α_1												−4.91
													18 32.82
			9.3	18 20.2	38.3	46.2	50.3	53.9	57.9	246.6	49.32	11.02	18 28.30
	κ									−0.592		11.02	−0.947
	((δ) — D) $\frac{\kappa'}{100}$												+ .37
													− .2
	α_2												18 37.71
													− 2.8
													18 37.40
4	24 47	43.5	7.3	24 29.0	51.3	59.0	62.9	66.9	70.8	319.9	63.98	10.95	24 51.33
	23 34.0	41.2	7.5							−3.69		10.95	−4.11
	κ												+ .44
	((δ) — D) $\frac{\kappa'}{100}$												− .2
													24 47.54
	α_1												−4.92
													24 42.62
			8.0	24 28.0	48.0	56.0	59.8	63.6	67.6	295.0	59.00	10.95	24 48.05
	κ									−0.592		10.95	−0.947
	((δ) — D) $\frac{\kappa'}{100}$												+ .37
													− .2
	α_2												24 47.46
													− .31
													24 47.12
4	25 59	20.4	8.3	25 42.9	2.6	10.2	14.0	18.0	21.9	66.7	13.34	10.87	25 2.6
	24 45.8	18.1	8.9							−3.70		10.87	2.47
	κ												− 4.11
	((δ) — D) $\frac{\kappa'}{100}$												+ .43
													− .2
	α_1												25 58.74
													− 4.80
													25 53.87
			8.6	25 43.0	59.4	7.2	11.0	14.9	18.7	51.2	10.24	10.87	25 59.37
	κ									−0.693		10.87	−0.947
	((δ) — D) $\frac{\kappa'}{100}$												+ .36
													− .2
	α_2												25 58.77
													− 0.33
													25 58.44
4	29 47	58.4	8.0	29 33.9	57.6	59.5	3.3	7.3	11.3	313.1	62.62	11.02	29 57.58
	28 33.6	56.5	9.4							−3.69		11.02	−4.11
	κ												+ .44
	((δ) — D) $\frac{\kappa'}{100}$												− .2
													29 47.89
	α_1												−4.97
													29 42.92
			8.0	29 31.8	48.4	56.3	0.3	4.0	8.1	284.9	59.42	11.02	29 48.40
	κ									−0.592		11.02	−0.947
	((δ) — D) $\frac{\kappa'}{100}$												+ .37
													− .2
	α_2												29 47.81
													− .33
													29 47.45
													3.15

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Runs Dec 31 – 20 Jan 1 – 23

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	188	0 – 0.5 – 1.5		–2.0	0 – 1.00	+10	–14.64	–20	52	50 44	24.5	15.08	
	+188	0			50 59.00	3 x 49.35 + .13				50' 44".34	– .10		+8.90
d	1.274416				49	50 245 0.41	14.16 –13 +63				+ 20		
	9.80 443					+ 1467	14.66				+ 8.43		
((δ) – D) $\frac{d'}{100}$	1.16653										+ .35		
+22.66											– 12.10		
+0 44.30 δ_1											24 11.88		
		17 57.85	25 55.6'										
	105	1 9.3	5.0	14.3	1 7.15	+03	–8.18	–30	52	50 58	23 51.02	1.02	
	+104				51 7.10	31 3.20	+ .07			50 59.03	24		
d	1.017703					50 23 5.4290	7.87–7 +32 Cor.				– 3		+9.41
	9.80 443					+ 8.12	–8.42				+ .26		
((δ) – D) $\frac{d'}{100}$	0.82940										+ 8.83		
	90										+ 35		
+18.17 δ_2											– 4.50		
+0 34.56		17 30.78		24 40.5							28 5.93	24	5.93
										50			
	150	1 14.9	11.1	26.0	1 13.00	+06	–11.68	–24	15	16 14	58 57.90		
	+149				16 13.00	6 35.35 + .24				16 1.53	– 6		+9.65
d	1.017319					50 58 46.41	10.78+69				+ 26		
	9.79903					+ 11.49	–11.47				+ 9.05		
((δ) – D) $\frac{d'}{100}$	1.06016										+ 40		
											– 12.10		
+22.82											58 55.45		
+0 42.80 δ_1		18 55.64		59 38.2									
	181	1 17.4	13.3	30.7	1 15.35	+ 20	–14.09	–29	16	16 13	58 58.65		
	+181				16 15.35	6 33.00 + .26				16 1.41	– 9		+10.10
d	1.257768					50 58 44.70	13.86 +8				+ 31		
	9.79903					+ 13.95	–13.94				+ 9.48		
((δ) – D) $\frac{d'}{100}$	1.14465										+ 40		
											– 4.60		
+18.26										50	59 4.15		
+0 34.24 δ_2		18 55.66		59 38.4									
	223	1 39.7	3.50	74.7	1 37.35	+12	–17.36	–32	30	31 20.0	43 39.27		
	+22.2				31 37.35	51 11.00 + .22				31 20.13	– .13		+9.34
d	1.346 35					50 43 22.06	17.32 –26 +16				+ 35		
	9.80 151					+ 17.21	–17.22				+ 8.77		
((δ) – D) $\frac{d'}{100}$	1.23580										+ .35		
											– 11.30		
+22.84											43 37.31		
+0 40.35 δ_1		25 5.46		44 17.7									
	200	1 37.3	3.40	71.3	1 35.65	+11	–15.57	–43	80	31 20.1	43 39.90		
	+20.0				31 35.65	51 12.70 + .22				31 20.16	– .11		+9.81
d	1.30103					50 43 24.40	15.74 –24				+ 38		
	9.80151					+ 15.50	–15.50				+ 9.19		
((δ) – D) $\frac{d'}{100}$	1.19048										+ 35		
											– 4.80		
+18.28										50	43 45.41		
+0 32.28 δ_2		25 5.40		44 17.7									
	197	0 58 – 3.2		8.7	0 4.35	+11	–15.34	–02	55	54 49.2	20 10.38		61
	+19.6				55 4.35	27 44.00 + .10				54 49.04	– .11		+8.79
d	1.292 26					50 19 5.506	14.95 –11 +47				+ 2		
	9.80 504					+ 15.32	–15.31				+ 8.35		
((δ) – D) $\frac{d'}{100}$	1.18524										+ .35		
											– 11.10		
+22.75											20 7.89		
+0 39.90 δ_1		26 16.62		20 47.8									
	164	0 2.9	– 1.3	1.4	0 0.70	+07	–12.77	–09	53	54 48.1	20 12.17		
	+164				55 0.70	27 47.65 + .09				54 47.88	– 4		+9.04
d	1.214 84					50 19 5.935	12.59 –9 +32				+ 0		
	9.80 504					+ 12.82	–12.82				+ 8.76		
((δ) – D) $\frac{d'}{100}$	1.10782										+ 35		
											– 4.20		
+18.21										50	20 17.01		
+0 31.92 δ_2		26 16.65		20 48.9									
	186	3 26.7	2.50	51.7	3 25.85	+09	–14.46	–46	15	18 11.1	56 47.91		
	+186				18 25.85	4 22.50	+ .30			18 11.53	– .10		+10.06
d	1.269 51					50 56 33.58	14.16 –30 +46				+ .75		
	9.79 734					+ 14.35	–14.32				+ 9.61		
((δ) – D) $\frac{d'}{100}$	1.15679										+ 40		
											– 10.80		
+22.98											56 47.17		
+0 38.35 δ_1		30 5.90		57 15.5									
	166	3 22.4	2.00	42.4	3 21.20	+07	–12.42	–43	15	18 7.9	56 51.66		
	+166				18 21.20	4 27.15	+ .23			18 8.42	– 8		+10.58
d	1.220 11					50 56 38.85	12.59 –27 +46				+ 82		
	9.79 934					+ 12.81	–12.78				+ 9.44		
((δ) – D) $\frac{d'}{100}$	1.10739										+ 40		
											– 4.20		
+18.38											56 58.04		
+0 30.68 δ_2		30 5.83		57 28.7									

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Date$_1$ = Dec 31 1870 — Observer Am, Recorder Anon — Date$_2$ = Jan 7 1871 — Observer Anon, Recorder Anon

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4 33 25	32 7	8.5	33	9.6	29.9	37.6	41.6	45.3	49.5	2089	4078	10.92
3.2 11.8	30.6	8.7							−3.70		10.92	33 2986
κ												−4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .44
												− 2
a_1												33 26.16
												−4.96
												33 21.20
		8.3	33	8.0	26.6	34.6	38.5	42.0	46.3	1880	3760	10.92
									−0.613		10.92	33 2668
κ												−1.957
((δ) − D) $\frac{\kappa'}{100}$												+ .36
												− 2
a_2												33 26.07
												− .34
												33 25.71
4 34 48	17 3	8.6	34	34.3	53.1	60.9	64.9	68.7	72.7	3203	6406	10.85
3.3 35.4	15.2	9.0							−3.71		10.85	34 5321
κ												−4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .43
												− 2
a_1												34 49.50
												−4.95
												34 44.55
		8.5	34	35.0	50.2	57.8	1.8	5.4	9.3	3045	6090	10.85
										−0.613		34 5005
κ												−0.957
((δ) − D) $\frac{\kappa'}{100}$												+ .36
												− 2
a_2												34 49.44
												− .34
												34 49.08
4 36 44	58 2	8.4	36	29.1	44.4	57.3	61.2	65.1	69.1	3021	6042	11.02
3.5 30.8	56.1	8.1							−3.70		11.02	36 4940
κ												−4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .44
												− 2
a_1												36 45.70
												−5.02
												36 40.68
		8.5	36	28.4	46.0	54.0	58.1	2.0	5.9	2860	5720	11.02
										−0.602		36 4618
κ												−0.957
((δ) − D) $\frac{\kappa'}{100}$												+ .37
												− 2
a_2												36 45.58
												− .37
												36 45.19
4 37 52	58 4	9.2	37	41.7	57.8	65.3	69.6	73.1	77.2	3426	6852	11.02
3.6 38.8	56.4	8.9							−3.70		11.02	37 5184
κ												−4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .44
												− 2
a_1												37 53.80
												−4.03
												37 49.81
		9.3	37	33.1	54.4	62.4	66.4	70.8	74.0	3275	6550	11.02
										−0.602		37 5448
κ												−0.957
((δ) − D) $\frac{\kappa'}{100}$												+ .37
												− 2
a_2												37 53.88
												− .37
												37 53.48
4 41 20	15 6	9.2	40	57.6	24.0	31.8	35.7	39.4	43.5	1744	3488	10.85
4.0 6.0	13.7	9.2							−3.71		10.85	41 2401
κ												−4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .43
												− 2
a_1												41 20.32
												−4.99
												41 15.33
		9.5	40	57.2	20.4	27.0	32.7	36.4	40.4	1644	3288	10.85
				58.2						−0.623		41 2103
κ												−0.957
((δ) − D) $\frac{\kappa'}{100}$												+ .36
												− 2
a_2												41 20.41
												− .37
												41 19.95

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	203	2 43.0	42.4	85.0	2 42.50	+11	15.81		40	42′	26.70	32 32.71	
	+20.3				42 42.50	40 5.85	.18					− .11	+9.39
d	1.30750					50 32 16.91	15.74 −18 +24					+ 39	
	9.88320					+ 15.80	15.80					+ 8.56	
((δ) − D) $\frac{d'}{100}$	1.19864											+ 35	
												− 10.30	
+22.91 δ₁		33 44.11		33 8.6								32 31.80	
+0 36.85													
	186	2 41.4	38.3	79.7	2 39.85	+09	14.48		40	42	25.30	32 34.75	
	+18.7				42 39.45	40 8.50	.16					− .10	+9.88
d	1.27184					50 32 20.20	14.16 −16 +55					+ 6.25	
	9.80320					+ 14.55	−14.55					+ 8.98	
((δ) − D) $\frac{d'}{100}$	1.16298											+ 35	
												− 4.00	
+18.33 δ₂		33 44.04		33 10.11							50	32 40.63	
+0 29.48													
	188	3 4.7	4.7	9.4	3 4.70	+10	14.64		53	57	49.92	17 9.50	
	+8.9				58 4.70	24 4.368	.08					− .10	+9.22
d	1.27646					50 16 54.71	+14.16 −9 +71					+ .68	
	9.80550					+ 14.79	−14.78					+ 8.29	
((δ) − D) $\frac{d'}{100}$	1.16990											+ .35	
+22.86												− 10.10	
+0 36.30 δ₁		35 7.41		17 44.9								17 8.62	
	152	3. 1.3	1.0	2.3	3 1.15	+06	11.83		53	57	49.42	17 10.64	
	+15.0				58 1.15	24 4.720	.08					− .6	+9.72
d	1.17609					50 16 58.90	11.80 −7					+ .72	
	9.80550					+ 11.74	−11.73					+ 8.71	
((δ) − D) $\frac{d'}{100}$	1.06953											+ .35	
+18.29												− 3.90	
+0 29.04 δ₂		35 7.37		17 45.5							50	17 16.46	
	208	2 5.3	4.2	9.5	2 4.75	+12	15.81		15	16	49.10	58 10.31	
	+20.3				17 4.75	5 43.60	.31					− .11	+9.80
d	1.30750					50 57 54.66	15.74 −33 +24					+ .46	
	9.79918					+ 15.65	−15.65					+ 9.05	
((δ) − D) $\frac{d'}{100}$	1.19462											+ .40	
												− 10.00	
+23.07 δ₁		37 3.75		58 45.6								58 10.11	
+0 35.50													
	176	2 5.3	3.0	8.3	2 4.15	+08	13.70		15	16	50.42	58 9.63	
	+17.8				17 4.15	5 44.20	.26					− .9	+10.29
d	1.25042					50 57 55.90	13.38 −27 +62					+ .50	
	9.79918					+ 13.73	−13.73					+ 9.48	
((δ) − D) $\frac{d'}{100}$	1.13754											+ .40	
												− 4.00	
+18.46 δ₂		37 3.65		58 44.3							50	58 15.92	
+0 28.40													
	158	2 7.2	6.0	13.2	2 6.60	+07	12.30		15	16	54.43	58 4.99	
	+15.8				17 6.60	5 41.75	.24					− .7	+9.84
d	1.19866					50 57 52.81	11.80 −25 +62					+ .46	
	9.79918					+ 12.18	−12.17					+ 9.05	
((δ) − D) $\frac{d'}{100}$	1.08578											+ .40	
												− 9.90	
+23.08 δ₁		38 11.89		58 40.0								58 4.93	
+0 35.05													
	213	2 12.5	9.4	21.9	2 10.95	+12	16.58		15	16	54.46	58 5.60	
	+21.4				17 10.95	5 37.40	.33					− .12	+10.29
d	1.33041					50 57 49.10	16.53 −35 +31					+ .53	
	9.79918					+ 16.50	−16.49					+ 9.48	
((δ) − D) $\frac{d'}{100}$	1.21753											+ .40	
												− 4.00	
+18.47 δ₂		38 11.90 (0)		58 39.9							50	58 1.89	
+0 28.04													
+ 26.4	244	4 1.5	0.2	1.7	4 0.85	+15	19.00		53	59	41.75	15 ~~17.66~~ 19.22	
1.42160	+24.4				(~~1.9~~) 0.45	22 47.50	.10					− .16	+8.41
9.80 d 580	1.38739					50 14 58.56	18.89 −11 +32					+ 0	
1.31534	9.80580					+ ~~19.10~~	−19.10					+ 8.27	
((δ) − D) $\frac{d'}{100}$	1.28113					+ 20.67						+ .30	
												− 9.30	
+22.93 δ₁		41 38.28		15 52.2								15 ~~16.77~~ 18.33	
+0 33.90													
+228	237	4 57.7	55.1	112.8	4 56.40	+14	18.45		58	59	37.77	15 ~~22.28~~ 21.50	
1.35793	+23.8	5 sums			59 56.40	22 51.95	.10					− .15	+10.00
9.80 d 580	1.37658					50 15 3.65	18.11 −10 +62					+ 1.18	
1.25167	9.80580					+ ~~18.63~~	−18.63					+ 8.67	
((δ) − D) $\frac{d'}{100}$	1.27082					+ 17.85						+ .30	
												− 3.70	
+18.35 δ₂		41 38.30		15 54.9								15 ~~28.58~~ 27.80	
+0 27.12													

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Date$_1$ = Dec 31 1870 Observer A.M. Recorder W.A.R. Date$_2$ = Jan 7 1871 Observer A.M. Recorder W.A.R.

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4 42 16 s	-25 1	8.8	42 7.5	20.5	28.3	32.3	36.3	40.1	1575	31.50	1092	2056
41 2.7	33.5	8.8							-3.70		10.92	42 35 20.38
κ												-4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .44
												− 2
a_1												42 16.88 +230.
												− 5.01 +0 33
												42 11.87
		8.4	42 9.9	17.6	25.0	28.8	33.0	37.0	1414	28.28	1092	1726
									-0.62 3		10.92	42 45 17.86
κ												-0.987
((δ) − D) $\frac{\kappa'}{100}$												+ .36
												− 2
a_2												42 16.74 +18.4
												− .38 +0 26
												42 16.35
4 43 59 31.8	23 3	8.3	43 40.9	49.5	57.5	1.5	5.4	9.0	3029	6058	10.88 49.70	4970 2.92 0.
42 44.9	21.7	8.8	33.2	2.7	10.7	14.6	18.6	22.4	690	13.80	10.88 − 4.12	43 49 7 0 4.12 9.
Double. 42 44.9	21.8								-3.71 -3.71		10.88 + .43	44 2.9 2 4.43 0
κ											− 2	− 2
((δ) − D) $\frac{\kappa'}{100}$											43 45.99	43 59.27
											− 5.01	− 5.01 +2300
a_1											43 40.98	43 54.26 +0 32.
		8.3	43 24.6	46.7	54.6	58.0	2.1	6.2	2876	5752	10.88 46.64	4664 59.4 1.15
			31.4 33.2	59.8	7.4	11.3	15.4	19.2	531	1062	10.88 − 0.987	43 46 40.9 7 9.8
κ									-0.62 3 -0.62 3		10.88 + .36	42 59.7 436 1.0
((δ) − D) $\frac{\kappa'}{100}$											− 2	− 2
											43 46.02	43 59.12
											− .39	− .39
a_2											43 45.62	43 58.72 +18.4
												+0 26
4 45 26	18 9	8.6	45 11.5	29.3	37.0	41.0	44.8	48.7	2008	4016	10.86	2930
44 11.9	17.2	8.9							-3.71		10.86	45 29.30
κ												− 4.12
((δ) − D) $\frac{\kappa'}{100}$												+ .43
												− 2
a_1												45 25.59 +22.9
												− 5.01 +0 31.
												45 20.58
		8.7	45 6.9	26.4	33.7	38.0	41.7	45.7	1855	3710	10.86	2624
									-0.62 3		10.86	45 26.24
κ												− 0.987
((δ) − D) $\frac{\kappa'}{100}$												+ .36
												− 2
a_2												45 25.62 +18.4
												− .39 +0 25
												45 25.22
4 47 47	46 4	8.8	47 30.9	52.2	60.1	64.0	67.8	71.7	3158	6316	10.96	5220
46 33.9	44.7	8.8							-3.70		10.96	47 62.20 1.3
κ												− 4.12 9.
((δ) − D) $\frac{\kappa'}{100}$												+ .44 1.
5 1 26												− 2
a_1												47 48.50 +23.1
												− 5.07 +0 30
												47 43.43
		8.3	47 27.7	49.0	57.0	0.8	4.7	8.8	3003	6006	10.96	4910
									-0.62 2		10.96	47 49.10
κ												-0.987
((δ) − D) $\frac{\kappa'}{100}$												+ .37
												− 2
a_2												47 48.49 +18.5
												− .41 +0 24
												47 48.07
4 52 11	3 7	8.8	5								10.80	
50 57.0	25.1	8.15									10.80	
κ												
((δ) − D) $\frac{\kappa'}{100}$												
5 3 21												
a_1												
50 11.8		8.3	51 7.2	25.7	33.5	37.4	41.0	45.0	1826	3652	10.80	
									-0.62 3		10.80	
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_2												51 25.62
												− 0.987
												+ .36
												− 2
												51 25.00 +18.3
												− .41 +0 23
												51 24.58
												3.12

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
d	13.0 +13.1 1.11724	4′ 30.9	3′08	617	4′ 30.85	+05	10.12		40	44′ 20.″67		38 39.76	
	9.80336				44 30.45	18.50	.13		35			− 5	+9.83
((δ) − D) $\frac{d'}{100}$	1.00857				39	50 30 29.56	10.24−14+8					+ 99	
						+ 10.20	−10.18					+ 8.54	
δ_1 +2303 +0 3325		42 34.50		36 17.6								+ .35	
												− 9.20	
												38 40.39	
d	77 +1.5 0.87506	4 27.7	2.50	3.27	4 26.31	+02	6.02		40 35	44 20.51		38 39.54	
	9.80336				44 26.35	38 43 22.00	.07					− 2	+10.34
((δ) − D) $\frac{d'}{100}$	0.76636				39	50 30 33.70	5.52 −7+39					+ 1.06	
						+ 5.84	−5.84					+ 8.95	
δ_2 +18.43 +0 2660		42 34.78		36 12.8								+ .35	
												− 3.70	
											50	38 46.18	
d	0.94448 9.80458	8.6 (1.63) +8.8	1 49.9	1 47.2	971	1 48.55	+02	6.70	52	51 41.67		23 17.73	23 34.05
	0.83710	29.7	50 23 17.73	50 23 34.05	51 48.55	30 59.80	.05			51 25.38		− 2	− 24
((δ) − D) $\frac{d'}{100}$	1.47276	+9.15		+8.94		50 23 10.86	6.30−5+63					+ 40	+ 40
	9.80458					+ 6.87	22.82−20+55					+ 8.42	+ 8.43
δ_1 +230 +0 32.50	1.36528	44 39.8		23 50.4			−6.88					+ .35	+ .35
		44 17.20		24 6.5		50 23 10.86	−23.17					− 9.00	− 9.00
						+ 23.19						23 17.88	23 33.99
d	1.15534 9.80458	1.5.3 1.35	1 54.8	51.8	1066	1 53.30	+06	11.91	52	51 42.14		23 17.92	23 34.19
	1.04786	1.43 +4.3 220				51 53.30	+05	10.51		51 25.92		− 445	− .33
((δ) − D) $\frac{d'}{100}$	1.54531	35.1 −25.1 374	23 17.92	23 34.15		30 55.05	11.12−10+24					+ .46	+ .46
	9.80458		+9.59	+9.32		50 23 6.75	27.34−24+8					+ 8.83	+ 8.84
δ_2 +18.40 +0 2600	1.48783	44 4.02		23 49.9		+ 11.17	.09					+ .35	+ .35
		44 17.12		24 5.9			.08					− 360	− 360
						50 23 6.75	− 11.16					23 23.91	23 39.84
						+ 27.40	− 27.38				52		
d	17.8 +17.8 1.25042	1 2.3	1.6	8.9	1 1.95	+09	13.86		53	55 48.01		19 11.38	
	9.80519				56 1.95	26 46.40	.09					− 9	+8.82
((δ) − D) $\frac{d'}{100}$	1.14355					50 18 57.46	13.38−8+64					+ .22	
						+ 13.92	−13.94					+ 8.34	
δ_1 +22.99 +0 31.90		45 43.57		19 43.3								+ .25	
												− 8.80	
												19 11.40	
d	19.5 +19.3 1.28556	1 2.7	0.9	3.6	1 1.80	+00	15.18		53	55 46.70		19 13.34	
	9.80519				56 1.80	26 46.55	.10					− .10	+9.24
((δ) − D) $\frac{d'}{100}$	1.17869					50 18 58.25	14.95−9+24					+ .24	
						+ 15.09	−15.10					+ 8.75	
δ_2 +18.40 +0 25.52		45 43.62		19 44.5								+ .35	
												− 3.60	
											50	19 18.98	
d	+21.3 1.32838	N3 +11.3 1.05308	3.5.70	58.0	1155	2 57.75	+08	8.80	25	28 48.99		46 ~~1044~~ 18.16	
	9.80105	9.80105			28 57.75	53 50.60	.14					− 3	+10.07
((δ) − D) $\frac{d'}{100}$	1.21737	0.94207				50 46 1.64	8.66−14+24					+ .88	
						+ ~~8.75~~ 16.50	−8.76					+ 8.82	
δ_1 +23.15 +0 30.95		48 6.58		46 50.7								+ 40	
												− 8.50	
												46 ~~11.08~~ 19.73	
d	21.3 +21.4 1.33041	3 36.9	5.50	1119	2 55.95	+12	16.58		25	28 39.38		46 20.67	
	9.80105				28 55.95	53 52.40	.26					− .12	+10.46
((δ) − D) $\frac{d'}{100}$	1.21940					50 46 4.10	16.53−27+31					+ .94	
						+ 16.57	−16.57					+ 9.24	
δ_2 +18.52 +0 24.76		48 6.59		46 52.3								+ .40	
												− 3.60	
												46 27.53	
d		1.39.0	39.2	782	1 8.910				10				
					11 89.10	11 9.25							
((δ) − D) $\frac{d'}{100}$													
δ_1													
											50		
d	185 +8.4 1.26482	1 41.2	39.3	805	1 40.25	+09	14.40		10	11 25.79		2 34.27	
	9.80762				11 40.25	49 8.10	.02					9	+9.07
((δ) − D) $\frac{d'}{100}$	1.16038					50 34 1980	14.16−2+32					− 4.89	55
						+ 14.47	−14.46					+ 8.45	
δ_2 +18.39 +0 23.56		51 42.97		4 4.1								+ 30	
												− 3.30	
												50 ~~44.04~~ 40.52	

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Date$_1$ = Dec 31 1870 — Observer / Recorder — Date$_2$ = Jany 1871 — Observer / Recorder

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
4	5 54 44	9 2	8.5	54	30.1	50.8	58.4	2.3	6.3	10.2	1086	6.1.60	10.82
	5 3 22.9	7.7	8.5							−3.72			54 50.78
	κ												− 4.13
	((δ) − D) $\frac{\kappa'}{100}$												+ .43
													− .2
	a_1 01												54 47.08 +23.0
													− 5.05
													54 42.01 +0.28
	5 7 27		7.8	54	32.8	47.6	55.2	59.0	2.9	7.0	291.7	5834	10.82
	κ										−0.683		54 47.52
	((δ) − D) $\frac{\kappa'}{100}$												− 0.987
													+ .36
	a_2												− .2
													54 46.90 +18.44
													− .42
													54 46.47 +0.22
4	5 58 28	36	8.6	58	19.8	33.2	41.1	45.1	49.0	53.0	221.4	4428	10.93
	5 7 14.4	34.7	9.3							−3.71			58 33.35
	κ												− 4.13
	((δ) − D) $\frac{\kappa'}{100}$												+ .44
													− .2
	a_1												58 29.64 +23.2
													− .10
													58 29.54 +0.26
			9.0	58 (W 12.8)	30.5	38.0	42.0	45.9	50.0	206.4	4128	10.93	58 30.35
	κ									−0.63			− .97
	((δ) − D) $\frac{\kappa'}{100}$												+ .36
													− .2
	a_2												58 29.72 +18.57
													− .45
													58 29.27 +0.21
5	2 26	58.2	8.8	3	28.8			15.3	19.2	23.0			10.99
	2 11.6	51.8	9.4		fair					−3.71			3 23.35
	no 10m place												− 4.13
	κ												+ .44
	((δ) − D) $\frac{\kappa'}{100}$												− .2
	a_1												2 59.64 +23.3
													− 5.14
													2 54.50 +0.24
			9.5	3	23.0	01	7.9	12.0	16.1	20.1	562	1024	10.99
	κ										−0.62		3 0.25
	((δ) − D) $\frac{\kappa'}{100}$												−0.97
													+ .34
	a_2												− .2
													2 59.63 +18.6
													− .47
													2 59.16 +0.19
5	4 51	45.4	8.7	1									10.96
	3 37.3	44.0	9.0										
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
			8.8	4	33.6	52.9	0.8	4.7	8.7	12.6	197	6394	10.96
	κ										−0.62		4 52.98
	((δ) − D) $\frac{\kappa'}{100}$												−0.97
													+ .34
	a_2												− .2
													4 52.36 +18.6
													− .47
													4 51.89 +0.1
5	9 45	5.23	8.0	9	27.1	49.1	57.5	1.4	5.3	9.0	30.28	6046	10.99
	8 31.2	51.0	8.0							−3.71			9 49.47
	κ												− 4.13
	((δ) − D) $\frac{\kappa'}{100}$												+ .44
													− .2
	a_1 11 10												9 45.76 +23.3
													− 5.17
													9 40.59 +0.21
			8.2	9	29.6	46.4	54.0	58.2	2.1	6.1	2868	5736	10.99
	κ										−0.682		46.97
	((δ) − D) $\frac{\kappa'}{100}$												9 44.97
													−0.987
	a_2												+ .37
													− .2
													9 45.14 +18.9
													− .42
													9 44.72 +0.1
													4526
													3.02

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke		z 50	δ′	
	207	0 47.2	45.9	93.1	0 46.55	+11	16.12		5	5	30.31	9 29.10	
	+20.7				5 46.55	17 1.80	-.05					− .12	+8.52
d	1.31 594					50 9 12.86	15.74-6+56					+ .18	
	9.80671					+ 16.24	-16.24					+ 8.16	
((δ) − D) $\frac{d'}{100}$	1.21062											+ .30	
												− 7.70	
+2.305												9 29.92	
+0 2.800 δ_1		55 5.06		9 57.92									
	148	0 43.3	40.6	83.9	0 39.5	+06	11.52		5	5	30.41	9 29.63	
	+14.7				5 44.95	17 6.40	-.03					− 6	+8.97
d	1.16732					50 9 18.10	11.02-4+56					+ .17	
	9.80671					+ 11.53	-11.54					+ 8.56	
((δ) − D) $\frac{d'}{100}$	1.06197											+ .30	
												− 3.30	
+18.44											50	9 35.30	
+0 22.40 δ_2		55 49.1		9 57.70									
	134	4 42.4	43.0	85.4	4 42.70	+05	10.43		3 5	39	32.21	35 27.18	
	+13.5				39 42.70	43 5.65	.13					− 5	+9.95
d	1.13033					50 35 16.41	10.24-14+40					+ 1.03	
	9.80274					+ 10.47	-10.50					+ 8.62	
((δ) − D) $\frac{d'}{100}$	1.02101											+ .35	
												− 7.30	
+23.21												35 29.83	
+0 26.45 δ_1		58 47.75		35 56.3									
	81	4 47.6	45.0	92.6	4 46.30	+02	6.31		3 5	39	32.54	35 27.51	
	(177)				39 46.30	43 2.05	.07					− 9	+10.45
d	47 +1.77					50 35 13.75	13.38-17+55					+ 1.15	
	1.24797					+ 13.76	-13.76					+ 9.04	
((δ) − D) $\frac{d'}{100}$	9.80274											+ .35	
	1.13865											− 3.20	
+18.57											50	35 34.76	
+0 21.16 δ_2		58 47.84		35 55.9									
	−2.55	0 57.0	55.4	112.9	0 56.45				2 0	21	16.13	53 43.27	
					20 56.45	1 51.90	19.67-38+39					− .17	+9.38
d	1.40654 2n					50 53 4 2.96	+19.68					+ .20	
	9.79981					− 19.69						+ 8.95	
((δ) − D) $\frac{d'}{100}$	1.29429n											+ .40	
												− 6.80	
+23.33												53 45.85	
+0 24.35 δ_1		3 17.83		57 10.2									
	−2.27	0 58.6	56.4	115.0	0 57.50				2 0	21	15.04	53 45.02	
					20 57.50	1 50.85						− .14	+9.58
d	1.35603 2n					50 54 2.55	17.32-32+54					+ .24	
	9.79981					− 17.53	+17.54					+ 9.38	
((δ) − D) $\frac{d'}{100}$	1.24378n											+ .40	
												− 3.10	
+18.66												53 51.80	
+0 19.48 δ_2		3 17.82		57 11.3									
		0 23.3	21.6	44.9	0 22.45				3 0				
					30 22.40	52 25.40							
d													
((δ) − D) $\frac{d'}{100}$													
δ_1											50		
	193	6 23.0	20.4	43.4	0 21.85	+10	15.03		3 0	30	6.83	44 50.70	
	+19.4				30 21.50	52 26.50	.23					− .10	+9.58
d	1.20780					50 44 38.20	14.95-24+31					+ .10	
	9.80120					+ 12.50	-15.02					+ 9.23	
((δ) − D) $\frac{d'}{100}$	1.09694											+ .35	
												− 3.00	
+18.65											50	44 57.28	
+0 19.00 δ_2		5 10.54		45 16.3									
	220	2 26.3	24.3	50.6	2 25.30	+12	17.13		2 0	22	8.05	52 51.34	
	+22.3				22 25.30	0 23.06	.31					− .13	+9.74
d	1.34830					50 52 34.11	17.32-31+24					+ .33	
	9.79996					+ 17.23	-17.25					+ 8.94	
((δ) − D) $\frac{d'}{100}$	1.23620											+ .40	
												− 5.90	
+23.38												52 55.18	
+0 21.70 δ_1		10 3.97		53 16.9									
	168	2 24.1	20.9	45.0	2 22.50	+20	20.87		2 0	22	9.52	52 50.53	
	+16.8				22 22.50	0 25.85	.36					− .8	+10.27
d	1.22531					50 52 37.56	12.37-23+62					+ .58	
	9.79996					+ 12.98	-12.98					+ 9.37	
((δ) − D) $\frac{d'}{100}$	1.11321											+ .40	
												− 2.90	
+18.70												52 57.90	
+0 17.36 δ_2		10 3.96		53 15.3									

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Date$_1$ = DEC 31 1870 | Observer DM, WAR | Date$_2$ = Jan 4 1871 | Observer ~~WAR~~ DM, WAR | Run

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
5 12 30	68	8.0	13 17.3	35.1	42.7	46.7	50.5	54.4	2294	4588	1081	3507
12 16.1	4.9	8.2							-3.72		10.81	13 35.07
κ												-4.13
((δ) — D) $\frac{\kappa'}{100}$												+ .43
α_1												— 2
												13 31.35
												— 5.12
												13 26.23
		8.2	13 13.7	31.7	39.7	43.5	47.3	51.3	2135	4270	1081	3189
κ									-0.673		10.81	13 31.89
((δ) — D) $\frac{\kappa'}{100}$												-0.987
α_2												+ .36
												— 2
												13 31.25
												— 48
												13 30.78
5 14 50	57.5	7.8	14 38.0	53.7	1.5	5.5	9.3	13.2	3232	6464	1099	3536
13 35.3	50.4	8.3							-3.72		10.99	14 53.65
κ												-4.14
((δ) — D) $\frac{\kappa'}{100}$												+ .44
α_1												— 2
												14 49.93
												— 5.18
												14 44.75
		8.0	14 31.2	50.5	58.3	2.3	6.0	10.5	3076	6152	1099	3054
κ									-0.632		10.99	14 53.58
((δ) — D) $\frac{\kappa'}{100}$												-0.987
α_2												+ .37
												— 2
												14 49.90
												— 51
												14 49.40
6 21 42	16.2	8.3	21 28.0	45.9	53.4	57.4	61.4	65.2	2833	5666	1085	4561
20 27.0	15.3	8.1							-3.73		10.85	21 45.81
κ												-4.14
((δ) — D) $\frac{\kappa'}{100}$												+ .43
α_1												— 2
												21 42.08
												— 5.17
												21 36.91
		8.0	21 27.2	42.7	50.6	54.0	58.1	2.0	2674	6348	1085	4263
κ									-0.643		10.85	21 42.63
((δ) — D) $\frac{\kappa'}{100}$												-0.987
α_2												+ .36
												— 2
												21 41.99
												— 52
												21 41.48
5 22 54	27.0	8.5	22 41.8	56.9	64.6	68.4	72.4	76.3	3386	6772	1089	5683
21 39.3	26.2								-3.73		10.89	22 56.83
κ												-4.14
((δ) — D) $\frac{\kappa'}{100}$												+ .43
α_1												— 2
												22 53.10
												— 5.19
												22 47.91
		8.0	22 35.2 ~~47.2~~	53.7	61.5	65.3	69.1	73.1	3927	6454	1089	5365
κ									-0.653		10.89	22 63.65
((δ) — D) $\frac{\kappa'}{100}$												-0.987
α_2												+ .36
												— 2
												22 53.00
												— 52
												22 52.50
5 23 43	10	9.0	23 38.6	48.0	55.7	59.5	63.3	67.4	2939	5878	1079	4799
22 28.2	8.2	9.2							-3.73		10.79	23 47.99
κ												-4.14
((δ) — D) $\frac{\kappa'}{100}$												+ .43
α_1												— 2
												23 44.26
												— 5.15
												23 39.11
		8.6	23 31.0	48.0	52.6	56.5	60.1	64.2	2784	5568	1079	4489
κ									-0.653		10.79	23 44.89
((δ) — D) $\frac{\kappa'}{100}$												-0.987
α_2												+ .36
												— 2
												23 44.24
												— 51
												23 43.75

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	178	4 54.0	54.0	1080	4 54.00	+09	13.86		5′	9′	40.″01	5 19.39	
	+17.8				9 54.00	12 54.35	.03					− 9	+9.38
d	1.25042					50 4 54.1	13.38 − 3 + 64					+ 1.08	
	9.80731					+ 13.98	− 13.99					+ 8.09	
((δ) − D) $\frac{d'}{100}$	1.14567											+ .30	
+23.19												− 5.50	
+0 20.10 δ_1		13 49.42		5 43.4								5 23.27	
	180	4 54.9	57.9	1063	4 53.15	+09	14.01		5′	9	38.86	5 21.20	
	+18.2				9 53.15	12 55.20	.03					− 9	+9.88
d	1.26007					50 5 6.90	14.16 − 3 + 16					+ 1.18	
	9.80731					+ 14.30	− 14.29					+ 8.49	
((δ) − D) $\frac{d'}{100}$	1.18532											+ .30	
+18.55												− 2.60	
+0 16.08 δ_2		13 49.33		5 44.6							50	5 28.48	
	157	3 55.5	55.9	1114	3 55.70	+07	12.22		20′	23	43.66	51 15.77	
	+15.6				23 55.70	58 52.65	.20					− 7	+10.10
d	1.19312					50 58 3.71	11.80 − 22 + 40					+ 8.6	
	9.80027					+ 12.06	− 12.04					+ 8.91	
((δ) − D) $\frac{d'}{100}$	1.08133											+ .40	
+23.41												− 5.40	
+0 19.50 δ_1		15 8.16		51 40.0								51 20.44	
	193	3 58.1	55.7	1138	3 56.90	+10	15.03		20′	23	44.98	51 18.07	
	+19.3				23 56.90	58 51.45	.26					− .10	+10.58
d	1.28556					50 51 3.15	14.95 − 27 + 24					+ .94	
	9.80027					+ 14.92	− 14.92					+ 9.34	
((δ) − D) $\frac{d'}{100}$	1.17377											+ .40	
+18.73												− 2.70	
+0 15.60 δ_2		15 8.13		51 41.6							50	51 25.95	
	179	4 5.3	5.1	104	4 5.20	+09	13.94		55′	58	51.25	16 8.14	
	+17.8				59 5.20	23 43.15	.08					− 9	+9.38 44
d	1.25042					50 15 54.21	13.38 − 7 + 64					+ .90	
	9.80565					+ 13.93	− 13.95					+ 8.28	
((δ) − D) $\frac{d'}{100}$	1.14401											+ .35	
+23.29												− 4.50	
+0 16.55 δ_1		22 0.20		16 29.6								16 13.08	
	155	4 5.9	3.2	91	4 4.55	+06 4.80	12.07		55′	58	52.49	16 7.55	
	+15.4				5-9 4.40	23 53.85	.06					− 6	+9.96
d	1.18752				4.55	50 15 5.55 5.50	11.80 − 6 + 32					+ .98	
	9.80565					+ 12.05	− 12.06					+ 8.69	
((δ) − D) $\frac{d'}{100}$	1.08111											+ .35	
+18.64												− 2.30	
+0 13.24 δ_2		22 0.12		16 26.4							50	16 ~~14.21~~ 15.21	
	151	2 44.8	4.35	883	2 44.15	+06	11.76		45′	47	32.47	27 26.96	
	+15.0				47 44.15	35 4.20	.11					− 6	+9.36
d	1.17609					50 27 15.26	11.81 − 12					+ .59	
	9.80394					+ 11.70	− 11.68					+ 8.48	
((δ) − D) $\frac{d'}{100}$	1.06800											+ .35	
+23.35												− 4.30	
+0 16.00 δ_1		23 11.26		27 48.0								27 ~~8.02~~ 3202	
	285	2 47.5	46.8	943	2 47.15	+21	22.19		45′	47	25.01	27 ~~35.84~~	
	284	18.4			47 47.15	35 1.20	.16					− .22	+9.70
d	1.45332	1.26482				50 27 12.90	22.03 − 21 + 32					+ .67	
	9.80397	9.80397				+ ~~22.14~~	− 22.14					+ 8.90	
((δ) − D) $\frac{d'}{100}$	1.34523	1.15673				14.35						+ .35	
+18.68												− 2.30	
+0 12.80 δ_2			23 11.18	27 47.4							50	27 ~~42.44~~ 34.65	
	94	4 2.3	3.2	55	4 2.75	+08	7.32		10′	13	65.35	1 4.06	
	9.4				14 2.75	8 45.60	.00					− .3	+9.15
d	0.97313					50 0 56.6	7.08 + 32					+ .88	
	9.80792					+ 7.40	− 7.40					+ 8.00	
((δ) − D) $\frac{d'}{100}$	0.86899											+ .30	
+23.22												− 4.20	
+0 15.70 δ_1		24 2.33		1 24.7								1 9.01	
	140	4 5.7	4.6	103	4 5.75	+05	10.90		10′	13	57.20	1 5.84	
	+13.9				14 5.75	8 43.20	.00					− .5	+9.62
d	1.14301					50 0 54.90	10.24 + 71					+ .98	
	9.80792					+ 14.94	− 10.95					+ 8.39	
((δ) − D) $\frac{d'}{100}$	1.03887											+ .30	
+18.68												− 2.20	
+0 12.56 δ_2		24 2.33		1 25.8								1 13.26	

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Date$_1$ = Dec 31 18 71 — Observer A.M. — Recorder H.A.R.

Date$_2$ = Jan 4 1871 — Observer A.M. — Recorder H.A.R.

Run

Star. α	δ	Mag.	T_s	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
5 25 24 27 12.3	1 10 10.2	9.5 7.5	25 15.4	31.4	38.8	42.6	46.7	50.6	21.01 −3.73	42.02	10.83 10.83	30 19 2d 31.19 −4.14 +.43 −.2 25 27.46 −5.17 25 22.29
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_1												
		9.5	25 11.8	28.0	36.0	39.7	43.7	47.3	1947 −0.65	38.94	10.83 10.83	28 11 2d 28.11 −0.98 +.36 −.2 25 27.46 −.52 25 26.96
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_2												
5 28 14 26.5 58.8	606 59.9	8.8 8.5	27 5.6	18.6	26.2	30.0	34.0	38.0	1468 −3.72	29.36	11.02 11.02	18 34 28 18.34 −4.14 +.44 −.2 28 14.62 −5.24 28 9.38
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_1												
		8.3	27 4.4	15.6	23.0	27.2	31.1	35.1	1319 −0.64	26.38	11.02 11.02	28 15.36 −0.98 +.37 −.2 28 14.72 −.55 28 14.19
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_2												
5 29 9 29? 54.2	−16 −2.2	8.0 9.2	28 29? 11.0	15.4	23.2	27.1	30.9	34.9	1215 −3.73	26.30	10.78 10.78	28 1.55 −4.14 +.43 −.2 29 11.79 −5.16 29 6.63
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_1												
		8.3	(29) 43.5	12.5	20.0	23.9	27.7	31.6	1157 −0.65	2314	10.78 10.78	29 12.36 −0.98 +.36 −.2 29 11.71 −.53 29 11.20
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_2												
5 33 19 32.3 6	378 37.2	7.8 7.0	33 7.3	21.7	29.5	33.5	37.3	41.5	1635 −3.73	29.70	10.93 10.93	2) 33 21.77 −4.15 +.44 −.2 33 18.04 −5.22 33 12.82
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_1												
		7.8	32 54.0	18.5	26.4	30.3	34.2	38.1	1475 −0.66	29.50	10.93 10.93	33 18.57 −.08 0.97 +.36 −.2 33 17.91 −.56 33 17.35
κ												
((δ) − D) $\frac{\kappa'}{100}$												
a_2												
Dec31 3 38 57 4 51 26 Dec31 37 39.5 50 11.8	19.9 3.8 16.7 2.1	6.0 8.3 6.0 8.5									10.87 10.87	8.24 28 21 16 15 10 12 12
((δ) − D) $\frac{\kappa'}{100}$												
a_1												
Dec31 4 53 21 Dec31 4 57 27 Dec31 5 κ/1 10 52 7.0 56 12.9 9 56.8	498 67 15.3 48.2 5.3 14.0	9.0 7.3 8.3 9.6 7.5 8.0									10.98 10.98 10.85 10.85	15 10 16 3 8.16
((δ) − D) $\frac{\kappa'}{100}$												
a_2												

3.10

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	160	4 17.3	17.3	34.6	4 17.30	+07	12.46		U	4′	44.90	10 54.50	
	+0.8				4 17.30	18 31.05	.05					− 7	+9.37
d	1.19866					50 10 42.11	11.80 − 4 + 64					+ 95	
	9.80641					+ 12.39	− 12.40					+ 8.19	
((δ) − D) $\frac{d'}{100}$	1.09301											+ 30	
+23.29												− 4.00	
+0 14.90 δ_1		25 45.58		11 14.8								10 59.87	
	162	4 17.8	15.4	33.2	4 16.35	+07	12.61		0	4	3.56	10 56.48	
	+6.3				4 16.35	18 32.00	.05					− 7	+9.84
d	1.21219					50 10 48.70	12.59 − 4 + 24					+ 103	
	9.80641					+ 12.78	− 12.79					+ 8.58	
((δ) − D) $\frac{d'}{100}$	1.10654											+ 30	
+18.63												− 2.10	
+0 11.92 δ_2		25 45.59		11 16.1								11 4.22	
	210	0 01	00	0.1	0 0.05	+12	16.35		15	14	44.10	0 15.31	
	+20.7				15 0.00	7 48.30	.35					− .12	+9.35
d	1.31597					50 59 59.36	15.41 + 54					+ 0	
	9.79887					+ 15.95	− 15.95					+ 9.07	
((δ) − D) $\frac{d'}{100}$	1.20278											+ 40	
+23.54												− 3.70	
+0 13.75 δ_1		28 32.92		0 34.7								0 ~~21.06~~ 20.96	
	961	0 6.8	2.7	9.5	0 4.75	+18	20.32		N	14	44.72	0 15.33	
	+26.0				15 4.70	7 43.60	.43					− .18	+9.75
d	1.41497					50 59 55.31	20.03					+ 2	
	9.79887					+ 20.03	− 20.03					+ 9.51	
((δ) − D) $\frac{d'}{100}$	1.30178											+ 40	
+18.83												− 2.10	
+0 11.00 δ_2		28 33.02		0 34.0								0 22.98	
	44	0 42.0	41.2	83.2	0 41.60	00	3.42		15	15	38.04	59 21.35	
	+4.5				15 41.60	7 6.75	.00					− 1	+8.43
d	0.65321					49 59 17.81	3.16 + 40					+ .15	
	9.80822					+ 3.54	− 3.56					+ 7.99	
((δ) − D) $\frac{d'}{100}$	0.54937											+ 30	
+23.25												− 3.50	
+0 13.35 δ_1		29 29.88		59 39.6								59 26.28	
	290	0 13.4	10.4	23.8	0 12.20	+22	22.58		18	15	36.70	59 23.36	
	~~289~~				15 12.20	7 36.15	.02					− .26	+8.48
d	31.1					49 59 47.85	24.40 + 2 + 8					+ 5	
	1.49276n					− 24.49	+ 24.80					+ 8.39	
((δ) − D) $\frac{d'}{100}$	9.80822											+ 30	
+18.60	1.38892n											− 1.90	
+0 10.68 δ_2		29 29.80		59 40.6								59 29.94	
	144	2 8.3	8.2	16.5	2 8.25	+05	11.21		35	36	57.00	38 2.42	
	+14.5				37 8.25	45 40.10	.14					− 5	+9.43
d	1.16137					50 37 51.16	11.02 − 16 + 39					+ 46	
	9.80228					+ 11.26	− 11.25					+ 8.67	
((δ) − D) $\frac{d'}{100}$	1.05159											+ 35	
+23.45												− 3.00	
+0 11.50 δ_1		33 36.27		38 20.4								38 8.85	
	245	2 19.9	16.4	36.1	2 18.05	+15	19.04		35	36	58.94	38 1.11	
	+24.6				37 18.05	45 30.30	.25					− .16	+9.83
d	1.39094					50 37 42.00	18.89 − 25 + 47					+ 55	
	9.80228					+ 19.11	− 17.41					+ 9.09	
((δ) − D) $\frac{d'}{100}$	1.28116											+ 35	
+18.76												− 1.90	
+0 9.20 δ_2		33 36.14		38 18.2								38 9.04	
		0 12.0	9.6	16					55				
		3 26.0	28.0						10				
d													
((δ) − D) $\frac{d'}{100}$													
δ_1													
		0 15.2	14.5						25				
		2 38.3	38.1						5				
d		0 8.9	6.9						0				
((δ) − D) $\frac{d'}{100}$													
δ_2													

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Date$_1$ = Dec 26 Observer W. A. R. Date$_2$ = Dec 26 Observer W. A. R.

n = +.31 C = +.00 Recorder A. M. Recorder A. M.

50°

Star.	α	δ	Mag.	T_δ	T_m	T_a	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
1	h m s	′ ″		m s	s	s	s	s	s	s	s	s	m s
	2 0 44	50 0.5	8.8	20 38.3	49.1	57.0	1.0	5.0	8.9	301.0	60.20	11.02	20 49.18
	19 45.7	55.5	8.6							−5.68		11.02	−6.04
	K												+.38
	((δ) − D) $\frac{\kappa'}{100}$												−.2
	a_1												20 43.50
													−3.11
													20 40.39
	22 53	0.2	8.6	22 41.1	57.6	6.4	9.3	13.0	17.0	342.3	68.46	10.79	
	21 54.8	−4.8	8.5							−5.68		10.79	22 57.67
	K												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.38
	a_2												−.2
													22 51.99
													−3.14
													22 48.85
	26 57	25.9	8.5	28 44.1	2.7	10.5	14.2	18.1	22.0	675	1350	10.93	
	27 58.5	31.0	8.8							−5.68		10.93	29 2.57
	K												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.38
	a_1												−.2
													28 56.89
													−3.22
													28 53.67
	30 01	47 58		30 17.8	21.5	25.0	28.9	31.5 = S(T$_m$ corr.)		1033			
	Jupiter & Venus			10.1									
	K												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
	32 21	50 16	8.6	32 16.0	26.0	32.9	37.4	41.3	45.2	1836	3672	10.84	2588
1	31 22.0	50 11.0	8.0							−5.69			−6.04
	K												+.37
	((δ) − D) $\frac{\kappa'}{100}$												−.2
	a_1												32 20.19
													−3.24
													32 16.95
	37 8	−1.7	9.3	51 6.4	13.4	21.3	24.9	28.4	32.7	1210	2420	10.78	
	50 7.0	−6.5	9.0							−5.69		10.78	51 1.42
	K												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.37
	a_2												−.2
													51 [illegible]
													−3.41
													51 4.26
	37 20	−1.5	8.8	51 1.3	25.7	33.4	37.0	41.0	44.9	1820	8640	10.78	
	50 7.6	−6.3	8.7							−5.69		10.78	51 25.62
	K 18.9												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.37
	a_1												−.2
													51 19.78
													−3.47
													51 16.46
	37 38	−1.2	8.6	51 56.7	25.2	51.0	55.0	58.9	62.8	2709	5418	10.78	
	50 36.9	−6.0	8.4							−5.69		11.78	51 43.40
	K												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.37
	a_2												−.2
													51 37.71
													−3.46
													51 34.25
	55 23	56.0	9.0	1 3.5	10.6	29.5	37.4	41.4	45.4	2031	4062	11.08	
	54 21.8	51.3	9.0							−5.68		11.08	55 2.82
	K												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.38
	a_1												−.2
													55 23.94
													−3.55
													55 20.39
1	56 34	42.4	8.9	1 5.6	24.3	40.7	48.7	52.5	56.4	2587	5174	10.95	
	55 32.3	37.7	9.0							−5.68		10.95	56 40.79
	K												−6.04
	((δ) − D) $\frac{\kappa'}{100}$												+.38
	a_2												−.2
													56 35.11
													−3.56
													56 31.55

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Dec. 26 – ϕ 51.73 R. Rys. R. +19

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	51	δ′	
	10.38	4′ 34.5	31.1	65.6	4′ 32.80	+03	8.41		10′	14′	24.41	0 32.22	
	+10.9				/ 4 32.80	8 15.55	.16					− 3	+8.52
d	1.037443					51 0 23.82	7.70+09					+ 86	
	9.79887					+ 8.40	−8.41	−8.39				+ 9.29	
$((\delta) - D)\ \frac{d'}{100}$	0.924424											+ 40	
												− 26.40	
+18.21 δ_1		20 58.60		1 50.4							51	0 16.34	
+/ 34.10													
	16.5	0 4.7	2.0	6.7	0 3.35	+08	12.85		15	14	50.55	0 6.06	
	+16.6				15 3.35	4 15.00	.00					− 8	+9.65
d	1.220117					50 59 53.27	12.32+18					+ 4	
	9.79887					+ 12.79	−12.80					+ 9.29	
$((\delta) - D)\ \frac{d'}{100}$	1.10692											+ 40	
				23.2								− 26.30	
+18.18 δ_2		23 7.03		1 22.6							50	39 49.43	
+/ 33.75													
	18.6	4 13.3	8.3	21.6	4 10.80	+09	14.48		35	38	56.43	36 0.20	
	+18.5				3 9 10.80	43 37.55	.18					− 9	+9.91
d	1.267179					50 35 45.82	14.16−18+39					+ 8.80	
	9.80259					+ 14.38	−14.37					+ 8.85	
$((\delta) - D)\ \frac{d'}{100}$	1.15770											+ 35	
												− 25.90	
+18.44 δ_1		29 12.11		37 17.2								35 44.21	
+/ 32.95													
	−78					+02	6.07						
							.07						
d													
$((\delta) - D)\ \frac{d'}{100}$													
δ_2											50		
	100	4 22.9	19.9			+03	7.08−3+10		55	57	13.65	15 42.97	
	+9.9				59 21.40	23 26.95	−7.75					− 3	+11.39
d	0.995641					50 15 35.22						+ 84	+9.59
	9.80565					+ 7.75						+ 8.48	
$((\delta) - D)\ \frac{d'}{100}$	0.88923											+ 30	
												− 25.70	
+18.51 δ_1		32 35.46		16 59.1								15 24.86	
+/ 32.20													
	127					+05	9.89						
	+12.7						.07						
d	1.103780						9.45+1+56						
							−10.02						
$((\delta) - D)\ \frac{d'}{100}$													
+19.07 δ_2		51 23.33		— —							49		
+/ 28.65													
	244	1 55.2	52.1	107.3	1 53.65	+15	14.00		15	16	34.51	58 22.11	
	+24.3				/ 16 53.65	5 54.70	.09					− .16	+8.68
d	1.385561					49 58 29.7	18.89+1+24					+ 36	
	9.80837					+ 19.14	−19.14					+ 8.18	
$((\delta) - D)\ \frac{d'}{100}$	1.28192											+ 30	
												− 24.50	
+19.08 δ_1		57 35.54		59 34.9		6						58 6.29	
+/ 28.60											49		
	−135	0 55.1	53.1	11.12	0 55.60	+05	10.51		15	16	6.09	54 50.53	
	−133				15 55.60	2 52.75	.00					− 5	+8.51
d	1.123855					49 58 1.02	10.24+1+24					+ 17	
	9.80882					1049	+10.49					+ 8.09	
$((\delta) - D)\ \frac{d'}{100}$	1.02061											+ 30	
												− 24.50	
+19.09 δ_2		51 53.34									50	54 34.54	
	185	3 55.6	54.4	110.5	3 55.25	+10	14.72		15	18	38.60	56 18.03	
	+19.0				/ 18 55.25	3 55.10	.29					− .10	+10.25
d	1.274875					50 56 3.37	14.95−30					+ .74	
	9.79950					+ 14.66	−14.65					+ 9.21	
$((\delta) - D)\ \frac{d'}{100}$	1.16619											+ 40	
												− 24.50	
+19.35 δ_1		55 39.74		57 31.5								56 3.78	
+/ 27.75											50		
	164	2 48.9	46.0	94.9	2 47.45	+07	12.77		30	32	34.66	42 21.97	
	+16.5				/ 32 47.45	50 0.90	.18					− 4	+9.81
d	1.214448					50 42 9.17	12.59−19+39					+ 5.3	
	9.80166					+ 12.80	−12.79					+ 8.95	
$((\delta) - D)\ \frac{d'}{100}$	1.10708											+ 40	
												− 24.30	
+19.34 δ_2		56 50.89		43 37.0								42 17.48	
+/ 27.80													

Big Paul – make Out –

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Date$_1$ = Dec 26 n=+.31 / Dec 31 n=+.38 — Observer W.A.R. / Recorder A.M. — Date$_2$ = Dec 26 / Dec 31 — Observer W.A.C. / Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
Dec 26 1	58 23 / 57 21.7 κ	61.0 / 55.3	9.0 / 9.0	1 58 24	288	36.5	40.7	44.0	46.5	1969 −5.68	39.24	11.02 / 11.02	58 28.22 −.604 +.38 −.2 = 58 22.54 −3.59 = 58 18.95
	((δ) − D) $\frac{\kappa'}{100}$			Dec 26									
	a_1												
Dec 26 2	3 2 / 59.5 κ	−0.2 / −4.9	8.8 / 8.8	2 2 50.1	7.1	14.8	18.6	22.4	26.3	892 −5.69	17.84	10.79 / 10.79	3 7.05 −6.04 +.37 −.2 = 3 1.36 −3.61 = 2 57.75
	((δ) − D) $\frac{\kappa'}{100}$			Dec 26									
	a_2												
Dec 26 Star 2	2 1 13 / 1 59 40.5 κ	26.7 / 23.1	8.8 / 7.2	2 0 26.7	46.1	52.9	57.8	1.6	5.6	2850 −5.68	57.00	10.89	0 48.11 −6.04 +.38 −.2 = 0 42.43 −3.60 = 0 38.83
	((δ) − D) $\frac{\kappa'}{100}$			Dec 31									
	a_1												
Dec 31			9.0	0 27.2	46.3	54.1	57.9	1.7	5.8	2858 −5.68	57.16	10.89	0 48.27 −6.04 +.38 −.2 = 0 42.59 −3.58 = 0 38.99
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
Dec 31 2	3 2 / 1 59.5 κ	−0.2 / −4.9	8.9 / 8.8	2 50.4	5.1	13.8	16.6	20.3	24.4	802 −3.68	1604	10.79 / 10.79	3 5.25 −4.09 +.43 −.2 = 3 1.57 −3.51 = 2 58.06
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
Dec 31	5 42 / 4 45.1 κ	−4.6 / −9.3	9.0 / 8.7	5 34.9	50.7	58.4	2.2	6.0	10.0	3073 −3.68	6146	10.79 / 10.79	5 50.69 −4.09 +.43 −.2 = 5 47.01 −3.51 = 5 43.50
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
Dec 31	10 25 / 9 22.5 κ	−5.1 / −9.7	9.0 / 9.2	10 13.0	28.3	36.0	39.9	43.7	47.6	1955 −3.67	3910	10.77 / 10.77	10 28.33 −4.08 +.43 −.2 = 10 24.66 −3.60 = 10 21.06
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												
Jan 1 Dec 31	14 40 / 13 36.4 κ	41.5 / 36.9	8.9 / 9.0	14 26.0	44.2	52.0	55.7	59.8	3.7	2753 −3.66	5506	10.94 / 10.94	14 44.02 −4.08 +.44 −.2 = 14 40.46 −3.68 = 14 36.78
	((δ) − D) $\frac{\kappa'}{100}$												
	a_2												
Dec 31	33 4 / 31 59.1 κ	32.7 / 28.5	9.4 / 9.4	32 9.9	51	16.0	19.8	23.7	27.7	953 −3.66	1906	10.92 / 10.92	13 3 8.14 −4.08 +.44 −.2 = 33 4.48 −3.89 = 33 0.59
	((δ) − D) $\frac{\kappa'}{100}$												
	a_1												Jan 1 h m 1 39
Jan 1 Dec 31	3 10 50. / 1 40 11 κ	29.9 / 26.3 / 40.4 Jan 1 36.0	7.0 / 8.6 / " " 8.9	3 10 42.9 / 1 39 59.2 / 2 29 43.8	54.5	2.3	6.1	10.0	13.9	3268	6536	10.90 / 11.90	1358 3 10 54.46 −3.81 +.46 = 3 10 50.11 −4.07 = 3 10 46.04 −3.89 = 3 10 42.15
	((δ) − D) $\frac{\kappa'}{100}$				13.7 / 4.5	21.3 / 12.3	25.3 / 16.0	29.3 / 20.1	33.0 / 24.0	1226	2452	10.94 / 10.84	1 40 3.44 +.54 = 1 40 3.98 −4.30 = 1 39 59.68 −3.89 = 1 39 55.79
	a_2												

Dec 31 11 789. 30 43.1 — Jan 1 — Dec 31

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Runs

Ref. Rd.
Dec 26 - 31 — 51.73 R. + .19"
49.93 R. .22

50 11 58.90 Jan 1
− .12
+ .73 +9.37
+ 8.46
+ .30
12 6.58
1.77

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke			δ'	
~~Dec 31~~	2.64 +25.8	0 10.1	4.8	148	0 7.45	+19	20.56		15		51	0 9.05	
d	1.41162	0 2.0	3.7	− 1.7	0 − 0.85		43			14'	47.57	− .18	+9.53
	9.79887				~~15 39.45~~	7 46.90	19.26 + 62					+ 2	
((δ) − D) $\frac{d'}{100}$	1.29843				15 7.45	50 59 49.17	19.88					+ 9.29	
					~~15 0.75~~	+ 19.88						+ .40	
+19.44 δ_1		5838.39		1 21.4								− 24.30	
+1 27.15											49	59 54.28	
~~Dec 31~~	.170 +16.9	0 32.3	29.2	6.15	0 3.075	+08	13.24		15	15	17.45	59 39.18	
d	1.22789	0 33.1	28.7		15 30.75	7 17.60	00					8	+8.50
	9.80822					49 59 25.87	12.59 + 71					+ 9	
((δ) − D) $\frac{d'}{100}$	1.12405					+ 13.31	−13.30					+ 8.19	
				50.0								+ .30	
+19.44 δ_2		3 17.19		0 ~~49.95~~								− 23.80	
+1 26.10											50	59 23.88	
	194 +18.4	2 42.7	28.8	8.15	2 40.75	+00	14.95 − 14 + 32		45	47	25.62	27 31.00	
d	1.28780				47 40.75	~~35.20~~ 7.60	−18.13					− .10	+9.45
	9.80397					50 27 15.87						+ .51	
((δ) − D) $\frac{d'}{100}$	1.17971					+ 15.13						+ 8.69	
						~~35 7.60~~						+ .35	
+19.43 δ_1		0 58.26		28 42.8								− 24.00	
+1 26.30												27 16.45	
	191 +19.1	2 42.7	28.8	8.15	47 40.75	.10	14.95 − 14 + 8		45	47	25.86	27 30.76	
d	1.28103					35 7.60	− 1.459					− .10	+9.45
	9.80397					27 15.87						+ .51	
((δ) − D) $\frac{d'}{100}$	1.17294					+ 14.89						+ 8.69	
												+ .35	
+19.43 δ_2		0 58.42		28 42.5								− 24.40	
+1 26.30											49	27 16.21	
	147 +14.8	0 33.1	28.9	6.20	0 3.100	+06	11.44		15	15	19.50	59 39.07	
d	1.17026				15 31.00	7 17.35	00					− .6	+8.34
	9.80822					49 39 27.42	11.02 + 48					+ .11	
((δ) − D) $\frac{d'}{100}$	1.06642					+ 11.65	−11.50					+ 7.99	
												+ .30	
+19.44 δ_1		3 17.50		0 49.3								− 24.58 20	
+1 26.10											49	59 23.21 5	
	160 +16.0	0 3.9	−0.1	38	0 1.90	+07	12.46		20	19	49.29	54 9.13	
d	1.20412				20 7.90	2 46.45	02					− 7	+8.14
	9.80882					49 54 56.52	12.39 + 2					+ 0	
((δ) − D) $\frac{d'}{100}$	1.10088					+ 12.61	−12.61					+ 7.91	
												+ .30	
+19.51 δ_2		6 3.01		56 19.0								− 23.80	
+1 25.50											49	54 53.47	
	153 +15.3	0 19.8	19.3	3.41	0 1.705	+06	11.91		20	20	49.98	54 53.43	
d	1.18466				20 17.05	2 31.30	02					− 6	+8.23
	9.80882					49 54 41.37	11.80 + 3 + 24					+ 7	
((δ) − D) $\frac{d'}{100}$	1.08145					+ 12.06	−12.07					+ 7.92	
												+ .30	
+19.64 δ_1		10 40.70		56 2.4								− 23.70	
+1 24.40											50	54 37.96	
~~Jan 1~~	182 +18.1	3 32.1	24.0	6.11	3 30.55	+09	14.17		30			41 41.91	
d	1.25768	~~3 29.2~~	~~25.4~~	54.6	3 27.30		21		30			− 9	+9.79
	9.80182				33 30.55	49 17.80	14.16 − 21 + 8					+ 7.77	
((δ) − D) $\frac{d'}{100}$	1.14744				~~33 27.30~~	50 41 27.87	− 14.03					+ 8.76	
						+ 14.04						+ 35	
+19.90 δ_2		14 56.68		42 51.6		~~49 21.05~~						− 23.50	
+1 23.35											50	41 28.20	
	222 +22.2	2 35.2	31.0	6.62	2 33.10	+12	17.28		40	42	15.81	32 42.60	
d	1.34635				42 33.10	40 15.25	20					− .13	+9.35
	9.80320					50 32 25.32	17.32 − 19 + 16					+ .57	
+2039 ((δ) − D) $\frac{d'}{100}$	1.22749					+ 17.28	−17.29					+ 8.56	
+1 1865	3											+ .35	
Jan 1 δ_1 m 2 29		33 26.98		33 48.4								− 22.20	
											50	32 29.75	
4.44	1.08446	2 23.8	19.5	4.33	0 2.165	+04	9.03		45	45	12.61	29 45.80	50 40 37.96
6 −3.82	9.80351						8.66 − 9 + 47					4	5
7 + 4	0.95591	4 33.2	30.4	6.39	4 31.95	+05	11.29 − 9.04		30	34	20.78	− 7	+ .99
14					4 5 21.65					34	16.96	+ 8.53	+ 8.48
	((δ) − D) $\frac{d'}{100}$	3 18.1	14.1		34 31.95	+11	11.02 − 16 + 31		0			+ .35	+ .55
8 1.08	1.15386	51 29 45.56	51 40 37.96			37 26.70	15.74 − 22 + 47					− 19.00	− 7.50
30 + 23	9.80997	+5.91	+10.27		3 16.10	50 29 36.77	24 −11.17					29 35.71	40 40.73
13 1.31	1.31387					+ 7.03	05 (−15.99)						
	9.80625	Dec 31	Jan 1 12.53	R4		48 16.40	19 32.25						
Jan 1	1.20806		40 32.73	41 58.1		50 40 26.90	50 11 42.75						
	+2.36 +1.506		29 16.37	13 19.1		+ 11.66	+ 16.15						
	+1 1.35 +1.1264												

* See top of the page.

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Date$_1$ = 1870 Dec 31 Observer A.M. Recorder W.A.R. Date$_2$ = 1870 Dec 31 Observer Recorder

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3	h 38 50	19.9	6.0	38	38.8	52.2	01.1	3.9	7.9	11.9	3160	6320	10.87
	37 39.5	16.7	6.0								−3.67		10.87
	κ												38 52 33
	((δ) — D) $\frac{\kappa'}{100}$												− 4.08
	α_1												+ .43
													− 2
													38 48.66
													− 4.55
													38 44.11
4				9	9.2	21.0	28.3	32.9	36.6	40.6	1594	3188	
	κ												
	((δ) — D) $\frac{\kappa'}{100}$												
	α_2												
4				45	54.1	24.0	31.9	35.5	39.5	43.3	1742	3484	
	κ												
	((δ) — D) $\frac{\kappa'}{100}$												
	α_1												
4	51 26	3.8	8.3	51	10.9	24.0	36.6	40.5	44.3	48.4	1988	3976	10.80
	50 11.8	2.1	8.5								−3.71		10.80
	κ												51 28 26
	((δ) — D) $\frac{\kappa'}{100}$												− 4.12
	α_2												+ .43
													− 2
													51 25.25
													− 5.02
													51 20.23
	53 21	49.8	9.0	53	2.0	22.9	30.8	34.6	38.6	42.5	1694	3388	10.98
	52 7.0	48.2	9.0								−3.71		10.98
	κ												53 22 90
	((δ) — D) $\frac{\kappa'}{100}$												− 4.13
	α_1												+ .44
													− 2
													53 19.19
													− 5.09
													53 14.10
	56 01	−7.5	7.8	56	3.9	25.2	32.9	36.7	40.5	44.5	1798	3596	10.76
	54 46.9	−9.0	7.5								−3.72		10.76
	κ												56 25 29
	((δ) — D) $\frac{\kappa'}{100}$												− 4.13
	α_2												+ .43
													− 2
													56 21.48
													− 5.01
													56 16.47
	57 27	6.4	7.3	57	15.4	29.7	37.4	41.2	45.0	49.0	2023	4046	10.82
	56 12.9	5.3	7.5								−3.72		10.82
	κ												57 29 64
	((δ) — D) $\frac{\kappa'}{100}$												− 4.13
	α_1												+ .43
													− 2
													57 25.92
													− 5.06
													57 20.86
6	11 10	15.3	8.3	10	53.8	14.2	21.7	25.7	29.7	33.6	1249	2498	10.85
	9 56.0	14.0	9.0								−3.72		10.85
	κ				1870 Dec 31								11 14 13
	((δ) — D) $\frac{\kappa'}{100}$				1870 Jan 7								− 4.13
	α_2												+ .43
													− 2
													11 10.41
													− 5.12
													11 5.29
3				33	33.0	45.8	53.1	56.7	0.2	4.0	2798	5596	
	κ												
	((δ) — D) $\frac{\kappa'}{100}$												
	α_1												
				36	42.0	47.0	53.0	57.1	00.4	03.6	1641	3282	
	κ										−3.69		13 28 11
	((δ) — D) $\frac{\kappa'}{100}$												− 4.10
	α_2												+ .43
													− 2
													3 24.42
													− 4.72
													19.70
Dec 31													
	4 3 26	−0.16	9.4	3	2.5	27.4	35.7	39.7	43.5	47.7	1945	3890	10.79
	2 15.0	−3.3	8.8										10.79

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z	50	δ′	
	194	0 12.0	9.6	216	0 10.80	+05	10.43		53	55′	0.″23	19 59.16	
	+135				55 10.80	27 37.55	.07					− 5	+9.19
d	1.13033					50 19 48.61	10.24−7+40					+ 4	
	9.80504					+ 10.55	−10.57					+ 8.85	
((δ) − D) $\frac{d'}{100}$	1.02331			499								+ .35	
+21.94												− 16.20	
+0 57.80 δ₁		39 6.05		20 50.0								19 52.15	
	1.8					+04							
d													
((δ) − D) $\frac{d'}{100}$													
δ₂													
	29.9					+.24							
d													
((δ) − D) $\frac{d'}{100}$													
δ₁					18 39.10						50		
	181	3 26.0	26.0	540	8 [illegible]	+09 9.25	14.09		10	13	12.78	3 46.55 3.45	5.5
	+18.1	39.0	39.2		.18 27.00	19 21.33	.02					− 9	+9.00
d	1.25768					50 + 3244	14.16−2+8					+ .77	
	9.80777				3 21.31	+ 14.24	−14.22					+ 8.02	
((δ) − D) $\frac{d'}{100}$	1.15339			5.0								+ .30	
+22.99												− 8.10	
+0 29.45 δ₂		51 43.22		4 47.9								3 47.55 3.64	5.5
	209	0 15.2	14.5	297	0 14.85	12	16.27		25	24	58.70	50 0.72	
	+20.9				25 14.85	57 33.50	.28					− .12	+9.21
d	1.32015					50 49 44.56	15.74−28+69					+ 4	
	9.80043					+ 16.16	−16.15					+ 8.89	
((δ) − D) $\frac{d'}{100}$	1.20852											+ .40	
+23.22												− 8.00	
+0 28.60 δ₁		53 37.32		50 30.5								50 1.93	
	213	2 35.3	36.1	714	2 35.70	+12	16.58		35	37	18.88	37 40.61	
	+21.3				37 85.70	45 12.65	.04					− .12	+ 8.45
d	1.32838					49 37 23.71	16.53+5+24					+ .57	
	9.81151					+ 16.90	−16.82					+ 7.70	
((δ) − D) $\frac{d'}{100}$	1.22783											+ .30	
+22.95												− 7.40	
+0 27.50 δ₂												37 41.66	
	143	2 38.3	38.1	764	2 38.20	+05	11.03		5	7	27.04	7 32.36	
	+14.2				7 38.20	15 10.15	.03					− 5	+8.95
d	1.15229					50 7 21.21	11.02−2+16					+ .57	
	9.80701					+ 11.15	−11.16					+ 8.13	
((δ) − D) $\frac{d'}{100}$	1.04724											+ .30	
+23.06												− 7.40	
+0 26.85 δ₁		57 43.92		8 0.8								7 33.91	
	204	0 8.7	6.9	156	0 7.80	+11	15.88		0	59	57.91	15 7.50	
	+20.3				0 7.80	22 40.55	.08					− .11	+8.48
d	1.30750					50 14 51.61	15.74−9+24					+ 7	
	9.80580					+ 15.89	−15.89					+ 8.27	
((δ) − D) $\frac{d'}{100}$	1.20124											+ .30	
+23.22												− 6.70	
+0 21.05 δ₂		11 28.51		15 31.33								15 10.28	
	+28					+05							
d													
((δ) − D) $\frac{d'}{100}$													
δ₁													
	−18.0					06					49	56 11.09	
d												− .18	7.95 8.95
												+ .90	
((δ) − D) $\frac{d'}{100}$	1.40824											+ .93	
	9.80864											+ .30	
	1.30485											− 13.60	
												56 66 6.44	
	254	4 8.5	8.2	170	4 8.50	+17	19.48		15	omitted in copy.			
	+256				19 6.50	3 39.85	967+48			18	48.35		
						49 55 50.91	−20.15						

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Date$_1$ = 1871 Jan 10 Observer W. A. R. Date$_2$ = 1871 Jan 17 Observer W. A. R.
n = +.30 Recorder A. M. n = +.30 Recorder A. M.

Star. α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2h 38m 47s	46° 7′	8.9	38	30.8	47.1	55.2	59.0	3.0	7.2	29 15	58.30	10.97
.37 41.5	42.6	8.5							+0.74		11.21	38 47.09
κ												+0.38
((δ) — D) $\frac{\kappa'}{100}$												+ .38
												− .2
a_1												38 47.783
												+ .33
												38 48.16
		8.5	38	29.5	44.3	52.3	56.2	0.2	4.2	27 72	55.44	11.21
κ									+3.56			38 44.23
((δ) — D) $\frac{\kappa'}{100}$												+3.20
												+ .38
												− .2
a_2												38 47.79
												+ .50
												38 48.29
46 2	7.4	9.0	39	43.7	3.0	10.8	14.8	18.3	22.6	6 95	13.90	11.82
.38 36.5	3.3	9.0							+3.73		11.05	40 2.85
κ									.01			+ 0.38
((δ) — D) $\frac{\kappa'}{100}$												+ .37
												− .2
a_1												40 3.58
												+ .33
												40 3.91
		9.2	41 39	44 43.1	0.0	7.8	11.7	15.7	19.6	5 48	10.96	11.15
κ									+3.55			39 59.91
((δ) — D) $\frac{\kappa'}{100}$												+3.20
												+ .37
												− .2
a_2												40 3.46
												+ .49
												40 3.95
41 30	12.8	9.0	41	11.3	29.0	37.0	41.0	44.9	48.0	20 09	40.18	11.86
40 23.0	13.7	9.1							+0.73		11.09	41 29.09
κ												+0.38
((δ) — D) $\frac{\kappa'}{100}$												+ .37
												− .2
a_1												41 29.82
												+ .32
												41 30.14
		9.0	41	5.0	26.3	34.1	38.1	42.0	46.1	18 66	37.32	11.09
κ									+3.55			41 26.23
((δ) — D) $\frac{\kappa'}{100}$												+3.20
												+ .37
												− .2
a_2												41 29.78
												+ .48
												41 30.26
42 29	53.6	8.3	42	11.4	18.7	26.7	30.7	34.6	38.7	14 94	29.88	11.24
41.43.7	49.5	8.3							+0.74			42 18.64
κ												+0.38
((δ) — D) $\frac{\kappa'}{100}$												+ .38
												− .2
a_1												42 19.38
												+ .31
												42 19.69
		8.1	42	5.0	15.7	23.8	27.7	31.8	35.8	13 48	26.96	11.24
κ									+3.56			42 15.72
((δ) — D) $\frac{\kappa'}{100}$												+3.20
												+ .38
												− .2
a_2												42 19.28
												+ .47
												42 19.75
43 51	55.5	2.8	43	30.6	52.4	0.4	4.3	8.5	12.6	31 82	53.64	11.24
42 45.5	51.5	7.5							+0.74			43 53.40
κ												+ 0.38
((δ) — D) $\frac{\kappa'}{100}$												+ .38
												− .2
a_1												43 53.14
												+ .30
												43 53.44
		7.6	43	27.2	49.6	57.7	1.5	5.4	9.7	30 39	60.78	11.24
κ									+3.56			43 48.54
((δ) — D) $\frac{\kappa'}{100}$												+3.20
												+ .38
												− .2
a_2												43 53.10
												+ .46
												43 53.56

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Runs: Jan 10 – 17 — Refs. 48.70 R. +.25; 48.60 R. .27 — Rns.

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke		z	51/50	δ′	
	5	3′ 35.0	32.2	28	3360		12.32 −21+24		25	28′	21.″25	46	3867	38.40
	+1.63				28 3360	54 14.75	−12.35						− 7	+11.58
d	1.21219					50 46 26.05							+ .88	
	9.80705					51 + 1262							+ 10.37	
((δ) − D) $\frac{d'}{100}$	1.10118					12.35							+ .40	
	9.79160												− 7.30	
δ1	1.09173	39 4.79		47 44.3									46 42.68	
+1.663														
+1 1.64														
	+1.47	3 34.4	29.1	28	31.75		10.78 −18+52		25	28	20.63	46	39.38	39.14
	1.16732				28 3175	54 1660	−11.12						− 6	+11.34
d	9.80705					50 46 28.00							+ .94	
	1.05632					51 + 11.38							+ 10.06	
((δ) − D) $\frac{d'}{100}$	9.79160					11.14							+ .40	
	1.04686												− 7.60	
δ2		39 4.92		47 44.5								51/50	46 42.88	
+1663														
+1 1.64														
	+1.1	2 58.3	54.8	7	56.55		13.09 −4+8		5	7	43.42	7	16.53	16.24
	1.23300				7 56.55	14 5180	−13.13						− 8	+10.66
d	9.80701					50 7 3.10							+ .72	
	1.12795					51 + 1343							+ 9.62	
((δ) − D) $\frac{d'}{100}$	9.79778					1314							+ .40	
	1.11872												− 7.20	
δ1		40 20.47		8 21.1									7 18.70	
+16.56														
+1 1.36														
	+1.68	2 57.5	53.2	7	55.35		12.32 −4+62		5	7	42.45	7	17.59	17.31
	1.22531				7 55.35	14 53.00	−12.90						− 8	+10.45
d	9.80701					50 7 4.40							+ .78	
	1.13026					51 + 1319							+ 9.35	
((δ) − D) $\frac{d'}{100}$	9.79778					1291							+ .40	
	1.11103												− 7.50	
δ2		40 20.51		8 21.6								51/50	7 20.26	
+16.56														
+1 1.36														
	+1.78	2 30.6	27.9	57	29.25		13.09 −8+62		55	57	18.62	17	34.42	4.03
	1.25042				57 29.25	25 19.10	−13.63						− 9	+10.76
d	9.80534					50 17 30.40							+ .62	
	1.14340					51 + 1392							+ 9.83	
((δ) − D) $\frac{d'}{100}$	9.79621					13.63							+ .40	
	1.13457												− 7.20	
δ1		41 46.76		18 48.6									17 47.59	
+1662														
+1 1.04														
	+21.2	2 33.2	28.7	57	30.95		16.18 −10+16		55	57	14.71	17	44.38	46.04
	1.32634				57 30.95	2 X5 1740	−16.24						− .12	+10.50
d	9.80534					50 17 28.80							+ .68	
	1.21962					51 + 1658							+ 9.54	
((δ) − D) $\frac{d'}{100}$	9.79621					16.24							+ .40	
	1.21049												− 7.50	
δ2		41 46.88		18 49.0								51/50	17 48.04	
+1662														
+1 1.04														
	+7.2	2 3.7	0.3	22	2.00		5.39 −10+16		20	21	56.55	53	3.21	3.09
	0.85733				22 2.00	0 46.35	−5.45						2	+11.36
d	9.74996					50 52 57.65							− .50	
	0.74523					51 + 556							+ 10.48	
((δ) − D) $\frac{d'}{100}$	9.79047					5.44							+ .40	
	0.73574												− 7.20	
δ1		42 36.42		54 8.1									53 7.25	
+16.73														
+1 0.84														
	+10.7	2 6.3	0.8	22	3.55		7.70 −15+52		20	21	55.48	53	4.47	4.28
	1.02938				22 3.55	0 44.80	−8.07						− 3	+11.12
d	9.74996					50 52 56.20							+ .57	
	0.91428					51 + 827							+ 10.18	
((δ) − D) $\frac{d'}{100}$	9.79047					8.08							+ .40	
	0.90719												− 7.50	
δ2		42 36.48		54 8.7								51/50	53 7.90	
+16.73														
+1 0.84														
	+21.8	4 53.0	50.1	19	51.55		16.18 −33+57		15	19	35.11	55	24.93	24.56
	1.33846				19 51.55	2 5680	−16.44						− .14	+11.99
d	9.74965					50 55 8.10							+ 1.20	
	1.22605					51 + 1683							+ 10.53	
((δ) − D) $\frac{d'}{100}$	9.79015					16.46							+ .40	
	1.21655												− 7.20	
δ1		44 10.21		56 29.9									55 29.35	
+16.77														
+1 0.52														
	+22.8	4 54.6	48.8	19	51.70		16.95 −34+22		15	19	34.87	55	25.26	24.89
	1.34830				19 51.70	2 5665	−16.83						− .14	+11.79
d	9.74965					50 55 8.05							+ 1.30	
	1.23589					51 + 1721							+ 10.23	
((δ) − D) $\frac{d'}{100}$	9.79015					1684							+ .40	
	1.22639												− 7.50	
δ2		44 10.33		56 29.9									55 29.18	
+16.77														
+1 0.52														

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Date$_1$ = 1871 Jan 10 22 Observer W. A. R. Recorder A. M. Date$_2$ = 1871 Jan 11 23 Observer W. A. R. Recorder A. M. Ru

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
1	44 48	32.4	8.2	44 33.4	44.6	52.6	56.6	0.5	4.5	2788	55.76	11.15	44 44.61
	43 40.0	28.4	8.9							+0.74			+0.38
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													44 45.35
	a_1												+.30
													44 45.65 +16.7
													+1 0.
			8.3	44 28.5	41.8	49.8	53.7	57.5	1.5	26 43	2.86	11.15	44 41.71
										+3.56			+3.20
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													44 45.27
	a_2												+.45
													+16.7
													44 45.72 +1 0.
2	46 17	44.3	9.0	45 58.6	17.0	25.0	28.9	33.0	36.9	1408	28.16	11.20	46 16.96
	45 16.4	40.3	9.2							+0.74			+0.38
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													46 17.70
	a_1												+.29
													+16.7
													46 17.99 +0 5
			9.0	45 59.0	14.1	22.1	26.0	30.1	34.2	1265	25.30	11.20	46 17.10
										+3.56			+3.20
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													46 17.66
	a_2												+.44
													+16.7
													46 18.10 +0 5
3	48 11	58.6	8.2	47 50.3	11.6	19.7	23.3	27.6	31.6	1136	22.76	11.26	48 11.50
	47 5.1	54.7	8.0							+0.74			+0.38
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													48 12.24
	a_1												+.27
													+16.8
													48 12.51 +0 5
			8.3	47 55.2	8.7	16.7	20.6	24.8	28.8	9 96	19.92	11.26	48 8.66
										+3.56			+3.20
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													48 12.22
	a_2												+.42
													+16.8
													48 12.64 +0 5
4	50 53	5.9	8.9	50 35.4	52.4	0.3	4.2	8.0	11.9	3168	63.36	11.05	50 52.31
	49 46.1	2.0	9.0							+0.73			+0.38
	κ												+.37
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													50 53.04
	a_1												+.26
													+16.7
													50 53.30 +0 58
			8.8	50 34.0	49.5	57.2	1.1	5.1	9.1	3020	60.40	11.05	50 49.35
										+3.56			+3.21
	κ												+.37
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													50 52.91
	a_2												+.41
													+16.7
													50 53.32 +0 5
5	51 40	57.3	6.8	51 ~~54.9~~	~~40.4~~	~~52.8~~ 48.5	52.8	56.5	0.5	2587	51.74	11.23	51 40.51
	50 33.7	47.4	5.7							+0.74			+0.38
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													51 41.25
	a_1												+.25
													+16.9
													51 41.50 +0 5
			6.5	51 31.8	37.4	45.5	49.6	53.5	57.6	2436	48.72	11.23	51 37.49
										+3.57			+3.21
	κ												+.38
	((δ) — D) $\frac{\kappa'}{100}$												−.2
													51 41.06
	a_2												+.40
													+16.9
													51 41.46 +0 58

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke		z	51/50	δ′	
	+1′12	3′ 49.3	46.6	43	49.05		8.47 −10 +15		4′0	43′	39.43	31 20.43	20.23	
d	1.04922				43 47.95	39 040	−8.52						− 3	+11.39
	9.80336					50 31 11.70							+ .95	
((δ) − D) $\frac{d'}{100}$	0.94052					51 + 8.72							+ 10.07	
	9.79399					8.53							+ .40	
+16.70 δ₁	0.93115												− 7.20	
+1 0.36		45 2.35		32 24.8								31	24.42	
	+1′32	3 52.1	47.3	43	49.70		10.111 −12 +15		40	43	39.66	31 20.33	20.11	
d	1.12057			99.4	43 49.70	38 58.65	−10.104						− 5	+11.16
	9.80336					51 31 10.05							+ 1.03	
((δ) − D) $\frac{d'}{100}$	1.01187					50 51 + 10.28							+ 9.78	
	9.79399					10.06							+ .40	
+16.70 δ₂	1.00250												− 7.50	
+1 0.36		45 2.42		32 24.1								51/50 31	23.77	
	+1′84	0 58.7	53.0	30	56.85		13.86 −22 +30		30	30	42.91	44 17.06	16.75	
d	1.26482			37	30 06.85	51 51.50	−13.94						− 9	+10.83
	9.80136					50 51 44 2.80 + 14.26							+ .22	
((δ) − D) $\frac{d'}{100}$	1.15412					13.95							+ 10.30	
	9.79192												+ .40	
+16.79 δ₁	1.14468												− 7.20	
+0 59.96		46 34.78		45 30.3								44	20.38	
	+1′57	0 55.0	50.3	30	52.65		11.55 −19 +8		30	30	41.21	44 18.90	18.55	
d	1.17898			5.3	30 52.65	51 55.70	−11.44						− 6	+10.58
	9.80136					50 44 7.10							+ .24	
((δ) − D) $\frac{d'}{100}$	1.06828					51 + 11.70							+ 10.00	
	9.79192					11.45							+ .40	
+16.79 δ₂	1.05884	46 34.89											* 7.50	
+0 59.96		47 18.06		45 20.6								51/50 44	21.63	
	+2′12	1 40.0	38.0	16	39.00	6	16,18 −35 +15		15	16	23.02	58 37.00	36.64	
d	1.32634				16 39.00	5 9.35	−15.98						− .12	+11.29
	9.79918					50 58 20.65							+ .42	
((δ) − D) $\frac{d'}{100}$	1.21346					51 + 16.35							+ 10.59	
	9.78967					15.99							+ .40	
+16.88 δ₁	1.20395												− 7.30	
+0 59.48		48 29.39		59 40.1								58	40.63	
	+1′35	1 35.3	29.6	16	32.45		10.111 −21 +37		15	16	22.28	58 37.71	37.48	
d	1.13033			4.9	16 32.45	6 15.90	−10.17						− 5	+11.05
	9.79918					50 58 27.30							+ .40	
((δ) − D) $\frac{d'}{100}$	1.01745					51 + 14.41							+ 10.30	
	9.78967					10.18							+ .40	
+16.88 δ₂	1.00794												− 7.70	
+0 59.48		48 29.52		59 40.3								51/50 58	40.83	
	+1′69	4 15.4	15.1	9	15.25		12.32 −3 +69		5	9	2.27	5 57.67	57.39	
d	1.22789				9 15.25	13 33.10	−12.98						− 8	+11.00
	9.80716					50 5 44.40							+ 1.08	
((δ) − D) $\frac{d'}{100}$	1.12204					51 + 13.27							+ 9.60	
	9.79793					12.99							+ .40	
+16.79 δ₁	1.11376												− 7.00	
+0 58.88		51 10.09		7 0.3								6	1.39	
	+1′54	4 15.5	11.6	9	13.33		11.55 −3 +31		5	9	1.72	5 59.30	58.04	
d	1.18752			7.1	9 13.33	13 34.80	−11.83						− 6	+10.80
	9.80716					50 5 46.20							+ 1.13	
((δ) − D) $\frac{d'}{100}$	1.08262					51 + 12.10							+ 9.33	
	9.79793					11.84							+ .40	
+16.79 δ₂	1.07339												− 7.40	
+0 58.88		51 10.11		7 0.3								51/50 6	1.44	
	−1′44	4 43.3	41.0	24	42.15		10.78 −20 +30		20	24	53.03	50 6.36	6.15	
d	1.15836			4.3	24 42.15	58 6.20	+10.88						− 5	+11.95
	9.80043					50 50 17.50							+ 1.18	
((δ) − D) $\frac{d'}{100}$	1.04673					51 − 11.14							+ 10.42	
	9.79095					10.90							+ .40	
+16.93 δ₁	1.03725												− 7.00	
+0 58.68		51 58.43		51 9.45								50	11.10	
	+5.6	4 57.0	54.0	24	56.50		3.85 −7 +44		20	24	52.28	50 7.58	7.49	
d	0.74819				24 56.50	57 51.85	−4.22						− 1	+11.83
	9.80043					50 51 3.25							+ 1.32	
((δ) − D) $\frac{d'}{100}$	0.63656					+ 4.33							+ 10.12	
	9.79095					4.24							+ .40	
+16.93 δ₂	0.62708												− 7.50	
+0 58.68		51 58.39		51 10.5								50	11.82	

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Date$_1$ = 1871 Jan 10 Observer W.A.R. Recorder A.M. Date$_2$ = 1871 Jan 17 Observer W.A.R. Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
2	53 42	44.0	9.6	53	22.0	42.3	50.0	54.3	58.4	2.1	26 71	53.42	11.20	53	42.32
	52 55.5	40.1	9.0							+0.74					+0.38
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														53	42.96
	α_1														+ 24
														53	43.20
			9.0	53	23.6	39.3	47.2	51.1	55.3	59.1	25 20	50.40	11.20	53	39.20
											+3.57				+3.21
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														53	42.77
	α_2														+ .39
														53	43.16
54	47	60.3	9.5	54	~~47.9~~	~~55.9~~	~~54.4~~	~~4.0~~	~~7~~	7.3	29 45	58.90	11.26	54	47.64
	53 40.2	56.5	9.0		55.1	42.7	55.9	59.4	4.0		+0.74				+0.38
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														54	48.38
	α_1														+ .22
														54	48.60
			9.2	54	28.6	44.2	52.1	56.2	0.2	4.2	27 69	55.38	11.26	44.12	44.76
			9.0		36.3	44.9	52.8	56.8	0.8	4.8	28 01	56.02	11.26	44.76	+3.21
	κ										+3.57	+3.57			+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														47.69	
	α_2														+ .38
														54 48.07	54 48.71
57	6	3.8	9.5	56	45.3	3.5	11.2	15.3	19.3	23.3	7 26	14.52	11.04	57	3.78
	57.5	0.0	8.5							+0.73					+0.38
	κ														+ .37
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														57	4.21
	α_1														+ .22
														57	4.43
			8.7	56	46.3	0.7	8.4	12.5	16.4	20.3	5 83	11.66	11.04	57	0.63
											+3.56				+3.21
	κ														+ .37
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														57	4.18
	α_2														+ .37
														57	4.55
58	13	51.3	9.0	57	58.0	13.4	21.6	25.5	29.2	33.4	1 23 1	24.62	11.23	58	13.39
57	5.6	47.4	8.8							+0.74					+0.38
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														58	14.13
	α_1														+ .21
														58	14.34
			8.7	57	58.0	10.6	18.6	22.6	26.5	30.7	10 90	21.80	11.23	58	10.57
											+3.57				+3.21
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														58	14.14
	α_2														+ .36
														58	14.50
59	57	36.0	9.5	59	28.3	49.7	57.1	1.6	5.0	9.5	30 29	60.58	11.16	59	49.42
58	43.6	32.2	9.0							+0.74					+0.38
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														59	50.16
	α_1														+ .20
														59	50.36
			9.0	59	30.2	46.5	54.4	58.4	2.4	6.3	28 80	57.60	11.16	59	46.44
											+3.57				+3.21
	κ														+ .38
	((δ) — D) $\frac{\kappa'}{100}$														− 2
														59	50.01
	α_2														+ .35
														59	~~47.34~~ 50.36

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke		z		δ′	
d	2.02	1 20.2	16.8	31′	16.8		15.41 − 24 + 75		30	31′	3.18	43	56.47	
	1.305535				31′ 18.″50	5							− .11	+10.90
	9.801336					41 29.85	−15.32						+ .32	
((δ) − D) $\frac{d'}{100}$	1.194965					50 33 41.15							+ 10.29	
	9.792208					51 43 + 1566							+ .40	
	1.185373					1532							− 7.00	
+16.96														
δ_1 +0 58.20		54 0.16		44 58.6									44 0.37	
d	+1.56	1 18.1	11.5	31	1480		11.55 − 19 + 44		30	31	3.00	43	5704 56.78	
	1.194312				31 14.80	51 33.55	−11.80						− .7	+10.65
	9.801336					50 43 44.95							+ .32	
	1.082422					51 + 1209							+ 1077	
((δ) − D) $\frac{d'}{100}$	9.792208					1183							+ .40	
	1.073142												− 7.40	
+16.96												52		
δ_2 +0 58.20		54 0.12		44 58.2								54	44 0.03	
d	−8.3	4 40.2	37.8	14	3990		6.03 + 22		10	14	45.25	0	1426 1439	
	0.919088				14 39.00	8 9.35	+ 6.25						− 2	+12.18
	9.949887					51 0 20.65							+ 1.18	
	0.868975					52 − 639							+ 10.62	
((δ) − D) $\frac{d'}{100}$	9.789342					626							+ .40	
	0.779636												− 7.20	
+17.05													0 19.37	
δ_1 +0 57.92		55 5.65		1 17.3										
	1.190233	+1.55	4 58.0	50.1	14	5305	11.55 + 37		10	14	41.13	0	1864 18.380	13.11 13.225
	9.949887	+8.5			14 53.05	4 55.30	6.16 + 34			14	46.52		− 7	− 2
	1.140120	+1.0				50 0 6.70	− 11.92						+ 1.32	+ 1.32
	9.789342	0.92942	0.92942	51 0 18.38	51 0 12.11	52 + 11.44	− 6.53						+ 10.32	+ 1032
((δ) − D) $\frac{d'}{100}$	1.079476	9.789342	9.789342	+11.97	+12.02	1168							+ .40	+ .40
	0.869818	0.806703											− 7.60	− 760
	9.789342					51 0 6.70								
	1.079160			55 5.76	1 15.4	52 + 655						51	0 22.75	0 17.53
+17.05						641						50		
δ_2 +0 57.92														
d	+1.82	1 42.9	41.4	11	4215		13.86 − 2 + 16		10	11	28.15	3	3481 3151	
	1.260007				11 42.15	11 6.20	−14.00						− 9	+10.28
	9.850762					50 3 17.50							+ .42	
	1.115563					51 + 1431							+ 9.55	
((δ) − D) $\frac{d'}{100}$	9.799840					1401							+ .40	
	1.146411												− 7.00	
+16.92													3 34.79	
δ_1 +0 57.36		57 21.35		4 32.2										
d	+1.43	1 40.6	35.3	11	3795		10.78 − 2 + 24		10	11	26.95	3	3404 33.81	
	1.155321				11 37.95	11 10.40	− 11.110						− 5	+10.04
	9.850762					50 3 22.80							+ 43	
	1.005090					51 + 1424							+ 9.26	
((δ) − D) $\frac{d'}{100}$	9.799840					11.01							+ .40	
	1.041681												− 7.40	
+16.92												51	3 26.45	
δ_2 +0 57.36		57 21.47		4 33.8								50		
d	+1.54	0 22.8	21.0	25	2190		11.55 − 22 + 30		25	26	10.27	49	7966 49.40	
	1.187522				25 21.90	57 26.45	− 11.63						− 6	+10.86
	9.800443					50 49 34.75							+ .10	
	1.075889					51 + 1491							+ 10.42	
((δ) − D) $\frac{d'}{100}$	9.790955					11.65							+ .40	
	1.066412												− 7.00	
+17.07													49 53.26	
δ_1 +0 57.08		58 31.41		50 50.3										
d	+1.56	0 25.4	19.8	25	2260		11.55 − 22 + 44		25	25	10.83	49	4921 48.95	
	1.193122				25 22.60	57 25.75	− 11.77						−	+10.56
	9.800473					50 49 37.15							+ .11	
	1.088149					51 + 1006							+ 10.12	
((δ) − D) $\frac{d'}{100}$	9.790955					11.80							+ .40	
	1.079201												− 7.40	
+17.07												51		
δ_2 +0 57.08		58 31.57		50 49.2								50	49 52.11	
d	+2.11	3 30.4	28.1	38	2925		16.18 − 21 + 7		35	38	13.21	36	4675 46.44	
	1.324228				38 29.25	44 19.10	− 16.04						− .12	+11.37
	9.802274					50 36 30.40							+ .92	
	1.214661					51 + 1679							+ 10.11	
((δ) − D) $\frac{d'}{100}$	9.793044					1604							+ .46	
	1.205526												− 7.00	
+17.06													46 50.81	
δ_1 +0 56.68		0 7.42		50 46.8										
				37 47.5										
d	+1.62	3 28.0	23.8	38	2590		12.32 − 16 + 15		35	38	12.59	36	4644 46.17	
	1.209552				38 25.90	44 22.45	− 12.31						−	+11.12
	9.802244					50 36 33.85							+ .92	
	1.012796					51 + 1259							+ 9.84	
((δ) − D) $\frac{d'}{100}$	9.793044					1232							+ .40	
	1.090500												− 7.40	
+17.06													46 49.89	
δ_2 +0 56.68		0 7.42		37 46.6										

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98 51° to 52°

Date$_1$ = 1871 Jan 10 — Observer W.A.R. / Recorder A.M.

Date$_2$ = 1871 Jan 17 — Observer W.A.R. / Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3	2m 26s	41.3	6.8	2m 6.8s	25.0s	33.0s	36.9s	40.9s	44.9s	1K 07s	36.14s	11.18s	2 24.96
	1 18.5	37.6	7.3							+0.74			+0.38
	K												+ .38
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													2 25.70
	α_1												+ 18
													2 25.88
			7.0	2 5.9	22.1	30.0	34.1	38.9	42.0	16 61	33.22	11.18	2 22.04
										+3.57			+ 3.21
	K												+ .38
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													2 25.61
	α_2												+ 33
													2 25.94
	3 31	62.1	9.0	3 11.2	31.1	39.0	43.0	47.0	51.0	21 11	42.22	11.27	3 30.95
	2 23.6	58.4	9.1							+0.74			+0.38
	K												+ .38
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													3 31.39
	α_1												+ 16
													3 31.85
			8.9	3 14.8	28.1	36.2	40.1	44.1	48.3	19 68	39.36	11.27	3 28.09
										+3.57			+ 3.21
	K												+ .38
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													3 31.66
	α_2												+ 31
													3 31.97
	4 32	18.3	7.2	4 24.6	31.9	40.0	43.8	47.8	51.8	21 54	43.05	11.09	4 31.99
	3 24.7	14.6	7.8							+0.73			+0.38
	K												+ .37
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													4 32.72
	α_1												+ 17
													4 32.89
			8.2	4 (12.3)	~~17.1~~	~~24.1~~	29.0	33.0	41.0	45.0	49.0	20 10	40.20
					17.1							+3.56	
	K				24.1 ?								11.09
	((δ) — D) $\frac{\kappa'}{100}$												4 29.11
													+ 3.21
	α_2												+ .37
													− 2
													4 32.67
													+ 31
													4 32.98
	5 30	6.0	8.3	5 20.1	29.8	37.6	41.4	45.4	49.5	20 37	40.74	11.05	5 29.69
	4 22.4	2.3	8.6							+0.73			+0.38
	K												+ .37
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													5 30.42
	α_1												+ 16
													5 30.58
			8.5	5 14.4	26.8	34.6	38.6	42.6	46.6	18 92	37.84	11.05	5 26.79
										+3.56			+3.21
	K												+ .37
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													5 30.35
	α_2												+ 31
													5 30.66
	~~5~~ 6 51	5.0	7.0	6 31.4	50.5	58.6	2.3	6.4	10.4	30 81	61.62	11.04	6 50.58
	~~2 37.35~~	1.4	7.8							+0.73			+0.38
	5 K 43.5												+ .37
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													6 51.31
	α_1												+ 16
													6 51.47
			8.0	6 33.8	42.8	55.7	57.5	3.6	7.6	29 42	58.84	11.04	6 47.80
										+3.56			+ 3.21
	K												+ .37
	((δ) — D) $\frac{\kappa'}{100}$												− 2
													6 51.36
	α_2												+ 39
													6 51.66

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z		δ′	
	+18.5	4′ 58.51	55.14	34′	56.90		13.86		30′	34′	43.10	40	16.57
	1.26007			34′	56.90	47 51.45	~~14.16~~ -.21 + 15						− 9 +11.77
d	9.80194					50 40 2.75	~~14.16~~ -13.80						+ 1.22
	1.14998					51 + 1412							+ 10.24
((δ) − D) $\frac{d'}{100}$	9.79256					13.82							+ .40
	1.14057												− 6.90
+17.13 δ₁		2 43.01		41 17.5								40	21.44
	+16.1	4.58.3	53.6	34	55.95		12.32 -19 +7		30	34	43.75	40	16.30 16.03
	1.20683			34	55.95	47 52.40	-12.20						− 7 +11.59
d	9.80197					50 40 3.80							+ 1.32
	1.09674					51 + 1250							+ 9.94
((δ) − D) $\frac{d'}{100}$	9.79256					1223							+ .40
	1.08733												− 7.40
+17.13 δ₂		2 43.07		41 16.3							54	40	20.22
	+19.7	2 25.9	23.7	12	24.80		14.33 -1 + 52		10	12	9.96	2	50.01 49.68
	1.29447			12	24.80	10 23.55	-14.84						− .11 +11.53
d	9.77840					51 2 34.85							+ .60
	1.18081					52 + 1516							+ 10.64
((δ) − D) $\frac{d'}{100}$	9.78886					14.83							+ .40
	1.17124			3									− 7.00
+17.22 δ₁		3 49.07		25 50.0								2	54.21
	+13.3	2 21.2	16.3	12	18.75		9.80 -1 +22		10	12	8.74	2	51.24 51.01
	1.12385			12	18.75	10 29.60	-10.01						− 5 +11.31
d	9.79840					51 2 41.00							+ 62
	1.01019					52 + 1424							+ 10.34
((δ) − D) $\frac{d'}{100}$	9.78886					1001							+ .40
	1.00065												− 7.50
+17.22 δ₂		3 49.19		3 50.6							51 50	2	54.82
	+7.4	2 15.2	13.1	57	14.15		5.39 -3 +31		55	57	9.04	17	51.29 51.17
	0.86923			57	14.15	25 34.20	-5.11						− 2 +10.75
d	9.80534					50 17 4550							+ 55
	0.76251					51 + 549							+ 9.82
((δ) − D) $\frac{d'}{100}$	9.79605					567							+ .40
	0.75322												− 6.80
+17.11 δ₁		4 50.00		18 50.6								17	55.12
	+16.8	2 22.4	17.8	57	20.20		12.32 -8 +62		55	57	7.24	17	52.79 52.51
	1.22531			57	20.10	25 28.25	-12.86						− 8 +10.48
d	9.80534					50 17 3965							+ .62
	1.11859					51 + 1314							+ 9.54
((δ) − D) $\frac{d'}{100}$	9.79605					1286							+ .40
	1.10930												− 7.30
+17.11 δ₂		4 50.09		18 51.2							51 50	17	55.69
	+9.6	3 54.1	52.9	8	53.50		6.93 -2 +46		5	8	46.13	6	13.39 13.23
	0.98227			8	53.50	13 54.85	-7.37						− 3 +10.95
d	9.80716					50 6 585							+ .98
	0.87927					51 + 754							+ 9.60
((δ) − D) $\frac{d'}{100}$	9.79793					7.38							+ .40
	0.86814												− 6.80
+17.09 δ₁		5 47.67		7 12.7								6	17.38
	+12.4	3 57.5	52.8	8	55.15		9.24 -2 +31		5	8	46.62	6	14.54 14.13
	1.09342			8	55.15	13 53.20	-9.53						− 4 +10.74
d	9.80716					50 6 460							+ 1.05
	0.98852					51 + 974							+ 9.33
((δ) − D) $\frac{d'}{100}$	9.79793					9.53							+ .40
	0.97929												− 7.30
+17.09 δ₂		5 47.75		7 12.8							51 50	6	17.57
	+19.2	0 3.6	0.2	10	1.90		14.63 -2 +16		10	9	47.13	5	12.54 12.52
	1.28330			10	1.90	12 46.45	-14.77						− 10 +9.89
d	9.82731					50 4 5475							+ 0
	1.17555					51 + 1504							+ 9.59
((δ) − D) $\frac{d'}{100}$	9.79809					1477							+ .40
	1.16933												− 6.70
+17.12 δ₁		7 8.59		6 10.6								5	15.71
	+14.0	4 57.5	56.1	9	57.80		10.78 -2		5	9	47.04	5	12.95 12.72
	1.14613			9	57.80	12 50.55	-10.76						− 5 +10.98
d	9.82731					51 5 1.95							+ 1.32
	1.04138					50 + 1440							+ 9.31
((δ) − D) $\frac{d'}{100}$	9.79809					10.77							+ .40
	1.03216												− 7.30
+17.12 δ₂		7 8.78		6 11.3								5	16.40

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100 51° to 52° 22

Date$_1$ = 1871 Jun 10 Observer W.A.R. Recorder A.M.

Date$_2$ = 1871 Jan 17 23 Observer Recorder

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3	8 16	14.2	8.8	7 58.5	15.7	23.4	27.3	31.3	35.3	13 30 +0.73	2 6.60	11.08	8 15.52 +0.38 +.37 −.2
	7 7.6	10.6	9.2										8 16.25 +.15
κ													8 16.40
((δ) − D) $\frac{\kappa'}{100}$													
a_1													
			9.0	7 56.1	12.7	20.6	24.5	28.4	32.4	11 86 +3.56	23.72	11.08	8 12.64 +3.21 +.37 −.2
κ													8 16.20 +.29
((δ) − D) $\frac{\kappa'}{100}$													8 16.49
a_2													
	10 5	24.4	8.8	9 46.0	5.0	13.0	16.9	20.8	24.9	8 06 +0.74	16.12	11.12	10 5.00 +0.38 +.38 −.2
	8 52.3	20.8	9.1										10 5.74 +.13
κ													10 5.87
((δ) − D) $\frac{\kappa'}{100}$													
a_1													
			9.0	9 41.4	2.1	10.0	14.0	17.8	22.0	6 59 +3.58 7	13.18	11.12	10 2.06 +3.2 81 +.38 −.2
κ													10 5.64 +.28
((δ) − D) $\frac{\kappa'}{100}$													10 5.91
a_2													
	11 4	8.9	7.4	10 54.6	11 2.9 3.4	6.3 11.2	11.2 15.2	15.1 19.0	19.0 23.0	5 65 +0.73	13.30	11.06	11 3.30 +0.38 +.37 −.2
	9 55.5	5.3	7.6										11 4.03 4.07 +.13
κ													11 7.10 4.16
((δ) − D) $\frac{\kappa'}{100}$													
a_1													
			7.3	10 47.7	0.6	8.4	12.4	16.1	20.1	5 74 +3.57 6	11.48	11.06	11 0.42 +3.2 81 +.37 −.2
κ													11 3.99 +.27
((δ) − D) $\frac{\kappa'}{100}$													11 4.25
a_2													
	12 36	52.9	9.0	12 16.8	34.0	42.0	45.8	49.9	53.8	22 5 5 +0.74	45.10	11.23	12 33.87 +0.38 +.38 −.2
	11 27.7	49.3	9.1										12 34.61 +.12
κ													12 34.73
((δ) − D) $\frac{\kappa'}{100}$													
a_1													
			8.9	12 14.9	31.0	39.0	43.0	46.9	51.0	21 09 +3.58 7	42.18	11.23	12 30.95 +3.2 81 +.38 −.2
κ													12 34.53 +.26
((δ) − D) $\frac{\kappa'}{100}$													12 34.78
a_2													
	13 54	47.4	9.5	13 39.2	54.9	2.9	6.8	10.7	14.6	32 99 +0.74	65.98	11.21	13 54.77 +0.38 +.38 −.2
	12 45.5	43.8	9.3										13 55.51 +.11
κ													13 55.62
((δ) − D) $\frac{\kappa'}{100}$													
a_1													
			9.4	13 32.8	52.0	0.0	4.0	8.0	11.9	31 59 +3.58 7	63.18	11.21	13 51.97 +3.2 81 +.38 −.2
κ													13 55.55 +.25
((δ) − D) $\frac{\kappa'}{100}$													13 55.79
a_2													

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke		z		δ′	
	+17.0	1′ 5.7	1.4	1′	1′ 3.55	21 44.80	13.09 −6 +1 −13.03		0′	0′	50.52	14	9.41	9.13
d	1.23045	9.80575				50 13 56.10							− 8	+10.36
	1.12434					51 + 1331							+ .28	
((δ) − D) $\frac{d'}{100}$	9.79668					1303							+ 9.76	
	1.11507												+ .40	
+17.17													− 6.70	
+0 54.56 δ_1		8 33.57		15 7.4								14	12.79	
	+16.5	1 4.7	0.0	1	2.35	21 46.00	12.32 −6 +39 −12.65		0	0	49.79	14	10.32	10.05
d	1.21948	9.81595			1 2.35	50 13 54.40							− 7	+10.07
	1.11137					51 + 1292							+ 27	
((δ) − D) $\frac{d'}{100}$	9.79668					1265							+ 9.47	
	1.10210												+ .40	
+17.17													− 7.30	
+0 54.56 δ_2		8 33.66		15 7.4								14	12.82	
	+19.0	0 12.7	10.0	50	11.35	32 37.00	14.63 −13 −14.56		50	49	56.85	25	3.12	2.28.81
d	1.27875	9.80428			50 11.35	50 24 48.30							− .10	+10.31
	1.14097					51 + 1482							+ .05	
((δ) − D) $\frac{d'}{100}$	9.79494					14.51							+ 9.96	
	1.16163												+ .40	
+17.24													= 6.70	
+0 54.12 δ_1		10 23.11		26 0.5								25	6.42	
	+20.7	0 14.1	9.9	50	12.00	32 36.35	18.41 −13 +53 −15.81		50	49	56.19	25	3.90	3.56
d	1.31597	9.80428			50 12.00	50 24 47.75							− 12	+10.01
	1.20819					51 + 1615							+ 5	
((δ) − D) $\frac{d'}{100}$	9.79494					1581							+ 9.68	
	1.19885												+ .40	
+17.24													− 7.20	
+0 54.12 δ_2		10 23.15		26 0.5								25	6.37	
+ 8.7	+.56	1 20.1	17.3	6	18.70	16 29.65	3.85 −1 +46 −4.30		5	6	14.40	8	15.34	4.763
0.93952	0.74819				6 18.70	50 8 40.95							− .01	+10.34
d 9.79746	9.80671					51 + 439 6.68							+ 32	
0.82492	0.64284					430							+ 9.63	
((δ) − D) $\frac{d'}{100}$	9.79746												+ .40	
	0.63359												− 6.70	
+17.21 δ_1													8 48.89	51.27
+0 53.84		11 21.37		9 45.1										
	+1.27	1 24.3	19.4	6	21.85	16 26.50	9.24 −3 +54 −9.75		5	6	12.10	8	17.86	4.765
d	1.10380	9.80671			6 21.85	50 8 34.90							− 5	+10.09
	9.99845					51 + 696							+ .38	
((δ) − D) $\frac{d'}{100}$	9.79746					9.75							+ 9.36	
	0.98920												+ .40	
+17.21 δ_2				4									− 7.20	
+0 53.84		11 21.46		9 45.4								8	50.54	
	+1.7	2 56.2	53.7	22	54.95	59 53.40	13.09 −24 +7 −12.92		20	22	42.03	52	17.91	17.63
d	1.23300	9.80012			22 54.95	50 52 4.70							− 8	+11.51
	1.12106					51 + 1321							+ .72	
((δ) − D) $\frac{d'}{100}$	9.79063					12.93							+ 10.47	
	1.11157												+ .40	
+17.37													− 6.70	
+0 53.44 δ_1		12 52.10		53 15.9								52	22.44	
	+1.60	2 56.3	57.2	22	53.75	59 54.60	12.32 −23 −12.09		20	22	41.66	52	18.36	18.10
d	1.20412	9.80012			22 53.70	50 52 6.00							− 7	+11.28
	1.09218					51 + 1336							+ .78	
((δ) − D) $\frac{d'}{100}$	9.79063					12.10							+ 10.17	
	1.08269												+ .40	
+17.37													− 7.10	
+0 53.44 δ_2		12 52.15		53 15.7								52	22.28	
	+1.56	2 53.3	50.3	27	51.80	54 56.55	11.55 −21 +44 −11.78		25	27	40.02	47	19.93	19.67
d	1.19312	9.80089			27 51.80	50 47 4.85							− 7	+11.42
	1.08195					51 4 1208							+ .72	
((δ) − D) $\frac{d'}{100}$	9.79144					11.82							+ 10.37	
	1.07250												+ .40	
+17.38													− 6.60	
+0 53.12 δ_1		14 13.00		48 17.6								47	24.49	
	+1.72	2 56.0	52.2	27	54.10	54 54.25	14.63 −25 +15 −14.53		25	27	39.57	47	20.51	20.19
d	1.28330	9.80089			27 54.10	50 47 56.5							− 10	+11.17
	1.17213					51 + 1486							+ .78	
((δ) − D) $\frac{d'}{100}$	9.79144					1454							+ 10.29	
	1.16268												+ .40	
+17.38													− 7.10	
+0 53.12 δ_2		14 13.17		48 17.4								47	24.26	

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Date$_1$ = 1871 Jan 10 22 Observer W.A.R. Recorder A.M.

Date$_2$ = 1871 Jan 17 23 Observer W.A.R. Recorder A.M.

Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
3	14 52	62 8	9.2	14 42.1	52.6	0.5	4.5	8.5	12.8	2 69 +0.71	63.78	11.28	14 52.50 +0.38 +.38 −.2
	13 43.5 κ	59.3	9.0										14 53.24 +.09
	((δ) − D) $\frac{\kappa'}{100}$												14 53.33
	α_1												
			8.5	14 36.7	49.6	57.7	1.7	5.6	9.7	30 43 +3.587	60.86	11.28	14 49.58 +3.221 +.38 −.2
	κ												14 53.16 +.24
	((δ) − D) $\frac{\kappa'}{100}$												14 53.39
	α_2												
	17 17	16.4	8.9	17 1.6	19.0	27.0	30.4	33.0	39.0	1509 +0.73	30.18	11.08	17 19.10 +0.38 +.37 −.2
	16 8.2 κ	12.9	8.0										17 19.83 +.09
	((δ) − D) $\frac{\kappa'}{100}$												17 19.92
	α_1												
			8.0	16 38.0	16.1	24.1	28.0	31.9	36.0	13 61 +3.57	27.22	11.08	17 16.14 +3.22 +.37 −.2
	κ												17 19.71 +.23
	((δ) − D) $\frac{\kappa'}{100}$												17 19.94
	α_2												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_1												
	κ												
	((δ) − D) $\frac{\kappa'}{100}$												
	α_2												

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Runs

	$T_m - T$	A	C	Sum	Mean	Red. to m. wire	Red. to h. wire	Red. runs	Stroke	z		δ′	
d	+104	2′ 26.1	22.7	12	24.40	10 23.95	7.54−1+20		10′	12	16.57	2 43.26	43.08
((δ) − D) $\frac{d'}{100}$	1.01703				12 24.40	54 2 35.25	−7.83					−	.3 +11.63
	9.998440					52 + 8.01						+	.60
	0.700334					.83						+	10.66
	9.78886											+	.40
	0.89383											−	6.80
+17.45 δ_1		15 10.78		3 40.8								2	47.81
+0 52.84													
d	+129	2 27.9	22.9	12	25.40	10 22.95	9.05−1+67		10	12	15.69	2 44.28	44.06
((δ) − D) $\frac{d'}{100}$	1.11059				12 25.40	54 2 34.35	−9.71					−	.5 +11.36
	9.999840					52 + 9.93						+	.65
	0.99693					9.71						+	10.36
	9.78886											+	.40
	0.98739											−	7.30
+17.45 δ_2		15 10.84		3 41.0							51	2	48.12
+0 52.84											50		
d	+175	4 57.1	56.0	59	56.55	22 51.80	13.09−7+38		55	59	43.15	15 46.80	16.51
((δ) − D) $\frac{d'}{100}$	1.24304				59 56.55	54 15 3.10	−13.46					−	.9 +11.30
	9.80580					51 + 13.70						+	1.22
	1.13648					13.41						+	9.77
	9.79652											+	.40
	1.12750											−	6.60
+17.35 δ_1		17 37.27		16 13.4								15	21.21
+0 52.20													
d	+181	4 57.9	57.4	59	57.15	22 51.20	13.86−8+8		53	59	43.29	15 16.77	16.44
((δ) − D) $\frac{d'}{100}$	1.25768				59 57.15	54 15 2.60	−13.86					−	.9 +11.07
	9.80580					51 + 14.17						+	1.27
	1.15142					13.87						+	9.49
	9.79652											+	.40
	1.14214											−	7.00
+17.35 δ_2		17 37.29		16 12.7								15	20.54
+0 52.20													
d													
((δ) − D) $\frac{d'}{100}$													
δ_1													
d													
((δ) − D) $\frac{d'}{100}$													
δ_2													
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((δ) − D) $\frac{d'}{100}$													
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((δ) − D) $\frac{d'}{100}$													
δ_1													
d													
((δ) − D) $\frac{d'}{100}$													
δ_2													

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Star.	α	δ	Mag.	T_δ	T_m	T_e	T_f	T_g	T_h	Sum	Mean	Red. to T_m	T
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
c_1													
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
a_2													
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
a_1													
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
a_2													
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
a_1													
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a_1													
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a_2													
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
a_1													
κ													
$((\delta) - D)\frac{\kappa'}{100}$													
a_2													

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