

KG
11366
v.605

Lone Stars. 43
Observations and Reductions
From Dec 17 1878 to Jan 26 1879

1878 Dec 17 Dec 18 Dec 19

Obs. H. H. R. Rec. J. S. M. C.

$n = -0.87$
 $h m v \text{ mag. } n = -0.87$
 $22 \ 56.27 \ 87 \ 55.54 \ 23 \ 11.25 \ 9.5 \ 10 \ 40.0$
 $8 \ 50.53' \ 48.2 \ 54.47' \ 41.5$

$h m v \text{ mag. } n = -0.87$
 $23 \ 21.21 \ 9.3 \ 20 \ 35.0$
 $57.57' \ 45.5$

Dec 17

Dec 18

Dec 17

Dec 18

+13.47 +13.52

$+9.05 +9.05$
 $23 \ 59.2 \ 2.3 \ 16 \ 43.6 \ 12.83$
 $2.5 \ 3.7 \ 47.2$
 $6.1 \ 7.2 \ 50.8$
 $0.3 \ 10.0 \ 54.4$
 $12.2 \ 13.2 \ 57.9$
 $28 \ 24 \ 56.6 \ 6.88 \ 16 \ 52.78 \ 5 \ 9.65 \ 5 \ 9.65$
 $-5 \ 8.52 \ 8.52 \ 5 \ 9.65 \ 5 \ 9.65$
 $-1.14 \ 1.14 \ 1.31$
 $22 \ 56 \ 56.20 \ 57.22 \ 11 \ 40.93$
 $-2.39 \ 2.39 \ 2.49$
 $56 \ 53.81 \ 54.83 \ 7.87 \ 11 \ 38.44 \ 8.05$
 $-57.87 \ 58.83$
 $8.5 \ 8.8 \ 7.87 \ 9.2 \ 8.4$

$+12.59$
 $16 \ 45.0 \ 12.59$
 48.3
 57.9
 53.5
 58.8
 $16 \ 51.90$
 $-5 \ 9.45 \ 5 \ 10.69$
 $-1.24 \ 1.24$
 $11 \ 41.21$
 -2.47
 $11 \ 38.74 \ 8.05$
 -58.83
 9.2

$26 \ 26 \ 13.47 \ 13.52$
 $26 \ 26$
 $22.0 \ 30.2$
 $25.2 \ 33.5$
 $29.0 \ 37.3$
 $32.5 \ 40.5$
 $36.0 \ 44.6$
 $26 \ 28.94 \ 37.22$
 $-5 \ 9.46 \ 5 \ 9.46 \ 5 \ 10.70 \ 5 \ 10.70$
 $-1.24 \ 1.24$
 $21 \ 18.24 \ 26.52$
 $-2.65 \ 2.65$
 $21 \ 15.59 \ 23.67 \ 8.26$
 -59.31
 9.2
 8.4

$2 \ 37.07 \ 45.07 \ 26 \ 13 \ 16 \ 8.23$
 $-31.21 +21.81 \ 17 \ 34 \ 42.55$
 $1.4949 \ 1.3366 \ 1.6289 \ 0$
 $9.7950 \ 9.7950 \ 9.7603 \ 0$
 $1.39986 \ 1.39986 \ 1.49554$
 $30 \ 25 \ 38.3 \ 38.3 \ 35$
 $0.500 \ 1.401 \ 55 \ 2.48 \ 188.2 \ 49.7$
 $0.1 \ 50.9 \ 58.6$
 $20 \ 23.55 \ 47.0 \ 26.44 \ 70 \ 37 \ 54.15$
 $51 \ 53.30 \ 56.85 \ 44 \ 54.20$
 $50.56 \ 40.4 \ 73.59 \ 54 \ 49 \ 49.4$
 $-25.11 +17.55 \ 31.30$
 $56 \ 45.94 \ 58.22 \ 11 \ 30.39 \ 48 \ 10.2 \ 11 \ 30.69 \ 48 \ 9.8$
 $46.96 \ 54.53 \ 40 \ 34.32$
 $+5.81$

$15 \ 59.2 \ 1.8$
 5.4
 8.3
 $11.5 \ 54 \ 49 \ 35.97$
 $16 \ 52.24 \ 55$
 $-50 \ 46.66$
 $+13.49 \ 1.66894 \ 13.34$
 $+30 \ 9.76057 \ 30$
 $-40.0 \ 35 \ 1.53558 \ 39.9 \ 30$
 $49 \ 9.07 \ 2 \ 52.5 \ 49 \ 8.66 \ 3 \ 11.5$
 0.6
 $37 \ 56.55 \ 20.4$
 $44 \ 57.80 \ 15.95$
 $54 \ 49 \ 1.65$
 $+34.32$

$26 \ 45.33 \ 54 \ 59 \ 58.15 \ 55 \ 0.421$
 $1639 \ 8.11 \ 34 \ 34$
 $1.21458 \ 0.90902 \ 13.53 \ 13.53$
 $9.76857 \ 9.76857 \ 30 \ 30$
 $1.07724 \ 0.97711 \ 40.9 \ 40.9$
 $1 \ 43.4 \ 59 \ 30.72 \ 59 \ 36.83$
 $26 \ 48.05 \ 52.7$
 $56 \ 0.30$
 $55 \ 0 \ 10.15$
 -12.0
 -6.74
 $21 \ 7.33 \ 58 \ 31.4 \ 58 \ 37.5$

$n = -0.92$
 $Res. = -19$
 $+4' 10.74$

$20 \ 23.55 \ 47.0 \ 26.44 \ 70$
 $51 \ 53.30 \ 56.85$
 $50.56 \ 40.4 \ 73.59$
 $-25.11 +17.55$
 $56 \ 45.94 \ 58.22$
 $46.96 \ 54.53 \ 40$
 $+5.81$

$37 \ 56.55$
 $44 \ 57.80$
 $54 \ 49 \ 1.65$
 $+34.32$

$33 \ 15.95$
 $59 \ 30.72$
 $59 \ 36.83$
 52.7
 0.30
 10.15
 12.0
 6.74
 7.33
 $58 \ 31.4$
 $58 \ 37.5$

Dec 19

$2 \ 2.3 \ 5.7 \ 8.8 \ 11.9 \ 15.1$
 $2 \ 8.76 \ 5 \ 10.39 \ 5 \ 11.57$
 $-5 \ 10.39 \ 11.8$
 $56 \ 57.19$
 -2.34
 $56 \ 54.85$
 -7.87
 -57.87
 8.6

$11 \ 30.39 \ 48 \ 10.2 \ 11 \ 30.69 \ 48 \ 9.8$

$58 \ 31.4$
 $58 \ 37.5$

$n = -0.945$
 $Res. = -20$
 $+4' 10.20$

$49.41 \ 57.9$
 $34 \ 53.65$
 $50 \ 54.70$
 $50 \ 56.49$
 $+15.10$
 $56 \ 46.98 \ 54 \ 52.8$

$54 \ 52.8$

$30 \ 14.9$
 23.5

1878 Dec 17, Dec 18, Dec 19.

α 23 21 37 9.5 20 51.9 30 350 23 31 51 9.0 31 28 0 2 14 8.9 1 26.5 1 15 36 7.8 14 34.0
 8 54 53 48.0 45.5 55 02 54 56.5 55 10 4.1 52 4 2.9

Dec 17

22

Dec 19 +12.56

Dec 17

+13.26

Dec 19 +9.90

 26 44.0
 48.0
 51.4
 53.0
 58.6

 37 13.2
 16.8
 20.7
 24.5
 28.0

 21 7.7
 10.9
 14.2
 17.4
 21.0

 26 51.40
 -5 10.42 -5 11.78
 - 1.36
 21 39.62
 - 2.63
 21 36.99

 37 20.64
 -5 8.57 -5 9.89
 - 1.32
 32 10.75
 -0 2.89
 32 7.86

 21 14.24
 -5 10.49 -5 11.72
 - 1.23
 16 12.52
 -4.78
 15 57.74

 -82.6
 -59.34

 -8.52
 -59.70

 -10.90
 -56.91

8.8

8.9

9.2

8.2

 26 7.2
 11.7
 19.0
 12.63

 36 38.3
 42.2
 46.5
 42.33

 20 24.0
 30.0
 37.9
 30.61

 26 12.63
 + 38.77
 1.58 8.80
 7.76 7.85
 1.48 4.42

 36 42.33
 + 38.31
 4.58 3.31
 4.75 7.81
 1.44 7.25

 20 30.63
 + 43.61
 1.63 9.59
 9.78 7.72
 1.53 3.38

 30 14.9
 23.5
 34 19.20
 48 29.15
 54 52 39.35
 + 28.47

 20 29.1
 37.9
 22 33.50
 0 14.85
 55 4 25.59
 + 28.70

 15 51.9
 0.8
 16 56.35
 5 52.00
 52 10 2.20
 + 34.15

21 28.73 51 40.6

31 59.34

15 46.84 9 8.8

Dec 18

 37 13.9 +13.15
 17.3
 21.1
 24.7
 28.3

 7 46.2 +13.30
 49.9
 53.5
 57.0
 6.7

 37 21.06
 -5 9.47 -5 10.71
 - 1.24
 32 10.35
 - 2.87
 38 7.48

 7 53.46
 -5 9.51 -5 10.75
 - 1.24
 2 42.71
 - 3.50
 2 39.21

8.9

8.6

 36 36.3
 46.0
 52.0

 6 53.0
 59.4
 6.1

 36 14.77
 + 36.29
 1.55 9.79
 9.75 7.87
 1.42 3.73

 6 59.50
 + 53.96
 1.73 2.07
 9.75 6.60
 1.59 4.74

 20 31.5
 40.5
 22 36.15
 0 12.20
 55 9 22.05
 + 26.53

 15 31.3
 25.1
 15 21.20
 7 27.15
 55 11 37.00
 + 39.33

31 58.96 3 21.1

2 29.93 10 47.6

 $n = -0.87$
 $\text{Res.} = -1.9$
 $+4' 9.85$

1878 Dec 18, Dec 19

Examine the minutes of these two dates

	h	m	s	mag.	h	m	s	mag.	h	m	s	mag.	h	m	s	mag.	h	m	s	mag.										
α	1	16	17	8.2	15	15.6	1	29	29	8.1	28	26.3	1	30	51	8.8	29	46.8	1	31	28	4.6	30	25.9	2	19	54	9.0	48	57.0
δ		52	12		59		53	27		223		52	20		147		57	39		31.9		50	42					37.7		
								8.1																						

Dec 18

25 +8.41

28 2.0
5.2
8.5
11.7

25 15.0

28 8.48

-5 9.65

-5 1.06

+19 57.77

-59.4

19 57.83

24

27 36.7

43.7

49.9

24

50 44 16.98

27 43.43

+25.05

1.39881

9.80 1.20

1.30608

40 57.4

5.2

43 1.45

39 46.90

57.43 56.75

+20.23

19 39.81

43 0.2

+8.58

25 3.0

6.2

9.4

13.0

15.9

25 9.50

-5 10.53

-5 11.69

-5 1.21

-5 1.16

-5 5.83

19 57.81

19 57.98

12.02

49.2

49.1

9.4

24 41.0

49.6

56.0

50 44 16.56

22 24.17

-21 34 33.62

-58 +26.06

+10.75

+23 4.77

+40.55

13 11.18

38.6

43.9

59 41.25

23 7.10

53 27 17.30

+19.81

16 28.34

12 14.3

31 2.57

20 45.8

31 40.34

37 51.4

19 39.96

42 59.8

Dec 19

+10.04

+11.14

+16.63

+9.53

+8.58

21 49.0

52.9

53.5

59.0

2.4

21 55.76

-5 10.49

-5 11.72

-5 1.23

-5 44.04

-5 4.79

16 39.25

-10.91

-56.85

8.6

22 18.3

24.2

30.0

-15

52 13 41.64

-21 34 33.62

-58 +26.06

+10.75

+23 4.77

+40.55

13 11.18

38.6

43.9

59 41.25

23 7.10

53 27 17.30

+19.81

16 28.34

12 14.3

31 2.57

20 45.8

31 40.34

37 51.4

19 39.96

42 59.8

34 49.8

54.5

59.5

4.5

9.5

34 59.56

-5 10.52

-5 11.78

-5 1.28

-5 47.78

-5 5.07

29 42.71

8.5

34 26.8

32.8

40.9

53 27 37.11

-18

94

+12.15

+26

-40.2

27 5.05

16.3

26.0

5 21.15

17 27.20

52 21 37.90

+33.29

31 2.57

20 45.8

31 40.34

37 51.4

19 39.96

42 59.8

36 24.0

27.3

30.5

33.9

37.3

36 30.60

-5 10.52

-5 11.73

-5 1.23

-5 18.87

-5 5.07

31 13.80

-11.23

-55.47

6.6

35 24.6

47.9

54.2

52 22 10.69

-48

6

+10.93

+24

-39.9

21 41.29

14.7

23.4

47 19.05

35 29.30

51 39 39.50

-22.39

31 2.57

20 45.8

31 40.34

37 51.4

19 39.96

42 59.8

37 5.2

8.52

8.1

11.5

15.0

37 8.29

-5 10.52

-5 11.71

-5 1.21

-5 56.58

-5 5.25

31 51.53

-11.19

-55.41

7.5

37 30.5

36.5

42.7

51 39 19.11

-21

46

+10.13

+22

-39.8

38 46.84

55.1

42 58.65

39 49.70

52 48 59.90

+16.66

19 39.96

42 59.8

31 2.57

20 45.8

31 40.34

37 51.4

19 39.96

42 59.8

25 3.0

6.2

9.4

13.0

15.9

25 9.50

-5 10.53

-5 11.69

-5 1.21

-5 1.16

-5 5.83

19 57.81

19 57.98

12.02

49.2

49.1

9.4

24 41.0

49.6

56.0

50 44 16.56

22 24.17

-21 34 33.62

-58 +26.06

+10.75

+23 4.77

+40.55

13 11.18

38.6

43.9

59 41.25

23 7.10

53 27 17.30

+19.81

16 28.34

12 14.3

31 2.57

20 45.8

31 40.34

37 51.4

19 39.96

42 59.8

1878 Dec. 18, Dec 19

21 12.6
18.5

R	m	v	Mag.	R	m	v	Mag.
2	21	47	8.5	20	38	4	21
8	54	36		312	54	20	

15.5

Dec 18

27	28	29	30
27	28	29	30
24.5	28.0	31.7	35.3
38.8	31.66	9.65	10.87
20.79	20.79	20.79	20.79
14.58	14.58	14.58	14.58

+12.00

11.95
+12.4013.14
+12.69

27	28	29	30
27	28	29	30
24.5	28.0	31.7	35.3
38.8	31.66	9.65	10.87
20.79	20.79	20.79	20.79
14.58	14.58	14.58	14.58

5.6 26

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

Dec 19

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

27	28	29	30
27	28	29	30
34.5	40.4	47.4	

1878 Dec. 23, Dec 24, Dec 25, Dec 26.

h m s Mag.
1 16.17 8.2 15 15.6
8 52° 12' 5.9

h m s Mag.
1 29.29 8.1 28 26.3
53° 27' 22.3

h m s Mag.
1 30.51 8.8 29 46.8
52° 20' 14.7

Dec 23

+1007

Dec 24 +1078

Dec 23 +1089

Dec 24 +1171

Dec 23 +1055

Dec 24

+11

22 50.8
54.4
57.7
1.2
4.5
22 57.72
-5 12.80 = 5 13.62
132
16 44.10
-48.3
16 39.27
8.0

21 51.3
54.7
58.0
1.3
4.9
21 58.14 04
-5 12.70 -5 13.74
1.21
16 44.13
-48.1
16 39.32
8.6

35 4.7
8.1
11.5
15.1
18.4
35 11.56
-5 12.31 -5 13.69
1.38
29 57.87
5.12
29 52.75
8.2

35 5.2
8.3
11.9
15.2
18.7
35 11.86
-5 12.41 -13.98
1.27
29 57.88
5.10
29 52.78
8.5

36 25.5
28.9
32.4
35.6
39.3
36 32.34
-5 12.32 -5 13.64
1.32
31 18.70
-5.11
31 13.59
8.4

36 25.0
29.2
32.5
35.9
39.4
36 32.58
-5 12.72 -5 13.93
1.21
31 18.65
-5.29
31 13.56
8.1

+11
1123
-55.47

22 38.1
44.0
51.3
52 13 41.72
21 50.30
-75
+10.64 0.88 8.14
+24 9.78 7.67
+40.6 10.78 18.8
3 22.9 13 11.19
31.1
13 27.00
9 21.35
52 13 31.36
+10.36
16 28.36 12 14.3

21 43.9
50.8
56.2
52 13 42.09
2 34 15.60
-71
+10.62 1.74 7.88
+24 9.77 4.56
+40.6 1.6 28.61
3 17.4
13 12.27
13 21.50
9 26.85
52 13 36.04
+6.65
16 28.41 12 15.4

34 9.0
15.8
22.0
53 29 50.97
-82
+12.08 1.75 5.57
+26 9.77 4.56
+40.3 1.63 6.20
2 45.9
29 21.56
2 47.2
57 50.95
24 57.90
53 29 58.6
+42.57

34 8.5
14.6
21.6
53 29 49.86
-84
+12.03 1.60 1.41
+26 9.78 5.76
+40.4 1.49 2.24
2 14.9
29 20.97
5 19.70
17 28.65
52 21 38.66
+31.13

35 46.0
52.2
59.0
52 22 9.79
-42
+10.80 1.66 7.55
+24 9.78 5.76
+40.6 1.55 9.38
21 48.34
5 27.3
17 25.85
52 21 34.74
+36.25

35 39.8
46.0
52.4
52 22 10.85
-42
+10.80 1.66 7.55
+24 9.78 5.76
+40.6 1.55 9.38
21 41.9
5 27.3
17 25.85
52 21 34.74
+36.25

+11
1123
-55.47

Dec 25

+10.25

+1134

+1064

21 51.5
54.7
58.1
1.3
5.0
21 58.12
-5 13.00 -5 14.17
1.17
16 43.95
-47.9
16 39.16
8.8

21 51.5
54.7
58.1
1.3
5.0
21 58.12
-5 13.00 -5 14.17
1.17
16 43.95
-47.9
16 39.16
8.8

35 5.2
8.6
12.0
15.7
18.0
35 12.08
-5 13.01 -5 14.24
1.23
29 57.84
5.08
29 52.76
8.8

35 5.2
8.6
12.0
15.7
18.0
35 12.08
-5 13.01 -5 14.24
1.23
29 57.84
5.08
29 52.76
8.8

36 26.0
29.8
32.7
36.1
39.7
36 32.80
-5 13.01 -5 14.18
1.17
31 18.62
-5.07
31 13.55
8.8

36 26.0
29.8
32.7
36.1
39.7
36 32.80
-5 13.01 -5 14.18
1.17
31 18.62
-5.07
31 13.55
8.8

+11
1123
-55.47

21 40.0
45.3
50.4
52 13 40.80
21 45.23
+14.89
1.11 0.25
9.78 9.07
+10.54
+24
+40.7
3 23.0 13 10.35
30.6
13 27.25
9 21.10
52 13 30.72
+10.28
16 28.25 12 13.5

21 40.0
45.3
50.4
52 13 40.80
21 45.23
+14.89
1.11 0.25
9.78 9.07
+10.54
+24
+40.7
3 23.0 13 10.35
30.6
13 27.25
9 21.10
52 13 30.72
+10.28
16 28.25 12 13.5

34 19.4
26.4
30.2
53 29 51.13
34 25.33
+46.75
1.66 9.78
9.77 4.56
+1.56 0.41
55
2 39.0 29 21.97
45.7
57 42.35
25 6.00
53 29 15.62
+35.57

34 19.4
26.4
30.2
53 29 51.13
34 25.33
+46.75
1.66 9.78
9.77 4.56
+1.56 0.41
55
2 39.0 29 21.97
45.7
57 42.35
25 6.00
53 29 15.62
+35.57

35 41.8
50.4
56.3
52 22 11.57
35 49.50
+43.30
1.63 6.49
9.78 5.76
+1.52 8.32
5
0 16.0 21 42.01
24.3
5 20.15
17 28.20
52 21 37.83
+33.75

35 41.8
50.4
56.3
52 22 11.57
35 49.50
+43.30
1.63 6.49
9.78 5.76
+1.52 8.32
5
0 16.0 21 42.01
24.3
5 20.15
17 28.20
52 21 37.83
+33.75

+11
1123
-55.47

1878. Dec. 23, Dec 24, Dec 25, Dec. 26.

	Dec 23	Dec 24	Dec 25	Dec 26
α	1 31 28	7 6 30 10 9	31 13.9	2 22 36
8	51° 10'	31 13.9	76	51° 14'
	+11.02	+862 +9.33	+967	+9.59
	36 37	37 52.9	28 19.1	38 46.7
	54.0 54.0	52.4 52.4	22.4 22.4	50.0 50.0
	53.70 57.0	59.1 59.1	25.7 25.7	53.0 53.0
	54.93 1.5	5.7 5.7	29.0 29.0	56.2 56.2
	36 54.2 187 59.10	37 59.38	28 25.68	38 53.10
	-5 12.32 -5 12.32	-5 12.72 -5 12.89	-5 12.87 -5 13.67	-5 12.88 -5 13.62
	-12.7 12.7	-1.17 1.17	-1.30 1.30	-1.24 1.24
	31 40.62 52.45 51	32 45.49	23 12.01	33 39.48
	-5.27 -5.10	-5.28 5.28	-5.99 5.99	-6.09 6.09
	31 35.55 40.41	32 40.41	23 6.02	33 33.39
	87 7.8	80	89	92
	37 37	37 20.4	27 34.5	38 5.9
	19.2 40.2	26.7 26.7	39.2 39.2	12.1 12.1
	25.4 46.5	32.7 32.7	47.9 47.9	21.0 21.0
	30.8 52.4			
	51 12 33.88 12.18	51 15 11.68	51 46 20.03	50 35 12.1
	37 25.73 46.37	37 26.60	27 40.53	38 13.00
	-30.92 +12.73	-84 -40	-29 -46	-54 -43
	1.49 0.24 1.10 4.83	+9.51 +9.57	+4.515	+40.10
	9.79 6.54 9.79 6.52	1.51 5.61	+9.53 1.65 4.66	+8.55 1.73 8.38
	1.39 3.15 1.00 7.92	+22 +22	+22 4.79 1.60	+20 9.80 2.74
	35.66 52.2	22.0 4.15	14.41 55	34 34.10
	39 0.5	12 12.05	41 14.00	52 24.85
	14 0.25 11 56.35	10 36.30	41 34.35	30 18.70
	8 48.10 10 52.00	51 14 45.49	51 45 44.36	50 34 28.71
	51 12 58.11 15 26.1	+26.19	+85.67	33 21.15
	-24.73 +10.17			+32.52 33 46.9
	31 24.40	11 6.8	32 29.23	13 46.1
	32 29.23	13 46.4	22 53.83	45 4.4
		+9.47	Dec. 26 +9.75	
	37 57.80	56.5 56.5	28 19.4	5 18 59.2
	.60 59.6	.60 59.6	23.0 23.0	2.8 2.8
	.50 2.8	.50 2.8	26.5 26.5	6.0 6.0
	63 6.2	63 6.2	29.6 29.6	9.4 9.4
	37 59.63	37 59.63	33.3 33.3	12.8 12.8
	-5 13.01	-5 14.15	28 26.42	2 6.04
	-1.14 1.14	-1.14 1.14	-5 13.19	-5 13.16
	32 45.48	32 45.48	-1.10 1.10	-5.14.36
	-5.26 5.26	-5.26 5.26	23 12.13	58 51.68
	32 40.42	32 40.42	-5.95 5.95	-8.02 8.02
	8.4	-11.18	23 6.18	58 43.66
		-55.41	-12.19	-48.84
	37 35.7	37 35.7	27 25.7	0.8.6
	42.6 42.6	42.6 42.6	38.5 38.5	11.0 11.0
	48.8 48.8	48.8 48.8	42.0 42.0	13.4 13.4
	51 15 12.36	51 15 12.36	45.4 45.4	16.5 16.5
	37 42.37	37 42.37	49.0 49.0	22.3 22.3
	+17.26	+17.26	51 46 19.85	52 0 4.36
	1.23 7.04	1.23 7.04	+44.42	+26 +5.68
	9.79 6.52	9.79 6.52	1.64 7.58	+10.8 1.71 3.32
	1.1 39.63	1.1 39.63	9.79 6.52	+23 23
	56.3 56.3	56.3 56.3	1.84 5.25	-36.6 36.6
	2.5 2.5	2.5 2.5	40 8.9	45 53.00
	11 59.40	11 59.40	41 17.1	
	10 48.95	10 48.95	41 35.35	
	51 14 58.57	51 14 58.57	51 48 44.73	
	+13.79	+13.79	+35.70	
	32 29.24	13 9.5	22 53.99	45 4.2

1878 Dec. 23, Dec 24, Dec 25, Dec 26

α h_2 m s $\Delta\alpha$ h_2 m s $\Delta\alpha$ h_2 m s $\Delta\alpha$ h_2 m s $\Delta\alpha$
 2 57.12 5.8 55.598 2 58.36 9.4 57.249 3 1 48 9.4 0 365 3 14 8 8.5 52 54.53 16 26 7.0 15 11.6
 8d 54 13' 8.7 53 54' 49.6 54 54' 56.0 54 8' 4.4 52 51' 47.8

Dec 23 2 2 11238 +1199 3 4 12.16 7 7 +1350 +1334 +10.82
 3 33.4 53.2 3 4 17.4 33.4 38.2 22 7.0
 36.8 58.9 20.8 36.0 41.8 10.4
 40.2 0.3 24.2 39.7 45.6 8.9 18.9
 43.8 3.8 27.9 43.2 48.9 17.3
 47.4 7.3 31.5 47.1 52.6 20.8
 5 40.32 0.30 5 4 24.36 33 7 32.65 45.42 22 18.58
 -5 12.41 12.41 -5 13.83 -5 13.83 -5 12.41 12.41 -5 13.87 -5 13.87 -5 12.43 -5 13.78
 -142 -142 -141 -141 -146 -146 -17 0.10
 57 26.49 46.47 -13.11 99 59 10.51 2 25.81 31.58 17 0.10
 -67.4 -67.4 -6.73 -6.73 -6.87 -6.87 -16 53.19
 57 19.75 38.73 -13.11 99 59 37.8 13.09 2 18.94 26.68 16 53.19
 -42.99 -42.99 -42.75 -42.75 -13.22 -39.33
 8.9 6.7 9.3 9.0 9.5 7.5
 18.6 2.2 3 44.4 8.7 8.5 21 50.1
 3.7 8.2 51.7 16.8 17.3 56.4
 10.3 13.4 56.9 28.4 24.2 2.0

54 15 1640 2901 53 55 3439 54 55 4132 55 4525 52 53 4387
 2 3.53 6.60 -36 -75 3 51.02 -29.7 16.63 8 16.67 -14 -25 21 36.17
 +36.79 +53.70 -46 -46 -38 +28.05 -31.25 -34 -38 +18.71
 1.56 573 1.72 997 +12.92 +12.92 1.52 32.3 +12.56 1.36 27 4.99 +13.68 +13.67 1.27 20.7
 9.76 660 9.76 660 +29 +29 9.77 20.8 +28 9.76 20.8 +31 +31 9.76 20.8
 1.43 450 1.60 264 -33.5 -33.5 30 1.39 93.9 -33.2 30 30 47.7 +33.0 -33.0 30 1.15 87.7
 2 6.2 2 6.2 55.28 17.50 46.0 55 13.35 30.8 54.5 55 21.52 54 25.59 3 25.9 53 23.69
 12.6 12.6 52.1 37.1 53.7 31 33.95 50.70 33 31.9
 12 9.40 44.0 31 49.05 31 33.95 50.70 33 31.9
 10 38.95 50 59.30 57 14.80 50.765 49 19.45
 54.14 48.96 53 55 9.31 58 14.41 55.96 52 53 29.46
 +27.44 +25.08 +16.91 -22.41 +14.41
 57 6.64 14 12.8 58 30.69 54 30.6 16 39.97 52 44.41
 26.62 14 24.5 +12.49 +12.48 +12.21 +12.87 +11.86 +10.48

Dec 26 2 2 4 18.0 7 33.0 19 57.3 22 7.7
 34.0 53.7 21.4 36.4 54.8 11.1
 37.4 57.5 25.0 40.1 58.3 14.5
 41.0 0.7 28.5 43.8 1.7 17.9
 44.6 4.4 32.1 47.5 51.4 21.4
 48.0 7.9 40.16 7 40.16 19 58.30 22 14.52
 -5 13.21 13.21 -5 14.42 5 14.42 -5 13.22 -5 14.46 -5 13.22 -5 14.43 -5 13.23 -5 14.39
 -121 -121 -120 -124 -121 -116
 57 26.58 46.42 -13.11 99 59 10.51 2 25.81 31.58 17 0.10
 -67.4 -67.4 -6.73 -6.73 -6.87 -6.87 -16 53.19
 57 19.88 39.71 -13.11 99 59 37.8 13.09 2 18.94 26.68 16 53.19
 -42.99 -42.99 -42.75 -42.75 -13.22 -39.33
 9.3 9.0 9.5 9.0 9.6 7.0

54.8 2 13.0 3 41.7 6 35.7 18 59.3 21 24.1
 2.5 21.1 48.7 42.5 2.6 28.3
 9.5 28.3 53.7 51.1 5.8 30.7
 8.6 34.0
 11.1 54.9 34.0 36.4 52 53 43.36
 2 2.27 20.80 -39 -42 3 45.03 -36 6 43.10 -83 19 54.8 -72 21 30.70 -50
 +38.73 +40.04 -46 -44 +36.32 -40 +57.06 -42 +52.82 -68 +43.82 -84
 1.58 805 1.60 249 +12.83 +12.83 1.56 785 +12.47 1.75 63.3 +13.59 1.72 28.0 +12.75 1.64 16.7 +11.35
 9.76 660 9.76 660 +29 +29 9.77 20.8 +28 9.76 20.8 +31 +31 9.76 20.8 +29 1.52 87.7 +31.4
 1.44 972 1.47 516 -33.5 -33.5 30 1.44 40.1 -33.6 30 1.62 18.9 -33.4 15 1.59 65.2 -31.9 30 1.52 87.7 -31.4
 12 -0.87 2 5.1 55.1 56.58 7.84 47.5 55 12.51 53.9 55 22.64 3 0.4 9 14.00 3 43.8 53 22.94
 11.4 1.6 55.1 59.0 6.0 2.5 39.34
 18 320 33 48.15 -30 43.4
 4 40.75 49 0.20 52 53 9.60
 54 8 54.58 +37.76
 +39.49
 14 23.52 8 24.2 16 40.02 53 49.4

8	50° 24'	201	50° 13'	100	51° 24'	232	54° 11'	79	51° 6'	33
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23	23	$+8.41 + 8.55$	$+7.67$	$+9.51$	38	38	$+11.41 + 12.05$	$+8.46$
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1134 198.84 28 55.34 29 46.16 38 7.58 10.98 39 39.78

17	5768	618	1290	23	4168	24	3244	32	5712	5712	367	34	2607
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-1290
 2815

$\frac{22}{500}$	$\frac{23}{332}$		$28 \quad 3.7$		$29 \quad 29.7$		$37 \quad 37$ $48 \quad 460$		$38 \quad 56.7$
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50 25 1845 35.73	50 15 1570	51 29 3199	54 12 4184 15.79	39 3 518
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108961	120222	+19	+19	456450	+	19	979431	+	22	139914	119943	+29	+29	979762	+	2
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1	52.4	6.70	12	10.65	58	33.15	11	56.25	56.25	19	13.60
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$$+ 1229 - 1573$$

46.56	34.6				36.18	22.0	
~~1846.18~~		+7.68		+9.79		+11.63 + 12.21	+9.02

[illegible]

23 11.86 20.32 -5 14.28 28 55.88 32.4 38 8.14 71.36 39 40.540
-5 13.23 13.23 -5 14.28 -5 13.23 -5 14.27 35.6 -5 13.24 13.24 -5 14.28 -5 14.25 15 13.24 -5 14.23

$17.538 - 6.04 = 11.498$
 $-670 - 670 = -1340$
 $-39.10 - 677 = -716.10$
 $12.95 - 110 = 12.05$
 $-725 - 725 = -1450$
 $-36.09 - 697 = -423.09$

77	95	112.90	24	26.09	13.07	8.6
		39.15			26.09	
	89		93			

38.1	56.4	29	44.3	12.2	52.3	57	50.
12.7	1.7	7.4	49.1	18.8	59.5		55.3

30 25 1001	50 15 1513	51 29 5276	38 34 12 43 25 15 01	51 8
123 13 127	20 9 28 660	20 37 10 30 023	63 - 3	30 5583

[illegible]

360	162	5570	1860	25.9		7.2		52.1	52.1		96.2	52.1
nd + 1	360	CRW-#	12	2230	57	3.70		14	5105	5105	18	32.60

$- \frac{1}{2} \times 76$	$+ 39.68$	$- 1.29$	$+ 86.55$	$- 12.78$
---------------------------	-----------	----------	-----------	-----------

17 37.98	24 16.8	23 21.89	14 14.6		32 32.75	11 49.1	34 5.89	7 14.0
46.14	34.4				35.99	21.4		

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Dec 23, Dec 26

[illegible]

+13.10

 $+12.89$

+13.34

+9.27

 $+10.19$

17 4.8 8.1 14.8 15.7 18.9	33 48.5 52.2 55.8 59.4 63.3	42 15.5 19.1 22.6 26.0 29.6	52 23.3 28.4 32.3 36.0 39.9	2 26.0 29.0 32.0 35.0 38.5	32.7 32.3 32.8
17 11.86 -5 12.49 -5 13.95 - 14.6 11 57.91 - 78.6	33 55.54 -5 55.54 -5 13.94 - 14.4 28 41.98 - 8.02	42 22.56 -5 12.57 -5 13.97 - 14.6 37 8.59 - 8.03	52 32.18 -5 12.53 -5 13.84 - 1.31 57 18.34 - 7.93	2 32.76 -5 12.53 -5 13.84 - 1.31 57 18.98 - 7.92	32.7 32.3 32.8 5 13.84 76 16.35
11 50.05 - 14.32 - 27.42	28 33.98 - 14.43 - 23.43	37 4.56 - 14.57 - 21.36	57 10.41 - 14.16 - 16.35	57 10.84 - 14.17 - 16.35	9.0 9.0 9.0

16 24.5	33 13.0	41 35.5	1 33.4	2 2.2
29.1	21.5	39.7	39.3	8.4
36.4	28.0	43.0	46.8	13.4
30.00	20.83	48.5		
54 59 47.52	54 39 53.92 ⁹	55 0 48.54	52 3 56.54	52 0 42.28
16 30.00	33 22.83	41 41.68	1 39.83	2 8.00
+ 41.86	+ 35.01 ¹⁰	+ 52	+ 32.35	+ 24.76 ⁶⁰
1.62 18.0	+ 13.82	1.54 41.93 ³¹	+ 13.83	1.71 8.92
9.75 8.77	+ 31	9.76 23.6	+ 31	9.75 8.52
14.8 6.64	- 23.7	1.41 24.34	+ 31	24 9.15 9.52
25 38.1	59 36.92	39 45.78	36.1 0 42.08	3 39.3
44.9	33.1	43.4	46.5	49.61
24 41.50	47 30.30	26 39.75	23 42.90	26 35.53
55 6.85	35 18.05	56 8.60	59 3.45	55 56 12.80
54 59 16.86	54 39 28.06	55 0 18.61	52 3 15.46	52 0 22.81
+ 30.66	+ 25.86	+ 29.93	+ 41.08	+ 19.47
11 35.73	59 9.5	28 19.56	39 22.4	36 45.99
0 20.7	56 56.25	3 93.3	56 56.67	0 4.8

Dec 26

+13.12-		+13.27		+12.98-		+10.20		+10.03	
17 5.2	33 49.5	42 16.0	5 2 23.8	2 51.7					
8.9	~~55.4~~	19.5	29.5	53.3					
12.1	56.8	23.4	32.8	58.5					
16.0	0.4	27.0	36.0	6.8					
19.4	3.9	30.3	39.7	4.8					
19 12.32	33 56.50 92	42 23.24	52 32.96	2 58.42					
-5 13.26 -5 14.30	-5 13.27 -5 14.30	-5 13.28 -5 14.52	-5 13.31 -5 14.42	-5 13.31 -5 14.42					
124	123	124	111	111					
11 57.53	28 42.30 22	37 8.72	57 18.34	57 44.00 v					
7.5	-8.21	-8.24	-7.95	-7.94					
11 49.97	28 34.28 1	37 0.68	57 10.39	57 36.06					
9.1	9.2	9.5	9.5	8.6					

16 18.9 26.4 33.9	33 34.8 41.8 47.7	41 17.8 24.7 31.0	2 10.8 15.8 23.2	3 13.7 20.4 27.7
+ 22				
54 59 46.19	54 39 53.46	55 0 49.61	52 3 56.98	51 58 35.51
16 26.40 + 45.92 1.66 2.00 9.78 8.77 26.15 26.84	33 41.43 - 54 + 59 + 13.72 + 31 - 24.3	41 24.50 - 88 - 40 + 13.73 + 31 - 20.3	2 16.60 - 7 + 16.16 + 10.51 + 24 - 16.7	3 20.60 - 13 - 22.18 + 10.38 + 24 - 16.7
41.7 48.1	39 35.31	47.8 54.5	0 42.29	3 50.48
27 44.90 155 34.5 54.59 12.85 + 33.64	47 15.70 35 32.5 54.29 42.05 + 11.35	26 51.15 55 57.20 55.0 6.60 + 43.01	23 13.45 59 34.90 52.3 44.30 + 12.68	28 4.80 54 42.55 57.58 52.95 - 17.44
11 35.65 59 7.9	28 19.78	39 21.5	36 46.11	0 20.9
			56 56.23	3 34.1
				57 21.89
				58 12.5

1878-9 Dec 31, Jan 5 Obs H A R Rec W A R.

11

α	δ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ	μ	σ
22 36	21 31.7	2 33 4	9.4 31 59	2 45 43	8.8 44 318	3 14 8	8.5 12 5453	17 58	8.8 16 4943	23 17	9.1 22 74						
51 44	39.4 50 33	28.5 53 54	49.7 54 5	1.4 51 43	39.2 51 31	24.3											
Dec 31	+9.88	+8.13	+12.14	+12.17	+9.60												
28 18.2	38 45.6	51 25.1	19 49.8	29 16.0													
21.5	48.7	28.5	53.1	19.5													
24.7	52.0	32.0	56.4	22.9													
28.1	55.3	35.3	0.3	26.0													
31.6	58.6	39.0	3.8	29.4													
28 24.82	38 52.04	51 31.98	19 56.68	29 22.76													
-5 11.71	-5 11.71	-5 11.71	-5 11.71	-5 11.71													
1.13	1.09	1.23	1.29	1.12													
23 11.98	33 39.24	46 19.04	14 43.73	24 9.92													
-5.87	-5.87	-6.91	-6.91	-6.97													
23 6.91	33 33.26	46 12.63	14 36.82	24 2.93													
9.1	9.1	9.1	8.8	9.0													
27 37.3	38 1.5	50 35.9	19 5.1	28 41.0													
41.5	6.7	42.9	11.4	48.3													
44.4	12.7	51.0	18.1	53.9													
47.8																	
51.2																	
27 44.44	38 6.97	50 43.27	19 11.53	28 47.73													
+40.38	+45.07	+48.71	+45.15	+34.03													
1.60 61.7	+10.24	1.65 38.9	+12.65	1.54 44.4													
9.79 16.6	+23	9.80 27.6	+28	9.79 33.5													
1.50 38.4	+37.2	1.56 23.6	+35.60	1.44 33.6													
40	60	36.10 30	35.60 15	40													
$n = -0.89$	4.9	2.98	53.5	1.4													
$\mu = -23$	13.9	36.0	59.4	8.4													
+4' 9.88	41 38.95	30 18.95	51 31.95	30 40.30													
	51.45 48.83	50.24 25.3	33.55 41.83	51.34 53.18													
	+31.90	+36.55	+36.61	+37.79													
22 53.92	21 52.8	45 59.77	55 9.9	23 36.3													
45 46	+9.32	+7.50	+11.56	+11.34													
28 38.8	38 38.5	51 23.6	19 48.5	29 1.4													
20.3	41.8	26.8	52.0	4.7													
23.5	45.0	30.3	55.2	8.0													
26.8	48.0	34.0	58.9	11.3													
30.2	51.4	37.5	2.4	14.7													
28 53.56	38 44.94	51 30.44	19 55.40	29 8.02													
-5 10.57	-5 10.57	-5 10.57	-5 10.57	-5 10.57													
108	10.4	11.7	118	107													
23 11.91	33 33.33	46 18.70	14 43.65	23 56.37													
-1.71	-1.71	-2.03	-2.37	-2.38													
23 16.20	33 31.52	46 16.67	14 41.28	23 33.99													
8.4	8.9	8.7	8.6	8.8													
27 28	37 54.0	50 38.5	18 59.4	28 30.3													
34.3	2.7	42.0	6.7	37.0													
37.0	9.2	45.7	13.4	46.7													
40.2		48.9															
42.7																	
27 38.55	38 29.7	50 45.28	19 6.50	28 38.00													
+45.01	+41.97	+45.16	+48.90	+30.02													
1.65 33.1	+10.06	1.62 29.4	+12.44	1.47 71.2													
9.79 16.0	+23 +23	9.80 27.6	+28	9.79 33.5													
1.50 38.4	+37.2	1.56 23.6	+35.60	1.44 33.6													
40	60	36.10 30	35.60 15	40													
$n = -0.85$	4.9	2.98	53.5	1.4													
$\mu = -23$	13.9	36.0	59.4	8.4													
+4' 9.91	41 38.15	30 18.95	51 31.95	30 40.30													
	51 45 48.06	50 25 0.96	33.55 45.16	51 28 1.21													
	+35.56	+34.14	+33.94	+23.86													
	+36.30																
22 53.95	45 6.5	45 59.52	55 9.5	23 36.49													
23 15.70	45 1.2			27 24.0													

1878		Dec 31. 1879		Jan 5																	
α	δ	h	m	s	Mag.	h	m	s	Mag.	h	m	s	Mag.	h	m	s	Mag.				
		3	38	8	9.136 520	3	57	56	8.756 390	4	0	17	8.5	4	11	12	8.59 527				
		53	03		52 59.5	53	3		39.5	54	20		17.1	49	58		550				
					+10.59				+11.93				+12.85				+11.86				
		43	50.0			4	3	31.9		6	0.0					33	52.2				
		53.7						35.0			3.4					53.5					
		57.0						38.1			7.1					58.9					
		0.4						41.5			10.8					2.2					
		13.9						45.4			14.2					6.2					
		43	57.00			43	38.38			6	7.10					33	59.00				
		-5	11.72	-5	12.90	-5	11.72	-5	12.90	-5	11.72	-5	12.96			-5	11.73 -5 12.93				
			1.18				1.18				1.29						1.20				
		38	441.0				58	25.48			0	54.14				28	46.07				
		-7.18					-7.43				-7.62					-7.85					
		38	36.92			38	18.05		-13.76		0	46.52				28	35.22				
									-30.51								-14.21				
																	-23.43				
		9.0				9.5				8.9						8.6					
		43	9.5			3	48.4			5	15.4					33	1.4				
		14.3					53.7				21.3					7.8					
		21.7					0.2				29.1					14.3					
					+12																
		53	3	47.2		53	1	32.76		54	21	38.59				53	32 10.56				
		43	15.17			43	3	52.10		5	21.93					33	7.83				
		+41.83					-101	-15.72			+45.17					+51.17	-68				
		1.62	14.9				+11.68	1.96	4.5		+13.18					1.70	9.02				
		4.77	8.4				+26	4.77	9.13		+29					4.99	4.05				
		20.50	6.52				+26.80	5	1.52	6.46		-26.60	85			5.58	9.14				
		4	22.3			2	45.82		9.7	1	17.89		49.8	21	24.84	3	22.8				
		28.9					17.1				56.7		48.8			48.8	32 0.02				
		24	25.60			25	13.40			5	53.25		38	47.25		55	26.50				
		58	22.75				57	34.95			16	55.10				27	2.85				
		53	2	32.68		53	1	44.23		54	21	47.8				53	31 31.23				
							-12.97				+53.61						+38.83				
		38	23.36			58	4.29	56	39.5	0	32.46	20	54.9			9	59.7				
							0	47.4	490							550	550				
									410.61								28	24.01			
																	31	36.6			
		43	48.6			4	3	37.0		5	59.0			16	44.3	16	53.5				
		52.4						40.5			2.4				47.8		58.5				
		55.6						44.0			5.8				50.7		1.9				
		59.0						47.5			9.3				53.8		5.0				
		2.4						51.0			13.0				57.2		8.5				
		43	55.60			43	44.00			5	5.90			16	50.8	14	18.8				
		-5	10.58	-5	11.71	-5	10.58	-5	11.71	-5	10.58	-5	11.76	-5	10.58	-5	11.59				
			1.13				1.13				1.18				1.01		1.01				
		38	43.89				58	32.29			0	54.14			11	39.19	06				
		-2.59					-2.83				-2.88				-2.78		11	50.29			
		38	41.30			38	29.46			0	57.26			11	36.44		-2.78				
															-17.95		-17.95				
															-26.56		-36.56				
		9.0				8.5				8.6				9.0		8.5					
		43	10.5			3	53.5			5	45.0			17	41.7	16	7.3				
		17.7					57.0				57.2				45.4		14.5				
		25.5					0.1				59.3				48.8		21.4				
							2.6								52.2						
		53	3	49.9		53	1	52.53	14.15	54	21	40.03		55.3	48.68	49	58	10.33			
		43	17.90			43	3	59.92		5	51.83			5	78.7	15.47	17	48.68			
		+34.70					-38	-15.92			+14.07				+35.47	58.03	87	44	46.80		
		1.57	6.34				+11.49	1.20	14.4		+11.57	1.14	8.29		+12.94	1.55	2.77	+8.15	1.67	0.25	
		1.46	137				+26	9.78	06.3		+26	9.76	55.4		+29	9.80	8.37	+18	9.80	8.37	
		20	55.00				-18.00	30	1.08	6.4		-17.00	5	1.01	9.90		-16.00	25	1.54	6.39	
		4	20.2			2	55.50	3	28.8	53	77.6	0	25.8	21	35.24	3	45.7	58	37.16	3	45.7
		25.9						34.9			31.6				45.8		57	13.57	58	39.97	
		24	23.10			33	31.85			5	28.70			28	47.25		28	47.25			
		58	25.25				49	16.50			17	19.65			54	11.10		54	11.10		
		53	2	35.16		52	53	26.41		54	21	29.56			49	58	11.01		49	58	11.01
							-12.26				+10.47				+29.32		+35.43				
															-47.65						
		8.5																			
		38	23.22			2	9.0	58	11.08	52	27.2	0	32.50	20	55.3	11	18.33	56	37.0	11	24.56

1878. Dec 31. Jan 5. 1879.

h m s mag. h m s mag. h m s mag. h m s mag.
 α 4 36.28 9.8 35.89 4 56.11 9.2 54.524 5 7 13 8.8 5 52.1 5 12.33 9.4 11 11.6
 δ 55° 0' 57.9 54° 10' 8.3 53° 33' 30.6 53° 42' 40.2

Dec. 31

+13.22

+12.11

+12.20

41 43.7 5 1 43.4 12 57.4 18 18.0
 47.2 47.0 0.9 20.8
 50.7 50.5 4.3 24.7
 54.5 52.1 7.5 28.0
 58.0 58.0 13 11.4 31.5
 41 50.82 51 50.54 12 4.90 18 24.60
 -5 11.73 -5 12.97 -5 11.73 -5 12.94
 -1.27 -1.24 -1.20 -1.21
 36 37.82 56 37.57 7 51.37 13 11.66
 -8.13 -9.89 -8.23 -8.30
 36 29.69 56 29.70 7 43.14 13 3.36
 -14.50 -13.65 -14.56 -12.30
 9.1 8.3 8.7 9.3

41 50.2 1 28.5 12 13.5 17 30.8
 11.9 35.2 19.9 35.2
 18.7 42.2 26.1 43.4
 55 2 7.29 53 32 26.82 53 42 21.61
 42 6.93 1 35.30 12 19.83 17 36.47
 -16.11 -106 +15.24 -52 +48.13
 1.20 7.10 +15.92 1.18 29.8 +1226 1.68 24.2
 9.75 8.23 +31 9.77 40.5 +27 9.77 23.3
 1.07 14.0 -21.30 -17.60 5.5 1.52 8.19 -16.00 1.56 0.82
 21 86.8 1 59.21 0 2.3 32 22.93 0 10.2 42 18.71
 41.5 8.0 5.0 16.8
 24 39.15 53 5.15 45 13.00
 58 9.20 27 43.20 37 35.35
 55 2 19.08 53 31 53.08 53 41 46.83
 -11.79 +33.74 +36.38

1879

Jan 5

+13.20

+8.81

+11.07

41 21.7 5 1 40.3 18 16.3
 25.5 43.9 20.1 12.11
 29.2 47.5 23.1
 32.7 51.0 26.5
 36.4 54.9 30.2
 41 29.10 51 47.62 18 23.24
 -5 10.59 -5 11.81 -5 10.59 -5 11.75
 -1.22 -1.18 -1.16
 36 17.29 56 38.75 13 11.49
 -3.24 -3.19 -3.45
 36 14.05 56 32.32 13 8.04
 -19.42 -16.40
 9.0 7.7 9.2

40 56.5 1 19.2 17 37.8
 4.24 25.3 45.3
 10.1 21.0 50.9
 54 56 20.56 22.5 51 15 54.8 53 42 21.81
 41 3.60 -16 1 25.77 -13
 +25.50 -21 +25.77 22.35 -48
 1.40 6.54 +13.61 1.34 9.28 +9.55
 9.75 9.31 +.31 9.76 6.60 +.22
 30 9.75 9.31 -15.80 10.72 2.95 -12.90
 0 54.0 56 18.76 23 6.8 15 14.9
 58.8 11.1 4 3.78
 30 56.40 123 18.95 45 5.60
 51 51.95 749 39.40 37 42.45
 54.56 1.86 54 14 49.31 53 41 52.66
 +18.70 +16.67 +29.15
 +18.56
 56 13.15 13 41.8 12 48.62 42 5.6

1878phae.proj.1.1609

1879 Jan 6, Jan 20, Jan 23 Obs. W.A.R. Ric. W.A.R.

h m s mag. h m s mag. h m s mag. h m s mag.

1 54 12 9.0 56 120 3 14 58 8.8 16 49.4 3 23 14 9.1 22 7.4 3 57 56 8.4 56 390

53 59' 545 51 53' 39.2 51 31' 243 53 3' 52 395

Jan 6 Jan 20 Jan 6 Jan 20 Jan 20 Jan 20

1 2 41.8 45.0 48.7 52.4 56.0 2 48.78 5 10.51 106 57 37.21 57 36.58 9.1 2 4.0 12.8 19.7 2 12.17 36.61 1.56 360 9.76 922 10.14 3889 4 40.0 46.1 24 43.05 24 53.0 54 2 16.13 57 22.46 1 15.0 24 2 56.2 3 59.6 3.2 6.4 9.5 25 2 96 5 14.85 105 19 47.06 19 45.06 24 22.93 40.05 1.60 260 9.79 947 36 1.49 926 3 25.9 36.1 33 31.00 49 17.5 51 53 26.99 19 27.62 52 55.0 28 8.4 12.0 15.2 18.4 21.5 27 15.10 56.84 10.53 5 11.50 13.54 5 14.70 13.54 5 14.70 27 33.5 38.0 44.3 27 38.60 21.06 1.32 346 9.79 939 56 12.35 26 36.80 51 30 47.21 58 4.18 0.43.0 28 12.2 15.7 19.0 22.4 25.5 28 18.60 70 14.85 5 15.88 1.03 22 44.52 22 42.77 28 24.0 26.7 30.0 32.7 37.0 51 31 4.84 28 30.08 29.38 1.46 806.2 9.79 939 33 68.23 23.9 35.7 55 29.80 27 18.55 51 31 28.19 22 25.29 30 2.2 28 31.2 37.8 42.0 28 37.00 40.16 1.60 379.2 9.79 939 55 23.45 27 24.90 51 31 35.73 31.91 56 12.35 26 36.80 51 30 47.21 58 4.18 0.43.0 28 12.2 15.7 19.0 22.4 25.5 28 18.60 70 14.85 5 15.88 1.03 22 44.52 22 42.77 28 24.0 26.7 30.0 32.7 37.0 51 31 4.84 28 30.08 29.38 1.46 806.2 9.79 939 33 68.23 23.9 35.7 55 29.80 27 18.55 51 31 28.19 22 25.29 30 2.2

56.30

52.5

11.67

88

7.4

9

0.8

0.3

9.85

14.75

10

53

18.35

40.68

-26.9

1.3118

-1

-0.9

+1.176

+27

-17.10

23.75

64

43.0

11.34

-15.93

18.35

40.68

-16

1.3523

-7

-13

+11.43

+27

-19.46

27.19

64

46.6

1879	Jan. 20.	Jan. 22.	Jan. 23	Obs. H. A. R. Rec. J. Inc.	15
α	3.58.6	3.58.7	3.58.9	3.58.14	3.58.14
δ	54.56	54.58	54.56	54.56	54.56
Jan 20	54.58	54.58	54.58	54.58	54.58
4 5	10.0	10.0	10.0	10.0	10.0
5	13.0	13.0	13.0	13.0	13.0
6	16.0	16.0	16.0	16.0	16.0
7	19.7	19.7	19.7	19.7	19.7
8	22.9	22.9	22.9	22.9	22.9
9	26.3	26.3	26.3	26.3	26.3
10	29.8	29.8	29.8	29.8	29.8
11	33.3	33.3	33.3	33.3	33.3
12	36.8	36.8	36.8	36.8	36.8
13	40.3	40.3	40.3	40.3	40.3
14	43.8	43.8	43.8	43.8	43.8
15	47.3	47.3	47.3	47.3	47.3
16	50.8	50.8	50.8	50.8	50.8
17	54.3	54.3	54.3	54.3	54.3
18	57.8	57.8	57.8	57.8	57.8
19	61.3	61.3	61.3	61.3	61.3
20	64.8	64.8	64.8	64.8	64.8
21	68.3	68.3	68.3	68.3	68.3
22	71.8	71.8	71.8	71.8	71.8
23	75.3	75.3	75.3	75.3	75.3
24	78.8	78.8	78.8	78.8	78.8
25	82.3	82.3	82.3	82.3	82.3
26	85.8	85.8	85.8	85.8	85.8
27	89.3	89.3	89.3	89.3	89.3
28	92.8	92.8	92.8	92.8	92.8
29	96.3	96.3	96.3	96.3	96.3
30	99.8	99.8	99.8	99.8	99.8
31	103.3	103.3	103.3	103.3	103.3
32	106.8	106.8	106.8	106.8	106.8
33	110.3	110.3	110.3	110.3	110.3
34	113.8	113.8	113.8	113.8	113.8
35	117.3	117.3	117.3	117.3	117.3
36	120.8	120.8	120.8	120.8	120.8
37	124.3	124.3	124.3	124.3	124.3
38	127.8	127.8	127.8	127.8	127.8
39	131.3	131.3	131.3	131.3	131.3
40	134.8	134.8	134.8	134.8	134.8
41	138.3	138.3	138.3	138.3	138.3
42	141.8	141.8	141.8	141.8	141.8
43	145.3	145.3	145.3	145.3	145.3
44	148.8	148.8	148.8	148.8	148.8
45	152.3	152.3	152.3	152.3	152.3
46	155.8	155.8	155.8	155.8	155.8
47	159.3	159.3	159.3	159.3	159.3
48	162.8	162.8	162.8	162.8	162.8
49	166.3	166.3	166.3	166.3	166.3
50	169.8	169.8	169.8	169.8	169.8
51	173.3	173.3	173.3	173.3	173.3
52	176.8	176.8	176.8	176.8	176.8
53	180.3	180.3	180.3	180.3	180.3
54	183.8	183.8	183.8	183.8	183.8
55	187.3	187.3	187.3	187.3	187.3
56	190.8	190.8	190.8	190.8	190.8
57	194.3	194.3	194.3	194.3	194.3
58	197.8	197.8	197.8	197.8	197.8
59	201.3	201.3	201.3	201.3	201.3
60	204.8	204.8	204.8	204.8	204.8
61	208.3	208.3	208.3	208.3	208.3
62	211.8	211.8	211.8	211.8	211.8
63	215.3	215.3	215.3	215.3	215.3
64	218.8	218.8	218.8	218.8	218.8
65	222.3	222.3	222.3	222.3	222.3
66	225.8	225.8	225.8	225.8	225.8
67	229.3	229.3	229.3	229.3	229.3
68	232.8	232.8	232.8	232.8	232.8
69	236.3	236.3	236.3	236.3	236.3
70	239.8	239.8	239.8	239.8	239.8
71	243.3	243.3	243.3	243.3	243.3
72	246.8	246.8	246.8	246.8	246.8
73	250.3	250.3	250.3	250.3	250.3
74	253.8	253.8	253.8	253.8	253.8
75	257.3	257.3	257.3	257.3	257.3
76	260.8	260.8	260.8	260.8	260.8
77	264.3	264.3	264.3	264.3	264.3
78	267.8	267.8	267.8	267.8	267.8
79	271.3	271.3	271.3	271.3	271.3
80	274.8	274.8	274.8	274.8	274.8
81	278.3	278.3	278.3	278.3	278.3
82	281.8	281.8	281.8	281.8	281.8
83	285.3	285.3	285.3	285.3	285.3
84	288.8	288.8	288.8	288.8	288.8
85	292.3	292.3	292.3	292.3	292.3
86	295.8	295.8	295.8	295.8	295.8
87	299.3	299.3	299.3	299.3	299.3
88	302.8	302.8	302.8	302.8	302.8
89	306.3	306.3	306.3	306.3	306.3
90	309.8	309.8	309.8	309.8	309.8
91	313.3	313.3	313.3	313.3	313.3
92	316.8	316.8	316.8	316.8	316.8
93	320.3	320.3	320.3	320.3	320.3
94	323.8	323.8	323.8	323.8	323.8
95	327.3	327.3	327.3	327.3	327.3
96	330.8	330.8	330.8	330.8	330.8
97	334.3	334.3	334.3	334.3	334.3
98	337.8	337.8	337.8	337.8	337.8
99	341.3	341.3	341.3	341.3	341.3
100	344.8	344.8	344.8	344.8	344.8
101	348.3	348.3	348.3	348.3	348.3
102	351.8	351.8	351.8	351.8	351.8
103	355.3	355.3	355.3	355.3	355.3
104	358.8	358.8	358.8	358.8	358.8
105	362.3	362.3	362.3	362.3	362.3
106	365.8	365.8	365.8	365.8	365.8
107	369.3	369.3	369.3	369.3	369.3
108	372.8	372.8	372.8	372.8	372.8
109	376.3	376.3	376.3	376.3	376.3
110	379.8	379.8	379.8	379.8	379.8
111	383.3	383.3	383.3	383.3	383.3
112	386.8	386.8	386.8	386.8	386.8
113	390.3	390.3	390.3	390.3	390.3
114	393.8	393.8	393.8	393.8	393.8
115	397.3	397.3	397.3	397.3	397.3
116	400.8	400.8	400.8	400.8	400.8
117	404.3	404.3	404.3	404.3	404.3
118	407.8	407.8	407.8	407.8	407.8
119	411.3	411.3	411.3	411.3	411.3
120	414.8	414.8	414.8	414.8	414.8
121	418.3	418.3	418.3	418.3	418.3
122	421.8	421.8	421.8	421.8	421.8
123	425.3	425.3	425.3	425.3	425.3
124	428.8	428.8	428.8	428.8	428.8
125	432.3	432.3	432.3	432.3	432.3
126	435.8	435.8	435.8	435.8	435.8
127	439.3	439.3	439.3	439.3	439.3
128	442.8	442.8	442.8	442.8	442.8
129	446.3	446.3	446.3	446.3	446.3
130	449.8	449.8	449.8	449.8	449.8
131	453.3	453.3	453.3	453.3	453.3
132	456.8	456.8	456.8	456.8	456.8
133	460.3	460.3	460.3	460.3	460.3
134	463.8	463.8	463.8	463.8	463.8
135	467.3	467.3	467.3	467.3	467.3
136	470.8	470.8	470.8	470.8	470.8
137	474.3	474.3	474.3	474.3	474.3
138	477.8	477.8	477.8	477.8	477.8
139	481.3	481.3	481.3	481.3	481.3
140	484.8	484.8	484.8	484.8	484.8
141	488.3	488.3	488.3	488.3	488.3
142	491.8	491.8	491.8	491.8	491.8
143	495.3	495.3	495.3	495.3	495.3
144	498.8	498.8	498.8	498.8	498.8
145	502.3	502.3	502.3	502.3	502.3
146	505.8	505.8	505.8	505.8	505.8
147	509.3	509.3	509.3	509.3	509.3
148	512.8	512.8	512.8	512.8	512.8
149	516.3	516.3	516.3	516.3	516.3
150	519.8	519.8	519.8	519.8	519.8
151	523.3	523.3	523.3	523.3	523.3
152	526.8	526.8	526.8	526.8	526.8
153	530.3	530.3	530.3	530.3	530.3
154	533.8	533.8	533.8	533.8	533.8
155	537.3	537.3	537.3	537.3	537.3
156	540.8	540.8	540.8	540.8	540.8
157	544.3	544.3	544.3	544.3	544.3
158	547.8	547.8	547.8	547.8	547.8
159	551.3	551.3	551.3	551.3	551.3
160	554.8	554.8	554.8	554.8	554.8
161	558.3	558.3	558.3	558.3	558.3
162	561.8	561.8	561.8	561.8	561.8
163	565.3	565.3	565.3	565.3	565.3
164	568.8	568.8	568.8	568.8	568.8
165	572.3	572.3	572.3	572.3	572.3
166	575.8	575.8	575.8	575.8	575.8
167	579.3	579.3	579.3	579.3	579.3
168	582.8	582.8	582.8	582.8	582.8
169	586.3	586.3	586.3	586.3	586.3
170	589.8	589.8	589.8	589.8	589.8
171	593.3	593.3	593.3	593.3	593.3
172	596.8	596.8	596.8	596.8	596.8
173	600.3	600.3	600.3	600.3	600.3
174	603.8	603.8	603.8	603.8	603.8
175	607.3	607.3	607.3	607.3	607.3
176	610.8	610.8	610.8	610.8	610.8
177	614.3	614.3	614.3	614.3	614.3
178	617.8	617.8	617.8	617.8	617.8
179	621.3	621.3	621.3	621.3	621.3
180	624.8	624.8	624.8	624.8	624.8
181	628.3	628.3	628.3	628.3	628.3
182	631.8	631.8	631.8	631.8	631.8
183	635.3	635.3	635.3	635.3	635.3
184	638.8	638.8	638.8	638.8	638.8
185	642.3	642.3	642.3	642.3	642.3
186	645.8	645.8	645.8	645.8	645.8
187	649.3	649.3	649.3	649.3	649.3
188	652.8	652.8	652.8	652.8	652.8
189	656.3	656.3	656.3	656.3	656.3
190	659.8	659.8	659.8	659.8	659.8
191	663.3	663.3	663.3	663.3	663.3
192	666.8	666.8	666.8	666.8	666.8
193	670.3	670.3	670.3	670.3	670.3
194	673.8	673.8	673.8	673.8	673.8
195	677.3	677.3	677.3	677.3</	

1879

Jan 20, Jan 22, Jan 23.

h m s mag.
 4 56.41 9.3 55.262
 52° 3' 1.7

h m s mag.
 5 7.13 8.8 5
 53° 33' 30.6

Jan 22

h m s mag.
 4 56.13 8.5
 52° 30'

Jan 20

5 2 260
 298
 333
 360
 398

+10.00

Jan 22

5 2 26.533.29
 30.633.94
 35.245.20

+89.9

Jan 20

12 59.0
 3.7
 6.2
 9.5
 13.1

+11.91

Jan 22

12 59.8
 3.3
 6.8
 10.4
 13.8

+11.64

2 3298
 -5 13.51 -5 14.69
 118
 57 18.29
 -313
 57 15.16

-18.89
 -21.80

2 3414
 -5 14.30 -5 15.58
 128
 57 18.56
 -311
 57 15.45

13 6.10
 -5 13.50 -5 14.74
 124
 7 57.36
 -331
 7 48.05

-1934
 -18.20

13 6.82
 -5 14.30 -5 15.65
 135
 7 51.17
 -328
 7 47.89

-1934
 -18.70

12 9.4
 16.2
 22.4

20.0
 32.8
 87.3

92
 2 44.3
 50.1
 54.2

52 4 0.27
 -26

93
 2 40.0
 47.4
 54.6

52 4 6.93
 +.02

85
 12 16.1
 21.5
 27.4

53 32 29.98
 -26

86
 12 9.4
 16.2
 22.4

53 32 30.55
 +.02

2 49.53
 -16.55
 1.21880
 9.78869
 2011368
 2 43.5
 49.1
 22 46.30
 0 2.05
 52 4 13.26
 -12.99

52 4 0.27
 -26
 8
 -64
 +10.78
 +25
 -15.20
 3 55.07
 36.2
 46.3
 0 7.10
 52 4 17.28
 -10.35

2 47.33
 -13.19
 1.12024
 9.78869
 2011368
 2 43.5
 49.1
 22 46.30
 0 7.10
 52 4 17.28
 -10.35

52 4 6.93
 +.02
 5
 -62
 +10.39
 +25
 -15.40
 4 1.52
 0.7
 5.9
 53 31 56.26
 +33.72

12 21.67
 -52
 +44.43
 1.64768
 9.77405
 2011368
 2 43.5
 49.1
 22 46.30
 0 7.10
 52 4 17.28
 -10.35

53 32 29.98
 -26
 52
 +50.82
 1.70603
 9.77405
 2011368
 2 43.5
 49.1
 22 46.30
 0 7.10
 52 4 17.28
 -10.35

53 32 30.55
 +.02
 52
 +50.82
 1.70603
 9.77405
 2011368
 2 43.5
 49.1
 22 46.30
 0 7.10
 52 4 17.28
 -10.35

53 32 30.55
 +.02
 52
 +50.82
 1.70603
 9.77405
 2011368
 2 43.5
 49.1
 22 46.30
 0 7.10
 52 4 17.28
 -10.35

53 32 30.55
 +.02
 52
 +50.82
 1.70603
 9.77405
 2011368
 2 43.5
 49.1
 22 46.30
 0 7.10
 52 4 17.28
 -10.35

56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

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7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

7 28.55 32 9.1

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7 28.55 32 9.1

56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

7 28.55 32 9.1

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7 28.55 32 9.1

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7 28.55 32 9.1

7 28.55 32 9.1

56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

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56 56.27 3 33.3

7 28.71 32 9.0

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56 56.27 3 33.3

7 28.71 32 9.0

7 28.55 32 9.1

7 28.55 32 9.1

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7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

7 28.55 32 9.1

1879 Jan. 25, Jan. 26 Obs. W. A. R. Rec. J. L. M.

α 3 23 7 90 21 550 3 38 12 6.4 37 16 4 56 10 8.6 54 52 55 49 4 9.6 47 45.2
 8 51 3' 49 59 49 58' 543 52 50' 480 52 40' 39.9
 0 2.50 50 55 9.8 46.5 9.0

Jan 25

28 28 43 43 5 2 2
 15.71 9.3 22.6 94.0 59.0 2.3 16.5 54 52.7 59.57 16.2
 41 12.4 26.0 37.1 2.2 5.7 19.9 55.2 58.62
 60 15.6 29.2 40.2 5.5 8.9 23.2 57.8 57.80
 79 19.0 32.0 43.4 8.5 12.6 26.7 3.2 56.31
 85.7 46.8 11.8 16.0 30.2

28 15.68 29.10 43 40.30 45.40 2.2 9.10 23.30 54 58.06
 -5 16.27 16.27 -5 17.25 16.27 -5 17.25 16.27 -5 17.36 -5 17.36
 22 58.43 11.86 38 23.05 48.15 56 51.74 57.59 4 -19.08 49 40.71
 -1.98 -1.98 -2.15 -2.15 -2.78 -2.78 -21.96 3.20
 22 56.45 9.88 38 20.90 46.00 -17.48 56 48.96 3.16 -19.08 49 37.51
 -46.44 -17.48 -46.44 53 53 -21.96

8.4 9.0 9.2 8.0 17.48 46.44 53 53 9.2
 27 28 42 44 1 14.9 1 48.4 54 14.0
 48.8 57.0 58.0 21.3 20.8 55.4 19.0
 53.9 54.6 3.0 26.2 27.4 1.3 24.2
 0.6 21.4 9.7 32.0

27 54.43 57.00 43 35.7 26.50 1 21.03 55.03 54 19.07
 +21.25 22.90 +36.73 21.10 +48.07 28.30
 1.32 7.36 1.44 5.60 1.56 5.02 1.32 4.8
 9.80 7.16 9.80 7.01 9.80 7.22 9.80 8.22 9.80 7.03 9.80 7.45
 1.24 0.26 1.33 8.80 2.47 9.93 2.52 8.02 1.56 7.03 1.33 9.45
 0 34.6 49.3 15.5 2 15.3 46.7 4 14.6
 47.0 21.2 27.3 26.8 1.4 26.9
 20 40.50 15.25 28 21.40 21.05 36 55.05 20.75 46 41.20
 2 7.55 33.10 34 26.9 55 27.30 45 53.30 38 27.60
 50.6 17.49 7.48 0.4 49.58 36.8 9.7 37.24 55.0 32.4 17.7 5.4
 +17.41 -22.85 +8.016 -17.33 +37.07 +21.85 52.40 17.09

n = -82

Rm = -23

+4 9.94

84

19.91-7

Jan 26

28 28 43 43 42 43
 15.4 53.2 34.9 59.8
 48.4 2.0 37.9 2.9
 51.8 5.0 41.2 6.0
 55.5 8.7 44.4 9.6
 58.7 12.0 47.6 12.4

28 57.96 5.18 43 41.20 46.14
 -5 17.15 17.15 -5 18.15 18.15 -5 18.15 -5 18.15
 -1.00 -1.00 -1.00 -1.00
 23 33.81 47.03 38 23.05 47.99 -17.48 -46.44
 -1.96 -1.96 -2.13 -2.13 -17.48 -46.44
 22 31.85 45.07 38 20.92 45.86

4.0 9.5 9.2 7.8 8.4 8.5 6.7
 28 29 42 43 42 43
 52.3 26.0 47.0 11.9
 56.7 31.9 49.5 16.4
 36.8 51.4 22.7

28 54.50 31.57 42 49.30 17.00
 -2.54 -26.39 +51.90 +49.14
 0.40 48.3 14.21 44 1.71 51.7 1.69 14.4
 9.80 7.01 9.80 6.66 9.80 8.22 9.80 8.22 9.80 7.03 9.80 7.45
 0.31 80.3 1.33 15.49 2.5 2.5 1.60 5.85
 4 46.1 47.7 5 36.8 3 14.6 35 35 45 45
 50.3 53.7 34.9 25.2 1 45.6 3 40.6 1 45.9 0 44.1
 19 48.20 50.70 37.25 22.40 56.1 38.45 1 57.1 49.4
 3 0.15 8.16 38 11.10 54.59 36 51.35 42.55 46 48.50 46.75
 50 4 12.83 8 10.33 48 23.78 58 38.63 57.1 49.4
 20.8 -21.60 +42.62 +40.35

n = -84

Rm = -23

+4 12.68

Memorandum of transformation of formulae for Transit-Instrument by Mr. Chandler.

Let E and ℓ equal the node and inclination
respectively of the meridian and the great-circle perpendicular
near to the line of the pivots.

$$\text{Then } \tan H = \frac{1}{n} \sec \phi - \tan \psi$$

$$e = n \sec E$$

$$\text{and } a = T + 90^\circ + [\sin(E + \phi) + c] \sec \delta$$

