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# Oct. 7, 1882.

| Transit | Dis.–Tr. Est. δ | α | T–α | O–C | Est. δ | δ | Est.–δ | O–C |
|---|---|---|---|---|---|---|---|---|
| 20h 27m 59.6 ✓ | 21.2 | 20h 27m 59.0 | +0.6 | −0.1 | 50.5 | 51.2 | −0.7 | −0.1 |
| | 24.7 | 59.2 | | | 57.7 | 58.4 | −0.7 | −0.1 |
| 28 20.8 ✓ | 50.5 | | | | | | | |
| 24.3 ✓ | 57.7 | | | | | | | |
| 29.8 ✓ | 15.9 | 28 28.8 | +1.0 | +0.3 | 57.6 | 58.5 | −0.9 | −0.3 |
| 35.8 ✓ | 13.2 | 35.5 | +0.3 | −0.4 | 53.8 | 54.6 | −0.8 | −0.2 |
| 45.7 ✓ | 57.6 | | | | | | | |
| 49.0 ✓ | 53.8 | | | | | | | |
| 29 9.3 ✓ | | 29 7.1 | +2.2 | +1.5 | 59.0 | 61.5 | −2.5 | −1.9 |
| 38.7 ✓ | | 37.8 | +0.9 | +0.2 | 58.7 | 59.2 | −0.7 | −0.1 |
| | | 41.0 | | | | 57.5 | | |
| 45.4 ✓ | | 44.8 | +0.6 | −0.1 | 57.3 | 58± | | |
| 48.6 ✓ | | | | | 50.0 | | | |
| | | 58.2 | | | | 51.6 | | |
| 30 44.0 | 16.9 | 58.5 30 43.2 | +0.8 | +0.1 | 53.7 | 56.9 53.8 | −0.1 | +0.5 |
| | | 43.9 | | | | 52.7 | | |
| 31 0.9 | 53.7 | | | | | | | |
| 11.0 | | 31 10.6 | +0.4 | −0.3 | 55.3 | 56.4 | −1.1 | −0.5 |
| 19.2 | 18.0 | 18.8 | +0.4 | −0.3 | 53.6 | 55.0 | −1.4 | −0.8 |
| 30.9 | 17.9 | 30.3 | +0.6 | −0.1 | 50.4 | 51.4 | −1.0 | −0.4 |
| 37.2 | 53.6 | | | | | | | |
| 48.8 | 50.3 | | | | | | | |
| 32 4.4 | 19.4 | 32 2.9 | +1.5 | +0.8 | 58.2 | 59.2 | −1.0 | −0.4 |
| 14.0 | 15.1 | 13.8 | +0.2 | −0.5 | 53.5 | 53.7 | −0.2 | +0.4 |
| | | 18.8 | | | | 51.4 | | |
| 23.8 | 58.2 | | | | | | | |
| 29.1 | 53.5 | | | | | | | |
| 33 2.7 | 6.7 | 33 2.1 | +0.6 | −0.1 | 59.9 | 61.6 | −1.7 | −1.1 |
| 9.3 | 59.9 | | | | | | | |
| 16.1 | 19.9 | 15.7 | +0.4 | −0.3 | 52.0 | 52.1 | −0.1 | +0.5 |
| 22.4 | 10.9 | 20.8 | +1.6 | +0.9 | 52.8 | 53.4 | −0.6 | 0.0 |
| 33.3 | 52.8 | | | | | | | |
| 36.0 | 52.0 | | | | | | | |
| 43.0 | 13.9 | 42.0 | +1.0 | +0.3 | 57.5 | 58.6 | −1.1 | −0.5 |
| 56.9 | 57.5 | | | | | | | |

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# Oct. 7, 1882.

| Transit | Dis.-Tr. Est. | α | T-α | O-C | Est. | δ | Est.-δ | O-C |
|---|---|---|---|---|---|---|---|---|
| $20^h\ 35^m\ 25^s.3$ | | $20^h\ 35^m\ 24^s.6$ | +0.7 | 0.0 | 51'.0 | 51'.4 | −0.4 | +0.2 |
| | | 24.5 | | | | 50.8 | | |
| 32.4 | 9.8? | 32.2 | +0.2 | −0.5 | 57.4 | 55.6 | | |
| 34.4 | | | | | ? | | | |
| 37.2 | | | | | 50.0? | | | |
| 42.2 | 57.4? | | | | | | | |
| 36 4.4 | 14.8 | 36 4.1 | +0.3 | −0.4 | 55.0 | 55.5 | −0.5 | +0.1 |
| 19.2 | 55.0 | | | | | | | |
| 36.5 | 10.1 | 36.6 | −0.1 | −0.8 | 52.2 | 52.1 | +0.1 | +0.7 |
| 42.0 | 14.6 | 40.7 | +1.3 | +0.6 | 58.6 | 58.3 | +0.3 | +0.9 |
| 46.6 | 52.2 | | | | | | | |
| 52.5 | 12.7 | 52.4 | +0.1 | −0.5 | 55.1 | 56.2 | −1.1 | −1.7 |
| 56.6 | 58.6 | | | | | | | |
| 37 5.2 | 55.1 | | | | | | | |
| 43.6 | 15.5 | 37 42.9 | +0.7 | 0.0 | 52.5 | 53.2 | −0.7 | −0.1 |
| 59.1 | 52.5 | | | | | | | |
| 38 34.4 | 14.9 | 38 34.0 | +0.4 | −0.3 | 51.7 | 52.0 | −0.3 | +0.3 |
| 41.3 | 10.0 | 40.8 | +0.5 | −0.2 | 52.5 | 53.2 | −0.7 | −0.1 |
| 49.3 | 51.7 | | | | | | | |
| 51.3 | 52.5 | | | | | | | |
| 57.0 | | 56.7 | +0.3 | −0.4 | 50.8 | 51.4 | −0.6 | 0.0 |
| 39 16.6 | 10.9 | 39 16.2 | +0.4 | −0.3 | 55.1 | 55.8 | −0.7 | −0.1 |
| 27.5 | 55.1 | | | | | | | |
| 38.5 | | | | | 53.2 | | | |
| | | 40 18.4 | | | | 56.7 | | |
| 40 25.6 | 14.7 | 25.5 | +0.1 | −0.5 | 51.3 | 51.6 | −0.6 | 0.0 |
| 37.0 | 12.9 | 36.2 | +0.8 | +0.2 | 57.6 | 58.5 | −0.9 | −0.3 |
| 40.3 | 51.3 | | | | | | | |
| 49.9 | 57.6 | | | | | | | |
| 41 1.4 | 9.1 | 41 0.5 | +0.9 | +0.3 | 59.8 | 60.1 | −0.3 | +0.3 |
| 10.5 | 59.8 | | | | | | | |
| | | 26.0 | | | | 50.1 | | |
| 32.5 | 31.8 | 31.6 | +0.9 | +0.3 | 59.9 | 60.6 | −0.7 | −0.1 |
| | | 43.4 | | | | 54.2 | | |
| | | 45.9 | | | | 51.8 | | |

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# Oct. 7, 1882.

| Transit | Dis-Tr. Est. | | α | T−α | O−C | Est. δ | δ | Est.−δ | O−C |
|---|---|---|---|---|---|---|---|---|---|
| | | | h m s | | | ′ | ′ | | |
| 20h 42m 4.3 | 59.9 | 20h | | | | | | | |
| 37.8 | 15.3 | 20 | 42 37.5 | +0.3 | −0.4 | 52.6 | 53.3 | −0.7 | −0.1 |
| 49.5 | 12.5 | | ✱ 48.2 | +1.3 | +0.6 | 58.9 | 59.6 | −0.7 | −0.1 |
| 53.1 | 52.6 | | | | | | | | |
| | | | 59.0 | | | | 57.3 | | |
| 43 2.0 | 58.9 | | | | | | | | |
| 9.8 | 16.8 | | 43 8.8 | +1.0 | +0.3 | 57.8 | 58.3 | −0.5 | +0.1 |
| 26.6 | 57.8 | | | | | | | | |
| 58.5 | 19.1 | | 57.7 | +0.8 | +0.1 | 57.5 | 57.6 | −0.1 | +0.5 |
| | | | 59.9 | | | | 52.9 | | |
| 44 14.3 | 20.2 | | 44 13.4 | +0.9 | +0.2 | 59.8 | 59.7 | +0.1 | +0.7 |
| 17.6 | 57.5 | | | | | | | | |
| 23.8 | 18.6 | | 22.9 | +0.9 | +0.2 | 59.8 | 59.6 | +0.2 | +0.8 |
| | | 45 | 17.0 | | | | 57.6 | | |
| 34.5 | 59.8 | | 36.4 | | | | 52.5 | | |
| 42.4 | 59.8 | | | | | | | | |
| | | | 58.8 | | | | 53.5 | | |
| 46 6.8 | 22.1 | 46 | 6.3 | +0.5 | −0.2 | 52.5 | 52.5 | 0.0 | +0.6 |
| 28.9 | 52.5 | | | | | | | | |
| | | | 44.3? | | | | 57.8? | | |
| 48.9 | 29.7 | | 48.5 | +0.4 | −0.3 | 53.8 | 53.6 | +0.2 | +0.8 |
| 47 0.5 | 15.5 | | | | | 52.6 | | | |
| 16.0 | 52.6 | | | | | | | | |
| 18.6 | 53.8 | | | | | | | | |
| 25.6 | 15.1 | 47 | 24.2 | +1.4 | +0.7 | 57.8 | 58.9 | −1.1 | −0.5 |
| 40.7 | 57.8 | | | | | | | | |
| 43.1 | 13.3 | | 42.2 | +0.9 | +0.2 | 58.3 | 59.4 | −1.1 | −0.5 |
| | | | ~~45.6~~ | | | | ~~52.9~~ | | |
| 56.4 | 58.3 | | ~~48.6~~ | | | | ~~57.8~~ | | |
| 48 46.0 | 19.4 | 48 | 45.6 | +0.4 | −0.3 | 52.8 | 52.9 | −0.4 | +0.2 |
| 50.2 | 13.4 | | 48.8 | +1.4 | +0.7 | 59.7 | 59.8 | −0.1 | +0.5 |
| 49 0.9 | 11.0 | 49 | 0.4 | +0.5 | −0.2 | 52.4 | 52.2 | +0.2 | +0.8 |
| 3.6 | 59.7 | | | | | | | | |
| 5.4 | 52.5 | | | | | | | | |
| 11.9 | 52.4 | | | | | | | | |
| 16.0 | 8.2 | | 15.6 | +0.4 | −0.3 | 52.4 | 52.4 | 0.0 | +0.6 |
| 24.2 | 52.4 | | | ± 0.36 | | | | | ± 0.44 |

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# Oct. 9, 1882.

| Transit | Est. | α | T−α | O−C | Est. | δ | E−δ | O−C. |
|---|---|---|---|---|---|---|---|---|
| 20h 27m 59s.8 | 35.6 | 20h 27m 59s.2 | +0.6 | −1.1 | 58.0 | 58.4 | −0.4 | −0,3 |
| 28 0.7 | 28.3 | 59.0 | +1.7 | 0.0 | 51.0 | 58.2 | −0,2 | −0,1 |
| 29.0 | 51.0 | | | | | | | |
| 30.5 | 4.9 | 28 28.8 | +1.7 | 0.0 | 58.0 | 58.5 | −0.5 | −0.4 |
| 35,4 | 58.0 | | | | | | | |
| 37.0 | | 35.5 | +1.5 | −0.2 | 54.3 | 54.6 | −0,3 | −0.2 |
| 29 8.3 | 15.6 | 29 7.1 | +1.2 | −0.5 | 60.0 | 60.5 | −0.5 | −0.4 |
| 23,9 | 60.0 | | | | | | | |
| 39.0 | 18.4 | 37.8 | +1,2 | −0.5 | 58.9 | 59.2 | −0.3 | −0,2 |
| 46.5 | 25.5 | 41.0 44.8 | +1.7 | 0,0 | 50.0 | 57.5 50± | 0,0 | +0.1 |
| 57.4 | 58.9 | 58.2 | | | | 51.6 | | |
| 30 0.3 | 24.9 | 58.5 | +1.8 | +0.1 | | 56.9 | | |
| 12,0 | 51.0 | | | | | | | |
| 25.2 | 57.0 | | | | | | | |
| 45.0 | 32.3 | 30 43.2 | +1.8 | +0.1 | 53.5 | 53.8 | −0,3 | −0.2 |
| 31 12.1 | 22.2 | 43.9 31 10.6 | +1.5 | −0.2 | 56.0 | 52.7 56.4 | −0.4 | −0,3 |
| 17.3 | 53.5 | | | | | | | |
| 20.7 | 24.7 | 18.8 | +1,9 | +0,2 | 54.0 | 55.0 | −1.0 | −0,9 |
| 32.8 | 25.5 | 30.3 | +2.5 | +0.8 | 51.0 | 51.3 | −0,3 | −0,2 |
| 34,3 | 56.0 | | | | | | | |
| 45.4 | 54.0 | | | | | | | |
| 58,3 | 51.0 | | | | | | | |
| 32 0.2 | | | | | | | | |
| 4,4 | 28.2 | 32 2.9 | +1.3 | −0,4 | 59,0 | 59.2 | −0.2 | −0.1 |
| 15.8 | 22.4 | 13.8 | +2.9 | +0.3 | 53.7 | 53.7 | 0,0 | +0.1 |
| 21.6 | | 18.8 | +2.8 | +1.1 | 51.5 | 51.4 | +0.1 | +0.2 |
| 25.0 | | | | | | | | |
| 32.6 | 58.0 | | | | | | | |
| 38.2 | 53.5 | | | | | | | |

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# Oct. 9, 1882.

| Transit | Dis-Z. Est | α | T−α | O−C | Est | δ | E−δ | O−C |
|---|---|---|---|---|---|---|---|---|
| 20h 33m 5.5s | 14.1 | 20h 33m 2.1 | [+3.4] | | 54.8 | 60.6 | [−5.8] | |
| 18.2 | | | 15.7 | +2.5 +0.8 | 52.1 | 52.1 | 0.0 | +0.1 |
| 19.6 | 54.8 | | | | | | | |
| 23.0 | 23.0 | | 20.8 | +2.2 +0.5 | 52.5 | 53.4 | −0.9 | −0.8 |
| 33.8 | 15.0 | | | | 52.5 | | | |
| | | | 42.0 | | | 58.6 | | |
| 46.0 | 52.5 | | | | | | | |
| 48.8 | 52.5 | | | | | | | |
| 54.0 | 16.7 | | | | 51.5 | | | |
| 34 3.3 | 12.4 | | | | 51.5 | | | |
| 6.0 | 12.8 | | | | 52.5 | | | |
| 10.7 | 51.5 | | | | | | | |
| 15.7 | 51.5 | | | | | | | |
| 18.8 | 52.5 | | | | | | | |
| 35 ~~21.7~~ | | | | | ~~57.5~~ | | | |
| 25.7 | 19.2 | 35 | 24.6 | [+1.1] | 57.5 | 51.4 | [+6.1] | |
| 26.9 | 18.0 | | 24.5 | +2.4 +0.7 | 58.0 | 50.8 | +0.2 | +0.3 |
| 34.0 | | | 32.2 | +1.8 +0.1 | | 55.6 | | |
| 44.9 | 57.5 / 51.0 | | | | | | | |
| 47.8 | 50.5 | | | | | | | |
| 54.8 | 3.8 | | | | 55.1 | | | |
| 58.6 | 55.1 | | | | | | | |
| 36 5.4 | | 36 | 4.1 | +1.3 −0.4 | | 55.5 | | |
| 26.1 | | | | | | | | |
| 38.0 | 13.0 | | 36.6 | +1.4 −0.3 | 52.7 | 52.1 | +0.6 | +0.7 |
| 42.0 | 22.2 | | 40.7 | +1.3 −0.4 | 59.0 | 58.3 | +0.7 | +0.8 |
| 51.0 | 52.7 | | | | | | | |
| 54.1 | 20.1 | | 52.4 | +1.7 0.0 | 55.6 | 56.2 | −0.6 | −0.5 |
| 37 4.2 | 59.0 | | | | | | | |
| 14.2 | 55.6 | | | | | | | |
| 17.6 | 14.8 | | | | 51.8 | | | |
| 32.4 | 51.8 | | | | | | | |

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# Oct. 9, 1882.

| Transit | Dis.-Tr. Est. | α | T−α | O−C | Est δ | δ | E−δ | O−C |
|---|---|---|---|---|---|---|---|---|
| 20h 37m 44.7 | 18.7 | 20h 37m 42.9 | +1.8 | +0.1 | 52'.8 | 53'.2 | −0.4 | −0.5 |
| 38 3.4 | 52.8 | | | | | | | |
| 36.0 | 19.7 | 38 34.0 | +2.0 | +0.3 | 52.3 | 52.0 | +0.3 | +0.4 |
| 42.7 | 18.3 | 40.8 | +1.9 | +0.2 | 52.8 | 53.2 | +0.4 | +0.5 |
| 53.7 | 52.3 | | | | | | | |
| 58.6 | 15.4 | 56.7 | +1.9 | +0.2 | 52.0 | 51.4 | +0.6 | +0.7 |
| 39 1.0 | 52.8 | | | | | | | |
| 14.0 | 52.0 | | | | | | | |
| 17.7 | 23.1 | 39 16.2 | +1.5 | −0.2 | 55.2 | 55.8 | −0.6 | −0.5 |
| 39.5 | 12.6 | | | | 53.7 | | | |
| 40.8 | 55.2 | | | | | | | |
| 52.1 | 53.7 | | | | | | | |
| 40 19.8 | 11.8 | 40 18.4 | +1.4 | −0.3 | 56.0 | 56.7 | −0.7 | −0.6 |
| 27.4 | 16.1 | 25.5 | +1.9 | +0.2 | 52.3 | 51.9 | +0.4 | +0.5 |
| 31.6 | 56.0 | | | | | | | |
| 37.0 | | 36.2 | +0.8 | −0.9 | 58.0 | 58.5 | −0.5 | −0.4 |
| 43.5 | 52.3 | | | | | | | |
| 56.2 | 5.6 | | | | 59.9 | | | |
| 41 1.8 | 59.9 | 41 0.5 | | | | 60.1 | | |
| ~~7.4~~ | | | | | | | | |
| 19.1 | | 26.0 | | | | 50.1 | | |
| 26.2 | | 31.6 | | | | 60.6 | | |
| 44.9 | 13.2 | 43.4 | +1.5 | −0.2 | 54.1 | 54.2 | −0.1 | 0.0 |
| 48.0 | 21.0 | 45.9 | +2.1 | +0.4 | 52.0 | 51.8 | +0.2 | +0.3 |
| 58.1 | 54.1 | | | | | | | |
| 42 9.0 | 52.0 | | | | | | | |
| 19.0 | ? | | | | 53.4 | | | |
| 32.2 | ? | | | | 52.8 | | | |
| 32.9 | ? | | | | | | | |
| 39.3 | ? | 42 37.5 | +1.8 | +0.1 | | 53.3 | | |
| | | 48.2 | | | | 59.6 | | |

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Oct. 9, 1882.

| Transit m s | Dis. Est. | h | α m | s | T−α | O−C | Est | δ | E−δ | O−C |
|---|---|---|---|---|---|---|---|---|---|---|
| 20h 42 48.4 | 53.4 | | | | | | | | | |
| 55.0 | 52.8 | | | | | | | | | |
| 43 0.3 | 17.5 | 20 | 42 | 59.0 | +1.3 | −0.4 | 57.5 | 57.3 | +0.2 | +0.3 |
| 10.2 | 21.9 | | 43 | 8.8 | +1.4 | −0.3 | 57.9 | 58.3 | −0.4 | −0.3 |
| 17.8 | 57.5 | | | | | | | | | |
| 32.1 | 57.8 | | | | | | | | | |
| 59.2 | | | | 57.7 | +1.5 | −0.2 | 57.6 | 57.6 | 0.0 | +0.1 |
| 44 2.0 | 19.2 | | | 59.9 | +2.1 | +0.4 | 52.6 | 52.9 | −0.3 | −0.2 |
| 14.5 | 26.0 | | 44 | 13.4 | +1.1 | −0.6 | 59.9 | 59.7 | +0.2 | +0.3 |
| 21.2 | 52.0 | | | | | | | | | |
| 24.0 | 24.0 | | | 22.9 | +1.1 | −0.6 | 59.9 | 59.6 | +0.3 | +0.4 |
| 40.5 | 59.9 | | | | | | | | | |
| 48.0 | 59.9 | | | | | | | | | |
| 45 18.7 | double | 14.6 | 45 | 17.0 | +1.7 | 0.0 | 57.2 | 57.6 | −0.4 | −0.3 |
| 33.3 | 57.2 | | | | | | | | | |
| 38.2 | 14.3 | | | 36.4 | +1.8 | +0.1 | 52.4 | 52.5 | −0.1 | 0.0 |
| 52.5 | 52.4 | | | | | | | | | |
| 46 1.2 | 18.1 | | | 58.8 | +2.4 | +0.7 | 53.2 | 53.5 | −0.3 | −0.2 |
| 7.4 | 36.7 | | 46 | 6.3 | +1.1 | −0.6 | 52.6 | 52.5 | +0.1 | +0.2 |
| 19.3 | 53.2 | | | | | | | | | |
| 25.0 | 16.3 | | | | | | 57.8 | | | |
| 41.3 | 57.8 | | | | | | | | | |
| 44.1 | 52.6 | | | | | | | | | |
| 46.6 | 19.4 | | | 44.3? | +2.3 | +0.6 | 57.6 | 57.8? | −0.2 | −0.1 |
| 50.2 | | | | 48.5 | | | 53.8 | 53.6 | | |
| 47 2.0 | 14.4 | | | | | | 52.7 | | | |
| 6.0 | 58.0 | | | | | | | | | |
| 16.4 | 52.7 | | | | | | | | | |
| 25.5 | 23.5 | | 47 | 24.2 | +1.3 | −0.4 | 58.2 | 58.9 | −0.7 | −0.6 |
| 32.1 | 52.8 | | | | | | | | | |

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# Oct. 9, 1882.

| Transit | Dis.-Tr. Est. | α | T-α | O-C | Est. δ | E-δ | O-C. |
|---|---|---|---|---|---|---|---|
| 20h 47m 43.5 | 21.8 | 20h 47m 42.2 | +1.3 | −0.4 | 59.6 | 59.4 +0.2 | +0.3 |
| 49.0 | 58.3 | | | | | | |
| 48 5.3 | 59.6 | | | | | | |
| 43.0 | | | | | 52.5 | | |
| 47.2 | | 48 45.6 | [+1.6 ? +2.1 ?] | | 59.9 | 52.9 −0.5 | −0.4 |
| 47.7 | | | | | 52.4 | | |
| 50.0 | | 48.8 | +1.2 | −0.5 | 59.9 | 59.8 +0.1 | +0.2 |
| 49 2.6 | | 49 0.4 | +2.2 | +0.5 | | 52.2 | |
| 10.6 | | | | ± 0.37 | | | ± 0.34 |
| 19.7 | | 15.6 | | | | 52.4 | |
| 22.5 | | | | | | | |
| 35.5 | | | | | | | |
| 39.8 | | | | | | | |

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Zones 143 and 144.

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# Oct. 25, 1882. Zones 143 and 144.

| Transit | Est. | α | T−α | O−C | Est. | δ | E−δ | O−C |
|---|---|---|---|---|---|---|---|---|
| 20h 28m 1.8s | | 20h 28m 2.2s | −0.4 | | 7.5 | 8.6 | −1.1 | |
| 1.9 | | | 2.1 | −0.2 | 0.5 | 1.4 | −0.9 | |
| 26,1 | 0.5? | | | | | | | |
| 31.3 | | | 31.8 | −0.5 | 7.7? | 8.7 | −1.0 | |
| 38,3 | | | 38.6 | −0.3 | | 4.7 | | |
| 45,7 | | | | | | | | |
| 51,0 | | | | | | | | |
| 29 9.8 | | 29 | 10.2 | −0.4 | 9.9 | 10.7 | −0.8 | |
| 15,1 | 9.9 | | | | | | | |
| 40,5 | | | 40.9 | −0.4 | 8.3 | 9.4 | −1.1 | |
| 42,9 | | | 44.1 | −1.2 ? | 6.8 | 7.7 | −0.9 | |
| 47,9 | | | 47.8 | [+0.1] ? | | 0.8 | | |
| 53,1? | (rattle only) | | | | | | | |
| 30 1.5 | | 30 | 1.2 | +0.3 | 0.0 | 1.7 | −1.7 | |
| | | | 1.5 | | | 7.1 | | |
| | | | | −3.0 .33 | | | | |
| 12,4 | 8.3 | | | | | | | |
| 14,1 | 7.6 | | | | | | | |
| 46,2? | 0.0? | | 46.2 | | | 4.0 | | |
| 46.4? | | | 46.8 | −0.4 | 2.0 | 2.8 | −0.8 | |
| 51,4 | 2.0 | | | | | | | |
| 31 7.0 | 2.4 | | | | | | | |
| 13,3 | | 31 | 13.7 | −0.4 | 5.0 | 6.6 | −1.6 | |
| 22,0 | | | 21.9 | +0.1 | 2.6 | 4.7 | −2.1 | |
| 26,0 | 5.0 | | | | | | | |
| 33,7 | | | 33.4 | +0.3 | 0.1 | 1.8 | −1.7 | |
| 40,2 | 2.6 | | | | | | | |
| 53,0? | 0.1? | | | | | | | |
| 53,9? | | | | | | | | |
| 32 6.0 | | 32 | 6.0 | 0.0 | 7.8 | 9.4 | −1.6 | |
| 15,6 | | | 16.8 | −1.2 | 2.4 | 3.9 | −1.5 | |
| 21,2 | 7.8 | | 22.0 | | | 1.5 | | |
| 26,1 | 2.4 | | | | | | | |

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Oct. 28. 1882. Revision of zones 143 and 144.

| A / B Transit | Est: | α | δ − α | Est: | δ | δ − δ |
|---|---|---|---|---|---|---|
| $20^h\,28^m\,2^s.1$ | | $20^h\,28^m\,2^s.2$ | −0.1 | 7.5 | 8.6 | −1.1 |
| 2.5 | | 2.1 | +0.4 | 0.5 | 1.4 | −0.9 |
| 28.7 | 0.5 | | | | | |
| 31.8 | | 31.8 | 0.0 | 7.6 | 8.7 | −1.1 |
| 34.6 | 7.5 | | | | | |
| 38.8 | | 38.6 | +0.2 | 3.3 | 4.7 | −1.4 |
| 52.8 | | | | | | |
| 29 10.3 | | 29 10.2 | +0.1 | 9.9 | 10.7 | −0.8 |
| 10.9? | | | | | | |
| 11.9? | | | | | | |
| 20.9 | | | | | | |
| 40.9 | | 40.9 | 0.0 | 7.8 | 9.4 | −1.6 |
| 44.0 | | 44.1 | −0.1 | 6.1 | 7.7 | −1.6 |
| 48.8 | | 47.8 | +1.0 | | 0.8 | |
| 56.8 | | | | | | |
| 59.9 | | | | | 1.7 | |
| 30 1.5 | | 30 1.2 | +0.3 | | 7.1 | |
| 4.4 | | 1.5 | +1.8 | +0.2 | | |
| 12.7 | | | | | | |
| 15.5 | | | | | | |
| 46.6 | | 46.2 | +0.4 | 2.5 | 4.0 | |
| 50.3 | | 46.8 | | 6.0 | 2.8 | |
| 56.6 | 6.0 | | | | | |
| 31 9.6 | 2.5 | | | | | |
| 13.7 | | 31 13.7 | 0.0 | 5.5 | 6.6 | −1.1 |
| 22.2 | | 21.9 | +0.3 | 3.0 | 4.7 | −1.7 |
| 26.5 | 5.5 | | | | | |
| 33.7 | | 33.4 | +0.3 | 0.5 | 1.8 | −1.3 |
| 40.5 | 3.0 | | | | | |
| 52.2 | 0.5 | | | | | |
| 32 6.0 | | 32 6.0 | 0.0 | 8.0 | 9.4 | −1.4 |
| 16.6 | | 16.8 | −0.2 | 2.7 | 3.9 | −1.2 |
| 22.0 | | 22.0 | 0.0 | 0.5 | 1.5 | −1.0 |
| 24.0 | 8.0 | | | | | |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | | | | | I – c | | |
| | $20^h\ 33^m\ 19^s.1$ | | $20^h\ 33^m\ 18^s.8$ | +0.3 | | 0.'8 | 2.'2 |
| | 24.0 | | 23.9 | +0.1 | | 2.4 | 3.6 |
| | 30.6 | 2.4 | | −0.2 | −0.03 | | |
| | 35.8 | 0.8 | | | | | |
| | 44.7 | | 45.1 | −0.4 | | 7.6 | 8.8 |
| | 56.5 | 7.6 | | | | | |
| B | | | | | | | |
| 35 | 26.7 | | 35 27.7 | −1.0 | | 7.6 | 1.6 |
| | 28.1 | | 27.6 | +0.5 | | 0.3 | 1.0 |
| | 33.8 | 7.6, 0.3 | | | | | |
| | | | 35.3 | | | | 5.8 |
| | 49.7 | | | | | 5.2 | |
| | 54.2 | 5.2 | | | | | |
| 36 | 6.8 | | 36 7.1 | −0.3 | | 5.0 | 5.8 |
| | 17.9 | 5.0 | | | | | |
| | 39.8 | | 39.7 | +0.1 | | 1.8 | 2.3 |
| | 43.8 | | 43.8 | 0.0 | | 8.7 | 8.5 |
| | 47.5 | 1.8 | | | | | |
| | 49.5 | 8.7 | | | | | |
| | 55.4 | | 55.5 | −0.1 | | 5.1 | 6.4 |
| 37 | 6.0 | 5.1 | | | | | |
| | 46.1 | | 37 46.0 | +0.1 | | 2.5 | 3.4 |
| | 56.7 | 2.5 | | | | | |
| 38 | 37.4 | | 38 37.3 | +0.1 | | 1.7 | 2.3 B |
| | | | 43.9 | −0.2 | −0.02 | | 3.4 |
| | 44.8 | 1.7 | 59.8 | | | | 1.6 |
| 39 | 18.8 | | 39 19.2 | −0.4 | | 5.0 | 6.0 |
| | 27.7 | 5.0 | | | | | 6.9 |
| A | | | 40 21.5 | | | 1.7 | |
| 40 | 28.8 | | 28.6 | +0.2 | | | 2.2 |
| | 36.2 | 1.7 | | | | | |
| | 39.3 | | 39.3 | 0.0 | | 7.5 | 8.8 |
| | 54.6 | 7.5 | | | | | |
| | | | 41 3.6 | | | | 10.3 |
| | | | 29.1 | | | | 0.3 |

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Transit: Oct. 28, 1882.

Est: $20^h\ 32^m\ 28^s.305$

| | | | | α | γ − α | Est. | δ | δ − δ |
|---|---|---|---|---|---|---|---|---|
| | | 32.7 | 2.7 | | | | | |
| A | | | | | | | | |
| | 33 | 19.4 | | $20^h\ 33^m\ 18^s.8$ | +0.6 | 1.0 | 2.2 | −1.2 |
| | | 24.0 | | 23.9 | +0.1 | 2.5 | 3.6 | −1.1 |
| | | 34.3 | | | | 2.5 | | |
| | | 37.6 | 1.0 | | | | | |
| | | 41.5 | 2.5 (2.5) | | | | | |
| | | 45.7 | | 45.1 | 0.0 | 7.6 | 8.8 | −1.2 |
| | 34 | 0.6 | 7.6 | | +1.5 +0.14 | | | |
| | 35 | 26.9 | | 35 27.7 | −0.8 | 0.6 | 1.6 | −1.0 |
| | | 27.4 | | 27.6 | +0.2 | 7.5 | 1.0 | |
| | | 36.7 | 7.5 | | | | | |
| | | | 0.6 | | | | | |
| | | 48.8 | | 35.3 | | 5.5 | 5.8 | −0.3 |
| | | 56.5 | 5.5 | | | | | |
| | 36 | 7.1 | | 36 7.1 | 0.0 | 5.0 | 5.8 | −0.8 |
| | | 21.4 | 5.0 | | | | | |
| | | 40.3 | | 39.7 | +0.6 | 1.0 | 2.3 | −1.3 |
| | | 43.7 | | 43.8 | −0.1 | 8.3 | 8.5 | −0.2 |
| | | 46.5 | 1.0 | | | | | |
| | | 55.1 | | 55.5 | −0.4 | 5.2 | 6.4 | −1.2 |
| | | 57.0 | 8.3 | | | | | |
| | 37 | 7.1 | 5.2 | | | | | |
| | | 46.3 | | 37 46.0 | +0.3 | 2.5 | 3.4 | −0.9 |
| B | | 0.2 | 2.5 | | | | | |
| | 38 | 37.3 | | 38 37.3 | 0.0 | 1.8 | 2.3 | −0.5 |
| | | | | 43.9 | −0.6 −0.07 | | 3.4 | |
| | | 48.1 | 1.8 | 49.8 | | 0.6 | 1.6 | −1.0 |
| | | 0.0 | | | | 5.0 | 6.0 | −1.0 |
| | 39 | 6.6 | 0.6 | 39 19.2 | −0.4 | | | |
| | | 18.8 | | | | | | |
| | | 31.3 | 5.0 | | | | | |
| | | 21.3 | | | | | | |
| | 40 | 27.2 | 5.8 | 40 21.5 | −0.2 | 5.8 | 6.9 | −1.1 |
| | | 28.9 | | 28.6 | +0.3 | 1.0 | 2.2 | 1.2 |
| | | 39.0 | | 39.3 | −0.3 | 7.6 | 8.8 | 1.2 |
| | | 41.2 | 1.0 | | | | | |
| | | 59.3 | 7.6 | | | | | |

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| | | | | γ-α | | |
|---|---|---|---|---|---|---|
| $20^h 41^m 34^s.4$ | | $20^h 41^m 34^s.7$ | | −0,3 | 10.1 | 10.8 |
| | | | 46.5 | −0.5 −0.1 | | 4.4 |
| 49.2 | | | 49.0 | −0,2 | 1.0 | 2.0 |
| 53.6 | | | | | 11.3 | |
| 57.3 | 1.0 0.3 | | | | | |
| 42 3.0 | 10.1 | | | | | |
| 40.9 | | 42 | 40.6 | +0.3 | 2.3 | 3.5 |
| 50,3 | 2.3 | | | | | |
| 52,8 | ? | | 51.3 | +0.5 | | 9.8 |
| | | 43 | 2.1 | | | 7.6 |
| 43 12.0 | | | 11.9 | +0.1 | 7.6 | 8.5 |
| 25,0 | 7.6 | | | | | |
| 44 0.7 | | 44 | 0.8 | −0.1 | 7.5 | 7.9 |
| 3.6 | | | 3.1 | +0.5 | 2.5 | 3.1 |
| 8,8 | | | | | | |
| 12,8 | 2.5 | | | | | |
| 16.2 | | | 16.5 | −0.3 | 8,8 | 9.9 |
| 18,7 | 7.5 | | | | | |
| 26,0 | | | 26,0 | 0,0 | 8,8 | 9.9 |
| 35,2 | 8.8 | | | | | |
| 47,2 | 8.8 | | | | | |
| B | | | | | | |
| 45 20,0 | | 45 | 20,1 | −0,1 | 7.3 | 7.7 |
| | | | | +0.7 +0.0 8 | | |
| 24,4 | 7.3 | | | | | |
| 39.7 | | | 39.5 | +0.2 | 2.3 | 2.7 |
| 43,8 | 2.3 | | | | | |
| | | 46 | 1.9 | | | 3.8 |
| 46 10,0 | | | 9.4 | +0.6 | 2.3 | 2.7 |
| 31,7 | 2.3 | | | | | |
| 48.0 | | | 47.4 | +0.6 | 7.5 | 8.0 |
| 51,8 | | | 51.6 | +0.2 | 3.3 | 3.8 |
| 59,7 | 7.5 | | | | | |

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Oct. 28, 1882. Zones 143 and 144.

| Transit: s | Est: | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 3.9 | | | | | | | | |
| $20^h\ 41^m$ | 11.0? | 9.9 | | | | | | | |
| | 34.7 | | | | | | | | |
| | 46.6 | | | | | | | | |
| | 49.6 | | | | | | | | |
| | 54.8 | 4.0 | | | | | | | |
| | | 1.0 | | | | | | | |
| 42 | 4.3 | 10.0 | | | | | | | |
| 13 | 40.7 | | 42 | 40.6 | +0.1 | 2.5 | 3.5 | −1.0 | |
| | 51.5 | | | 51.3 | +0.2 | | 9.8 | | |
| | 53.0? | 2.5 | | | | | | | |
| | | | 43 | 2.1 | | | 7.6 | | |
| 43 | 12.0 | | | 11.9 | +0.1 | 7.8 | 8.6 | −0.8 | |
| | 15.0? | | | | | 7.6 | | | |
| | 15.8? | 7.8 | | | | | | | |
| | 30.2 | 7.6 | | | | | | | |
| 44 | 0.8 | | 44 | 0.8 | 0.0 | 7.5 | 7.9 | −0.4 | |
| | 3.7 | | | 3.1 | +0.6 | 2.4 | 3.1 | −0.7 | |
| | 14.6 | 2.4 | | | | | | | |
| | 16.4 | | | 16.5 | −0.1 | 8.6 | 9.9 | −1.1 | |
| | 21.4 | 7.5 | | | | | | | |
| | 26.0 | | | 26.0 | 0.0 | 8.9 | 9.8 | −0.9 | |
| | 34.3 | 8.8 | | | | | | | |
| | 48.1 | 8.9 | | | | | | | |
| 45 | 20.3 | | 45 | 20.1 | +0.2 | 7.0 dbl. | 7.7 | −0.7 | |
| | 29.0 | 7.0 | | | | | | | |
| | 39.8 | | | 39.5 | +0.3 | 2.3 | 2.7 | −0.4 | |
| | | | | | +1.4 +0.16 | | | | |
| | 47.0 | 2.3 | | | | | | | |
| | 2.1 | | 46 | 1.9 | +0.2 | 2.7 | 3.8 | −1.1 | |
| 46 | 7.6 | 2.7 | | | | | | | |
| | 10.0 | | | 9.4 | +0.6 | 2.4 | 2.7 | −0.3 | |
| | 24.7 | 2.4 | | | | | | | |
| | 48.0 | | | 47.4 | +0.6 | 7.5 | 8.0 | −0.5 | |
| | 51.9 | | | 51.6 | +0.3 | 2.8 | 3.8 | −1.0 | |
| | 55.0 | 7.5 | | | | | | | |

| | δ | δ − δ |
|---|---|---|
| Est: | | |
| 9.9 | 10.3 | −0.4 |
| | 0.3 | |
| 10.0 | 10.8 | −0.8 |
| 4.0 | 4.4 | −0.4 |
| 1.0 | 2.0 | −1.0 |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | $20^h 47^m 3^s.3$ | | | | 2-2 | 2'.3 | |
| | 11.1 | 2.3 | | | | | |
| | 18,4 | 3.3 | | | | | |
| | 27.3 | | $20^h 47^m 27^s.3$ | | 0.0 | 8.0 | 9'.2 |
| | 41,0 | 8.0 | | | | | |
| | 45.1 | | | 45.3 | -0,2 | 9.0 | 9.7 |
| | 57,1 | 9.0 | | | | | |
| A 48 | 49.0 | | 48 | 48.7 | +0.3 | 2.5 | 3.1 |
| | 51.9 | | | 51.9 | 0.0 | 9.8 | 10.2 |
| | 56,5 | 2.5 | | | | | |
| | 58.7 | 9.8 | | | | | |
| 49 | 4.0 | | 49 | 3.5 | +0.5 | 2.0 | 2.5 |
| | 15,4 | 2.0 | | | +2.2 +0.24 | | |
| | | | | 18.7 | | | 2.7 |
| | 37.1 | | | 37.3 | -0.2 | 6.1 | 7.0 |
| | 46,2 | 6.1 | | | | | |
| | | | | 52.0 | | | 1.5 |
| 50 | 0.4 | | | | | 5.2 | |
| | 4,8 | 5.2 | | | | | |
| | 7.7 | | | | | 10.1 | |
| | 12.0 | | 50 | 11.5 | +0.5 | 0.5 | 1.4 |
| | 37,0 | 0.5 | | | +0.3 +0.15 | | |
| B | | | | | | | |

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Oct. 28, 1882. Zones 143 and 144.

| Transit: | Est: | α | γ − α | Est: | δ | δ − δ |
|---|---|---|---|---|---|---|
| $20^h\ 47^m\ 3.5^s$ | | | | 2.4 | | |
| 13.9 | 2.4 | | | | | |
| 21.5 | 2.8 | | | | | |
| 27.6 | | $20^h\ 47^m\ 27.3^s$ | +0.3 | 8.2 | 9.2 | −1.0 |
| 39.5 | 8.2 | | | | | |
| 45.3 | | 45.3 | 0.0 | 8.9 | 9.7 | −0.8 |
| 58.1 ? | 8.9 | | | | | |
| A 59.5 ? | | | | | | |
| 48 48.9 | | 48 48.7 | +0.2 | 2.4 | 3.1 | −0.7 |
| 52.1 | | 51.9 | +0.2 | 9.3 | 10.2 | −0.9 |
| 49 3.9 | | 49 3.5 | +0.4 | | 2.5 | |
| 5.5 | 9.3 | | | | | |
| 10.1 ? | 2.4 | | | | | |
| 16.3 | 2.3 | | | | | |
| 19.1 | | 18.7 | +0.4 | 2.3 | 2.7 | −0.4 |
| 27.5 | 2.3 | | +0.2 | | | |
| 37.2 | | 37.3 | −0.1 | 6.0 | 7.0 | −1.0 |
| 52.6 | 6.0 | | | | | |
| 50 0.4 | | 52.0 | | | 1.5 | |
| | | | | 6.2 | | |
| 12.1 | | 50 11.5 | +0.6 | 0.8 | 1.4 | −0.6 |
| 14.4 ? | | | | | | |
| 16.8 ? | | | | | | |
| 38.3 | 0.8 | | | | | |
| 51 2.4 | | 51 2.7 | −0.3 | 9.2 | 9.5 | −0.3 |
| 7.4 | | | | | | |
| | | 9.7 | | 2.2 ? | −0.1 | |
| 12.0 | | 12.1 | −0.1 | 7.3 | 7.8 | −0.5 |
| 28.8 | 7.3 | | | | | |
| | | 44.4 | | 9.9 | 10.0 | −0.1 |

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Transit: Oct: 28, 1882. Bruce 143 and 144.

| | Est. | | | α − a | Est. | δ | δ − δ |
|---|---|---|---|---|---|---|---|
| $20^h\ 52^m\ 20^s.9$ | | $20^h\ 52^m\ 21^s.7$ | | −0.8 | | 10.3 | |
| 30.7 | | 30.2 | | +0.5 | 7.9 | 8.2 | −0.3 |
| 37.0 | 9.9 | | | | | | |
| | 7.9 | | | | | | |
| 40.6 | | 39.7 | | +0.9 | 1.0 | 1.6 | −0.6 |
| 51.1 | 1.0 | | | | | | |
| 55.8 | | 55.9 | | −0.1 | 9.5 | 10.1 | −0.6 |
| 53 4.6 | 9.5 | 53 3.9 | | | | 8.9 | |
| 35.7 | | | | | 9.9 | | |
| 43.7 | 9.9 | | | | | | |
| 51.3 | | 51.3 | | 0.0 | 10.0 | 10.5 | −0.5 |
| 54 0.7 | 10.0 | | | | | | |
| 26.1 | | 54 26.0 | | +0.1 | 7.3 | 7.5 | −0.2 |
| 44.5 | | 44.4 | | +0.1 | 10.1 | 10.9 | −0.8 |
| 48.4 | | 48.0 | | +0.4 | 10.2 | 11.1 | −0.9 |
| 57.0 | 7.3 | | | | | | |
| 55 6.4 | | 55 6.2 | | +0.2 | 2.7 | 3.6 | −0.9 |
| 7.1 | | 7.0 | | +0.1 | 7.3 | 8.0 | −0.7 |
| 20.8 | 2.7 | | | | | | |
| 27.0 | 7.3 | | | | | | |
| | | 35.1 | | | | 10.1 | |
| 50.8 | | 50.8 | | 0.0 | 4.8 | 5.2 | −0.4 |
| 56.7 | | 56.8 | | −0.1 | 8.0 | ~~1.0~~ | −1.0 |
| 56 0.1 | 4.8 | | | | | | |
| 27.9 | | 56 26.7 | | +0.6 | 3.0 | 4.0 | −1.0 |
| | | 35.9 | | | | 2.5 | |
| 37.0 | | 36.7 | | +0.3 | 5.0 | 5.4 | −0.4 |
| 45.2 | 8.0 | | | | | | |
| 50.3 | 3.0 | | | | | | |
| 57.7 | 5.0 | | | | | | |

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Transit:

Oct. 28, 1882. Rings 143 and 144.

| | | Est: | | | | γ − α | Est: | δ | δ − δ |
|---|---|---|---|---|---|---|---|---|---|
| | 20h 57m 1.7 | | 20h 57m 0.9 | | | | 0.0 | 0.2 | −0.2 |
| | 14.4 | 0.0 | | | | | | | |
| B | 38.6 | | | 35.7 | | | | 0.8 | |
| | | | | 38.3 | +0.3 | | 5.2 | 5.4 | −0.6 |
| | 43.1 | | | | +0.4 | +0.8 | | | |
| | | | | 43.0 | +0.1 | | 6.3 | 7.3 | −1.0 |
| | 53.8 | | | 55.5 | +0.3 | | 10.0 | 10.4 | −0.4 |
| | 54.3 | 5.2 | | | | | | | |
| | 59.1 | 6.3 | | | | | | | |
| 58 | 10.1 | 10.0 | | | | | | | |
| | 19.2 | | | | | | 7.4 | | |
| | 30.9 | 7.4 | | | | | | | |
| | 34.0 | | 58 | 34.4 | −0.4 | | 10.0 | 10.1 | −0.1 |
| | 37.3 | | | 37.1 | +0.2 | | 4.8 | 5.2 | −0.4 |
| | 41.9 | 4.8 | | | | | | | |
| | 49.0 | 10.0 | | | | | | | |
| A | | | | | | | | | |
| 59 | 25.2 | | 59 | 24.9 | +0.3 | | 5.3 | 6.6 | −1.3 |
| | 28.5 | | | 28.0 | +0.5 | | 5.9 | 7.3 | −1.4 |
| | 34.4 | 5.9 | | | | | | | |
| | 39.1 | 5.3 | | | | | | | |
| | 51.4 | | | 51.1 | +0.3 | | 5.6 | 6.4 | −0.8 |
| 21h 0m | 1.6 | 5.6 | | | | | | | |
| | 4.9 | | 21h 0m | 4.6 | +0.3 | | 4.3 | 4.4 | −0.1 |
| | 31.9 | 4.3 | | | | | | | |
| | 47.3 | | | 47.2 | +0.1 | | 6.8 | 7.2 | −0.4 |
| 1 | 3.6 | | 1 | 2.4 | +1.2 | | 5.8 / 7.6 | 6.4 | −0.6 |
| | 20.8 | 6.0 | | | +2.9 | | | | |
| | 24.0 | | | 7.4 | | | | 8.2 | |
| | | | | 23.6 | +0.4 | | 10.1 | 10.6 | −0.5 |
| | 27.8 | 7.5 / 2.0 | | | | | | | |
| | 49.9 | 10.1 | | | | | | | |

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1882phae.proj.1431.



Transit. Oct. 28, 1882, Pjmes 143 and 144.

| | | Est. | | | γ − α | Est. | δ | δ − δ |
|---|---|---|---|---|---|---|---|---|
| 21h | 2m | 5.7 | 21h | 2m 5.5 | +0.2 | 9.2 | 9.6 | −0.4 |
| | 14.1 | | | | | | | |
| | 22.9 | | | 22.6 | +0.3 | 10.2 | 10.2 | 0.0 |
| | 23.6 | | | 23.5 | +0.1 | 4.5 | 4.6 | −0.1 |
| | 41.3 | 4.4 | | | | | | |
| | 55.7 | 9.9 | | | | | | |
| 3 | 3.6 | | 3 | 3.4 | +0.2 | 4.3 | 4.2 | +0.1 |
| | 13.5 | 4.3 | | | | | | |
| | 16.3 | | | 14.6 | +1.7 | 2.0 | 4.8 | −0.3 |
| | 27.0 | 2.0 | | 15.4 | +0.9 | 4.5 | 2.3 | −0.3 |
| | | 4.5 | | 6.1 | | | 2.6 | |
| 4 | 24.9 | | 4 | 24.8 | +0.1 | 7.5 | 7.6 | −0.1 |
| | 38.6 | 7.5 | | | +3.9 +0.49 | | | |
| | 48.6 | | | 28.0 | | 0.7 dk. | 1.1 | |
| 5 | 1.0 | 0.7 | | | | | | |

A
B

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John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

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Nov. 4, 1882.

| Transit | Est. | α | γ − α | | Est. | S | O − S | |
|---|---|---|---|---|---|---|---|---|
| 20h 28m 1.9 | | 20h 28m 2.2 | −0.3 | +1 | 7.5 } 0.5 } | 8.6 | −1.1 | +4 |
| 27.4 | 0.5 | 2.1 | −0.2 | +2 | | 1.4 | −0.9 | +6 |
| 31.8 | | 31.8 | 0.0 | +4 | 7.5 | 8.7 | −1.2 | +3 |
| 36.7 | 7.5 | | | | | | | |
| 38.2 | | 38.6 | −0.4 | 0 | 3.0 | 4.7 | −1.7 | −2 |
| 52.5 | 3.0 7.5 | | | | | | | |
| 29 9.7 | | 29 10.2 | −0.5 | −1 | 9.8 | 10.7 | −0.9 | +6 |
| 21.0 | 9.8 | | | | | | | |
| 40.5 | | 40.9 | −0.4 | 0 | 8.0 | 9.4 | −1.4 | +1 |
| 43.6 | | 44.1 | −0.5 | −1 | 6.5 | 7.7 | −1.2 | +3 |
| 55.9 | 8.0 6.5 | 47.4 | | | | 0.8 | | |
| 30 1.0 | | 30 1.2 | −0.2 | +1 | 5.8 } | 1.7 | −1.2 | +3 |
| 21.1 | 5.8 0.5 | 1.5 | −0.5 | −2 | 0.5 } | 7.1 | −1.3 | +2 |
| 46.2 | | 46.2 | 0.0 | +3 | 2.5 } | 4.0 | −1.5 | 0 |
| 46.7 | | 46.8 | −0.1 | +2 | 1.0 } | 2.8 | −1.8 | −3 |
| 57.8 | 1.0 | | | | | | | |
| 31 6.1 | 2.5 | | | | | | | |
| 13.3 | | 31 13.7 | −0.4 | −1 | 5.2 | 6.6 | −1.4 | 0 |
| 21.8 | | 21.9 | −0.1 | +2 | 2.5 | 4.7 | −2.2 | −3 |
| 32.0 | 5.2 | | | | | | | |
| 33.6 | | 33.4 | +0.2 | +5 | 0.1 | 1.8 | −1.7 | −3 |
| 38.6 | 2.5 | | | | | | | |
| 52.3 | 0.1 | | | | | | | |
| 32 5.8 | | 32 6.0 | −0.2 | +1 | 7.8 | 9.4 | −1.6 | −2 |
| 16.5 | | 16.8 | −0.3 | 0 | 2.6 | 9.9 | −1.3 | +1 |
| 21.5 | | 22.0 | −0.5 | −2 | 0.2 | 1.5 | −1.3 | +1 |
| 23.9 | 7.8 | | +21 | −7 | | | | |
| 34.0 | 2.6 0.2 | | | | | | | |

B

+30 −18

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34.8
25.9

20.7

14.3

11.3

15.4
12.3

20.1
20.1

19.9
11.6

18.7
16.8

18.7

18.1
17.5
12.5

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Nov. 4. 1882.

| Transit | Est. | $\alpha$ | | $\Sigma\alpha$ +21 −7 | Est. | $\delta$ | $\Sigma\delta$ +30 −18 |
|---|---|---|---|---|---|---|---|
| 20h 33m 18.6 | | 20h 33m 18.8 | −0.2 | +1 | 0.3 | 2.2 | −1.9 +8 −5 |
| 23.6 | | 23.9 | −0.3 | 0 | 2.3 | 3.6 | −1.3 +1 |
| 33.7 | 0.3 | | ~~−1.7~~ | | | | |
| 37.0 | 2.3 | | | | | | |
| 44.8 | | 45.1 | −0.3 | 0 | 7.5 | 8.8 | −1.3 +1 |
| 34 2.3 | 7.5 | | | | | | |
| 35 27.0 | | 35 27.7 | [−0.7] | −4 | 7.5 | 1.6 | [+5.9] |
| 27.6 | | 27.6 | 0.0 | +3 | 0.2 | 1.0 | −0.8 +5 |
| 36.6? | | 35.3 | [+1.3] | | 5.3 | 5.8 | −0.5 +4 |
| 36.7 | 0.2 7.5 | | | | | | |
| 44.8 | | | | | | | |
| 57.7 | 5.3 | | | | | | |
| 36 6.6 | | 36 7.1 | −0.5 | −2 | 5.0 | 5.8 | −0.8 +5 |
| 21.1 | 5.0 | | | | | | |
| 39.1 | | 39.7 | −0.6 | −3 | 1.5 | 2.3 | −0.8 +5 |
| 43.6 | | 43.4 | −0.2 | +1 | 8.0 | 8.5 | −0.5 +8 |
| 49.0 | 1.5 | | | | | | |
| 54.5 | | 55.5 | −1.0 | −7 | 5.0 | 6.4 | −1.4 −1 |
| 56.6 | 8.0 | | | | | | |
| 37 10.2 | 5.0 | | | | | | |
| 45.9 | | 37 46.0 | −0.1 | +2 | 2.4 | 3.4 | −1.0 +3 ~~+1~~ |
| 38 0.6 | 2.4 | | ~~−0.2~~ | ~~0.0~~ | | | −34.0 |
| 36.7 | | 38 37.3 | −0.6 | −4 | 1.2 | 2.3 | −1.1 +2 |
| 43.9 | | 43.9 | ~~−2.7~~ 0.0 | +2 | 2.2 | 3.4 | −1.2 +1 |
| 50.7 | 1.2 | | | | | | |
| 52.8 | 2.2 | 59.8 | | | | 1.6 | |
| 39 18.9 | | 39 19.2 | −0.3 | −1 | 5.0 | 6.0 | −1.0 +2 |
| 36.4 | 5.0 | | | +30 −24 | | | |

+71 +24

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



15.1
13.4

17.5

9.7
9.1
21.1

14.5

9.9
13.0

15.7

14.7

14.0
8.9

14.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882bae.proj.1431.



Nov. 4, 1882.

| Transit: | Est: | α | γ-α | +30 | -28 | Est: | δ | δ-δ | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | +71 | -24 |
| 20h 40m 21.2 | | 20h 40m 21.5 | -0.3 | | -1 | 5.1 dbl. | 6.9 | -1.8 | | -6 |
| 28.0 | | 28.6 | -0.6 | | -3 | 0.5 | 2.2 | -1.7 | | -5 |
| 31.6 | 5.1 | | | | | | | | | |
| 38.5 | | 39.3 | -0.8 | | -6 | 7.5 | 8.8 | -1.3 | | -1 |
| 40.8 | 0.5 | | | | | | | | | |
| 51.6 | | | | | | 4.9 | | | | |
| 41 2.0 | {7.5 4.9 | 41 | | | | | | | | |
| 22.0 | | 8.6 | | | | 7.5 | 10.4 | | | |
| 28.5 | 7.5 | 29.1 | | | | | 0.3 | | | |
| 34.3 | | 34.7 | -0.4 | | -2 | 10.0 | 10.8 | -0.8 | +4 | |
| 46.5 | | 46.5 | 0.0 | | | 3.3 | 4.4 | -1.1 | +1 | |
| 49.0 | | 49.0 | ~~-2.4~~ 0.0 | ~~-0.34~~ +2 | | 0.6 | 2.0 | -1.4 | | -2 |
| 54.5 | 3.0 | | | | | | | | | |
| 42 0.7 | 0.6 | | | | | | | | | |
| ~~9.5~~ 40.3 | 10.0 | 42 40.6 | -0.1 | +1 | | 2.4 | 3.5 | -1.1 | +1 | |
| 51.1 | | 51.3 | -0.2 | 0 | | 8.3 | 9.8 | -1.5 | | -3 |
| 57.9 | 2.4 | | | | | | | | | |
| 43 8.5 | 8.3 | 2.1 | | | | | 7.6 | | | |
| 11.8 | | 43 11.9 | -0.1 | +1 | | 7.4 | 8.6 | -1.2 | | -1 |
| 30.8 | 7.4 | | | | | | | | | |
| 44 0.7 | | 44 0.8 | -0.1 | +1 | | 7.0 | 7.9 | -0.9 | +2 | |
| 3.0 | | 3.1 | -0.1 | +1 | | 1.8 | 3.1 | -1.3 | | -2 |
| 16.3 | | 16.5 | -0.2 | 0 | | 9.0 | 9.9 | -0.9 | +2 | |
| 19.3 | 1.8 | | | | | | | | | |
| 25.4 | | 26.0 | -0.2 | 0 | | 9.0 | 9.8 | -0.8 | +3 | |
| 28.5 | 4.0? | | | +36 | -40 | | | | | |
| 34.4 | 9.0 | | | | | | | | | |
| 51.0 | 9.0 | | | | | | | | | |

+84 -214

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10.4
12.8

23.5

10.4

6.5

35.2
8.3
11.7

17.4
17.4

19.0

16.3
23.1

25.2

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1882phae.proj.1431.



Nov. 4. 1882.

| Transit- | Esl. | α | γ − α +36 −40 | Esl. | δ | E. δ |
|---|---|---|---|---|---|---|
| 20h 46m 19.8 | | 20h 45m 20.1 | −0.3 −2 | 7.3 dbl. | 7.7 | −0.4 +7 +84 −42 |
| 31.6 | 7.3 | | | | | |
| 39.6 | | 39.5 | +0.1 +2 −7.2 0.13 | 1.5 | 2.7 | −1.2 −1 |
| 50.8 | 1.5 | | | | | |
| 46 2.0 | | 46 1.9 | +0.1 +2 | 2.6 | 3.8 | −1.2 −1 |
| 9.3 | | 9.4 | −0.1 0 | 2.0 | 2.7 | −0.7 +4 |
| 10.7 | 2.6 | | | | | |
| 31.7 | 2.0 | | | | | |
| 47.9 | | 47.4 | +0.5 +6 | 7.4 | 8.0 | −0.6 +5 |
| 51.7 | | 51.6 | +0.1 +2 | 2.6 | 3.8 | −1.2 −1 |
| 47 2.9 | | | | 2.3 | | |
| 4.7 | 7.4 | | | | | |
| 17.6 | 2.3 | | | | | |
| 20.3 | 2.6 | | | | | |
| 27.0 | | 47 27.3 | −0.3 −2 | 7.7 | 9.2 | −1.5 −5 |
| 45.8 | | 45.3 | 0.0 +1 −3.9 | 8.0 | 9.7 | −1.7 −7 |
| 47.0 | 7.7 | | | | | −27.6 |
| 48 0.0 | 8.0 | | | | | |
| B 48.7 | | 48 48.7 | 0.0 +1 | 2.4 | 3.1 | −0.7 −7 |
| 51.8 | | 51.9 | −0.1 0 | 9.5 | 10.2 | −0.7 +3 |
| 49 3.5 | | 49 3.5 | 0.0 +1 | 2.0 | 2.5 | −0.5 +5 |
| 7.0 | 2.4 | | | | | |
| 10.9 | 9.5 | | | | | |
| 18.7 | | 18.7 | 0.0 +1 +0.2 | 2.0 | 2.7 | −0.7 +3 |
| 20.5 | 2.0 | | | | | |
| 29.2 | 2.0 | | | | | |
| 37.6 | | 37.3 | +0.3 +4 | 5.8 | 7.0 | −1.2 −2 |
| 49.9 | 5.8 | | | | | |
| 52.0 | | 52.0 | 0.0 +1 | 0.2 | 1.4 | −1.2 −2 |
| 58.4 | 0.2 | | +57 −44 | | | +111 −70 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



11.8

11.2

8.7

22.4

16.8

28.6

14.7

20.0

14.7

18.3

19.1

17.0

10.5

12.3

6.4

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1882phae.proj.1431.



Nov. 4, 1882.

| Transit- | Est: | α | γ - α | +57 | -44 | Est: | δ | δ - δ | +111 | -70 |
|---|---|---|---|---|---|---|---|---|---|---|
| 20h 50m 0.3 | | 21h 50m | | | | 5.1 | | | | |
| 11.8 | | 11.5 | +0.3 | +4 | | 0.5 | 1.4 | -0.9 | +1 | |
| 16.5 | 5.6 | | | | | | | | | |
| 38.4 | 0.5 | | | | | | | | | |
| 51 2.3 | | 51 2.7 | -0.4 | | -3 | 8.5 | 9.5 | -1.0 | | -1 |
| 12.0 | | 9.7 12.1 | -0.1 | 0 | | | -0.1 | | | |
| 15.3 | 8.5 | | | | | 7.2 | 7.8 | -0.6 | +3 | |
| 30.6 | 7.2 | | | | | | | | | |
| 32.3 | | | | | | 2.5 | | | | |
| 41.0 | 2.5 | | | | | | | | | |
| 44.4 | | 44.4 | 0.0 | +1 | | 9.0 | 10.0 | -1.0 | | -1 |
| 52.0 | 9.0 | | | | | | | | | |
| A 52 20.7 | | 52 21.7 | -1.0 | | -9 | 9.8 | 10.3 | -0.5 | +4 | |
| 29.4 | | 30.2 | -0.8 | | -7 | 7.5 | 8.2 | -0.7 | +2 | |
| 30.0 | | | | | | | | | | |
| 39.8 | | 39.7 | +0.1 | +2 | | 0.8 | 1.6 | -0.8 | +1 | |
| 43.4? | 9.8 7.5 | | -1.6 | -0.17 | | | | | | |
| 52.5 | 0.8 | | | | | | | | | |
| 56.0 | | 55.9 3.9 | +0.1 | +2 | | 9.5 | 10.1 8.9 | -0.6 | +3 | |
| 53 6.2 | 9.5 | 53 | | | | | | | | |
| 24.2 | | | | | | 5.5 | | | | |
| 33.0 | 5.5 | | | | | | | | | |
| 35.7 | | | | | | 9.0 | | | | |
| 45.6 | 9.0 | | | | | | | | | |
| 51.3 | | 51.3 | 0.0 | +1 | | 9.5 | 10.5 | -1.0 | | -1 |
| | | | | +67 | -63 | | | | | |

+125 -73

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1882phae.proj.1431.



16.2
26.6

13.0
18.6

8.7

7.6

22.7
14.0

12.7

10.2

8.8

9.9

11.3

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 4, 1882.

| Transit | Est. | α | γ − α | Est. | δ | E − S |
|---|---|---|---|---|---|---|
| | | | | | | +125 −73 |
| 20h 54m 2.6s | 9.5 | 20h 54m | +67 −63 | | | |
| 25.9 | | 26s.0 −0.1 | −1 | 7.0 | 7.5 | −0.5 +4 |
| 44.3 | | 44.4 −0.1 | −1 | 10.0 | 10.9 | −0.9 0 |
| 48.1 | | 48.0 +0.1 | +1 | 10.2 | 11.1 | −0.9 0 |
| 54.0 | 10.0 | | | | | |
| 55 0.0 | 5.0? | | | | | |
| 6.5 | | 55m 6.2 +0.3 | +3 | 2.5 | 3.6 | −1.1 −3 |
| 7.0 16.7 | 2.5 | 7.0 0.0 | 0 | 7.4 | 8.0 | −0.6 +2 |
| 23.7 | 7.4 | 35.1 | | | 10.1 | |
| 50.8 | | 50.8 0.0 | 0 | 4.8 | 5.2 | −0.4 +4 |
| 57.0 | | 56.8 ~~+0.3~~ +0.2 ~~+0.004~~ | | 8.1 | −1.0 | [+9.1] |
| 59.8 | 4.8 | | | | | |
| 56 26.6 | | 56 26.7 −0.1 | −1 | 3.2 | 4.0 | −0.8 0 |
| 37.1 | | 35.9 36.7 +0.4 | +4 | 4.8 | 2.5 5.4 | −0.6 +2 |
| 46.8 | 9.0 3.0 | | | | | |
| 55.0 | 3.8 | | | | | |
| 57 0.8 | | 57 0.9 −0.1 | −1 | −0.2 | 0.2 | −0.4 +4 |
| 16.5 | −0.2 | | | | | |
| 38.5 | | 35.7 38.3 +0.2 | +2 | ~~−2.0~~ 4.9 | 0.8 5.8 | −0.9 −1 |
| 43.1 | | 43.0 +0.1 | +1 | 6.0 | 7.3 | −1.3 −4 |
| 45.0 | | | | 2.6 | | |
| 56.4 | 2.6 5.0 | 55.5 | | | 10.4 | |
| 59.8 | 6.0 | | | | | |
| 58 19.0 | | ~~−0.9~~ −0.7 | | 7.3 | | −20.5 |
| 27.6 | 7.3 | | | | | |
| 34.4 | | 34.4 0.0 ~~+0.7~~ | 0 +0.1 | 9.8 | 10.1 | −0.3 +5 |
| 37.0 | | 37.1 −0.1 | −1 | 4.7 | 5.2 | −0.5 +3 |
| 48.8 | 4.7 | | +78 −68 | | | |
| 50.7 | 9.8 | | | | | |
| | | | | | | +149 −81 |

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1882phae.proj.1431.



9.7

10.2
16.7

9.0
49.8?

20.2
17.9

15.7

17.9
16.7
11.4

8.6

16.3
11.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nr. 4. 1882.

| Transit | Est. | α | I − α | +78 −64 | Est. | δ | O − C | +149 −81 |
|---|---|---|---|---|---|---|---|---|
| 20h 59m 24.8 | | 20h 59m 24.9 | −0.1 | −1 | 5.6 | 6.6 | −1.0 | −2 |
| 27.5 | | 28.0 | −0.5 | −5 | 6.0 | 7.3 | −1.3 | −5 |
| 39.8 | 5.6 6.0 | | | | | | | |
| 50.6 | | 51.1 | −0.5 | −5 | 5.5 | 6.4 | −0.9 | −1 |
| 21 0 2.5 | 5.5 | | | | | | | |
| 4.7 | | 21h 0 4.6 | +0.1 | +1 | 3.5 | 4.4 | −0.9 | −2 |
| 35.8 | 3.5 | | | | | | | |
| 47.3 | | 47.2 | +0.1 | +1 | 6.5 | 7.2 | −0.7 | 0 |
| 1 3.5 | | 1 2.4 | +1.1 | +11 | 0.7 5.1 | 6.4 | −1.3 | −6 |
| 7.8 | | 7.4 ~~+0.4~~ | | | 4.1 | 8.2 | [−4.1] | |
| 19.1 | 5.2 | | | | | | | |
| 24.1 | 2.6 | 23.6 | | | | 10.6 | | |
| 31.0 | | | | | 4.0 | | | |
| 32.6 | 5.1 7.0 | | | | | | | |
| 38.8 | 4.0 | | | | | | | |
| 49.8 | | | | | 4.2 | | | |
| 56.7 | 4.0 | 5.5 ~~+0.5~~ | | ~~+0.063~~ | | 9.6 | | |
| ~~2 28.0~~ 2 23.5 | | 2 22.6 +0.4 | | | 4.2 | 10.2 | −0.3 | +4 |
| | | 23.5 | 0.0 | −1 | 9.9 | 4.6 | −0.4 | +3 |
| 42.8 | 4.2 | | | | | | | |
| 54.7 | 9.9 | | | | | | | |
| 3 3.6 | | 3 3.4 | +0.2 | +1 | 4.0 | 4.2 | −0.2 | +5 |
| 15.3 | | 14.6 | +0.7 | +6 | 4.0 | 4.8 | −0.8 | −1 |
| 17.0 | 4.0 | 15.4 | −0.1 | −2 | 1.5 | 2.3 | −0.8 | −1 |
| 27.4 | 4.0 | | | | | | | |
| 30.8 | 1.5 | | | | | | | |
| B 4 0.0 | | | | | 5.0 | | | |
| 6.3 | | 4 6.1 | +0.2 | +1 | 2.0 | 2.6 | −0.6 | 0 |
| 8.1 | 5.0 | | | | | | | |
| 16.9 | 2.0 | | | | | | | |
| 24.5 | | 24.8 | 0.0 | −1 | 7.0 | 7.6 | −0.6 | 0 |
| | | 28.0 | | +99 −83 | | 4.1 | | +161 −99 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



15.0

12.3

11.9

31.1

29.1

8.8

6.9

19.8

31.2

13.4

12.1

13.8

8.1

10.6

14.3

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nr. 4, 1852.

| | Transit | Est: | α | γ - α | | Est: | δ | δ δ |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | +161 −99 |
| | 21h 4m 39.1 | 7.0 | | | +99 −83 | | | |
| | 48.0 | | | | | 0.6 dkl. | | |
| | 58.7 | 0.6 | | | | | | |
| B | 5 48.0 | | 21h 5m 48.3 | −0.3 | −4 | 10.0 | 10.3 | −0.3 +3 |
| | 6 5.8 | | 6 5.8 | 0.0 | −1 | 10.0 | 10.0 | 0.0 +6 |
| | 14.0 | | 14.1 | +1.1 +0.12 −0.1 | −2 | 9.9 | 9.7 | +0.2 +4 |
| | 17.5 | 10.0 | | | | | | |
| | 22.3 | 10.0 | | | | | | |
| | 34.3 | 9.9 | | | | | | |
| A | 7 32.8 | | 7 32.5 | +0.3 | +2 | 4.8 | 5.2 | −0.4 +2 |
| | 37.8 | | 37.1 | +0.7 | +6 | 5.0 | 5.7 | −0.7 −1 |
| | 46.5 | 5.0 | | | | | | |
| | 53.3 | | 53.2 | +0.1 | 0 | 10.0 | 10.3 | −0.3 +3 |
| | | | 59.1 | | | | 0.4 | |
| | 59.4 | 4.8 | | | | | | |
| | 8 4.2 | | | +2.2 +2.6 | | 2.5 | | −12.1 |
| | 6.3 | 10.0 | | | | | | |
| | 9.4 | 2.5 | | | | | | |
| | 11.9 | | 8 11.9 | 0.0 | −1 | 7.5 | 8.2 | −0.7 −2 |
| | 18.0 | | 14.1 | −0.1 | −2 | 6.0 | 6.8 | −0.8 −3 |
| | 20.8 | 7.5 | | | | | | |
| | 26.0 | | 25.8 | +0.2 | +1 | 1.0 | 1.3 | −0.3 +2 |
| | 36.6 | 6.0 | | | | | | |
| | 43.8 | | 44.0 | −0.2 | −3 | 7.3 | 7.8 | −0.5 0 |
| | 52.1 | 1.0 | | | | | | |
| | 9 4.4 | 6.0 | | | | | | |
| | 13.5 | | 9 13.0 | +0.5 +1.4 +0.16 | | 5.4 | 6.1 | −0.7 −2 |
| | 17.0 | | 16.8 | +0.2 | +1 | 4.5 | 4.8 | −0.3 +2 |
| | 27.7 | 5.4 | | | | | | |
| | 42.5 | | 42.2 | +0.3 | +2 | 2.5 | 3.0 | −0.5 0 |
| | | | | | | | | +182 −107 |
| | 45.0 | 4.7 | | | | | | |
| | | | 55.4 | +111 | −96 | | 11.1 | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



10.7

29.5
16.5
20.3

26.6
8.7

13.0

5.2

8.9
18.6

26.1

20.6?

14.2
28.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nr. 4, 1882.

| | Transit | Est. | α | γ-α | | Est. | δ | ε-δ | |
|---|---|---|---|---|---|---|---|---|---|
| | 21h 10m 14.9 | | 21h 10m 14.8 | +0.1 | +111 −96 | 9.9 | 10.0 | −0.1 | +183 −107 +4 |
| | 21.3 | | 21.2 | +0.1 | −1 | 2.2 | 2.9 | −0.7 | −2 |
| | 35.1 | 2.2 | | | | | | | |
| | 45.8 | 9.9 | | | | | | | |
| | 48.7 | | 48.2 | +0.5 | +3 | 2.4 | 3.3 | −0.9 | −4 |
| | 50.0 | | 49.5 | +0.5 | +3 | 7.0 | 7.8 | −0.8 | −3 |
| 11 | 9.1 | 7.0 | | | | | | | |
| | 14.1 | 2.4 | | | | | | | |
| B 12 | 5.8 | | 12 5.5 | +0.3 | +1 | 7.8 | 9.0 | −1.2 | −8 |
| | 6.3 8.8 | | 6.1 | +0.2 | 0 | 7.3 | 7.9 | −0.6 | −2 |
| | | | 8.9 | −0.1 | −3 | 0.4 | 1.1 | −0.7 | −3 |
| | 16.7 | 7.8 | | +2.1 | 0.25 | | | | |
| | 18.8 | 0.4 | | | | | | | |
| | 25.3 5 8.2 | 7.2 | | | | | | | |
| A 13 | 3.3 | | 58.0 | +0.2 | 0 | 9.0 | 9.4 | −0.4 | 0 |
| | | | 13 3.5 | −0.2 | −4 | 2.3 | 3.0 | −0.7 | −3 |
| | 14.9 | 2.3 9.6 | | | | | | | |
| | 23.8 | | 23.9 | −0.1 | −3 | 10.0 | 10.2 | −0.2 | +2 |
| | 30.1 | | 29.9 | +0.2 | 0 | 7.2 | 7.5 | −0.3 | +1 |
| | 36.4 | | 36.2 | +0.2 | 0 | 1.0 | 1.4 | −0.4 | 0 |
| | 38.0 | 10.0 | | | | | | | |
| | 46.0 | | 46.1 | −0.1 | −3 | 6.0 | 6.9 | −0.9 | −5 |
| | 57.2 | 0.3 | | | | | | | |
| | 59.3 | 7.0 6.0 | | | | | | | |
| 14 | 17.0 | | 14 16.8 | +0.2 | 0 | 0.0 | 0.0 | 0.0 | +4 |
| | 24.5 | 0.0 | | | | | | | |
| | 26.1 | | 26.5 | −0.4 | −6 | 4.9 | 5.3 | −0.4 | 0 |
| | 34.8 | | 34.5 | +0.3 | +1 | 7.5 | 8.1 | −0.6 | −2 |
| | 36.7 | 4.9 | | | | | | | |
| | 48.4 | | 48.1 | +0.3 | +1 | 8.5 | 8.9 | −0.4 | 0 |
| | 59.7 | 7.5 | | +0.6 | | | | | |
| | | | | | +120 −117 | | | | +194 −139 |

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30.9
13.8

25.4
13.1

10.9
19.0
10.0

16.7
11.6

14.2
29.2
20.8

13.3

7.5

10.6
18.9

13.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 4, 1882.

| Transit- | Est. | α | γ - α | | Est. | δ | δ - δ |
|---|---|---|---|---|---|---|---|
| | | | | | | | +194 −139 |
| 21h 15m 1.6 | 8.0 | | | +120 −117 | | | |
| 5.3 | | | | | 2.5 | | |
| 14.0 | 2.5 | | | | | | |
| 39.6 | | 21h 15m 39.3 | +0.3 | +1 | 2.8 | 8.5 | −0.7 −3 |
| 45.0 | | 45.1 | −0.1 | −3 | 9.5 | 9.5 | 0.0 +4 |
| 56.2 | 2.8 | | | | | | |
| 58.7 | 9.5 | | | | | | |
| 16 6.8 | | 16 6.5 | +0.3 | +1 | 9.7 | 9.4 | +0.3 +6 |
| 15.4 | | 15.1 | +0.3 | +1 | 9.9 | 9.8 | +0.1 +4 |
| 22.4 | 9.7 | | | | | | |
| 28.5 | 9.9 | | | | | | |
| 42.6 | | 42.5 | +0.1 | −1 | 7.0 | 7.3 | −0.3 0 |
| 50.3 | | 50.4 | −0.1 | −3 | 5.0 / 7.4 | 5.1 | −0.1 +2 |
| 53.7 | 7.0 | | | | | | |
| 58.7 | 5.0 / 7.4 | | | | | | |
| 17 7.3 | | 17 7.2 | +0.1 | −1 | 10.1 | 10.4 | −0.3 0 |
| 25.8 | 10.1 | | | | | | |
| 32.1 | | | | | 5.1 | | |
| 35.7 | | 35.8 | −0.1 | −3 | 4.8 | 4.8 | 0.0 +3 |
| 45.8 | 5.1 / 4.8 | | | | | | |
| 48.7 | | 48.8 | −0.1 / +3.8 | −3 | 5.5 | 6.5 | −1.0 −7 / −15.1 |
| 18 5.3 | 5.5 | | | | | | |
| 26.6 | | 18 26.9 | −0.3 / +0.4 | −4 | 0.1 | 0.3 | −0.2 +1 |
| 37.4 | 0.1 | | | | | | |
| 42.2 | | 42.1 | +0.1 | −1 | 7.0 | 7.0 | 0.0 +3 |
| 55.8 | 7.0 | | | | | | |
| A 19 25.6 | | 19 25.1 | +0.5 | +2 | 4.8 | 4.5 | +0.3 +6 |
| 45.3 | 4.8 | | | +125 −137 | | | |

+223 −149

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



8.7

16.6

13.7

15.6

13.1

11.1

8.4

5.0

18.5

13.7

10.1

16.6

10.8

13.6

19.7

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1882phae.proj.1431.



Nov. 4, 1882.

| Transit | Est: | α | γ − α | Est: | δ | Ø − δ |
|---|---|---|---|---|---|---|
| | | | | | 10.7 | +223 −149 |
| 21d 21m 45.7 | rej | 21h 21m 38.5 | +125 −137 | | | |
| 46.5 | | 46.6 | −0.1 −4 | 1.8 | 1.7 | +0.1 +3 |
| 52.3 | | 52.1 | +0.2 −1 | 8.0 dbl. | 8.5 | −0.5 −3 |
| 58.6 | 1.8 | | | | | |
| 22 6.7 | | 22 6.1 | +0.6 +3 | 4.0 | 4.7 | −0.7 −5 |
| 10.8 | 8.0 | | | | | |
| 16.7 | 4.0 | | | | | |
| 33.0 | | 32.6 | +0.4 +1 | 0.1 | 0.5 | −0.4 −2 |
| 44.8 | | 44.3 | +0.5 +2 | 10.0 | 9.3 | +0.7 +9 |
| 49.3 | 0.1 | 49.4 | | | 1.8 | |
| 23 13.3 | | | | 7.5 | | |
| 15.5 | 10.0 | | | | | |
| 22.8 | | 23 23.5 | ~~−0.7~~ −10 | 8.0 | 5.6 | [+2.4] |
| | | | ~~+1.5 +2.4~~ | | | |
| 23.5 | 7.5 | | | | | |
| 32.1 | 4.0 | | | | | |
| 57.3 | | | | 2.0 | | |
| 53.8 | | | | 5.0 | | |
| 57.4 | 2.0 | | | | | |
| 59.2 | | 59.0 | +0.2 −1 | 4.7 | 6.1 | +0.1 +3 |
| 24 0.8 | | 24 0.4 | +0.4 +1 | 6.2 | 4.9 | −0.2 0 |
| | | | +132 −153 | | | |
| 6.7 | 5.0 | | | | | |
| 13.8 | 4.7 / 6.2 | | | | | |
| 36.0 | | | | 2.2 | | |
| 41.1 | | | | 2.0 | | |
| 47.1 | 2.2 | | | | | |
| 49.5 | 2.0 | | | | | |
| B | | | | | | |
| 25 46.3 | | | | 10.1 | | |
| 54.1 | 10.1 | | | | | |

+238 −159

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1882phae.proj.1431.



12.1
18.5

10.0

16.3
30.7

10.2
9.3

6.1
12.9

14.6
13.0

11.1
8.4

7.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 4, 1882.

| Transit. | Est. | α | γ - α | Est. | δ | C - δ |
|---|---|---|---|---|---|---|
| 21h 26m 14s | | 21h 26m | +132 -153 | 0.5 | | +238 -157 |
| 22.6 | 0.5 | | | | | |
| 28.9 | | | | 1.0 | | |
| 30.0 | | 29.5 | +0.5 +2 | 8.5 | 9.0 | -0.5 -4 |
| 45.8 | 1.0 | | | | | |
| 48.3 | | 47.7 | +0.6 +3 | 0.2 | 0.3 | -0.1 0 |
| 59.7 | 8.5 | 52.7 | | | 0.4 | |
| 27 9.8 | 0.2 | | | | | |
| 43.1 | | 27 43.1 | 0.0 -4 | 8.3 | 8.8 | -0.5 -4 |
| 51.1? | 8.3 | | ~~+3.6~~ 2.9 | | | -1.9 |
| | | 10.1 | | | 0.6 | |
| 28 19.0 | | 28 18.3 | +0.7 +3 | 2.2 | 2.0 | +0.2 +3 |
| 21.4 | | 20.6 | +0.8 +4 | 4.0 | 4.3 | -0.3 -2 |
| 25.8 | 2.2 | | | | | |
| 28.9 | 4.0 | | | | | |
| 35.9 | | 35.7 | +0.2 -2 | 5.0 | 5.1 | -0.1 0 |
| 46.7 | | | ~~+3.4 +0.43~~ | 2.5 | | |
| 52.0 | 5.0 | | | | | |
| 58.3 | 2.5 | | | | | |
| 29 18.2 | | 29 17.5 | +0.7 +3 | 7.0 | 7.4 | -0.4 -3 |
| 20.0 | | 19.6 | +0.4 0 | 5.5 | 6.2 | -0.7 -6 |
| 26.5 | | 26.7 | -0.2 -6 | 8.0 | 8.7 | -0.7 -6 |
| 32.3 | | 31.6 | +0.7 +3 | 1.8 | 2.0 | -0.2 -1 |
| 42.1 | 5.0 / 9.0 | | | | | |
| 47.3 | 7.0 | | | | | |
| 55.3 | 2.0 | | | | | |
| 30 14.3 | | 30 13.7 | +0.6 +2 | 4.0 | 4.4 | -0.4 -4 |
| 23.6 | 4.0 | | | | | |
| 24.8 | | 24.4 | ~~+0.4~~ 0 | 7.0 | 0.0 | [7.0] |
| 32.6 | 7.0 | | | | | |
| 35.9 | | 34.7 | +0.6 +2 | 7.5 | 7.6 | -0.1 -1 |
| | | | +154 -165 | | | +241 -190 |

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7.8

16.9

29.7

21.5

8.0

6.0

7.5

16.1

11.6

29.1

22.1

15.6

23.0

8.7

7.8

17.1

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1882phae.proj.1431.



Nr. 4, 1882.

| Transit | Est. | α | γ − α | Est. | δ | Est. − δ |
|---|---|---|---|---|---|---|
| | | | +154 −165 | | | +241 −190 |
| 21h 30m 52.4 | 7.5 | | | | | |
| 31 18.0 | | 21h 31m 17.57 | +0.3 −1 | 6.0 | 5.9 | +0.1 +1 |
| 21.3 | | 21.0 | +0.3 −1 | 7.8 | 8.1 | −0.3 −3 |
| 25.7 | 6.0 | | | | | |
| 32.1 | 7.8 | | | | | |
| 39.0 | | 38.7 | +0.3 −1 | 1.9 | 2.5 | −0.6 −6 |
| 53.5 | 1.9 | | ~~+4.1~~ | | | |
| 32 7.0 | | 32 6.5 | +0.5 +1 | 5.0 | 5.0 | 0.0 0 |
| 25.3 | 5.0 | | | | | |
| B 33 5.3 | | 33 4.7 | +0.6 +2 | 7.6 | 7.5 | +0.1 +1 |
| 23.5 | | 22.8 | +0.7 +3 | 7.0 | 6.6 | +0.4 +4 |
| 25.6 | 7.6 | | | | | |
| 36.1 | 7.0 | | | | | |
| | | 36.6 | | | 8.5 | |
| 34 46.8 | | 34 46.8 | 0.0 −4 | 2.5 | 2.4 | +0.1 +1 |
| 55.0 | | 54.6 | +0.4 0 | 9.9 | 9.6 | +0.3 +3 |
| 35 0.0 | 9.9 | | | | | |
| 4.6 | 2.5 | | | | | |
| 36 55.5 | | 36 54.9 | +0.6 +1 | 10.0 | 9.9 | +0.1 +2 |
| 37 11.3 | 10.0 | | | | | |
| 48.1 | | 37 47.9 | +0.2 −3 | 7.3 | 7.0 | +0.3 +2 |
| 38 10.4 | 7.3 | 38 55.6 | ~~+8.4~~ 8.8 | | 10.9 | −2.2 |
| 39 9.0 | | 39 8.5 | +0.5 0 | 9.8 | 9.2 | +0.6 +5 |
| 26.7 | | | ~~+2.5 +0.44~~ | 4.0 | | |
| 30.7 | 9.8 / 4.0 | | | | | |
| 48.3 | | 42.5 | +0.8 +3 | 5.0 | 4.9 | +0.1 0 |
| 58.8 | 5.0 | | | | | |
| 40 18.8 | | 40 14.5 | +0.3 −2 | 10.0 | 9.5 | +0.5 +3 |
| 21.6 | | 20.8 | +0.8 +3 | 7.4 | 7.4 | 0.0 −2 |
| 27.6 | 10.0 | | +167 −177 | | | |
| 36.5 | 7.4 | | | | | +261 −207 |

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1882phae..proj.1431.



7.7
10.8

14.5

18.3

20.3
12.6

17.8
5.0

15.8

23.3

21.7
4.0

15.5

8.8
14.9

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1882phae.proj.1431.



Nr. 4, 1882.

| Transit - | Est: | α | | α-α | | Est: | δ | δ-δ | |
|---|---|---|---|---|---|---|---|---|---|
| 21h 42m 37.2s | | 21h | 42m 37.0s | +0.2 | +167 -177 -3 | 0.7 | 0'6 | +0.1 +261 | -201 -1 |
| 43 0.5 | 0.7 | | | | | | | | |
| 2.5 | | | 43 2.0 | +0.5 | 0 | 0.8 | 0.9 | -0.1 | -3 |
| 4.5 | | | 3.7 | +0.8 | +3 | 5.3 | 5.4 | -0.1 | -3 |
| 8.8 | 0.8 | | | | | | | | |
| 13.0 | 5.3 | | | | | | | | |
| 41.7 | | | 41.2 | +0.5 | 0 | 5.2 | 5.2 | 0.0 | -2 |
| 48.8 | | | 48.3 | +0.5 | 0 | 8.3 | 8.3 | 0.0 | -2 |
| 53.9 | 5.2 | | | | | | | | |
| 58.8 | | | 58.2 | +0.6 | +1 | 0.2 | 0.6 | -0.4 | -6 |
| 44 0.7 | 8.3 | | | | | | | | |
| 4.1 | | | 44 3.7 | +0.4 | -2 | 2.4 | 2.6 | -0.2 | -4 |
| 16.9 | 0.2 | | | +5.1 | | | | | |
| 26.7 | 2.4 | | | | | | | | |
| 55.8 | | | 55.3 | +0.5 | -1 | 8.0 | 8.0 | 0.0 | -2 |
| 45 10.3 | 8.0 | | | | | | | | |
| 33.4 | | | 45 32.2 | +1.2 | +6 | 3.0 | 3.1 | -0.1 | -3 |
| 33.8 | | | 33.0 | +0.8 | +2 | 0.2 | -0.7 | +0.9 | +7 |
| 46.5 | 3.0 0.2 | | | | | | | | |
| 46 35.8 | | | | | | 0.3 | | | |
| 43.2 | | | | | | 4.0 | | | |
| 44.5 | 0.3 | | | | | | | | |
| 51.3 | 4.0 | | | | | | | | |
| 56.8 | | | | | | 9.5 | | | |
| 58.7 | | | 46 58.4 | +0.3 | -3 | 1.5 | 1.9 | -0.4 | -7 |
| 47 10.4 | 9.0 | | | | | | | | |
| 10.9 | | | | | | | | | |
| 14.3 | 1.5 | | | | | | | | |
| 23.0 | | | 47 22.3 | +0.7 | +1 | 0.2 | 0.4 | -0.2 | -3 |
| 32.9 | | | 32.2 | +0.7 | +1 | 6.0 | 5.9 | +0.1 | -2 |
| | | | | +181 | -176 | | | +268 | -241 |

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1882phae.proj.1431.



23.3

6.3

8.5

12.2

11.9

18.1

22.6

14.5

13.1

12.7

8.7

8.1

13.6

15.6

11.0

10.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov 4, 1882.

| Transit- | Est: | α | γ − α | Est: | δ | δ − δ |
|---|---|---|---|---|---|---|
| 21h 47m 34.0 | 0.2 | | | | | +268 −241 |
| 43.4 | 6.0 | | +10.1 +8.9 +1.1 −186 | | | +0.8 |
| 48 19.7 | | 21h 48m 19.2 | +0.5 −1 | 10.3 | 10.3 | 0.0 −3 |
| 49 27.8 | | 49 27.3 | +0.5 −1 | 4.8 | 4.1 | +0.7 +4 |
| 45.2 | | 44.1 | +1.1 +5 | 10.4 | 10.2 | +0.2 −1 |
| 49.8 | 4.8 | | | | | |
| 55.0 | | 54.6 | +0.4 −2 | 10.4 | 10.1 | +0.3 0 |
| 50 29.8 | | 50 29.4 | +6.7 +0.4 −2 | 10.0 | 9.1 | +0.9 +6 |
| 47.7 | 10.0 | | | | | |
| 51 2.7 | | 51 2.3 | +0.4 −2 | 7.5 | 7.3 | +0.2 −2 |
| 6.0 | | 5.6 | +0.4 −2 | 4.7 | 4.2 | +0.5 +1 |
| 12.4 | | | | 9.8 | | |
| 15.8 | 7.0 | | | | | |
| 21.6 | 5.0 3.0 | | | | | |
| 35.9 | | 35.1 | +0.8 +2 | 10.2 | 9.8 | +0.4 0 |
| 38.8 | | 38.0 | +0.8 +2 | 3.0 | 3.9 | −0.9 −13 |
| 47.3 | 10.2 | | | | | |
| 55.4 | 3.0 | | | | | |
| 58.3 | | | | 3.2 | | |
| 52 5.5 | 3.2 | | | | | |
| 24.0 | | 52 23.3 | +0.7 0 | 2.7 | 2.9 | −0.2 −6 |
| 30.5 | | 29.9 | +0.6 −1 | 10.2 | 10.0 | +0.2 −2 |
| 42.0 | 3.0 | | | | | |
| 45.7 | 10.2 | | | | | |
| 52.1 | | 51.6 | +0.5 −2 | 3.3 | 3.1 | +0.2 −2 |
| 53 3.5 | | 53 3.1 | +0.4 −3 | 3.5 | 3.4 | +0.1 −3 |
| 7.4 | 3.3 | | | | | |
| 16.0 | | 15.3 | +0.7 0 | 4.5 | 3.8 | +0.7 +3 |
| 19.8 | 3.8 | | +5.7 | | | |
| 27.5 | | 26.5 | +1.0 +3 | 8.0 | 8.1 | −0.1 −5 |
| | | | +193 −202 | | | +282 −378 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



22.0

17.9

13.1

15.6

9.2

11.4

16.6

7.2

18.0

15.2

15.3

16.3

17.3

31.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 4. 1882.

| | Transit | Est: | α | γ − α | Est: | δ | ε − δ | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | +282 −278 | |
| | 21h 5m 33.3s | 4.8 | | +193 −202 | | | | |
| | 37.0 | | | | 5.9 | | | |
| | 48.2 | | | | 10.0 | | | |
| | 50.5 | 5.0 | | | | | | |
| | 57.0 | 8.0 | | | | | | |
| | 54 1.5 | 10.0 | | | | | | |
| | 8.5 | | | | 0.2 | | | |
| | 10.6 | | | | 7.4 | | | |
| | 21.0 | 0.2 | | | | | | |
| | 26.5 | 7.4 | | | | | | |
| | 34.7 | | 21h 54m 33.8 | +0.9 +2 | 7.8 | 7.7 | +0.1 | −3 |
| | 34.1 | 7.8 | | | | | | |
| | 56.1? | | | | | | | |
| B | 55 19.7 | | 55 19.4 | +0.3 −4 | 7.2 | 6.6 | +0.6 +2 | |
| | 30.6 | | | | 8.6 | | | |
| | 38.3 | | | | 7.0 | | | |
| | 42.0 | 7.2 | | | | | | |
| | 49.0 | 8.0 7.0 | | | | | | |
| | 58.6 | | 57.6 | 1.0 +3 | 10.1 | 9.4 | +0.7 +3 | |
| | 56 13.0 | 10.0 | | | | | | |
| | 17.8 | | | | 6.0 | | | |
| | 21.4 | | 56 20.5 | +0.9 +2 | 5.5 | 5.4 | +0.1 | −3 |
| | 25.2 | 6.0 | | | | | | |
| | 40.4 | 5.5 | | | | | | |
| A | 57 ~~3.6~~ | | | | | | | |
| | 38.3 | | 57 37.6 | +0.7 0 | 10.2 | 9.7 | +0.5 0 | |
| | 50.3 | 10.2 | | | | | | |
| | 58 5.4 | | 58 4.9 | +0.5 −2 | 6.8 | 6.0 | +0.8 +3 | |
| | 8.3 | | | | | | | |
| | 17.5 | | | 16.6 +0.9 +2 | 0.0 | 0.0 | 0.0 | −5 |
| | | | | +202 −204 | | | +290 −289 | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



13.5
13.3

12.5
15.9

19.4

22.3
18.4
10.7

14.4

7.9
19.0

12.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 4, 1882.

| Transit | Est. | α | γ − α | Est. | σ | δ − δ |
|---|---|---|---|---|---|---|
| $21^h\,58^m\,21^s.8$ | | | +202 −208 | 8.2 / 9.0 | | +290 −289 |
| 30.4 | 2.0 / 9.0 | | | | | |
| 36.3 | | $21^h\,58^m\,35^s.8$ | +0.5 −2 | 2.4 | $1^s.8$ | +0.6 −1 |
| 38.7 | 2.0 / 5.0 | | 6.7 ~~0.74~~ | | | |
| 55.1 | 2.4 | | | | | |
| 13 5.9 29.6 | | | | | | |
| 30.6 | | | | | | |
| A: | | | 14.9 +202 −210 | | | +6.6 |

+290 −290

±.286

No + 58 No − 90

No 25

203

203) 58.0 (.286

406

174

1624

116

12 18

1882phae.proj.1431.



8.6

188

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 16, 1882.

| Transit - | Est: | α | γ - α | Est: | δ | δ - δ |
|---|---|---|---|---|---|---|
| 21h 28m 14.2 | | 21h 28m 10.1 | | -0.3 | 0.6 | -0.9 1.0 |
| 18.7 | | 18.3 | +0.4 +6 | 1.5 | 2.0 | -0.5 +0.4 |
| 21.0 | -0.3 | 20.6 | +0.4 +6 | 3.5 | 4.3 | -0.8 +0.1 |
| 24.6 | 1.5 | | | | | |
| 32.5 | 3.5 | | | | | |
| 36.0 | | 35.7 | +0.3 +5 | 4.3 | 5.1 | -0.8 +0.1 |
| 46.3 | | | | 2.0 | | |
| 56.7 | 4.3 | | | | | |
| 29 7.5 | | | | | | |
| 18.1 | | 29 17.5 | +0.6 | 6.5 | 7.4 | -0.9 0.0 |
| 19.9 | | 19.6 | +0.3 | 6.5 | 6.2 | -0.7 +0.2 |
| 26.4 | | 26.7 | +0.3 | 7.7 | 8.7 | -1.0 -0.1 |
| 31.8 | | 31.6 | +0.2 | 1.5 | 2.1 | -0.5 +0.4 |
| 45.8 | 5.5 | | | | | |
| 49.1 | 7.6 | | | | | |
| 54.0 | 6.5 | | | | | |
| 30 8.5 | 1.5 | | | | | |
| | | 13.7 | | | 7.4 | |
| 28.5 | | 30 24.4 | ~~-0.9~~ ~~+0.0~~ +0.13 | 10.2 | 6.0 | [10.2] |
| 35.1 | | 34.7 | +0.4 | 6.8 | 7.6 | -0.8 +0.1 |
| 47.9 | 10.2 | | | | | |
| 31 1.0 | 6.8 | | | | | |
| 18.2 | | 31 17.7 | +0.5 | 5.0 | 5.9 | -0.9 0.0 |
| | | 21.0 | | | 8.1 | |
| 39.3 | | 38.7 | +0.6 | 0.5 | 2.5 | -2.0 -1.1 |
| 40.8 | 5.0 | | | | | |
| 32 2.9 | 0.5 | | | | | |
| 7.1 | | 32 6.5 | +0.6 | 4.0 | 5.0 | -1.0 -0.2 |
| 34.0 | 4.0 | | | | | |
| A 33 5.0 | | 33 4.7 | +0.3 | 6.7 | 7.4 | -0.7 +0.1 |
| 23.6 | | 22.8 | +0.8 | 5.8 | 6.6 | -0.8 0.0 |
| 51.0 | 6.7 | | | | | -14 +14 |
| 44.0 | 5.8 | | | | | |

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1882phae.proj.1431.



6.8

5.9
11.5

20.7

35.9
25.9
0.1 22.7
31.7

24.4
25.9

22.6
1 22.6

.2 26.9

26.0
20.4

14

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Nov. 16, 1882.

| Transit. | Est: | α | γ−α | Est: | δ | δ−δ |
|---|---|---|---|---|---|---|
| | | 36.s6 | | | 8.5 | +14 −14 |
| 21h 34m 47.s4 | | 21h 34m 46.8 | +0.6 +7 | 1.8 | 2.4 | −0.6 +2 |
| 55.1 | | 54.6 | +0.5 +6 | 8.3 | 9.6 | −1.3 −5 |
| 35 8.8 | 8.3 | | ~~+4.3 +0.54~~ | | | |
| 15.2 | 1.8 | | | | | |
| 36 53.7 | | 36 54.9 | +0.8 +9 | 9.0 | 9.9 | −0.9 −2 |
| 37 21.0 | 9.0 | | | | | |
| 48.1 | | 37 47.9 | +0.2 +3 | 6.0 | 7.0 | −1.0 −3 |
| 38 15.8 | 6.0 | | ~~+7.2~~ 6.3 | | | −16.1 |
| 56.1 | | 38 55.6 | +0.5 +6 | 10.0 | 10.9 | −0.9 −2 |
| 39 9.0 | | 39 8.5 | +0.5 +6 | 8.2 | 9.2 | −1.0 −3 |
| 17.5 | 10.0 | | | | | |
| 34.9 | 8.2 | | | | | |
| 43.8 | | 42.5 | +0.8 +9 | 4.5 | 4.9 | −0.4 +3 |
| 40 8.3 | 4.5 | | | | | |
| 18.4 | | 40 18.5 | +0.3 +3 | 4.8 | 9.6 | −0.8 −2 |
| 19.0? | | | | | | |
| 21.0 | | 20.8 | +0.2 +2 | 7.0 | 7.4 | −0.4 +2 ~~−2~~ |
| 36.9 | 8.8 | | | | | |
| 44.0 | 7.0 | | | | | |
| 42 37.4 | | 42 37.0 | +0.4 +4 | −0.1 | 0.6 | −0.7 −1 |
| 43 2.0 | | 43 2.0 | 0.0 0 | 0.0 | 0.9 | −0.9 −3 |
| 4.2 | | 3.7 | +0.5 +5 | 4.9 | 5.4 | −0.5 +1 |
| 9.0 | 0.0 | | ~~+4.2~~ | | | |
| 14.0 | −0.1 | | | | | |
| 21.0 | 4.9 | | | | | |
| 42.0 | | 41.2 | +0.8 +8 | 4.8 | 5.2 | −0.4 +2 |
| 48.9 | | 48.3 | +0.6 +6 | 7.8 | 8.3 | −0.5 +1 |
| 58.4 | | 58.2 | +0.2 +2 | 0.0 | 0.6 | −0.6 00 |
| | | | | | | +25 −35 |

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27.8
13.7

25.3

27.7

21.7
25.9

25.0

18.1

23.0

36.6
7.0
16.8

24.1
21.1
27.3

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 16, 1882.

| Transit- | Est: | $\alpha$ | $\gamma-\alpha$ | Est: | $\delta$ | $\delta-5'$ +25 -35 |
|---|---|---|---|---|---|---|
| $21^h 44^m 4^s.1$ | | $21^h 44^m 3^s.7$ | +0.4 | 2.4 | 2,6 | -0.2 +3 |
| 6.1 | 4.4 | | | | | |
| 10.0 | 8.0 | | | | | |
| 21.3 | | | | 7.3 | | |
| 25.7 | 0.0 | | | | | |
| 36.0 | 7.3 / 2.0 | | | | | |
| 56.0 | | 55.3 | +0.7 | 7.5 | 8.0 | -0.5 00 |
| 45 13.5 | 7.5 | | | | | |
| 33.5 | | 32.2 | | 2.5 | 3.1 | -0.6 -1 |
| | | 45 33.0 | +0.5 | -0.3 | -0.7 | +0.4 +9 |
| 50.2 | -0.3 | | | | | |
| 52,8 | 2.5 | | | | | |
| 13 46 57.0 | | | | 8.3 | | |
| 59.1 | | 46 58.4 | +0.7 | 1.8 | 1.9 | -0.1 +4 |
| 47 15.9 | 1.8 | | | | | |
| 17.5 | 8.3 | | | | | |
| | | 22.3 | | | 0.4 | |
| 32.9 | | 47 32.2 | +0.7 | 5.5 | 5.9 | -0.4 +1 |
| 42.5 | | | +~~1.6~~ ~~0.5~~ | 6.0 | | |
| 51.0 | 5.5 | | | | | |
| 56.7 | 6.0 | | | | | |
| | | | +7.8 | | | -8.5 |
| 48 0.6 | | 48 | | 0.5 | | |
| 14.5 | 0.5 | | | | | |
| 19.9 | | 19.2 | +0.7 | 9.7 | 10,3 | -0.6 -1 |
| 43.9 | 9.7 | | | | | |
| 49 28.0? | | 49 27.3 | +0,7 | 9.9 | 4.1 | -0.2 +3 |
| 44.9 | | 44.1 | +0.8 | 9.8 | 10.2 | -0.4 +1 |
| 55.1 | | 54.6 | +0.5 | 9.8 | 10.1 | -0,3 +2 |
| 58.3 | 3.9 | | | | | |
| 50 8.9 | 9.8 | | | | | |
| 17.7 | 9.8 | | | | | |
| 30.0 | | 50 27.4 | +0.6 | 8.2 | 9.1 | -0.9 -5 |
| 55.1 | 8.2 | | | | | +45 -42 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



31.9

14.7

17.5

18.8?
16.7

20.5
16.8

18.1
14.2

13.9

24.0

30.3
24.0
22.6

25.1

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 16. 1882.

| Transit. | Est. | α | 2-α | Est. | δ | δ-δ +44 -42 |
|---|---|---|---|---|---|---|
| 21h 51m 3.0 | | 21h 51m 2.3 | +0.7 | 7.0 | 7.3 | -0.3 +1 |
| 6.0 | | 5.6 | +0.4 | 4.0 | 4.2 | -0.2 +2 |
| 23.5 | 4.0 7.0 | | | | | |
| 35.9 | | 35.1 | +0.8 | 9.6 | 9.4 | -0.2 +2 |
| 38.8 | | 38.0 | +0.8 | 2.5 | 3.9 | -1.4 -10 |
| 52 5.0 | 9.6 2.5 | | | | | |
| 23.9 | | 52 23.3 | +0.6 | 2.4 | 2.9 | -0.5 -1 |
| 30.8 | | 29.9 | ~~+0.6~~ +0.9 | 9.7 | 10.0 | -0.3 +1 |
| 52.2 | | 57.6 | +0.6 | 2.5 | 3.1 | -0.6 -2 |
| 54.8 | 9.7 | | | | | |
| 53 0.0 | 2.4 | | | | | |
| 3.5 | | 53 3.1 | +0.4 | 2.6 | 3.4 | -0.8 -4 |
| 16.0 | | 15.3 | +0.7 | 3.0 | 3.8 | -0.8 -4 |
| 19.0 | 2.5 | | | | | |
| 27.2 | | 26.5 | +0.7 | 7.5 | 8.1 | -0.6 -2 |
| 29.7 | 2.6 | | | | | |
| 37.0 | | | | 4.0 | | |
| 43.4 | 9.0 | | | | | |
| 48.2 | | | | 8.5 | | |
| 57.9 | 4.0 | | | | | |
| 54 10.5 | | | | 7.0 | | |
| 14.1 | 8.0 7.5 | | | | | |
| 34.5 | | 54 33.8 | +0.7 | 7.4 | 7.7 | -0.3 +1 |
| 36.0 | 7.0 | | | | | |
| A 55 3.7 | 7.4 | | | | | |
| 20.0 | | 55 19.4 | +0.6 | 6.0 | 6.6 | -0.6 -2 |
| 30.7 | | | | 7.5 | | +55 -67 |
| 38.4 | | | | 5.5 | | |
| 48.1 | 7.0 | | | | | |
| 55.9 | 8.0 | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



42

20.5
17.5

29.1
10 26.2

1 36.1
24.0
2 26.8

1 26.2
1 27.4

2 46.9

20.9

25.9

25.5

29.2

40.1
7 17.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 16, 1882.

| Transit | Sol: | α | γ − α | Sol: | δ | δ − δ | +55 | −67 |
|---|---|---|---|---|---|---|---|---|
| 21h 56m 58.3s | | 21h 55m 57.6s | +0.7 | 9.0 | 9.4 | −0.4 | 00 | −4 |
| 56 0.1 | 6.5 | | | | | | | |
| 21.0 | | 56 20.5 | +0.5 | 5.0 | 5.4 | −0.4 | | −1 |
| 25.2 | 9.0? | | | | | | | |
| 49.0 | 5.0 | | | | | | | |
| B 57 38.4 | | 57 37.6 | +0.8 +0.6 | 9.5 | 9.7 | −0.2 | +1 | |
| 58 5.6 | | 57 4.9 | +0.7 | 5.4 | 6.0 | −0.6 | | −3 |
| 8.6 | 9.5 | | | | | | | |
| 17.1 | | 16.6 | +0.5 | −0.2 | 0,0 | −0.2 | +1 | |
| 36.5 | | 35.8 | +0.7 | 2.0 | 1.8 | +0.2 | +3 | |
| 41.2 | 5.2 | | +1.9 +0.6 | | | | | |
| 45.1 | −0.2 | | | | | | | |
| 59 3.4 | 2.0 | | +15.1 | | | | +62 | −71 |
| 30.7 | | | | 8.0 | | | | |
| 50.1 | 3.0 | | | | | | | |
| A | | | | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



26.9

28.0

30.2

35.6

28.0

26.9

19.4

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 18, 1882.

| Transit- | Est. | α | γ − α | Est. | δ | ε − δ | |
|---|---|---|---|---|---|---|---|
| 21h 49m 43s.8 | | 21h 49m 44s.1 | −0.3 | 9.6 | 10.2 | −0.6 | +4 |
| 53.7 | | 54.6 | −0.9 | 9.6 | 10.1 | −0.5 | +5 |
| 50 0.4 | 9.6 | | | | | | |
| 8.8 | 9.6 | | | | | | |
| 29.0 | | 50 29.4 | −0.4 | 7.8 | 9.1 | −1.3 | −3 |
| 50.1 | 7.6 | | | | | | |
| 51 2.0 | | 51 2.3 | −0.3 | 6.3 | 7.3 | −1.0 | 0 |
| 5.0 | | 5.6 | −0.6 | 3.0 | 4.2 | −1.2 | −2 |
| 15.4 | 6.3 | | | | | | |
| 21.1 | 3.0 | | | | | | |
| 34.7 | | 35.1 | −0.4 | 8.5 | 9.8 | −1.3 | −3 |
| 38.0 | | 38.0 | 0.0 | 2.2 | 3.9 | −1.7 | −7 |
| 57.5 | 8.5 / 2.2 | | | | | | |
| 52 22.7 | | 52 23.3 | −0.6 | 2.3 | 2.9 | −0.6 | +3 |
| 29.7 | | 29.9 | −0.2 | 9.0 | 10.0 | −1.0 | −1 |
| 47.8 | 2.3 | | | | | | |
| 51.6 | | 51.6 | 0.0 / −3.7 | 2.4 | 3.1 | −0.7 | +2 |
| 52.8 | 9.0 | | | | | | |
| 53 2.3 | | 53 3.1 | −0.8 | 2.5 | 3.4 | −0.9 | 0 |
| 10.0 | 2.4 | | | | | | |
| 15.0 | | 15.3 | −0.3 | 2.8 | 3.8 | −1.0 | −1 |
| 22.0 | 2.5 | | | | | | |
| 26.0 | | 26.5 | −0.5 | 7.4 | 8.1 | −0.7 | +2 |
| 35.6 | | | | 9.9 | | | |
| 38.4 | 2.6 | | | | | | |
| 53.4 | 3.9 | | | | | | |
| 54 5.1 | 7.5 | | | | | | |
| 9.6 | | | | 5.8 | | | |
| 23.0 | 5.8 | | | | | | |
| 33.7 | | 54 33.8 | −0.1 | 7.0 | 7.7 | −0.7 | +2 |
| 50.6 | 7.0 | | | | | | +18 −17 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



16.6
15.1

21.1

13.4
16.1

22.8
19.5

25.1
23.1

18.4

19.7

23.4

27.4
17.8

13.4

16.9

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1882phae.proj.1431.



Nov. 18, 1882.

| Transit - | Est: | α | γ - α | Est: | δ | δ - δ | +18 -17 |
|---|---|---|---|---|---|---|---|
| 21h 55m 18.9 | | 21h 55m 19.4 | -0.5 | 5.5 | 6.6 | -1.1 | -2 |
| 42.2 | 5.5 | | | | | | |
| 57.1 | | 57.6 | -0.5 | 8.5 | 9.4 | -0.9 | 0 |
| 56 17.8 | 8.5 | | | | | | |
| 20.0 | | 56 20.5 | -0.5 | 4.6 | 5.4 | -0.8 | +1 |
| 38.1 | 4.6 | | | | | | |
| A 57 37.1 | | 57 37.6 | -0.5 | 8.8 | 9.7 | -0.9 | -1 |
| 58 0.8 | 8.8 | | | | | | |
| 4.6 | | 58 4.9 | -0.3 | 5.0 | 6.0 | -1.0 | -2 |
| 16.7 | | 16.6 | +0.1 | -0.4 | 0.0 | -0.4 | +4 |
| 35.9 | | 35.8 | +0.1 | 0.3 | 1.8 | -1.5 | -7 |
| 37.7 | 0.4 / 5.0 | | | | | | |
| 57.2 | 3.0 | | | | | | |
| 22h 0 19.0? | | | -1.5 | | | | |
| 29.0? | | | | | | | |
| 1 48.0 | | 22h 1m 48.2 | -0.2 | 5.5 | 6.4 | -0.9 | -1 |
| 59.9 | | 2 0.1 | -0.2 | 4.5 | 5.2 | -0.7 | +1 |
| 2 2.4 | | 2.2 | +0.2 | 3.8 | 4.2 | -0.4 | +4 |
| 10.0 | 5.5 | | | | | | |
| 14.3 | | 14.4 | -0.1 | 5.5 | 6.2 | -0.7 | +1 |
| 17.1 / 17.3 | | 17.3 | -0.2 | 7.0 | 7.3 | -0.3 | +5 |
| 28.6 | 4.5 | | | | | | |
| 32.2 | 4.0 | | | | | | |
| 46.0 | 7.0 | | | | | | |
| 49.0 | 5.5 | | | | | | |
| 3 9.7 | | 3 9.6 | +0.1 | 5.6 | 6.5 | -0.9 | -2 |
| 22.3 | 5.6 | | | | | | |
| B 6 42.0 | | 6 42.1 | -0.1 | 4.3 | 5.0 | -0.7 | +2 |
| 7 12.5 | 4.3 | | | | | | |
| 8 8.2 | | 8 9.1 | -0.8 | 7.5 1n.p. | 8.4 | -0.9 | -2 |
| 14.2 | | 14.3 | -0.1 | 3.0 | 3.8 | -0.8 | -1 |
| | | | -1.8 | | | +36 | -35 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



23.3

20.7

18.1

23.7

33.1

21.0

22.0

28.7

19.8

34.7

28.9

22.6

30.5

24.1

25.9

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 18 1882.

| Transit | Est. | $\alpha$ | $\gamma-\alpha$ | Est. | $\delta$ | $\delta-\delta$ | +36 −35 |
|---|---|---|---|---|---|---|---|
| 22h 8m 32.3 | 7.5 | | | | | | |
| 40.1 | 3.0 | | | | | | |
| 10 39.4? | | 22h 10m | −1.4 | | | | |
| 58.5? | | 39.9 | −0.4 | −0.2 | 0.4 | −0.6 | 0 |
| 58.0 | | 57.9 | +0.1 | 4.8 | 5.5 | −0.7 | −1 |
| 11 0.4 | | 11 0.3 | +0.1 | 5.4 | 6.8 | −0.9 | −3 |
| 9.4 | −0.2 | | | | | | |
| 14.0 | 4.8 | | | | | | |
| 29.4 | 5.4 | | | | | | |
| 12 8.8 | | 12 8.8 | 0.0 | 2.3 | 2.4 | −0.1 | +5 |
| 12.0 | | 11.9 | +0.1 | 0.9 | 1.4 | −0.5 | +1 |
| 20.5 | 0.9 | | | | | | |
| 26.8 | 2.3 | | | | | | |
| | | 28.2 | | | 7.4 | | |
| 13 10.0 | | 13 11.0 | −1.0 | 1.7 | 1.9 | −0.2 | +4 |
| 16.9 | | 17.1 | −0.2 | 7.0 | 7.4 | −0.4 | +2 |
| 28.9 | | 29.0 | −0.1 | 9.5 | 10.3 | −0.8 | −2 |
| 32.7 | 7.0 | | | | | | |
| 37.0 | | 37.4 | −0.4 | 7.8 | 8.3 | −0.5 | +1 |
| 41.0 | 1.5 | | −1.8 −0.2 | | | | |
| 57.3 | 7.8 | | | | | | |
| 57.0 | 9.5 | 56.5 | +0.5 | 0.0 | 0.6 | −0.6 | 0 |
| 15 2.4 | | 15 2.1 | +0.3 | 4.9 | 5.4 | −0.5 | +1 |
| 4.1 | | 3.9 | +0.2 | 0.7 | 1.2 | −0.5 | +1 |
| 25.0 | | 24.9 | +0.1 | 2.6 | 3.5 | −0.9 | −3 |
| 29.1 | | 31.0 | −1.9 | 7.5 | 0.8 | | |
| 32.4 | 7.0 5.0 2.6 7.5 | 16 31.0 | | | 0.3 | | |
| 16 7.2 | | 7.5 | −0.3 | 7.5 | 9.8 | [−2.3] | |
| 14.1 | 7.5 | | | | | | |
| 17 57.8 | | | | 7.8 | | +5 | 44 |
| 58.0 | 7.8 | | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



29.9
16.0
29.0

17.0
8.5

31.0
15.8
28.1

14.3

28.3

7.4
3.3

6.9

6.2

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 18, 1882.

| Transit | Est. | $\alpha$ | $\gamma - \alpha$ | Est. | $\delta$ | $\delta - \delta$ +51 -44 |
|---|---|---|---|---|---|---|
| $22^h\ 18^m\ 57^s.8$ | | $22^h\ 18^m\ 52^s.1$ | -0.3 / -1.3 | 8.7 | 9.2 | - 0.5 |
| 19 3.4 | 8.7 | | | | | |
| A 20 39.2 | | 20 39.0 | +0.2 | 10.0 | 10.4 | - 0.4 +1 |
| 41.0 | | 41.0 | 0.0 | 6.2 | 6.6 | -0.4 +1 |
| 54.3 | 10.0 | | | | | |
| 21 15.3 | 6.2 | | | | | |
| 42.5 | | 21 47.4 | +0.1 / ~~+1~~ | 3.0 | 3.9 | -0.9 -4 |
| 54.5 | 3.0 | | | | | |
| 56.0 | | 56.2 | -0.2 | 9.6 | 9.6 | 0.0 +5 |
| 57.1 | | 57.1 | 0.0 | 7.3 | 7.4 | - 0.1 +4 |
| 22 11.8 | 9.6 | | | | | |
| 17.3 | 7.3 | | | | | |
| 42.5 | | 22 42.6 | -0.1 | 5.8 | 6.2 | -0.4 +1 |
| 23 11.9 | | 23 12.1 | -0.2 | 4.8 | 4.9 | - 0.1 +3 |
| 16.5 | 4.8 / 5.8 | | | | | |
| 24.3 | | 24.5 | -0.2 | 4.3 | 4.5 | - 0.2 +2 |
| 31.2 | | | | | | |
| 32.4 ? | | | | | | |
| 33.6 ? | | | | | | |
| 37.6 | | 38.0 | -0.4 | 10.0 | 10.5 | - 0.5 -1 |
| 41.2 | 4.3 | | | | | |
| 24 6.5 | 10.0 | | | | | |
| | | 20.2 | | | 1.5 | |
| 25.6 | | 24 25.5 | +0.1 | 0.2 | 0.7 | -0.5 -1 |
| 28.9 | | 29.1 | -0.2 | 10.1 | 10.8 | -0.7 -3 |
| 36.2 | 0.2 | | | | | |
| 38.5 | 10.1 | | | | | |
| 25 23.8 | | 25 23.6 | +0.2 / ~~+1.0 = 0.11~~ | 1.7 | 1.9 | -0.2 +2 |
| 52.9 | | 52.9 | 0.0 | 4.0 | 4.3 | -0.3 +1 |
| 26 1.4 | 4.0 | | | | | +71 -53 |
| 3.0 ? | 1.7 | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



11.6

15.1
34.3

7.0

15.8
20.2

34.0
4.6

16.9

28.9

10.6
9.6

39.5
8.5

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1882phae.proj.1431.



Nov. 18, 1882.

| Transit | Est. | $\alpha$ | $\gamma - \alpha$ | Est. | $\delta$ | $\epsilon - \delta$ | +71 −53 |
|---|---|---|---|---|---|---|---|
| $22^h\ 29^m\ 27.5$ | | $22^h\ 27^m\ 28.0$ | −0.5 | 8.3 | 9.2 | −0.9 | −5 |
| 44.5 | | 44.5 | 0.0 | 5.0 | 5.4 | −0.4 | 0 |
| 49.5 | 8.2 | | | | | | |
| 28 8.4 | 5.0 | 28 | | | | | |
| 12.0 | | 12.2 | −0.2 | 6.0 | 6.6 | −0.6 | −2 |
| 22.9 | | 23.0 | −0.1 | 2.4 | 3.3 | −0.9 | −5 |
| 26.1 | 6.0 | | | | | | |
| 41.7 | 2.4 | | | | | | |
| 49.3 | | 49.6 | −0.3 | 8.3 | 9.1 | −0.8 | −4 |
| 29 3.7 | 8.3 | | −1.8 | | | | |
| 16.5 | | 29 16.4 | +0.1 | 5.0 | 5.3 | −0.3 | +1 |
| 41.0 | 5.0 | | | | | | |
| 58.5 | | 58.6 | −0.1 | 7.5 | 7.7 | −0.2 | +2 |
| 58.8 | | 59.0 | −0.2 | 5.8 | 6.3 | −0.5 | −1 |
| 30 4.8 | 5.8 | | −1.5 ~~−0.14~~ | | | | |
| 7.7 | 7.5 | | | | | | |
| 27.5 | | 30 27.6 | −0.1 | 9.0 | 9.0 | −0.0 | +3 |
| 47.4 | 9.0 | | | | | | |
| 31 16.5 | | 31 16.8 | −0.3 | 3.8 | 3.8 | 0.0 | +3 |
| 31.8 | 9.8 | | | | | | |
| | | 48.6 | | | 2.7 | | |
| 51.0 | | 51.2 | −0.2 | 5.1 | 5.7 | −0.6 | −3 |
| 32 16.1 | 5.1 | | | | | | |
| 37.8 | | 32 37.7 | +0.1 | 4.7 | 4.8 | −0.1 | +2 |
| 43.9 | | | | 7.8 | | | |
| 48.1 | 4.7 | | | | | | |
| 52.8 | 7.8 | | | | | | |
| 58.5 | | 58.8 | −0.3 | 4.5 | 4.4 | +0.1 | +4 |
| 33 4.0 | 4.5 | | | | | | |
| 11.0 | | 33 11.0 | 0.0 | 2.3 | 2.3 | 0.0 | +3 |
| 15.9 | 2.3 | | | | | | |
| 40.8 | | 40.8 | 0.0 | 7.0 | 7.0 | 0.0 | +3 |

+92 −79

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



22.0

23.9

14.1

18.8

14.4

24.5

14.2

6.0

19.9

15.3

25.1

10.3

8.9

5.5

4.9

31.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 15, 1882.

| Transit | δ s1: | α | γ - α | δ s1: | δ | δ - δ +92 -73 |
|---|---|---|---|---|---|---|
| 22h 33m 5s.3 | | 22h 33m 5s.7 | -0.4 | -0.1 | 0.0 | -0.1 +2 |
| 34 9.0 | -0.1 | | | | | |
| 12.3 | 7.0 | | | | | |
| 35 33.7 | | 35 34.3 | -0.6 | 9.9 | 9.9 | 0.0 +3 |
| 46.2 | 9.9 | | -1.6 -0.2 | | | |
| 36 2.7 | | 36 2.9 | -0.2 | 8.0 | 8.5 | -0.5 -2 |
| 8.0 | 8.6 | | | | | |
| 40.5 | | 40.7 | -0.2 | 9.0 | 9.2 | -0.2 +1 |
| 51.3 | | 51.6 | -0.3 | 7.4 | 7.8 | -0.4 -1 |
| 37 1.1 | 9.0 | | | | | |
| 6.7 | | 37 6.8 | -0.1 | 8.0 | 8.4 | -0.4 -1 |
| 12.5 | 7.4 | | | | | |
| 18.4 | | 18.5 | -0.1 | 7.5 | 7.6 | -0.1 +2 |
| 22.2 | 8.0 | | | | | |
| 41.4 | | 41.5 | -0.1 | 8.8 dbl. | 8.9 | -0.1 +2 |
| 50.8 | | 50.7 | +0.1 | 4.7 | 4.7 | 0.0 +3 |
| 53.6 | 7.5 | | | | | |
| 38 4.6 | 8.8 | | | | | |
| 9.0 | 4.8 | | | | | |
| 43.7 | | 38 43.5 | +0.2 | 6.3 | 6.6 | -0.3 -1 |
| 39 2.7 | 6.3 | | -2.7 | | | |
| 6.7 | | 39 2.3 | | 9.3 | 9.6 | |
| 10.4 | | 10.6 | -0.2 | 6.8 | 7.0 | -0.2 0 |
| 26.3 | 8.3 | | -0.9 0.1 | | | |
| 36.8 | 6.8 | | | | | |
| 40 23.9 | | 40 23.2 | +0.7 | 7.5 | 7.5 | 0.0 +2 |
| 32.0 | 7.5 | | | | | |
| 41 15.0 | | 41 15.3 | -0.3 | 0.0 | 0.2 | -0.2 0 |
| 21.0 | 0.0 | | | | | |
| 38.0 | | 38.2 | -0.2 | 0.0 | 0.3 | -0.3 0 -1 |
| | | | | | | +107 -79 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



13.7

12.5

5.3

20.6

21.2

15.5

35.2

23.2

18.2

19.0

19.6

26.4

8.1

6.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 18, 1882.

| Transit | Est: | α | γ − α | Est: | δ | δ − δ | |
|---|---|---|---|---|---|---|---|
| | 0.0 | | | | | +107 | -79 |
| 22h 41m 45.6 | | | | | | | |
| 48.2 | | 22h 41m 47.5s 48.7 | −0.5 | 2.0 dbl. hf | 2.0 | 0.0 | +2 |
| 42 11.2 | | 42 10.4 | −0.2 | 10.2 l. edge of w. | 10.3 | −0.1 | +1 |
| 43 56.1 | | 43 56.3 | −0.2 | 0.8 | 1.1 | −0.3 | −1 |
| 44 1.0 | | 44 1.2 | −0.2 | 8.0 | 8.2 | −0.2 | 0 |
| 11.0 | 0.8 | | | | | | |
| 19.2 | 8.0 | | | | | | |
| 45 21.2 | | 45 21.2 | 0.0 | 0.5 | 0.8 | −0.3 | −1 |
| 28.0 | | 27.9 | +0.1 ~~−0.8 −0.09~~ | 6.0 | 6.4 | −04 | −2 |
| 39.7 | | 39.4 | +0.3 | 6.1 | 6.6 | −0.5 | −3 |
| 48.0 | 5. 6.1 | | | | | | |
| 51.9 | 6.0 | | | | | | |
| 46 21.1 | | 46 21.6 | −0.5 | 5.8 | 6.3 | −0.5 | −3 |
| 25.8 | 5.8 | | | | | | |
| 56.0 | ? | | | | | | |
| 47 30.5 | | 47 30.5 | 0.0 | 10.0 | 10.1 | −0.1 | +1 |
| 39.5 | 10.0 | | | | | | |
| 45.4 | | 45.3 | +0.1 | 3.2 | 3.6 | −0.4 | −2 |
| 51.0 | 3.2 | | | | | | |
| 48 24.0 | | 48 23.7 | +0.3 −0.5 | 3.0 | 3.3 | −0.3 | −2 |
| 36.3 | 3.0 | | | | | | |
| 49 45.9 | | 49 45.3 | +0.6 | 2.2 | 1.8 | +0.4 | +5 |
| 50 16.2 | 2.2 | 50 1.1 7.7 | | | 2.8 2.0 | | |
| 51 25.7 | | 51 25.5 | +0.2 | 5.2 | 5.9 | −0.7 | −6 |
| 43.0 | 5.2 | | | | | | |
| 51.7 | | 51.6 | +0.1 ~~+1.1 +0.14~~ 0.0 | 0.3 | 0.8 | −0.5 | −4 |
| 58.9 | | 58.9 | | 7.2 | 7.2 | 0.0 | |
| | | | | | | +116 | 103 |
| 52 0.7 | 0.2 | | | | | | |
| 10.7 | 7.2 | | | | | | |
| 26.7 | | | | -0.4 | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



14.9
18.2

23.9
8.3

4.7

9.0

5.6

12.3

30.3

17.3

9.0
11.8

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 18, 1882.

| Transit | Est. | α | γ − α | Est. | S | E − S | +116 −103 |
|---|---|---|---|---|---|---|---|
| 22h 52m 42.2 | | 22h 52m 42s.5 | − 0.3 | 9.8 | 9.8 | 0.0 | +1 |
| 47.7 | 9.8 | | | | | | |
| 57.0 | | 56.9 | +0.1 | 6.7 | 6.6 | +0.1 | +2 |
| 53 15.2 | 6.7 | | | | | | |
| 35.0 | | 53 35.2 | −0.2 | 9.8 | 9.7 | +0.1 | +2 |
| 55.3 | | 55.2 | +0.1 | 3.3 | 3.4 | −0.1 | 0 |
| 56.4 | 9.8 | | | | | | |
| 54 0.3 | 3.3 | | | | | | |
| 44.9 | | | | 8.0 | | | |
| 52.2 | 8.0 | | | | | | |
| 53 21.5 | | 55 21.2 | +0.3 | 5.1 | 5.3 | −0.2 | −1 |
| 34.7 | 5.1 | | | | | | |
| 57 13.4 | | 57 13.1 | +0.3 | 4.3 | 4.1 | +0.2 | +3 |
| 23.4 | | 23.2 | +0.2 | 0.8 | 0.8 | 0.0 | |
| 27.0 | | 27.0 | 0.0 | 8.2 | 8.5 | −0.3 | −2 |
| 29.8 | 4.3 | | | | | | |
| 44.8 | 8.2 | | | | | | |
| 56.0 | 0.8 | | | | | | |
| 58 18.3 | | 58 18.3 | 0.0 | 10.3 } Tr. Pos. | 10.6 | −0.3 | −2 |
| 31.9 | | 31.8 | +0.1 | 10.3 } Tr. Disp. | 10.8 | −0.5 | −4 |
| 48.9 | | 44.1 | −0.2 | 6.0 Obl. | 6.4 | −0.4 | −3 |
| 52.4 | 6.0 | | +0.1 | | | | |
| A | | | 1.3 | | | | +127 −112 |

Star at 22h 12m 24s.2 seen.
Faint star seen prec. star at 22h 24m 20s.2.
Star at 22h 50m 1.1 not seen.

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1882phae.proj.1431.



5.5

18.2

21.4
5.0

7.3

13.2

16.4
32.6
17.8

8.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 15, 1882. 2nd sheet.

| Transit | Est: | α | γ − α | Est: | δ | Est − δ |
|---|---|---|---|---|---|---|
| $23^h\ 45^m\ 52^s.8$ | | $23^h\ 45^m\ 52^s.8$ | 0.0 | 4.5 | 4.6 | −0.1 +3 |
| 46 16.0 | 4.5 Part. 1st Satz | | | | | |
| 21.7 | | 46 21.6 | +0.1 | 5.1 | 5.5 | −0.4 0 |
| 56.0 | 5.1 | | | | | |
| 59.8 | | 59.4 | −0.1 | 2.5 | 3.0 | −0.5 −1 |
| 47 6.8 | | | | 2.8 | | |
| 8.0 | 2.5 | | | | | |
| 12.4 | 2.8 | | | | | |
| 46.0 | | 47 46.1 | −0.1 | 9.9 | 10.0 | −0.1 +3 |
| 48.9 | rej. | | | | | |
| 49.9 | | | | 6.0 | | |
| 53.9 | | 53.4 | +0.5 | 2.5 | 3.5 | −1.0 −6 |
| 48 0.7 | 6.0 | | | | | |
| 9.6 | 9.0 / 2.5 | | | | | |
| 12.7 | | | | 2.5 | | |
| 17.5 | | 17.0 | +0.5 | 2.8 | 3.4 | −0.6 −2 |
| 20.6 | 2.5 | | | | | |
| 25.6 | 2.8 | | | | | |
| A 49 24.7 | × | | | 4.9 | | |
| 30.3? | 4.9 | | | | | |
| 51 11.2 | | 51 11.1 | +0.1 | 9.7 | 9.7 | 0.0 +4 |
| 14.0 | | 17.8 | +0.2 | 10.0 | 10.1 | −0.1 +3 |
| 29.5 | | 29.7 | +0.2 | 9.0 | 9.4 | −0.4 0 |
| 31.3 | 9.7 | | | | | |
| 33.7 | 10.0 | | | | | |
| 58.4 | 9.0 | | | | | |
| 52 38.0 | | 52 38.1 | −0.1 | 10.0 | 10.3 | −0.3 +1 |
| 45.0 | | | +0.7 | | | +14 −9 |
| 46.3? | | | | | | |
| 51.0 | 10.0 | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



23.2

34.3

8.7
5.6

17.6

10.8
9.7

7.8
8.1

5.6

20.1
15.7

13.0

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 18. 1882. 2nd Shift.

| Transit | Est: | α | δ−α | Est: | δ | δ−δ | +14 −9 |
|---|---|---|---|---|---|---|---|
| $23^h 53^m 1.8^s$ | | $23^h 53^m 1.7^s$ | +0.1 | 9.6 | 9.6 | 0.0 | +4 |
| 32.7 | 9.6 | | | | | | |
| 56.6 | | 56.6 | 0.0 | 1.0 | 1.8 | −0.8 | −4 |
| 54 8.1 | 1.0 | | | | | | |
| 12.5 | Must seem on prism, although bright: | 54 12.5 | 0.0 | 4.8 | 4.9 | −0.1 | +3 |
| 32.1 | | 32.5 | −0.4 | 10.0 | 10.6 | −0.6 | −2 |
| 48.0 | 10.0 | | | | | | |
| 57.9 | | 57.8 | +0.1 +0.1 | 6.1 | 5.6 | −0.5 | −1 |
| 55 9.0 | | 55 8.9 | +0.1 | 6.0 | 5.5 | −0.5 | −1 |
| 14.0 | 5.1 | | | | | | |
| 24.5 | 5.0 | | | | | | |
| 36.0 | | 35.7 | +0.3 | 0.9 | 1.4 | −0.5 | −1 |
| 51.8 | 0.9 | | | | | | |
| 55.5 | | | | 5.3 | | | |
| 56 7.8 | 5.3 | | | | | | |
| 19.8 | | 56 19.7 | +0.1 | 7.7 | 8.3 | −0.6 | −2 |
| 37.9 | 7.7 | | | | | | |
| 46.7 | | 46.6 | +0.1 | 1.0 | 1.6 | −0.6 | −2 |
| 59.0 | 1.0 | | | | | | |
| 57 19.9 | | 57 19.7 | +0.2 +0.6 | 0.7 | 1.4 | −0.7 | −3 |
| 31.2 | 0.7 | | | | | | |
| 59.6 | | 59.4 | +0.2 | 0.6 | 1.3 | −0.7 | −3 |
| 58 4.8 | 0.6 | | | | | | |
| 57.0 | | 58 57.5 | −0.5 | 7.2 | 7.3 | −0.1 | +3 |
| 59 7.8 | 7.2 | | | | | | |
| 21.4 | | 59 21.5 | −0.1 | 1.3 | 1.9 | −0.6 | −2 |
| 22.0 33.8 | 1.3 | 22.3 | −0.3 | 7.8 | 8.3 | −0.5 | +1 |
| 40.1 | 7.8 | | | | | | |
| 46.5 | | 45.8 | −0.3 | 9.9 | 9.9 | 0.0 | +4 |
| | | | | | | | +29 −30 |

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1992phae.proj.1431.



-9 30.9

4 11.5

2 15.9

1 16.1

1 15.5

1 15.8

12.3

2 18.1

2 12.3

11.3

3 5.2

10.8

2 12.1
18.1

22.7

30

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1882phae.proj.1431.



Nov. 15, 1882. 2nd shutter.

| Transit. | Est: | α | γ-α | Est: | δ | δ-δ +29 -30 |
|---|---|---|---|---|---|---|
| 0h 0m 10.0 | | 0h 0m 9.9 | +0.1 | 3.0 | 3.2 | -0.2 +2 |
| 11.2 | 9.9 | | | | | |
| 17.5 | | | | 7.5 | | |
| 27.6 | 7.5 | | | | | |
| 41.2 | 3.0 | | | | | |
| 58.5 | | 58.4 | +0.1 | 7.9 | 8.3 | -0.4 0 |
| 1 19.0 | | | | 9.3 | | |
| 28.1? | 7.9 | | | | | |
| 31.5? | 9.3 | | | | | |
| 2 47.0 | | 2 46.8 | +0.2 | 7.6 | 8.0 | -0.4 0 |
| 3 1.5 | 7.6 | | | | | |
| 19.0 | | 3 19.0 | 0.0 | 0.2 | 0.7 | -0.5 -1 |
| 35.0 | | 34.9 | +0.1 | 5.1 | 5.5 | -0.4 0 |
| 36.9 | 0.2 | | ~~-0.5~~ | | | |
| 43.0 | 5.1 | | | | | |
| 59.9 | | | | 0.7 | | |
| 4 8.5 | 0.7 | | | | | |
| 28.0? | | 0.1<br>4 27.7 | +0.3 | 3.0 | 1.0<br>3.7 | -0.7 -3 |
| 29.1 | | 28.9 | +0.2 | 4.9 | 5.0 | -0.1 +3 |
| 37.1 | | 36.9 | +0.2 | 4.0 | 4.2 | -0.2 +2 |
| 41.8 | {3.0<br>{4.9 | | | | | |
| 46.5 | 4.0 | | +1.0 | | | |
| 5 44.8 | | 5 44.6 | +0.2 | 6.2 | 6.4 | -0.2 +2 |
| 46.3 | | 46.8 | -0.5 | 5.0 | 5.5 | -0.5 -1 |
| 50.5 | 6.2 | | | | | |
| 54.8 | 5.0 | | | | | |
| 6 4.9 | | 6 4.6 | +0.3 | 7.9 | 8.4 | -0.5 -1 |
| 14.3 | | 14.5 | -0.2 | 5.9 | 6.5 | -0.6 -2 |
| 21.5? | 5.9 | | | | | +34 -38 |
| 24.8 | 7.6 | | | | | |

B

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1002phae.proj.1431.



31.2

10.1

29.6
12.5

14.5

17.9
8.0

8.6

13.8
12.7
9.4

5.7
8.5

19.9
7.2

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1882phae.proj.1431.



Nov. 15, 1882. Shut-end.

| Grms sid. | Est. | α | γ − α | Est. | δ | δ − δ | +38 −38 |
|---|---|---|---|---|---|---|---|
| $\delta^h$ $7^m$ 31.7 | | h m s<br>0 7 31.7 | 0.0 | -0.1 | 0.2 | −0.3 | +1 |
| 50.1 | -0.1 | | | | | | |
| 9 0.5 | | 9 0.7 | −0.2 | 6.0 | 6.5 | −0.5 | −1 |
| 4.7 | | | +0.3 +0.033 | | | | |
| 6.8 | 6.0 | 4.6 | +0.1 | 0.5 | 1.3 | −0.8 | −4 |
| 16.5 | 0.5 | | | | | | |
| 10 0.5 | | 10 0.5 | 0.0 | 9.9 | 10.0 | −0.1 | +3 |
| 5.8 | | 5.8 | 0.0 | 7.0 | 7.4 | −0.4 | 0 |
| 8.0 | 9.9 | | | | | | |
| 22.7 | | | | | | | |
| 34.5 | 7.0 | | | | | | |
| 36.8 | | 36.4 | +0.4 | 4.5 | 4.7 | −0.2 | +2 |
| 11 22.0 | 4.5 | 39.8 | | | 6.2 | | |
| 12 38.3 | | 12 38.2 | +0.1 | 7.3 | 7.6 | −0.3 | +1 |
| 48.6 | | 48.8 | 0.0 | 2.5 | 2.9 | −0.4 | 0 |
| 57.3 | 7.3 | | | | | | |
| 13 3.9 | 2.5 | | | | | | |
| 47.8 | | 13 48.2 | −0.4 | 10.0 | 10.5 | −0.5 | −1 |
| 14 3.0 | 10.0 | | | | | | |
| 14.4 | | 14 14.0 | +0.4 | 0.8 | 1.4 | −0.6 | −2 |
| 29.8 | 0.8 | | +0.2 | | | | |
| 16 15.5 | | 16 15.3 | +0.2 | 7.5 | 7.7 | −0.2 | +2 |
| 81.0 | | 20.8 | +0.2 +0.09 | 1.2 | 2.0 | −0.8 | −4 |
| 28.0 | 7.5 | | | | | | |
| 35.0 | 1.2 | | | | | | |
| 17 24.3 | | 17 24.2 | +0.1 | 6.0 | 6.6 | −0.6 | −2 |
| 52.2 | 6.0 | | | | | | |
| 18 38.5 | | 18 38.2 | +0.3 | 5.2 | 5.9 | −0.7 | −3 |
| 54.0 | 5.2 | | | | | | |
| 19 21.0 | | 19 20.8 | +0.2 | 9.2 | 9.4 | −0.2 | +2 |
| 36.0 | 9.2 | | | | | | +49 −55 |

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18.4

6.3

9.7

7.5

28.7

45.2

19.0

15.1

15.2

14.9

12.5

14.0

27.9

15.5

15.0

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Transit. Nov. 15, 1882. 2nd Sheet.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| $1^h 19^m 45^s.0$ | Est: | $0^h 19^m 45^s.6$ | $\gamma-\alpha$ 0.0 | Est: -0.5 | $\delta$ -0.2 | $\delta-\delta$ -0.3 | +49 -55 +1 |
| 47.8 | -0.5 | | | | | | |
| 20 29.8 | | | | 9.5 | | | |
| 36.7 | 9.5 | | | | | | |
| | | 33.0 | | | 1.1 | | |
| 43.0 | | 20 | | 0.3 | | | |
| 53.5 | | 53.3 | +0.2 | 1.2 | 2.2 | -1.0 | -6 |
| 21 2.2 | 0.3 | | | | | | |
| 8.8 | 1.2 | | | | | | |
| 22 52.9 | | 22 52.9 | 0.0 | 9.4 | 9.4 | 0.0 | +4 |
| 23 1.7 | 9.4 | | | | | | |
| 10.0 | | 23 10.6 | -0.6 | 2.3 | 2.5 | -0.2 | +2 |
| 21.5 | | 21.5 | 0.0 | 6.5 | 7.1 | -0.6 | -2 |
| 28.8 | 2.3 | | ~~+0.1~~ ~~+0.04~~ | | | | |
| 41.2 | 6.5 | | | | | | |
| 43.3 | | 42.9 | +0.4 | 0.0 | 0.5 | -0.5 | +4 -1 |
| 24 13.2 | 0.0 | | +1.0 | | | | |
| 25 13.6 | | 25 13.2 | +0.4 | 4.8 | 5.0 | -0.2 | +2 |
| 34.9 | 4.8 | | | | | | |
| 55.1 | | 55.3 | -0.2 | 8.1 | 8.2 | -0.1 | +3 |
| 26 80.3 | 8.1 | | | | | | |
| 27 46.9 | | 27 46.5 | +0.4 | 9.3 | 9.3 | -0.0 | +5 |
| 28 5.7 | 9.3 | | | | | | |
| 41.7 | | 28 41.7 | 0.0 | 0.4 | 1.2 | -0.8 | -3 |
| 51.5 | | 51.2 | +0.3 | 4.7 | 4.9 | -0.2 | +3 |
| 29 11.1 | 4.7 | | | | | | |
| 14.5 | 0.4 | | | | | | |
| 30 23.9 | | 30 23.5 | +0.4 | 7.2 | 7.3 | -0.1 | +4 |
| 36.0 | | 35.9 | +0.1 | 0.4 | 1.2 | -0.8 | -3 |
| 51.4 | 7.2 | | | | | | |
| 31 6.5 | 0.4 | | | | | | |
| 8.7 | | 31 8.2 | +0.5 | 6.4 | 6.9 | -0.1 | +4 +81 -70 |

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2.8

6.9

19.2
15.3

8.8

18.8
19.7

29.9

21.3

25.2

18.8

32.8
19.6

27.5
30.5

9.9

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Nov. 18, 1882. 2nd sheet.

| Transit. | Est: | α | γ−α | Est: | δ | δ−δ | +81 −70 |
|---|---|---|---|---|---|---|---|
| $0^h\ 31^m\ 18^s$ | 6.8 | $0^h$ | | | | | |
| 32 36.3 | | $32^m\ 35^s.8$ | +0.5 | 2.8 | 8.4 | −0.6 | −1 |
| 47.6 | 2.8 | | +~~2.8~~ | | | | |
| 50.9 | | 50.4 | +0.5 | 10.3 | 10.7 | −0.4 | +1 |
| 56.1 | 10.3 | | | | | | |
| 33 2.9 | | 33 2.1 | +0.8 | 5.8 | 6.6 | −0.8 | −3 |
| 16.2 | 5.8 | | | | | | |
| 34 24.0 | | 34 23.7 | +0.3 | 8.0 | 8.8 | −0.8 | −3 |
| 24.8 | ng. | | | | | | |
| | | | +4.0 | | | | |
| 35 0.5? | 8.0 | | | | | | |
| 2.5? | | | | | | | |
| ~~2.8?~~ | | | | | | | |
| 30.5 | | 35 29.9 | +0.6 | 5.0 | 5.7 | −0.7 | −2 |
| 31.8 | | | | 0.2 | | | |
| 36.7 | 0.2 | 37.7 | +1.0 | 8.0 | 9.0 | −1.0 | −5 |
| 45.8 | | 45.0 | +0.8 | 8.5 | 9.6 | −1.1 | −6 |
| 36 0.9 | 8.0 | | | | | | |
| 6.9 | 5.0 | | | | | | |
| 13.0 | 8.5 | | | | | | |
| 53.9 | | 36 53.1 | +0.8 | 7.7 | 7.4 | +0.3 | +8 |
| 37 1.9 | | 37 1.0 | +0.9 | 3.2 | 2.3 | +0.9 | +14 |
| 12.4 | 7.7 | | | | | | |
| 15.4 | 3.2 | | | | | | |
| 38 23.5 | | 38 22.8 | +0.7 | 3.0 | 4.3 | −1.3 | −8 |
| | | 23.0 | +~~0.4~~ | | 4.0 | | |
| 26.8 | | 25.9 | +0.9 | 5.8 | 6.6 | −0.8 | −3 |
| 33.0 | 3.0 | | | | | | |
| 39 0.0 | 5.8 | | | | | | |
| 3.5 | | 39 2.8 | +0.7 | 7.2 | 7.6 | −0.4 | +1 |
| 15.9 | 7.2 | | | | | | |
| 24.4? | | | | | | | +105 −101 |

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1882phae.proj.1431.



11.3

5.2

13.3

36.5

36.4

6.9

22.2

27.2

18.5

13.5

9.5

33.2

12.4

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Nov. 18, 1882. 2nd sheet.

| Transit | Est: | α | γ − α | Est: | δ | Σ.δ +10.5 −101 |
|---|---|---|---|---|---|---|
| 0h 39m 27.5s | | | | | | |
| 58.6 | | 0h 39m 58.9s | +0.7 | 5.7 | 6.4 | −0.7 −2 |
| 40 21.8 | 5.7 | | | | | |
| 45.7 | | 45.3 | +0.4 | 5.0 | 5.6 | −0.6 −1 |
| 53.7 | | | | 9.0 | | |
| 41 0.3 | 5.0 | | | | | |
| 5.9 | 9.0 | 41 5.7 | +0.2 | 7.0 | 7.3 | −0.3 +2 |
| 15.8 | 7.0 | | | | | |
| 28.7 | | 28.1 | +0.6 | 1.8 | 2.2 | −0.4 +1 |
| 35.0 | | 34.4 | +0.6 | 2.6 | 3.2 | −0.6 −1 |
| 52.0 | 2.6 | | | | | |
| 57.0 | 1.8 | | | | | |
| 42 43.5 | | 42 42.9 | +0.6 | 4.0 | 4.4 | −0.4 −1 |
| 50.3 | | | | 6.5 | | |
| 52.0 | | | | | | |
| 57.3 | 6.5 | | | | | |
| 43 11.4 | 4.0 | | | | | |
| 24.0 | ? | | | 1.1? | | |
| 37.1 | 1.1? | | | | | |
| 55.9 | | 43 55.0 (23.5) | +0.9 | 0.9 (1.8) | 1.6 | −0.7 −2 |
| 44 8.0 | 0.9 | | ~~+0.6 +0.02~~ +10.4 | | | |
| 45 19.5 | | 45 18.7 | +0.8 | 10.3 | 10.9 | −0.6 0 |
| 31.6 | 10.3 | | | | | |
| 47 52.9 | | 47 52.9 | 0.0 | 2.0 | 2.4 | −0.4 −2 |
| 54.8 | | | | 6.2 | | |
| 59.3 | {2.0 6.2 | | | | | |
| 48 14.8 | | 48 14.3 | +0.5 | 6.0 | 6.9 | −0.9 −8 |
| 29.0 | 6.0 | | | | | |
| 49 16.5 | | 49 15.6 | +0.9 | 7.6 | 8.5 | −0.9 −3 |
| 40.6 | | 39.9 | +0.7 | 4.9 | 5.4 | −0.5 +1 |
| | | | | | | +10.9 −116 |

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1882phae.proj.1431.

.101

2 23.2

1 14.6

10.2

19.9

30.3

17.0

27.9

7.0

13.1

12.1

12.1

6.4

4.5

14.2

3 26.0

32.3

16

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 15, 1882. 2nd sheet.

| Transit | Est: | α | Δα | Est: | δ | δ - δ |
|---|---|---|---|---|---|---|
| | | h | | | | +109 −116 |
| 0h 49m 42.5 | 7.6 | 0 | | | | |
| 50 12.9 | 4.9 | | | | | |
| 51 5.6 | | 51m 2.5 | | | 8.3 | |
| 17.7 | 4.0 | | | 4.0 | | |
| 31.3 | | | | 8.0 | | |
| 36.9 | 8.0 | | | 9.3 | | |
| 50.5 | 9.3 | | 40.6 | | 0.4 | |
| 53 2.9 | | 53 | 2.4 +0.5 | 7.4 | 7.6 | −0.2 +4 |
| 7.7 | | | | 2.5 | | |
| 15.4 | 2.5 | | | | | |
| 29.0 | 7.4 | | 29.1 −0.1 | 7.0 | 7.3 | −0.3 +3 |
| 47.6 | 7.0 | | | | | |
| 54 17.6 | | 54 | 16.9 +0.7 | 0.6 | 1.6 | −1.0 −4 |
| 25.7 | | | +~~7.0~~ +~~0.5~~ | 4.3 | | |
| 38.0 | 0.6 | | | | | |
| 38.8 | | | 38.4 +0.4 | 3.8 | 3.9 | −0.1 +5 |
| 40.3 | 4.3? | | | | | |
| 49.1 | 3.4 | | | | | |
| 57.3 | | | 56.5 +0.8 | 2.2 | 2.4 | −0.2 +4 |
| 55 5.3 | 2.2 | | | | | |
| 19.4 | | 55 | 18.5 +0.9 | 5.5 | 6.2 | −0.7 −1 |
| 43.5 | 5.5 | | | | | |
| 56 7.6 | | 56 | 6.9 +0.7 | 10.0 | 10.7 | −0.7 −1 |
| 24.0 | 10.0 | | | | | |
| 35.0 | | | | 5.5 | | |
| 36.5 | | | 35.6 +0.9 | −0.6 | −0.1 | −0.5 +1 |
| 39.7 | | | | 8.3 | | +126 −122 |
| 43.0 | 6.0 | | | | | |
| 50.1 | 4.0 | | | | | |

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1882phae.proj.1431.



12.1

5.6
13.6

26.1
7.7

18.6

4 15.4
14.6

10.3

4 8.0

-1 24.1

-1 16.4

8.0
29.9
122 10.4

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1882phae.proj.1431.



Nov. 15, 1882. 2nd sheet:

| Transit - | Est: | α | γ - α | Est: | δ | δ - δ +126 -122 |
|---|---|---|---|---|---|---|
| $0^h 57^m 6.^s4$ | -0.5 | | | | | |
| 37.9 | | $0^h 57^m 37.^s9$ | 0.0 | -0.3 | 0.2 | -0.5 +1 |
| 50.1 | 8.0 | | | 8.0 | | |
| 58 8.3 | -0.3 | | | | | |
| 38.7 | | | | 5.0 | | |
| 48.3 | 5.0 | | | | | |
| 51.1 | | 58 50.3 | +0.8 | 0.1 | 1.8 | -1.7 -10 |
| 53.5 | | 52.4 | +1.1 | 7.3 | 7.7 | -0.4 +3 |
| 59 7.7 | 0.1 | | | | | |
| 19.8 | | 59 19.1 | +0.7 | 2.5 | 8.0 | -0.5 +2 |
| 25.3 | 7.3 | | | | | |
| 30.8 | | 30.0 | +0.8 | 7.2 | 7.4 | -0.2 +5 |
| 42.3 | | | ~~+7.1~~ | 7.7? | | +137 -132 |
| 44.4 | 3.0 | | | | | — |
| 51.3 | 7.2 | | +11.1 | | | |
| 56.4 | 7.6 | | | | | |

A

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.

-12

30.4
12.2

9.6

0 16.6
31.8

24.6

20.5
132 14.1

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

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Nov. 27, 1882.

| Transit | Est. | | α | | γ − α | Est. | δ | ε − δ | |
|---|---|---|---|---|---|---|---|---|---|
| A | 22h 53m 35.8 | | 22h | 53m | 35.2 | +0.6 | 9.5 | 9.7 | −0.2 +5 |
| | 56.0 | | | | 55.2 | +0.8 | | 9.4 | |
| | 54 4.0 | 9.5 | | | | | | | |
| | 7.7 | | | | | | | | |
| | 9.7 | 2.6 | | | | | | | |
| | 44.5.? | | | | | | 2.0 | | |
| | 45.6.? | | | | | | 7.6 | | |
| | 56.0 | 2.0 | | | | | | | |
| | 55 2.1 | 7.6 | | | | | | | |
| | 21.8 | | 55 | | 21.2 | +0.6 | 4.8 | 5.3 | −0.5 +2 |
| | 42.1 | 4.8 | | | | | | | |
| A | 57 13.9 | | 57 | | 13.1 | +0.8 | 3.3 | 4.1 | −0.8 −1 |
| | 28.5 | | | | 23.2 | +0.3 | 0.0 | 0.8 | −0.8 −1 |
| | 27.9 | | | | 27.0 | +0.9 | 7.6 | 8.5 | −0.9 −2 |
| | 30.8 | 3.3 | | | | | | | |
| | 57.0 | 7.6 | | | | | | | |
| | 59.6 | 0.0 | | | | | | | |
| | 58 18.9 | | 58 | | 18.3 | +0.6 | 10.0 | 10.6 | −0.6 +1 |
| | 32.5 | | | | 31.8 | +0.7 | 10.0.? | 10.8 | −0.8 −1 |
| | 44.7 | | | | 44.1 | +0.6 | 5.7 | 6.4 | −0.7 0 |
| | 48.6 | 10.0 2nd | | | | | | | |
| | 55.8 | 10.0 1st | | | | | | | |
| A | 23 0 16.1 | | 23 | 0 | 15.2 | +0.9 | 4.8 | 4.8 | −0.0 +7 |
| | 26.9 | 4.0 | | | 15.4 | +0.8 | 4.0 | 5.4 | −1.4 −7 |
| | 32.8 | 4.8 | | | | | | | |
| | 42.1 | | | | 41.6 | +0.5 | 9.0 | 9.8 | −0.8 −1 |
| | 43.8 | | | | 42.7 | +1.1 | 9.6 | 10.4 | −0.8 −1 |
| | 56.7 | | | | | | 8.0 | | |
| | 57.8 | | | | 56.7 | +1.1 | 0.0 | 0.6 | −0.6 +1 |
| | 59.6 | 9.0 9.6 | | | | | | | |

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28.2

11.5

16.5

20.3

16.9

36.1

23.1

36.9

16.1

11.1

16.7

10.8?

17.5

15.8

16.2

20.9

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Nov. 27, 1882.

| | Transit | Est: | | $\alpha$ | $2\alpha$ | Est: | $\delta$ | $\alpha - \delta$ | |
|---|---|---|---|---|---|---|---|---|---|
| | ~~23h~~ 1m 12.9 | 8.0 | | | | | | | |
| | 18.7 | 0.0 | | | | | | | |
| | 56.0 | | 23h 1m | 55.2 | +0.8 | 9.8 | 10.4 | -0.6 | +1 |
| B | 2 16.7 | 9.8 | | | | | | | |
| | 46.0 | | 2 | 45.4 | +0.6 | 5.8 | 6.5 | -0.7 | 0 |
| | 50.9 | | | 50.3 | +0.6 | 7.7 | 8.4 | -0.7 | 0 |
| | 58.9 | | | 58.0 | +0.9 | 5.0 | 5.6 | -0.6 | +1 |
| | 3 5.5 | 5.8 | | | +12.4 | | | | |
| | 11.6 | {5.0 7.7 | | | | | | | |
| A | ~~5.40~~ | | | | | 9.8 | | | |
| | 4 5.4 | | 4 | 4.7 | +0.7 | 9.8 1.8 | 10.2 | [-0.4] | |
| | 14.8 | 9.8 | | | | 1.8 | | | |
| | 28.5 | | | 22.5 | +1.0 | 2.8 | 2.2 | +0.6 | +13 |
| | 29.0 | | | 28.3 | +0.7 | 7.7 | 3.6 | [+4.1] | |
| | 32.0 | 2.0 | | | ~~+8.0 +7.3~~ | | | | |
| | 34.6 | | | 33.7 | +0.9 | 1.0 | 1.7 | -0.7 | 0 |
| | 45.7 | 2.8 | | | | | | | |
| | 52.2 | 7.7 | | | | | | | |
| | 5- 1.1 | 1.0 | | | | | | | |
| B | 27.8 | | 5 | 27.0 | +0.8 | 4.8 | 5.4 | -0.6 | +1 |
| | 48.4 | 4.8 | | | | | | | |
| | 57.6 | | | 56.9 | +0.7 | 4.3 | 4.6 | -0.3 | +7 |
| | 6 26.4 | 4.3 | | | | | | | |
| A A | 7 24.9 | | 7 | 24.3 | +0.6 | 3.5 | 4.3 | -0.8 | -2 |
| | 38.4 | 9.5 | | | | | | | |
| | 8 10.4 | | 8 | 9.5 | +0.9 | 7.7 | 8.6 | -0.9 | -3 |
| | 25.0 | | | 24.4 | +0.6 | 9.9 | 10.6 | -0.7 | -1 |
| | 28.6 | | | 27.8 | +0.8 | 8.5 | 9.8 | -1.3 | -7 |
| | 31.2 | 7.7 | | | | | | | +20 -13 |
| | 46.1 | 9.8 | | | | | | | |

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1882phae.proj.1431.



20.7

19.5
20.7
12.7

20.8
26.6

22.2
23.2

26.5

15.6

29.2

13.5

20.8
21.1
29.9

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1882phae.proj.1431.



Nov. 27. 1882.

| | Transit | Obs. | α | γ−α | Obs. | δ | δ−δ | +20 | −13 |
|---|---|---|---|---|---|---|---|---|---|
| | 23h 8m 49.5s | | 23h 8m 48.7 | +0.8 | 5.8 | 6.6 | −0.8 | | −2 |
| | 58.5 | 9.0 | | | | | | | |
| | 10.5 | 5.8 | | | | | | | |
| | 9 20.2 | | 9 19.5 | +0.7 | 2.5 | 3.3 | −0.8 | | −2 |
| | 27.7 | | 27.0 | +0.7 | 7.5 | 7.9 | −0.4 | +2 | |
| | 39.0 | | 38.3 | +0.7 | 7.4 | 7.8 | −0.4 | +2 | |
| | 40.4 | 2.5 | | | | | | | |
| | 4.0 | 7.5 | | | | | | | |
| | 56.4 | 7.4 | | | | | | | |
| B | 10 26.7 | | | | 5.1 | | | | |
| | 38.4? | | | | | | | | |
| | 40.0? | | | | | | | | |
| | 42.6 | 5.1 | | | | | | | |
| | 55.4 | | 10 54.4 | +1.0 | 8.3 | 9.1 | −0.8 | | −2 |
| | 11 13.8 | 8.3 | | | | | | | |
| A | 35.3 | | | | 8.3 | | | | |
| | 38.1 | | 11 37.3 | +0.8 | 2.0 | 2.5 | −0.5 | +1 | |
| | 46.1 | | 45.9 | +0.2 | 6.8 | 7.3 | −0.5 | +1 | |
| | 50.4 | 8.3 / 2.0 | | | | | | | |
| | 12 3.5 | 8.0 | | | | | | | |
| | 8.5 | | 12 7.4 | +1.1 | 0.0 | 0.8 | −0.8 | | −2 |
| | 14.4 | | 13.5 | +0.9 | 5.8 | 6.6 | −0.8 | | −2 |
| | 22.1 | 0.0 | | +14.6 | | | | | |
| B | 43.1 | 5.8 | | | | | | | |
| | 13 9.7 | | 13 8.8 | +0.9 | 4.6 | 5.0 | −0.4 | +2 | |
| | 19.5 | 4.6 | | | | | | | |
| B | | | | | | | | | |
| B | 14 8.1 | | 14 7.2 | +0.9 | 7.6 | 8.4 | −0.8 | | −2 |
| | 17.1 | | 16.5 | +0.6 | 2.4 | 3.0 | −0.6 | 0 | |
| | 19.5 | 7.6 | | | | | | +24 | −25 |
| | 30.1 | 2.4 | | | | | | | |

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1882phae.proj.1431.



13
2 21.0

2 20.2
16.3
17.4

15.9

17.9

15.1
12.3

2 13.6
2 28.7

9.8

2 11.4
13.0
25

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1882phae.proj.1431.



Nov. 27, 1882.

| Transit | Obs: | α | γ − α | Obs: | δ | δ − δ | +28 | −28 |
|---|---|---|---|---|---|---|---|---|
| 23h 15m 17.0s | | 23h 15m 16.5s | +0.5 | −0.1 | 0.5 | −0.6 | 0 | |
| 24.7 | | 23.8 | +0.9 | 8.2 | 9.1 | −0.9 | | −3 |
| 29.8 | | 28.9 | +0.9 | 2.3 | 2.8 | −0.5 | +1 | |
| 45.0 | −0.1 | | | | | | | |
| 47.5 | 2.0 | | | | | | | |
| 49.9 | | 48.9 | +1.0 | 3.5 | 5.2 | −1.7 | | −11 |
| 55.6 | 8.0 | | | | | | | |
| 16 2.0 | | 16 1.3 | +0.7 | 9.7 | 10.3 | −0.6 | 0 | |
| 10.0 | 3.5 | | | | | | | |
| 20.7 | 9.7 | | | | | | | |
| A 17 8.9 | | 17 8.1 | +0.8 | 5.0 | 5.6 | −0.6 | 0 | |
| 10.9 | | 10.7 | +0.2 | 4.9 | 5.4 | −0.5 | +1 | |
| 23.4 | 5.0 | | | | | | | |
| 30.8 | 4.9 | | | | | | | |
| 43.8 | | 42.7 | +1.1 | 1.7 | 2.0 | −0.3 | +3 | |
| 18 8.0 | 1.7 | | | | | | | |
| 29.8 | | 18 29.2 | +0.6 | 4.6 | 4.5 | −0.5 | +1 | |
| 55.0 | | 54.0 | +1.0 | 0.3 | 1.1 | −0.8 | | −2 |
| 58.1 | 4.0 | | | | | | | |
| 19 5.6 | 0.3 | | | | | | | |
| 32.9 | | 19 32.0 | +0.9 | 0.7 | 1.6 | −0.9 | | −8 |
| 39.8 | | 38.9 | +0.9 | 5.1 | 5.8 | −0.7 | | −1 |
| 51.0 | 0.7 | | | | | | | |
| 20 1.5 | | 20 0.5 | +1.0 | 9.1 | 9.7 | −0.6 | | −1 |
| 15.6 | 5.1 | | | | | | | |
| 28.9 | 9.1 | | | | | | | |
| 32.1 | | 31.2 | +0.9 | 3.9 | 4.4 | −0.5 | 0 | |
| 37.5 | | 36.6 | +0.9 | 6.2 | 6.8 | −0.6 | | −1 |
| 56.8 | 6.2 | | | | | | +34 | −47 |

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1882phae..proj.1431.



28.0
30.9
17.7

20.1

18.7

14.5
19.9

19.2

28.3
10.6

18.1
35.8

27.4

31.2
19.3

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1882phae.proj.1431.



Nov. 27, 1882.

| | Transit | Est. | α | | γ − α | Est. | δ | | δ − δ +34 −47 |
|---|---|---|---|---|---|---|---|---|---|
| | 23h 21m 3.3 | 3.9 | 23h | 21m | | | | | |
| A | 34.0 | | | 33.0 | +1.0 | 9.5 | 9.8 | | −0.3 +2 |
| | 50.8 | | | 49.5 | +1.3 | 4.3 | 4.6 | | −0.3 +2 |
| | 58.0 | 9.5 | | | | | | | |
| 22 | 11.9 | | 22 | 10.9 | +1.0 | 0.2 | 1.1 | | −0.9 −4 |
| | 13.5 | 4.3 | | | | | | | |
| | 29.5 | 0.2 | | | | | | | |
| | 32.8 | | | 31.6 | +0.7 | 1.1 | 1.9 | | −0.8 −3 |
| | 50.8 | | | 49.7 | +1.1 | 1.0 | 1.7 | | −0.7 +2 |
| | | | | | +19.8 | | | | |
| 23 | 2.6 | 1.1 | | | | | | | |
| | 6.2 | 1.0 | | | | | | | |
| | 22.6 | | 23 | 21.8 | +0.8 | −0.5 | −0.2 | | −0.3 +2 |
| B | | | | | +9.6 | | | | |
| | 41.1 | −0.5 | | | | | | | |
| | 59.8 | nj. | | 59.8 | 0.0 | 4.2 | 4.4 | | −0.2 +3 |
| 24 | 0.7 | | | | | | | | |
| | 16.0 | | 24 | 15.1 | +0.9 | 0.1 | 0.9 | | −0.8 −3 |
| | 22.2 | 4.2 | | | | | | | |
| | 29.4 | 0.1 | | | | | | | |
| | 32.5 | | | 31.6 | +0.9 | 7.4 | 7.6 | | −0.2 +3 |
| | 35.0 | | | 34.0 | +1.0 | 0.8 | 1.6 | | −0.8 −3 |
| | 56.4 | | | 55.7 | +0.7 | −0.2 | 0.3 | | −0.5 +0 |
| | 57.1 | 0.8 | | | | | | | |
| 25 | 6.6 | 7.4 | | | | | | | |
| | 11.4 | −0.2 | | | | | | | |
| A A | 26 12.7 | | 26 | 11.6 | +1.1 | 4.0 | 4.4 | | −0.4 +1 |
| | 28.6 | 4.0 | | | | | | | |
| 27 | 34.0 | | 27 | 33.0 | +1.0 | 2.7 | 3.3 | | −0.6 −1 |
| | 45.2 | 2.7 | | | | | | | |
| | | | | 47.4 | | −0.5 | | | |
| | 49.0 | | | | | | 9.9 | | +49 −6.1 |
| 28 | 16.5 | | | | | | | | |

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-47

24.0

22.7

4 17.6

3 30.3

15.4

18.5

22.4

9 13.4

34.3

.9 24.1

15.0

15.9

-1 11.2

.1

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Nov. 27, 1882.

| Transit - | Est: | α | γ - α | Est: | δ | ε - δ +49 -61 |
|---|---|---|---|---|---|---|
| 23h 28m 20.5s | | 23h 28m 19.3s | +1.2 | 5.0 | 5.5 | -0.5 0 |
| 30.7 | 5.0 | | | | | |
| ~~45.2~~ | | | | | | |
| 53.2 | | 52.4 | +0.8 | 9.9 | 10.4 | -0.5 0 |
| 24 16.5 | | | +7.6 +0.84 | | | |
| 30.6 | | | | | | |
| 39.2 | | | | | | |
| ~~53.2~~ | | | | | | |
| 29 11.0 | 9.9 | 29 | | | | |
| 20.0 | | 19.1 | +0.9 | 0.0 | 0.6 | -0.6 -1 |
| 34.8 | 0.0 | | | | | |
| 38.0 | | | | 9.7 | | |
| 54.7 | 9.7 | | | | | |
| 56.1 | | 55.2 | +0.9 | 4.8 | 5.2 | -0.4 +1 |
| A 30 20.2 | | 30 19.1 | +1.1 | 2.3 | 2.5 | -0.2 +3 |
| 26.1 | 4.8 | | | | | |
| 48.4 | 2.2 | | | | | |
| B 31 46.0 | | 31 44.8 | +1.2 | 5.2 | 5.7 | -0.7 -2 |
| | | 46.5 | +1.3 | 3.0 | 3.8 | -0.8 -3 |
| 47.8 | | | | | | |
| 7.8 | 3.0 | | | | | |
| 11.0 | 5.2 | | | | | |
| 32 ~~59.9~~ | | 32 58.8 | +1.1 | 2.2 | 2.4 | -0.2 +3 |
| 33 26.8 | 2.2 | | +14.9 | | | |
| 46.1 | | 33 45.2 | +6.9 | 2.3 | 2.5 | -0.2 +3 |
| 34 16.4 | 2.3 | | | | | |
| 55.0 | | 34 54.3 | +0.7 | 10.0 | 10.6 | -0.6 -1 |
| 35 5.0 | | 35 3.6 | | 2.8 | 3.6 | -0.8 -3 |
| 30.0 | 2.8 | | | | | |
| 46.2 | | 45.2 | +1.0 | 2.4 | 3.0 | -0.6 -1 |
| 36 7.7 | | 36 6.5 | +9.7 +1.2 +1.01 | 9.0 | 9.5 | -0.5 0 |
| 9.9 | 2.4 | | | | | +59 -72 |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1992phae.proj.1431.



10.4

17.8

14.8

16.7

30.0

28.2

25.0

20.0

26.9

30.3

25.0

23.7

24.5

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.

Nov. 27/1882.

| | Transit | Est: | α | | δ - α | Est: | δ | | δ - δ +59 -72 |
|---|---|---|---|---|---|---|---|---|---|
| | 23h 36m 20.2 | 9.0 | | | | | | | |
| A | 58.2 | | | | | 10.2 | | | |
| | 37 7.0 | 10.2 | | | | | | | |
| | 23.5 | | 23h 37m 22.2 | | +1.3 | 4.3 | 4.6 | | -0.3 +2 |
| | 32.2 | | 31.2 | | +1.0 | 10.0 | — | | |
| | 46.8 | {10.0 4.3 | | | | | | | |
| | 38 12.0 | | 38 11.0 | | +1.0 | 6.9 | 7.2 | | -0.3 +1 |
| | 31.2 | 6.9 | | | | | | | |
| | 39.0 | | 37.8 | | +1.2 | 3.0 | 3.8 | | -0.8 -4 |
| | 45.2 | | 44.1 | | +1.1 | 9.5 | 9.8 | | -0.3 +1 |
| | 39 11.8 | 9.5 | | | | | | | |
| | 16.7 | 3.0 | | | | | | | |
| | 52.2 | | 39 51.1 | | +1.1 | 7.3 | 7.6 | | -0.3 +1 |
| | 55.6 | | 54.9 | | +0.7 | 7.8 | 8.5 | | -0.7 -3 |
| | 40 10.4 | 7.3 | | | | | | | |
| | 21.5 | 7.8 | | | | | | | |
| | 34.0 | | 40 33.0 | | +1.0 | 10.1 | 10.7 | | -0.6 -2 |
| | 41 4.7 | 10.1 | | | | | | | |
| B | 44.0 | | 41 43.1 | | +0.9 | 1.8 | 1.8 | | 0.0 +4 |
| | 49.5 | 1.8 | | | +~~0.3~~ | | | | |
| | 42 15.8 | | 42 14.6 | | +1.2 | 2.3 | 2.7 | | -0.4 0 |
| | 18.7 | | | | | 5.0 | | | |
| | 26.9 | 2.3 | | | +14.3 | | — | | |
| | 28.5 | 5.0 | | | | | | | |
| | 43 17.1 | | 43 16.0 | | +1.1 | 2.5 | 3.2 | | -0.7 -3 |
| | 25.0 | | 23.9 | | +1.1 | 6.6 | 6.8 | | -0.2 +2 |
| | 44.0 | 2.5 | | | | | | | |
| | 57.0 | 6.6 | | | | | | | |
| A | 44 22.7 | | 44 21.5 | | +1.2 | 7.0 | 7.3 | | -0.3 +1 |
| | 28.5 | 7.0 | | | | | | | +71 -84 |

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1882phae.proj.1431.



8.8

23.3
14.6

19.2

37.7
26.6

18.2
25.9

30.7

5.5

11.1
9.8

26.9
32.0

5.8

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1882phae.proj.1431.



Nov. 27. 1882.

| Transit | Est: | α | | γ - α | Est: | δ | ε - δ +71 -84 |
|---|---|---|---|---|---|---|---|
| 23h 45m 53s.8 | | 23h | 45m 52s.8 | +1.0 | 4.3 | 4.6 | -0.3 +1 |
| 46 18.5 | 4.3 | | | | | | |
| 22.8 | | | 21.6 | +1.2 | 5.0 | 5.5 | -0.5 -1 |
| 57.4 | 5.0 | | | | | | |
| 47 0.5 | | | 59.4 | | 2.4 | 3.0 | -0.6 -2 |
| 6.4 | 2.4 | | | | | | |
| 47.3 | | 47 | 46.1 | +1.2 | 9.8 | 10.0 | -0.2 +2 |
| 54.5 | | | 53.4 | +1.1 | 2.7 | 3.5 | -0.8 -4 |
| 48 4.3 | 2.7 | | | | | | |
| 6.0 | 9.8 | | | | | | |
| 19.0 | | 48 | 17.0 | +2.0 ~~+1.1~~ ~~1.25~~ | 2.8 | 3.4 | -0.6 -2 |
| 32.7 | 2.8 | | | | | | |
| A 51 12.3 | | 51 | 11.1 | +1.2 | 9.6 | 9.7 | -0.1 +3 |
| 19.0 | | | 17.8 | +1.2 | 9.8 | 10.1 | -0.3 +1 |
| 30.9 | | | 29.7 | +1.2 | 9.3 | 9.4 | -0.1 +3 |
| 83.0 | 9.6 | | | | | | |
| 87.1 | 9.8 | | | | | | |
| 52 2.4 | 9.3 | | | | | | |
| 39.6 | | 52 | 38.1 | +1.5 | 9.9 | 10.3 | -0.4 0 |
| 52.6 | 9.9 | | | | | | |
| 53 2.9 | | 53 | 1.7 | +1.2 | 9.4 | 9.6 | -0.2 +2 |
| 55.3 | 9.4 | | | | | | |
| 57.0 | | | 56.6 | +0.4 | 1.8 | 1.8 | 0.0 +4 |
| 11.5 | 1.8 | | | | | | |
| 54 13.7 | | 54 | 12.5 | +1.2 | 4.7 | 4.9 | -0.2 +2 |
| 27.7 | 4.7 | | | | | | |
| 33.8 | | | 32.5 | +1.3 | 10.0 | 10.6 | -0.6 -2 |
| 55.4 | 10.0 | | | | | | |
| 59.2 | | | 57.8 | +1.4 | 5.0 | 5.6 | -0.6 -2 |
| | | | | | | | +8.9 -97 |

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1882phae.proj.1431.

84 19.7

1 34.6

2 5.9

18.7

4 9.8

2 13.7

20.7

18.1

31.5

13.0

32.4

14.5

14.0

2 21.6

2 18.8

7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Nov. 27. 1882.

| Transit | Est. | $\alpha$ | $\Delta\alpha$ | Est. | $\delta$ | $\delta - \delta$ | +8.9 | -9.7 |
|---|---|---|---|---|---|---|---|---|
| $23^h\,55^m\,10^s.1$ | | $23^h\,55^m\,8^s.9$ | +1.2 | 5.0 | 5.6 | −0.6 | | −0.2 |
| 18.0 | 5.0 | | 11.8 | | | | +8.9 | −9.9 |
| 95.9 | 5.0 | | +21.7 | | | | | |

B
B

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1892phae.proj.1431.



97
02
99

158

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1882phae.proj.1431.



Dec. 8. 1882.

| Transit | Est | α | γ − α | | Est | δ | δ − δ | |
|---|---|---|---|---|---|---|---|---|
| 21h 49m 27.3 | | 21h 49m 27.3 | 0.0 | −0.2 | 3.0 | 4.1 | −1.1 | −3 |
| 44.2 | | 44.1 | +0.1 | −0.1 | 9.8 | 10.2 | −0.4 | +4 |
| 54.8 | | 54.6 | +0.2 | 0.0 | 9.8 | 10.1 | −0.3 | +5 |
| 56.4 | 3.0 | | | | | | | |
| 50 8.7 | 9.8 | | | | | | | |
| 17.6 | 9.8 | | | | | | | |
| 29.5 | | 50 29.4 | +0.1 | −0.1 | 8.3 | 9.1 | −0.8 | −1 |
| 58.0 | 8.3 | | | | | | | |
| 51 2.5 | | 51 2.9 | +0.2 | 0.0 | 7.0 | 7.3 | −0.3 | +4 |
| 5.5 | | 5.6 | −0.1 | −0.3 | 3.2 | 4.2 | −1.0 | −3 |
| 25.5 | 7.0 / 3.2 | | | | | | | |
| 35.5 | | 35.1 | +0.4 | +0.2 | 9.5 | 9.8 | −0.3 | +4 |
| 38.2 | | 38.0 | +0.2 | 0.0 | 2.4 | 3.9 | −1.5 | −8 |
| 52 8.6 | 9.5 | | | | | | | |
| 6.1 | 2.4 | | | | | | | |
| 23.5 | | 52 23.3 | +0.2 | 0.0 | 2.5 | 2.9 | −0.4 | +3 |
| 30.2 | | 29.9 | +0.3 | +0.1 | 9.6 | 10.0 | −0.4 | +3 |
| 51.7 | | 51.6 | +0.1 | −0.1 | 2.4 | 3.1 | −0.7 | +0 |
| 54.3 | 2.5 / 9.6 | | | | | | | |
| 53 3.0 | | 53 3.1 | −0.1 | −0.3 | 2.5 | 3.4 | −0.9 | −2 |
| 15.5 | | 15.3 | +0.2 | 0.0 | 2.6 | 3.8 | −1.2 | −5 |
| 18.0 | 2.4 | | | | | | | |
| 28.5 | 2.5 | 26.5 | 0.0 | −0.2 | 7.5 | 8.1 | −0.6 | +1 |
| 36.1 | | | | | 3.0 | | | |
| 41.0 | 2.6 | | | | | | | |
| 47.8 | | | | | 9.0 | | | |
| 57.8 | 2.6 | | | | | | | |
| 54 3.6 | 7.5 | 54 | | | | | | |
| 10.0 | 9.0 | | | | 6.0 | | | |
| 34.1 | | 33.8 | +0.3 | +0.1 | 7.3 | 7.7 | −0.4 | +3 |
| | | | | | | | +27 | −22 |

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29.1
24.5
22.8

28.5

23.0
20.0

28.1
27.9

30.8
24.1
26.3

23.5
25.5

37.1
23.2

22.2

26.1
26.7

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1882phae.proj.1431.



Dec. 8, 1882.

| Transit | Est. | α | | δ | | δ − δ +27 −22 |
|---|---|---|---|---|---|---|
| 21h 54m 36.8 | 6.0 | | | | | |
| A 55 0.8 | 7.3 | | | | | |
| 19.8 | | 21h 55m 19.4 | +0.4 +0.2 | 5.7 | 6.6 | −0.9 −3 |
| 30.3 | | | | 7.5 | | |
| 49.0 | 5.7 | | | | | |
| 58.5 | 7.5 | | | | | |
| 57.8 | | 57.6 | +0.2 0.0 | 8.2 | 9.4 | −1.2 −6 |
| 56 20.9 21.9 | 8.2 | 56 20.5 | +0.4 +0.2 | 4.9 | 5.4 | −0.5 +1 |
| 49.7 | 4.9 | | | | | |
| B 57 37.9 | | 57 37.6 | +0.3 +0.1 | 9.2 | 9.7 | −0.5 +1 |
| 58 1.2 | 9.2 | | | | | |
| 5.0 | | 54 4.9 | +0.1 −0.1 | 5.1 | 6.0 | −0.9 −3 |
| 16.9 | | 16.6 | +1.9 +0.3 +0.1 | −0.5 | 0.0 | −0.5 +1 |
| 35.9 | | 35.8 | +0.1 −0.1 | 1.3 | 1.8 | −0.5 +1 |
| 41.6 | −0.5 | | | | | |
| 43.4 | 5.1 | | +3.9 | | | |
| 59 1.7 | 1.3 | | | | | |
| A 57.7 | | | | | | |
| 22 1 48.8 | | 22 1 48.2 | +0.1 −0.1 | 5.5 | 6.4 | −0.9 −4 |
| 2 0.6 | | 2 0.1 | +0.5 +0.3 | 4.8 | 5.1 | −0.3 +2 |
| 2.5 | | 2.2 | +0.3 +0.1 | 3.5 | 4.2 | −0.7 −2 |
| 14.8 | | 14.4 | +0.4 +0.2 | 5.1 | 6.2 | −1.1 −6 |
| 17.8 | 5.1 | 17.3 | +0.5 +0.3 | 7.0 | 7.3 | −0.3 +2 |
| 34.1 | 4.8 3.0 | | | | | |
| 49.2 | 7.0 | | | | | |
| 58.8 | 5.0 | | | | | |
| 3 10.0 | | 3 9.6 | +0.4 +0.2 | 6.0 dbl. | 6.5 | −0.5 0 |
| 35.9 | 6.0 | | | | | +35 −46 |
| 5 29.9 | | | | | | |
| A 30.6? | | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



22

-3 29.2
23.2

6 24.1
28.8

233

3 38.4
24.7
25.8

29.5
33.5
2 31.6
39.0
31.4

25.9

16

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Dec. 8, 1882.

| Transit | Est: | α | γ-α | | Est: | δ | δ-δ | +3.5 -46 |
|---|---|---|---|---|---|---|---|---|
| 22h 6m 42s.3 | | 22h 6m 42s.1 | +0.2 | 0.0 | 4.8 | 5.0 | -0.2 | +3 |
| 7 20.4 | 4.8 | | | | | | | |
| 8 8.5 | | 8 9.0 | ~~-0.5~~ +3.3 | -0.8 | 7.8 tripl. | 8.4 | -0.6 | -2 |
| 14.5 | | 14.3 | +0.2 | -0.1 | 3.0 | 3.8 | -0.8 | -4 |
| 44.8 | 7.8 / 3.0 | | | | | | | |
| | | | +2.1 | | | | | |
| 8 10 27.6 | | | | | 3.0 | | | |
| 40.4 | | 10 39.9 | +0.5 | +0.2 | 0.0 | 0.4 | -0.4 | 0 |
| 46.1 | 3.0 | | | | | | | |
| 58.1 | | 57.9 | +0.2 | -0.1 | 5.0 | 5.5 | -0.5 | -1 |
| 11 0.7 | | 11 0.3 | +0.4 | +0.1 | 5.8 | 6.3 | -0.5 | -1 |
| 11.4 | 0.0 | | | | | | | |
| 22.2 | 5.0 | | | | | | | |
| 35.9 | 5.8 | | | | | | | |
| 12 9.1 | | 12 8.8 | +0.3 | 0.0 | 2.3 | 2.4 | -0.1 | +3 |
| 12.1 | | 11.9 | +0.2 | -0.1 | 1.8 | 1.4 | +0.4 | +8 |
| 28.4 | | 28.2 | +0.2 | -0.1 | 7.5 | 7.4 | +0.1 | +5 |
| 38.7 | 1.8 | | | | | | | |
| 36.0 | 2.3 | | | | | | | |
| 54.1 | 7.5 | | | | | | | |
| 13 10.5 | | 13 11.0 | -0.5 | -0.8 | 1.9 | 1.9 | 0.0 | +4 |
| 17.6 | | 17.1 | +0.5 | +0.2 | 7.3 | 7.4 | +0.1 | +5 |
| 29.5 | | 29.0 | +0.5 | +0.2 | 10.0 | 10.3 | -0.3 | +1 |
| 37.8 | | 37.4 | ~~+2.5~~ +0.4 | +0.1 | 8.0 | 8.3 | -0.3 | +1 |
| 40.0 | 7.3 | | | | | | | |
| 46.6 | 2.0 | | | | | | | |
| 56.8 | | 56.5 | +0.3 | 0.0 | 0.2 | 0.6 | -0.4 | 0 |
| 14 1.4 | 10.0 | | | | | | | |
| 5.4 | 8.0 | | | | | | | |
| 18.0 | 0.2 | | | | | | | |
| 15 2.4 | | 15 2.1 | +0.3 | 0.0 | 5.0 | 5.4 | -0.4 | -1 |
| | | | | | | | +6.5 | -55 |

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38.1

36.3

30.3

18.5

31.0

24.1

35.2

26.9

21.6

25.7

36.1

22.4

31.9

27.6

21.2

32.9

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1882phae.proj.1431.



Dec. 8, 1882.

| Transit | Est: | α | γ − α | Est: | δ | δ − δ +65 −54 |
|---|---|---|---|---|---|---|
| 22h 15m 4.3 | | 22h 15m 3.9 | +0.4 +0.1 | 0.5 | 1.2 | −0.7 −4 |
| 25.4 | | 24.9 | +0.5 +0.2 | 3.0 | 3.5 | −0.5 −2 |
| 29.5 | | | | 7.5 | | |
| 35.3 | 5.0 | 31.0 | | | 0.3 | |
| | 0.5 | | | | | |
| 47.8 | 3.0 | | | | | |
| 51.9 | 7.5 | | | | | |
| 16 8.0 | | 16 7.5 | +0.5 +0.2 | 7.5 | 9.8 | [−2.3] [7.0] |
| 30.1 | 7.5 | | | | | |
| B 18 52.4 | | 18 52.1 | +0.3 0.0 | 9.0 | 9.2 | −0.2 +1 |
| | | | +5.0 | | | |
| 19 19.4 | 9.0 | | | | | |
| 20 37.8 | | 20 39.0 | +0.8 +0.5 | 10.2 | 10.4 | −0.2 +1 |
| 41.2 | | 41.0 | +0.2 −0.1 | 6.0 | 6.6 | −0.6 −3 |
| 21 6.8 | 10.2 | | +3.7 +~~4.1~~ | | | |
| 25.0 | 6.0 | | | | | |
| 47.9 | | 21 47.4 | +0.5 +0.2 | 3.4 | 3.9 | −0.5 −3 |
| 56.8 | | 56.2 | +0.6 +0.3 | 10.0 | 9.6 | +0.4 +6 |
| 57.7 | | 57.1 | +0.6 +0.3 | 7.0 | 7.4 | −0.4 −2 |
| 22 6.6 | 3.4 | | | | | |
| 20.2 | 10.0 | | | | | |
| 25.3 | 7.0 | | | | | |
| 42.8 | | 22 42.6 | +0.2 −0.1 | 5.8 | 6.2 | −0.4 −2 |
| 12.1 | | 12.1 | 0.0 −0.3 | 4.9 | 4.9 | 0.0 +2 |
| 23 16.6 | 5.8 | | | | | |
| 24.8 | | 23 24.5 | +0.3 0.0 | 4.8 | 4.5 | +0.3 +5 |
| 30.2 | 4.9 | | | | | |
| 38.1 | | 38.0 | +0.1 −0.2 | 10.3 | 10.5 | −0.2 0 |
| 46.9 | 4.8 | | | | | |
| 24 12.3 | 10.3 | | | | | |
| 20.4 | | 24 26.2 | +0.2 −0.1 | 1.0 | 1.5 | −0.5 −3 |
| 25.8 | | 25.5 | +0.3 0.0 | 0.5 | 0.8 | −0.3 −1 |
| 29.3 | | 29.1 | +0.2 −0.1 | 10.4 | 10.8 | −0.4 −2 |
| | | | +~~3.0~~ | Edge of Image | | +5.0 −77 |

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31.0
22.4
22.4

22.1

27.0

27.0
43.8

18.7
23.4
27.6

33.8
18.1

22.1

34.2

22.0
23.2

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Dec. 8, 1882.

| | Transit | Est: | α | γ − α | | Est: | δ | δ − δ | +80 −77 |
|---|---|---|---|---|---|---|---|---|---|
| | 22h 24m 42s.4 | 1.0 | | | | | | | |
| | 49.0 | 0.5 | | | | | | | |
| A | 25 23.9 | | 22h 25m 23s.6 | +0.3 | 0.0 | 2.2 | 1.9 | +0.3 | +5 |
| | 53.5 | | 52.9 | +0.6 | +0.3 | 4.0 | 4.3 | −0.3 | −1 |
| | 26 8.4 | 2.2 | | | | | | | |
| | 18.7 | 4.0 | | | | | | | |
| | 27 11.1 | | 27 11.2 | −0.1 | −0.4 | 4.0 | 4.1 | −0.1 | +1 |
| | 28.0 | | 28.0 | 0.0 | −0.3 | 4.2 9.2 | 9.2 | 0.0 | +2 |
| | 33.0 | 4.2 | | | | | | | |
| | 45.0 | | 44.5 | +0.5 | +0.2 | 5.0 | 5.4 | −0.4 | −2 |
| | 55.2 | 9.2 | | | | | | | |
| | 28 12.5 | | 28 12.2 | +0.3 | −0.1 | 6.2 | 6.6 | −0.4 | −3 |
| | 19.0 | 5.0 | | | | | | | |
| | 23.2 | | 23.0 | +0.2 | −0.2 | 2.7 | 3.3 | −0.6 | −5 |
| | 36.8 | 6.0 | | | | | | | |
| | 49.9 | | 49.6 | +0.3 | −0.1 | 9.0 | 9.1 | −0.1 | 0 |
| | 57.7 | 3.0 | | +6.1 | | | | | |
| | 29 16.8 | 9.0 | 29 16.4 | +0.4 | 0.0 | 5.0 | 5.3 | −0.3 | −2 |
| | 30.1 | | | | | 4.5 | | | |
| | 44.5 | 5.0 4.5 | | | | | | | |
| | 54.0 | | 53.6 | +0.4 | 0.0 | 7.6 | 7.6 | 0.0 | +1 |
| | 59.1 | | 59.0 | +0.1 | −0.3 | 6.0 | 6.3 | −0.3 | −2 |
| | 30 14.1 | 6.0 | | | | | | | |
| | 19.3 | 7.6 | | | | | | | |
| | 27.2 | | 30 27.6 | −0.4 | −0.8 | 9.0 | 9.0 | 0.0 | +1 |
| | 55.0 | 9.0 | | | | | | | |
| B | 31 17.0 | | 31 16.8 | +0.2 | −0.2 | 3.3 | 3.8 | −0.5 | −4 |
| | 44.5 | 3.0 | 48.6 | | | | 2.7 | | |
| | 51.7 | | 51.2 | +0.5 | +0.1 | 5.3 | 5.7 | −0.4 | −3 |
| | 32 4.6 | | | | | 7.5 | | | +96 −79 |

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1882phae..proj..1431.



77

44.5

.1 20.2

21.9

27.2

2 34.9

8 24.3

5 28.5

26.9

2 27.7

14.4

25.3

2 15.0

27.8

4 27.5

31.8

9 16.0

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Dec. 8, 1882.

| Transit | Est. | $\alpha$ | $\gamma - \alpha$ | Est. | $\delta$ | $\delta - \delta$ |
|---|---|---|---|---|---|---|
| $22^h 32^m 20^s.6$ | 7.5 | | | | | +90 −99 |
| 23.5 | 5.3 | | | | | |
| 37.8 | | $22^h 32^m 37^s.7$ | +0.1 −0.3 | 4.7 | 4.8 | −0.1 0 |
| 44.1 | | | | 7.9 | | |
| 55.7 | 4.5 | | | | | |
| 57.2 | | 58.8 | +0.4 0.0 | 4.5 | 4.4 | +0.1, 2 |
| 83 5.7 | 7.9 | | | | | |
| 11.5 | | 33 11.0 | +0.5 +0.1 | 2.4 | 2.3 | +0.1 +2 |
| 19.0 | 4.5 | | | | | |
| 26.7 | 2.4 | | | | | |
| 41.3 | | 40.8 | +0.5 +0.1 | 7.0 | 7.0 | 0.0 +1 |
| 56.1 | | 55.7 | +0.4 0.0 | 6.0 | 6.0 | 0.0 +1 |
| 84 17.0 | 7.0 | | +~~2.3~~ | | | |
| 23.0 | 0.0 | | | | | |
| A A 35 34.7 | | 35 34.3 | +0.4 0.0 | 10.0 | 9.9 | +0.1 +2 |
| 86 2.0 | 10.0 | 36 2.9 | +0.3 ~~−0.9~~ −0.1 ~~−1.3~~ | 8.0 | 8.5 | −0.5 −5 |
| 4.3 | mean 3.2 | | | | | |
| 41.0 | | 40.7 | +0.3 −0.1 | 9.3 | 9.2 | +0.1 +1 |
| 52.0 | | 51.6 | +0.4 0.0 | 7.7 | 7.8 | −0.1 −1 |
| 87 7.3 | | 37 6.8 | +0.5 +0.1 | 8.2 | 8.4 | −0.2 −2 |
| 9.8 | 9.3 | | | | | |
| 18.9 | | 18.5 | +0.4 0.0 | 7.5 | 7.6 | −0.1 −1 |
| 19.9 | 7.5 | | | | | |
| 31.3 | 8.0 | | | | | |
| 42.0 | | 41.5 | +0.5 +0.1 | 9.0 dbl. | 8.9 | +0.1 +1 |
| 51.0 | | 50.7 | +0.3 −0.1 | 4.8 | 4.7 | +0.1 +1 |
| 56.6 | 7.5 | | | | | +101 −104 |
| 38 7.9 | 8.2 | | | | | |
| 16.2 | ~~4.6~~ | | | | | |
| 22.7 | 4.8 | | | | | |

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae..proj..1431.



99

17.9
21.6

19.8

15.2

35.7
26.9

27.3

5

28.8

.1 27.9
.2

-1 ~~36.7~~ ~~7.0~~

~~24.7~~ 27.1

04

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1882phae.proj.1431.



Dec. 8, 1882.

| Transit- | δ-1 | α | δ-2 | | δ-1 | δ | δ-δ | +101 -105 |
|---|---|---|---|---|---|---|---|---|
| 22h 38m 44.1s | | 22h 38m 43.5s | +0.6 | +0.2 ~~-0.2~~ | 6.8 | 6.6 | +0.2 | +.2 |
| 39 7.0 | | 39 2.3 | [+4.7] | [+1.3] | 3.7 | 3.6 | +0.1 | +.1 |
| 11.2 | | 39 10.6 | +0.6 | +0.2 | 7.3 | 7.0 | +0.3 | +3 |
| 16.5 | 6.8 | | | | | | | |
| 82.6 | 3.7 | | | | | | | |
| 45.5 | 7.3 | | | | | | | |
| B 40 24.7 | | 40 23.2 | +1.5 | +1.1 | 7.4 | 7.5 | -0.1 | -1 |
| 40.1 | 7.4 | | | | | | | |
| 41 15.8 | | 41 15.3 | +0.5 | +0.1 | 0.0 | 0.2 | -0.2 | -2 |
| 35.5 | 0.0 | | | | | | | |
| 38.8 | | 38.2 | +0.6 | +0.2 | 0.2 | 0.3 | -0.1 | -1 |
| 49.1 | | 48.7 | +0.4 | 0.0 | 2.3 dbl. h+f. | 2.0 | +0.3 | +3 |
| 42 0.0 | 2 | | | | | | | |
| 15.7 | 2.3 | 42 10.4 | | | | 10.3 | | |
| 38.7 | | | | | 7.0 | | | |
| 60.7 | 7.0 | | | | | | | |
| 43 57.0 | | 43 56.3 | +0.7 | +0.3 | 0.8 | 1.1 | -0.3 | -3 |
| 44 1.8 | | 44 1.2 | +0.6 | +0.2 | 8.0 | 8.2 | -0.2 | -3 |
| 17.3 | 0.8 | | | | | | | |
| 28.4 | 8.0 | | | | | | | |
| A 45 22.0 | | 45 21.2 | +0.8 | +0.4 | 0.5 | 0.8 | -0.3 | -4 |
| 28.5 | | 27.9 | ~~+3.7~~ +0.6 | 0.7 +0.2 | 6.0 | 6.4 | -0.4 | -5 |
| 39.9 | | 39.4 | +0.5 | +0.1 | 6.3 | 6.6 | -0.3 | -4 |
| 58.8 | 0.5 | | +12.4 | | | | +105 | -131 |
| 46 1.9 | 6.0 | | | | | | | |
| 8.4 | 6.3 | | | | | | | |

13
B

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



108

32.4
25.6
34.3

-1 15.4

2 19.7

-1 21.2
26.6

17.2

3 20.3
26.6

1 31.8
5 33.4
4 28.5
3)

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1882phae.proj.1431.



Dec. 12, 1882.

| | Transit | Obs'r: | α | γ − α | | Obs'r: | δ | δ − δ | +108 −131 |
|---|---|---|---|---|---|---|---|---|---|
| | 22h 40m 28.3s | | 22h 40m 23.2s | +0.1 | +0.9 | 6.5 | 7.5 | −1.0 | +3 |
| | 43.7 | 6.5 | | | | | | | |
| A | 41 14.1 | | 41 15.3 | −1.2 | −0.4 | −1.0 | 0.2 | −1.2 | 0 |
| | 37.5 | −1.0 | 38.2 | −0.7 | +0.1 | −1.0 | 0.3 | −1.3 | −1 |
| | 46.7 | | 47.8 | −1.1 | −0.3 | 0.5 | 2.0 | −1.5 | −3 |
| | 47.1 | | 48.7 | −1.6 | −0.8 | 0.5 | 2.0 | −1.5 | −3 |
| | 42 2.0 | −1.0 | | | | | | | |
| | 9.9 | | 42 10.4 | −0.5 | +0.3 | 9.6 | ~~10.3~~ 10.8 | ~~−0.7~~ −1.2 | ~~+5~~ 0 |
| | 13.8 | 0.5 / 0.5 | | | | | | | |
| | 36.5 | 9.6 | | | | | | | |
| B | 43 46.1 | | | | | 0.3 | | | |
| | 55.7 | | 43 56.3 | −0.6 | +0.2 | −0.2 | 1.1 | −1.3 | −1 |
| | 44 0.7 | | 44 1.2 | −0.5 | +0.3 | 7.0 | 8.2 | −1.2 | 0 |
| | 4.9 | 0.3 | | | | | | | |
| | 18.2 | −0.2 | | | | | | | |
| | 31.0 | 7.0 | | | | | | | |
| | 45 20.2 | | 45 21.2 | −1.0 | −0.2 | −0.3 | 0.8 | −1.1 | +1 |
| | 27.1 | | 27.9 | ~~−0.8~~ −0.8 | 0.0 | 5.2 | 6.4 | −1.2 | 0 |
| | 38.5 | | 39.4 | −0.9 | −0.1 | 5.3 | 6.6 | −1.3 | −1 |
| | 54.0 | −0.3 | | | | | | | |
| | 46 2.9 | 5.2 | | | | | | | |
| | 8.6 | 5.3 | | | | | | | |
| | 20.8 | | 46 21.6 | −0.8 | 0.0 | 5.0 | 6.3 | −1.3 | −1 |
| | 25.0 | | | | | 0.5 | | | |
| | 40.7 | 5.0 / 0.5 | | | | | | | |
| A | 47 30.0 | | 47 30.5 | −0.5 | +0.3 | 9.0 | 10.1 | −1.1 | +1 |
| | 44.7 | | 45.3 | −0.6 | +0.2 | 2.5 | 3.6 | −1.1 | +1 |
| | 52.1 | 9.0 | | | | | | | |
| | 48 5.8 | 2.5 | | | | | | | |
| | 23.0 | | 48 23.7 | −0.7 | +0.1 | 2.4 | 3.3 | −0.9 | +3 |

+122 +141

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-13

20.4

23.4

-1 24.5

9 27.1

.3 26.7

26.6

18.8

1 22.5

30.3

33.8

35.8

-1 30.1

1 19.9

15.7

22.1

21.1

26.8



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Dec. 12, 1882.

| Transit | Obs'r. | α | δ − α | Obs'r. | δ | δ − δ |
|---|---|---|---|---|---|---|
| | | | | | | +122 −141 |
| $22^h\,48^m\,49^s.8$ | 2.4 | | | | | |
| 49 44.7 | | $22^h\,49^m\,45^s.3$ | −0.6 +0.1 | 0.5 | 1.8 | −1.3 −1 |
| 56.0 | | | 1.1 −12.0 | 5.0 | 2.8 | — |
| 50 11.8 | 5.0 | 50 | | | | |
| 22.7 | 0.5 | | | | | |
| 40.6 | | | | 9.2 | | |
| 57.7 | 9.2 | | | | | |
| 59.9 ? | | | | | | |
| 51 6.8 | | 51 7.7 | −0.9 −0.2 | 0.6 | 2.0 | −1.4 −3 |
| 24.8 | | 35.5 | −0.7 0.0 | 4.9 | 5.9 | −1.0 +1 |
| 26.5 | 0.6 | | | | | |
| 50.5 | 4.9 | 51.6 | −1.1 −0.4 | −0.4 | 0.8 | −1.2 −1 |
| 58.2 | | 58.9 | −0.7 0.0 | 6.0 | 7.2 | −1.2 −1 |
| 52 18.0 | −0.4 | | | | | |
| 25.9 | 6.0 | | | | | |
| 41.5 | | 52 42.5 | −1.0 −0.3 | 8.3 | 9.8 | −1.5 −4 |
| 56.0 | | 56.9 | −0.9 −0.2 | 5.3 | 6.6 | −1.3 −2 |
| 53 3.9 | 8.3 | | | | | |
| 26.1 | 5.3 | | | | | |
| 34.6 | | 53 35.2 | −0.6 +0.1 | 8.5 | 9.7 | −1.2 −1 |
| 54.5 | | 55.2 | −0.7 0.0 | 2.5 | 3.4 | −0.9 +2 |
| 54 4.4 | 8.5 | | | | | |
| 14.1 | 2.5 | | | | | |
| 44.4 | | | | 7.5 Not in Nic. catal. | | |
| 55 7.7 | 7.5 | | | | | |
| 20.8 | | 55 21.2 | −0.4 +0.3 | 4.5 | 5.3 | −0.8 +3 |
| 45.2 | 4.5 | | | | | |
| 57 12.1 | | 57 13.1 | −1.0 −0.3 | 3.0 | 4.1 | −1.1 0 |
| 22.5 | | 23.2 | −0.7 0.0 | −0.5 | 0.8 | −1.3 −2 |
| 26.7 | | 27.0 | −0.3 +0.4 | 7.6 | 8.5 | −0.9 +2 |
| | | | | | | +130 −150 |

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1882phae.proj.1431.



41

1 38.0
15.8

17.1

3 19.7
25.7

-1 22.5
.1 27.7

4 22.4
2 30.1

-1 29.8
19.6

23.3

24.2

23.9
2 44.3
33.3

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1882phae.proj.1431.



Dec. 12, 1882.

| Transit | Est: | α | γ − α | Est: | δ | δ − δ +130 −156 |
|---|---|---|---|---|---|---|
| $22^h 57^m 36^s.0$ | 3.0 | | | | | |
| 58 0.0 | 7.6 | | | | | |
| 6.8 | 0.5 | | | | | |
| 17.6 | | $22^h 58^m 18^s.3$ | −0.7 0.0 | 9.8 | 10.6 | −0.8 +3 |
| 31.0 | | 31.4 | −0.8 −0.1 | 9.8 | 10.8 | −1.0 +1 |
| 36.0 | | | | 1.0 | | |
| 58.5 | 9.8 pol. 1.0 | 44.1 | | | 6.4 | — |
| | | | −10.5 | | | |
| 59 3.0 | 9.8 prec. | | | | | |
| A 23 0 14.9 | | 23 0 15.2 | −0.3 +0.1 | 3.3 4.5 | — 4.8 | −1.5 −4 |
| 33.6 | 3.3 | 15.4 | −0.5 +0.2 | | 5.4 | −0.9 +2 |
| 41.0 | 4.5 | 41.6 | −0.6 +0.1 | 8.0 | 9.8 | −1.8 −7 |
| 42.7 | | 42.7 | 0.0 +0.7 | 9.0 | 10.4 | −1.4 −3 |
| 55.1 | | | | 7.6 | | |
| 1 5.5 | 8.0 9.0 | 56.7 | | | 0.6 | |
| 15.9 | 7.6 | | | | | |
| 54.8 | | 1 55.2 | −0.4 +0.2 | 9.5 | 10.4 | −0.9 +2 |
| 2 22.7 | 9.5 | | | | | |
| 44.8 | | 2 45.4 | −0.6 0.0 | 5.3 | 6.5 | −1.2 −2 |
| 49.7 | | 50.3 | −0.6 0.0 −0.7 | 7.6 | 8.4 | −0.8 +2 |
| 57.5 | | 58.0 | −0.5 +0.1 | 4.7 | 5.6 | −0.9 +1 |
| 3 14.0 | 5.3 | | | | | |
| 20.7 | 4.8 7.6 | | | | | |
| B 52.8 | | 3 53.2 | −0.4 +0.2 | 9.3 | 10.3 | −1.0 .0 |
| 4 4.0 | | 4 ~~4.7~~ 4.6 | ~~−0.7~~ −0.6 0.0 −0.1 | 1.0 | ~~10.6~~ 2.2 | −1.2 −0.2 [−9.2] −8.2 |
| 14.2 | 9.3 | | | | | |
| 22.0 | | 22.5 | −0.5 +0.1 | 2.5 | ~~2.2~~ 3.8 | −1.3 −0.3 |
| 28.0 | | 28.3 | −0.3 +0.3 | 7.8 | ~~9.6~~ 9.0 | ~~+0.3 +13~~ −1.2 ~~[+4.2]~~ [+5.2] −0.7 |
| 33.0 | | 33.7 | −0.7 −0.1 | 0.8 | 1.7 | −0.9 +1 |
| 35.0 | 1.0 | | | | | +155 −172 |
| 52.7 | 2.5 | | | | | |
| 5 0.7 | 7.0 | | | | | |

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1882phae.proj.1431.



45.4
27.5
22.5

18.6
26.1
24.5
22.8
20.8

27.9

29.2
31.2
23.4

21.4
31.0

30.7
32.7
36.6

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1882phae.proj.1431.



Dec. 12, 1882.

| Transit - | Est: | α | γ - α | | Est: | δ | δ - δ +155 -172 | |
|---|---|---|---|---|---|---|---|---|
| 23h 5m 9.6 | 0.8 | | | | | | | |
| 26.1 | | 23h 5m 27.0 | -0.9 | -0.3 | 4.2 | 5.4 | -1.2 | -2 |
| 45.0 | 4.2 | | | | | | | |
| 56.4 | | 56.9 | -0.5 | +0.1 | 8.8 | 4.6 | -0.8 +2 | |
| 6 33.0 | 8.8 | | | | | | | |
| A 7 23.7 | | 7 24.3 | -0.6 | 0.0 | 2.8 | 4.3 | -1.5 | -5 |
| 40.0 | | | | | 10.1 | | | |
| 44.5 | 2.8 | | | | | | | |
| 8 9.0 | | 8 9.5 | -0.5 | +0.1 | 7.5 | 8.6 | -1.1 | -1 |
| 11.0 | 10.1 | | | | | | | |
| 22.0 | | | | | 2.5 | | | |
| 23.6 | | 24.4 | -0.8 | -0.2 | 9.8 | 10.6 | -0.8 +2 | |
| 27.0 | | 27.8 | ~~-0.8~~ -0.8 | -0.2 | 9.0 | 9.8 | -0.8 +2 | |
| 36.4 | 2.8 | | | | | | | |
| 41.5 | 7.5 | | | | | | | |
| 48.1 | | 48.7 | -0.6 | 0.0 | 5.3 | 6.6 | -1.3 | -3 |
| 58.7 | 9.8 | | | | | | | |
| 9 0.8 | 9.0 | | | | | | | |
| 14.7 | 5.3 | | | | | | | |
| 17.0 | | 9 19.5 | -0.5 | +0.1 | 2.5 | 3.3 | -0.8 +2 | |
| 26.6 | | 27.0 | -0.4 | +0.2 | 7.2 | 7.9 | -0.7 +3 | |
| 37.7 | | 38.3 | -0.6 | 0.0 | 7.1 | 7.8 | -0.7 +3 | |
| 47.5 | 2.5 | | -11.9 | | | | | |
| 52.0 | 7.2 | | | | | | | |
| 10 1.8 | 7.1 | | | | | | | |
| B 53.9 | | 10 54.4 | -0.5 | +0.1 | 7.8 | 9.1 | -1.3 | -3 |
| 11 18.2 | 7.8 | | | | | | | |
| 36.5 | | 11 37.3 | -0.8 | -0.2 | 1.5 | 2.5 | -1.0 0 | |
| 45.0 | | 45.9 | -0.9 | -0.3 | 6.7 | 7.3 | -0.6 +4 | |
| 56.2 | 1.5 | | | | | | +173 -186 | |

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1882phae.proj.1431.

18.9

36.6

20.8
31.0

32.5

14.4
30.1
33.8

26.6

28.5
25.4
24.1

24.3

19.7
29.4

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Dec. 12, 1882

| Transit | cos | α | α − α | cos | δ | δ − δ | |
|---|---|---|---|---|---|---|---|
| | | | | | | | +173 −186 |
| 28h 12m 7.8 | | 28h 12m 7.4 | +0.4 +1.0 | −0.1 | 0.8 | −0.9 | +1 |
| 12.9 | | 13.5 | −0.6 0.0 | 5.2 | 6.6 | −1.4 | −4 |
| 14.4 | 6.5 | | −5.2 | | | | |
| 27.5 | −0.1 | | | | | | |
| 47.2 | 5.2 | | | | | | |
| 13 8.3 | | 13 8.8 | −0.5 0.0 | 4.6 | 5.0 | −0.4 | +6 |
| 26.7 | 4.6 | | | | | | |
| 14 7.0 | | 14 7.2 | −0.2 +0.3 | 7.6 | 8.4 | −0.8 | +1 |
| 16.0 | | 16.5 | −0.5 0.0 | 2.2 | 3.0 | −0.8 | +1 |
| 27.7 | 7.6 | | | | | | |
| 36.2 | 2.2 | | | | | | |
| 40.8 | | | | 8.0 | | | |
| 45.9 | | | | 9.0 | | | |
| 15 7.3 | 8.0 | | | | | | |
| 8.4 | 9.0 | | | | | | |
| 12.9 | | | | 5.5 | | | |
| 16.0 | | 15 16.5 | −0.5 0.0 | −0.5 | 0.5 | −1.0 | −1 |
| 23.8 | | 23.8 | 0.0 +0.5 | 8.0 | 9.1 | −1.1 | −2 |
| 25.0 | 5.0 | | | | | | |
| | | 28.9 | | | 2.8 | | |
| 48.1 | | 48.9 | −0.8 −0.3 | 3.0 | 5.2 | −2.2 | −13 |
| 49.6 | −0.5 | | | | | | |
| 58.1 | 4.0 | | | | | | |
| 16 1.0 | | 16 1.3 | −0.3 +0.2 | 9.0 | 10.3 | −1.3 | −4 |
| 6.0 | 2.5 | | | | | | |
| 27.1 | 9.0 | | | | | | |
| 17 7.0 | | 17 8.1 | −1.1 −0.6 | 4.9 | 5.6 | −0.7 | +2 |
| 10.0 | | 10.7 | −0.7 −0.2 | 4.8 | 5.4 | −0.6 | +3 |
| 24.9 | 4.9 | | −4.6 −0.54 | | | | |
| 35.8 | 4.8 | | | | | | |
| 42.0 | | 42.7 | −0.7 −0.2 | 0.8 | 2.0 | −1.2 | −3 |
| | | | | | | | +147 −213 |

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19.7
34.3

18.4

20.7
20.9

23.5
22.5

12.1
33.6
34.3

17.9

26.1

17.9
25.8

29.5

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1882phae.proj.1431.



Dec. 12. 1882.

| Transit- | Est: | α | γ − α | | Est: | δ | δ − Δ +187 −213 |
|---|---|---|---|---|---|---|---|
| 23h 18m 11.5s | 0.4 | | | | | | |
| 28.8 | | 23h 18m 29.2 | −0.4 | +0.1 | 3.3 | 4.5 | −1.2 −3 |
| 58.5 | | 54.0 | −0.5 | 0.0 | 0.1 | 1.1 | −1.0 −1 |
| 19 0.1 | 3.3 | | | | | | |
| 12.0 | 0.1 ~~1.0~~ | | | | | | |
| 31.2 | | 19 32.0 | −0.8 | −0.3 | 0.4 | 1.6 | −1.2 −3 |
| 38.6 | | 38.9 | −0.3 | +0.2 | 4.9 | 5.8 | −0.9 0 |
| 56.6 | 0.4 | | −9.7 | | | | |
| 20 0.1 | | 20 0.5 | −0.4 | +0.1 | 9.0 | 9.7 | −0.7 +2 |
| 17.3 | 4.9 | | | | | | |
| 30.7 | | 31.2 | −0.5 | 0.0 | 3.5 | 4.4 | −0.9 0 |
| 36.0 | 9.0 | 36.6 | −0.6 | −0.1 | 5.8 | 6.8 | −1.0 −1 |
| 21 2.0 | 5.8 | | | | | | |
| 7.5 | 3.5 | | | | | | |
| 32.5 | | 21 33.0 | −0.5 | 0.0 | 9.1 | 9.8 | −0.7 +2 |
| 49.0 | | 49.5 | −0.5 | 0.0 | 3.9 | 4.6 | −0.7 +2 |
| | | | ~~−5.2~~ | | | | |
| B 22 4.0 | 9.0 | | | | | | |
| 10.0 | | 22 10.9 | −0.9 | −0.4 | 0.1 | 1.2 | −1.1 −2 |
| 16.0 | 4.0 | | | | 7.8 | | |
| 31.1 | | 31.6 | −0.5 | 0.0 | 0.5 | 1.9 | −1.4 −5 |
| 35.0 | 7.0 | | | | | | |
| 40.0 | 0.1 | | | | | | |
| 49.0 | | 49.7 | −0.7 | −0.7 | 0.3 | 1.7 | −1.4 −5 |
| 23 8.5 | 0.5 0.3 | | | | | | |
| 21.3 | | 23 21.8 | −0.5 | 0.0 | −1.0 | −0.2 | −0.8 +1 |
| 59.1 | | 59.8 | −0.7 | −0.2 | 3.5 | 4.4 | −0.9 0 |
| 24 6.6 | −1.0 | | | | | | |
| 24.8 | 3.5 | 24 15.1 | | | 3.5 | 0.9 | |
| 31.3 | | 31.6 | −0.3 | +0.2 | 7.0 | 7.6 | −0.6 +3 |
| 33.7 | | 34.0 | −0.3 | +0.2 | 0.4 | 1.6 | −1.2 −3 |
| | | | | | | | +197 −236 |

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31.3
18.5

25.7
38.7

35.9

36.8
26.0

31.5
27.0

30.0
19.0
37.4

19.5

45.3
25.7

37.4
28.1

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1882phae.proj.1431.



Dec. 12, 1882.

| Transit- | Obs'd. | $\alpha$ | $\gamma - \alpha$ | | Obs'd. | $\delta$ | $\epsilon - \delta$ +197 −236 |
|---|---|---|---|---|---|---|---|
| 23h 24m 52.9 | | 23h | | | 0.3 | | |
| 55.3 | | 24m 55s.7 | −0.4 | +0.1 | −0.4 | 0.4 | −0.8 +1 |
| 25. 1.8 | 0.4 | | | | | | |
| 8.7 | 7.0 | | | | | | |
| 13.5 | 0.3 | | | | | | |
| 21.5 | −0.4 | | | | | | |
| 13 26 11.2 | | 26 11.6 | −0.4 | 0.0 | 3.7 | 4.4 | −0.7 +2 |
| 20.8 | | | ~~−4.7~~ | ~~−0.5~~ | 9.9 | | |
| 31.6 | 3.7 | | | | | | |
| 40.0 | 9.9 | | | | | | |
| 27 32.2 | | 27 33.0 | −0.8 | −0.4 | 2.5 | 3.3 | −0.8 +1 |
| 47.1 | | ~~47.4~~ | ~~−0.3~~ | | ~~−1.0~~ | 9.9 | [+8.9] [+9.7] |
| 57.4 | 2.5 | 47.4 | −0.3 | +0.1 | −1.0 | | |
| 28 19.0 | | 28 19.3 | −0.3 | +0.1 | 4.5 | 5.5 | −0.7 +2 |
| 24.3 | −1.0 | | | | | | |
| 27.4 | 4.8 | | | | | | |
| 52.0 | | 52.4 | −0.4 | 0.0 | 9.7 | 10.4 | −0.7 +2 |
| 29 18.7 | 9.7 | 29 19.1 | −0.4 | 0.0 | −0.2 | 0.6 | −0.8 +1 |
| 36.8 | | | | | 9.3 | | |
| 41.4 | −0.2 | | | | | | |
| 54.8 | | 55.2 | −0.4 | 0.0 | 4.7 dbl. | 5.2 | −0.5 +4 |
| 30 1.7 | 9.3 | | −9.5 | | | | |
| 18.7 | | 30 19.1 | −0.4 | 0.0 | 1.2 | 2.5 | −1.3 −5 |
| 32.0 | 4.7 | | | | | | |
| 48.0 | 1.2 | | | | | | |
| 13 B 31 44.7 | | 31 44.8 | −0.1 | +0.3 | 5.0 | 5.9 | −0.9 −1 |
| 46.1 | | 46.5 | −0.4 | 0.0 | 3.0 | 3.8 | −0.8 0 |
| 32 14.0? | 3.0 | | | | | | |
| 18.0? | 5.0 | | | | | | |
| A 58.0 | | 32 58.8 | −0.8 | −0.4 | 1.8 | 2.4 | −0.6 +2 |
| | | | ~~−0.5~~ | | | | +219 −242 |

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1892phae.proj.1431.



20.6
26.2

20.4
19.7

25.2
37.2
8.4

20.7
22.7
24.9

37.2

29.3

32.3
27.9

38.1

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1882phae.proj.1431.



Dec. 12, 1882.

| Transit - | Obs: | α | γ - α | Obs: | δ | δ - δ |
|---|---|---|---|---|---|---|
| | | | | | | +212 -242 |
| 23h 33m 36.1 | 1.8 | | | | | |
| 44.8 | | 23h 33m 45.2 | -0.4 0.0 | 2.0 | 2.5 | -0.5 +3 |
| 34 28.8 | 2.0 | | | | | |
| 54.0 | | 34 54.3 | -0.3 +0.1 | 9.8 1st Light: | 10.6 | -0.8 0 |
| 35 3.2 | | 35 3.6 | -0.4 0.0 | 2.6 | 3.6 | -1.0 -2 |
| 32.6 | 2.6 | | | | | |
| 44.5 | | 45.2 | -0.7 -0.3 | 2.4 | 3.0 | -0.6 +2 |
| 36 6.2 | | 36 6.5 | -0.3 +0.1 | 8.8 | 9.5 | -0.7 +1 |
| 9.3 | 2.4 | | | | | |
| 24.7 | 8.8 | | | | | |
| B 57.1 | | | | 10.1 | | |
| 37 20.5 | 10.1 | 37 | | | | |
| 21.0? | | | | | | |
| 22.0? | | 22.2 | -0.2 +0.2 | 4.0 | 4.6 | -0.6 +2 |
| 31.0 | | 31.2 | -0.2 +0.2 | 9.8 | | |
| A 52.7 | 4.0 | | | | | |
| 55.4 | 9.8 | | | | | |
| 38 10.5 | | 38 11.0 | -0.5 -0.2 | 6.0 | 7.2 | -1.2 -4 |
| 37.5 | | 37.8 | -0.3 0.0 | 9.0 | 9.8 | -0.8 0 |
| 39.1 | 6.0 | | | | | |
| 43.8 | | 44.1 | -0.3 0.0 | 8.5 | 9.8 | -1.3 -5 |
| | | | -3.6 | | | |
| 39 17.2 | 8.5 | | | | | |
| 21.3 | 9.0 | | | | | |
| 50.7 | | 39 51.1 | -0.4 -0.1 | 7.0 | 7.6 | -0.6 +2 |
| 54.9 | | 54.9 | 0.0 +0.3 | 8.2 | 8.5 | -0.3 +5 |
| 40 10.0 | 7.0 | | | | | |
| 22.0 | 8.2 | | | | | |
| 32.9 | | 40 33.0 | -0.1 +0.2 | 9.9 | 10.7 | -0.8 0 |
| 41 5.8 | 9.9 | | | | | |
| A A 42.5 | | 43.1 | -0.6 -0.3 | 0.8 | 1.8 | -1.0 -2 |
| | | | | | | +227 255 |

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1882phae.proj.1431.



42

39.0

2

29.4

24.8

18.5

23.4

30.7

24.4

4

28.6

43.8

5

33.4

19.3

27.1

32.9

17.1

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Dec. 12, 1882.

| Transit- | Est: | α | γ-α | | Est. | δ | δ-δ |
|---|---|---|---|---|---|---|---|
| | | | | | | | +227 -255 |
| 23h 41m 55.5s | | | | | 7.7 | | |
| 59.6 | 0.8 | | | | | | |
| 42 11.0 | 7.7 | | | | | | |
| 14.5 | | 23h 42m 14.6 | -0.1 | +0.2 | 2.2 | 2.7 | -0.5 +3 |
| 35.8 | 2.2 | | | | | | |
| 43 15.7 | | 43 16.0 | -0.3 | 0.0 | 2.5 | 9.2 | -0.7 +1 |
| 23.7 | | 23.9 | 0.0 | +0.3 | 6.3 | 6.8 | -0.5 +3 |
| 49.5 | 2.5 | | | | | | |
| 44 0.7 | 6.3 | | | | | | |
| 21.1 | | 44 21.5 | -0.4 | -0.1 | 6.5 | 7.3 | -0.8 0 |
| 44.0 | 6.5 | | | | | | |
| A. 45 52.0 | | 45 52.8 | -0.8 | -0.5 | 3.8 | 4.6 | -0.8 0 |
| 46 21.7 | | 46 21.6 | +0.1 | +0.4 | 4.9 | 5.6 | -0.7 +1 |
| 23.5 | 3.8 | | -2.6 | | | | |
| 59.0 | | 59.4 | -0.4 | -0.1 | 2.3 | 9.0 | -0.7 +1 |
| 47 2.6 | 4.9 | | | | | | |
| 18.9 | 2.3 | | | | | | |
| 46.0 | | 47 46.1 | -0.1 | +0.2 | 9.3 | 10.0 | -0.7 +1 |
| 50.0 | | | | | 5.8 | | |
| 53.4 | | 53.4 | 0.0 | +0.3 | 2.7 | 3.5 | -0.8 0 |
| 48 9.7 | 6.0 | | | | | | |
| 13.3 | 9.0<br>3.0 | | | | | | |
| 16.8 | | 48 17.0 | -0.2 | +0.1 | 2.6 | 3.4 | -0.8 0 |
| 41.5 | 2.6 | | -8.6 | | | | +237 -255 |
| B. B. | | | | | | | |

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1882phae.proj.1431.



15.5

21.3

33.8
36.8

22.9

31.5
40.9

19.9

27.3
19.7
19.9

24.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.



Series 8

Dec. 14, 1882.

| Transit- | Obs'r: | α | γ − α | | Obs'r: | δ | δ − δ |
|---|---|---|---|---|---|---|---|
| 23h 44m 21.6s | | 23h 44m 21.5s | +0.1 | −0.1 | 7.3 | 7.3 | 0.0 +1 |
| 34.8 | 7.3 | | | | | | |
| 45 52.7 | | 45 52.8 | −0.1 | −0.3 | 4.3 | 4.6 | −0.3 −2 |
| 46 15.5 | 4.3 | | | | | | |
| 21.8 | | 46 21.6 | +0.2 | 0.0 | 5.1 | 5.5 | −0.4 −3 |
| 59.2 | | 59.4 | −0.2 | −0.4 | 2.7 | 8.0 | −0.3 −2 |
| 47 3.0 | 5.1 | | | | | | |
| 16.7 | 2.7 | | | | | | |
| 46.7 | | 47 46.1 | +0.6 | +0.4 | 10.0 | 10.0 | 0.0 +1 |
| 50.1 | | | | | 6.8 | | |
| 53.4 | | 53.4 | 0.0 | −0.2 | 3.4 | 3.5 | −0.1 0 |
| 48 9.8 | 10.0 6.8 3.4 | | | | | | |
| 12.4 | | | | | 2.5 | | |
| 17.1 | | 48 17.0 | +0.1 | −0.1 | 3.0 | 3.4 | −0.4 −3 |
| 31.0 | 2.5 | | | | | | |
| 39.5 | 3.0 | | | | | | |
| A 50 38.5 | ? | | | | | | |
| 51 11.7 | | 51 11.1 | +0.6 | +0.4 | 9.6 | 9.7 | −0.1 +0 |
| 18.3 | | 17.8 | +0.5 | +0.3 | 9.9 | 10.1 | −0.2 −1 |
| 30.1 | | 29.7 | +0.4 | +0.2 | 9.3 | 9.4 | −0.1 0 |
| | | | +~~2.2~~ | | | | |
| 36.6 | 9.6 | | | | | | |
| 40.8 | 9.9 | | | | | | |
| 52 4.5 | 9.3 | | | | | | |
| 38.9 | | 52 38.1 | +0.8 | +0.6 | 10.1 | 10.3 | −0.2 −1 |
| 56.1 | 10.1 | | | | | | |
| 53 2.1 | | 53 1.7 | +0.4 | +0.2 | 9.6 | 9.6 | 0.0 +1 |
| 37.0 | 9.6 | | | | | | |
| 56.4 | | 56.6 | −0.2 | −0.4 | 2.0 | 1.8 | +0.2 +3 |
| 12.9 | | 54 12.5 | +0.4 | +0.2 | 4.8 | 4.9 | −0.1 0 |
| | | | +3.6 | | | | +6 −12 |
| 54 18.0 | 2.0 | | | | | | |

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1882phae.proj.1431.



13.2

22.8

41.2

17.5

22.6

19.2

15.9

18.6

22.4

24.9

22.5

34.4

17.2

34.9

21.6

21.1

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1882phae.proj.1431.



Dec. 14, 1882.

| Transit | Est: | α | γ − α | | Est: | δ | δ − δ | +6 −12 |
|---|---|---|---|---|---|---|---|---|
| 23h 54m 31.9 | | 23h 54m 32.5 | ~~δ − 0.6~~ | −0.8 | 7.0 | 10.6 | [+3.6] | −3.5 |
| 34.0 | 4.8 | | | | | | | |
| 42.5 | 7.0 | | | | | | | |
| 58.0 | | 57.8 | +0.2 | 0.0 | 5.5 | 5.6 | −0.1 | 0 |
| 55 9.2 | | 55 8.9 | +0.3 | +0.1 | 5.0 | 5.5 | −0.5 | −4 |
| 19.5 | 5.5 | | | | | | | |
| 30.5 | 5.0 | | | | | | | |
| 35.8 | | 35.7 | +0.1 | −0.1 | 1.2 | 1.4 | −0.2 | −1 |
| 45.0 | | | | | 9.7 | | | |
| 55.8 | | | | | 6.0 | | | |
| 59.2 | 1.2 / 9.7 | | | | | | | |
| 3 6 12.7 | 6.0 | | | | | | | |
| 20.5 | | 56 19.7 | +0.8 | +0.6 | 7.7 | 8.3 | −0.6 | −5 |
| 15 46.7 | 7.7 | 46.6 | +0.1 | −0.1 | 1.5 | 1.6 | −0.1 | 0 |
| 55.8 | | | ~~+2.3~~ | | 7.8 | | | |
| 5 7 5.6 | 1.5 | | | | | | | |
| 15.0 | 7.4 | | | | | | | |
| 19.9 | | 57 19.7 | +0.2 | 0.0 | 1.2 | 1.4 | −0.2 | −1 |
| 41.0 | 1.2 | | | | | | | |
| 58.9 | | 59.4 | −0.5 | −0.7 | 1.0 | 1.3 | −0.3 | −2 |
| 5 8 14.7 | 1.0 | | | | | | | |
| 58.0 | | 58 57.5 | +0.5 | +0.3 | 7.4 | 7.3 | +0.1 | +2 |
| 5 9 19.0 | 7.4 | | | | | | | |
| 21.7 | | 59 21.5 | +0.2 | 0.0 | 2.0 | 1.9 | +0.1 | +2 |
| 22.5 | | 22.3 | +0.2 | 0.0 | 8.0 | 8.3 | −0.3 | −2 |
| 44.4 | 2.0 | | | | | | | |
| 48.9 | | 48.5 | +0.4 | +0.2 | 10.0 | 9.9 | +0.1 | +2 |
| 50.4 | 8.0 | | | | | | | |
| 0 0 9.8 | | 0 0 9.9 | −0.1 | −0.3 | 3.2 | 3.2 | 0.0 | +1 |
| 16.8 | 10.0 | | | | | | | +13 −27 |

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1882phae..proj..1431.



10.6

21.5

21.3

23.9

14.2

16.9

26.2

18.9

19.2

21.1

15.8

21.0

22.7

27.9

27.9

3
27.7

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431.

Dec. 14, 1882.

| Transit– | est: | α | g–α | est: | δ | g–δ | +12 | –27 |
|---|---|---|---|---|---|---|---|---|
| 0h 0m 47.5 | 3.2 | | | | | | | |
| 58.8 | | 0h 0m 58.s4 | +0.4 +0.2 | 8.0 | 8.3 | –0.3 | | –2 |
| 1 19.2 | | | | 9.5 | | | | |
| 38.0 | 8.0 | | | | | | | |
| 40.5 | 9.5 | | | | | | | |
| 2 47.4 | | 2 46.8 | +0.6 +0.4 | 7.7 | 8.0 | –0.3 | | –2 |
| 3 11.7 | 7.7 | | | | | | | |
| 18.9 | | 3 19.0 | –0.1 –0.3 | 0.5 | 0.7 | –0.2 | | –1 |
| 35.0 | | 34.9 | +0.1 –0.1 | 5.2 | 5.5 | –0.3 | | –2 |
| 48.3 | 0.5 | | | | | | | |
| 55.4 | 5.2 | | +3.4 +2.8 | | | | | |
| 4 0.0 | | 4 0.1 | –0.1 –0.3 | 0.8 | 1.6 | –0.2 | | –1 |
| 21.9 | 0.8 | | | | | | | |
| 28.0 | | 27.7 | +0.3 +0.1 | 3.2 | 3.7 | –0.5 | | –4 |
| 29.3 | | 28.9 | +0.4 +0.2 | 5.0 | 5.0 | 0.0 | +1 | |
| 36.8 | | 36.9 | –0.1 –0.3 | 4.0 | 4.2 | –0.2 | | –1 |
| 52.9 | 3.0 / 5.0 | | | | | | | |
| 57.1 | 4.0 | | | | | | | |
| 5 8.8 | ? | | | | | | | |
| A 10.0 | ? | | | | | | | |
| 45.0 | | 5 44.6 | +0.4 +0.2 | 6.2 | 6.4 | –0.2 | | –1 |
| 47.1 | | 46.8 | +0.3 +0.1 | 5.5 | 5.5 | 0.0 | +1 | |
| 6 2.9 | 6.2 / 5.5 | | | | | | | |
| 5.3 | | 6 4.6 | +0.7 +0.4 | 8.2 | 8.4 | –0.2 | | –1 |
| 14.9 | | 14.5 | +0.4 +0.1 | 6.8 | 6.5 | +0.3 | +4 | |
| 33.2 | 8.2 / 6.8 | | | | | | | |
| 7 27.0 | | | | 4.8 | | | | |
| 31.7 | | 7 31.7 | 0.0 –0.2 | 0.0 | 0.2 | –0.2 | | –1 |
| 42.0 | 4.8 | | +2.4 | | | | +18 | –43 |
| 57.2 | 0.6 | | | | | | | |

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1882phae.proj.1431.



27

-2 39.2
21.3

2 24.3

-1 29.4
-2 20.4

1 21.9

4 24.9
23.6

-1 20.3

1 17.9
15.8

-1 27.9
18.3

15.0

-1 25.5

93

John G. Wolbach Library, Harvard-Smithsonian Center for Astrophysics • Provided by the NASA Astrophysics Data System

1882phae.proj.1431:



Dec. 14, 1882.

| Transit- | Est: | α | γ-α | | Est: | δ | ε-δ +18 -43 |
|---|---|---|---|---|---|---|---|
| 0h 9m 0.9 | | 0h 9m 0s.7 | +0.2 | -0.1 | 6.0 | 6.5 | -0.5 -4 |
| 4.6 | | 4.6 | 0.0 | -0.3 | 1.0 | 1.3 | -0.3 -2 |
| 15.6 | 6.0 | | | | | | |
| 28.2 | 1.0 | | | | | | |
| 10 1.2 | | 10 0.5 | +0.7 | +0.4 | 10.0 | 10.0 | 0.0 +1 |
| 6.1 | | 5.8 | +0.3 | 0.0 | 7.4 | 7.4 | 0.0 +1 |
| 21.7 | 10.0 | | | | | | |
| 36.8 | | 36.4 | +0.4 | +0.1 | 4.8 | 4.7 | +0.1 +2 |
| 43.6 | 7.4 | 39.8 | | | | 6.2 | |
| 54.8 | | | | | 5.5 | | |
| 11 5.5 | 5.5 | | | | | | |
| 26.4 | 4.8 very nearly in sight. | | | | | | |
| 12 38.7 | | 12 38.2 | +0.5 | +0.2 | 7.5 | 7.6 | -0.1 +1 |
| 49.0 | | 48.8 | -0.2 | -0.5 | 2.5 | 2.9 | -0.4 -2 |
| 13 4.0 | 7.5 | | | | | | |
| 11.8 | 2.5 | | | | | | |
| B 49.0 | | 13 48.2 | +0.8 | +0.5 | 10.2 / 5.8 | 10.5 | -0.3 -1 |
| 14 3.4 | 5.8 | | +5.0 | | | | |
| 14.0 | 10.2 | 14 14.0 | 0.0 | -0.3 | 1.0 | 1.4 | -0.4 -2 |
| 36.2 | 1.0 | | +2.7 +0.3 | | | | |
| A 16 16.0 | | 16 15.3 | +0.7 | +0.4 | 7.6 | 7.7 | -0.1 +1 |
| 21.0 | | 20.8 | +0.2 | -0.1 | 2.0 | 2.0 | 0.0 +2 |
| 38.9 | 7.6 | | | | | | |
| 44.8 | 8.0 | | | | | | |
| 17 24.4 | | 17 24.2 | +0.2 | -0.1 | 6.8 | 6.6 | +0.2 +4 |
| 18 1.0 | 6.8 | | | | | | |
| 38.8 | | 18 38.2 | +0.6 | +0.3 | 5.6 | 5.9 | -0.3 -1 |
| 19 0.0 | 5.6 | | | | | | |
| 21.8 | | 19 20.8 | +1.0 | +0.7 | 9.3 | 9.4 | -0.1 +1 |
| 44.8 | | 45.0 | -0.2 | -0.5 | -0.5 dH. | -0.2 | -0.3 -1 |
| | | | | | | | +3.1 -56 |

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43
4
-2

14.7
23.6

20.5
37.5

49.6

10.7

25.3
23.8

2

25.0
14.4

1

22.2

2

22.9
23.8

36.6

21.2

1

26.2
22.2

-1
56

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1882phae.proj.1431.

Dec. 14, 1882.

| Transit- | Est: | α | γ-α | | Est: | δ | ε-δ +31 -56 | |
|---|---|---|---|---|---|---|---|---|
| h m s | | | | | | | | |
| 0 19 48.0 | 9.3 | | | | | | | |
| 20 7.0 | 0.5 | | | | | | | |
| 30.4 | | 0h 20m | | | 9.7 | | | |
| 43.0 | | 43.0 | 0.0 | −0.3 | 0.8 | 1.1 | −0.3 | −0.1 |
| 48.6 | 9.7 | | | | | | | |
| 58.4 | | 53.3 | +0.1 | −0.2 | 2.2 | 2.2 | 0.0 | +2 |
| 21 9.9 | 0.8 | | | | | | | |
| 16.5 | 2.2 | | | | | | | |
| 13 22 25.7 | | | | | 9.2 | | | |
| 41.7 | 9.2 | | | | | | | |
| 58.9 | | 22 52.9 | +1.0 | +0.7 | 9.5 | 9.4 | +0.1 | +3 |
| 23 10.7 | | 23 10.6 | +0.1 | −0.3 | 2.3 | 2.5 | −0.2 | 0 |
| 14.0 | 9.5 | | +3.7 | +0.41 | | | | |
| 21.9 | | 21.5 | +0.4 | 0.0 | 6.9 | 7.1 | −0.2 | 0 |
| 33.7 | 2.4 | | | | | | | |
| 42.9 | | 42.9 | 0.0 | −0.4 | 0.2 | 0.5 | −0.3 | −1 |
| 50.4 | 6.9 | | 4.1 | | | | | |
| 24 14.6 | 0.2 | | | | | | | |
| A A 25 13.8 | | 25 13.2 | +0.1 | −0.3 | 4.8 | 5.0 | −0.2 | 0 |
| 48.8 | 4.8 | | | | | | | |
| 55.8 | | 55.3 | +0.5 | +0.1 | 8.0 | 8.2 | −0.2 | 0 |
| 26 24.9 | | | | | | | | |
| 28.5 | 8.0 | | | | | | | |
| 27 47.7 | | 27 46.5 | +1.2 | +0.8 | 9.0 | 9.3 | −0.3 | −1 |
| 28 17.0 | 9.0 | | | | | | | |
| 41.8 | | 28 41.7 | +0.1 | −0.3 | 0.7 | 1.2 | −0.5 | −2 |
| 51.5 | | 51.2 | +0.3 | −0.1 | 4.7 | 4.9 | −0.2 | 0 |
| 29 18.2 | 0.7 | | | | | | | |
| 21.4 | 4.7 | | | | | | | |
| 30 24.0 | | 30 23.5 | +0.5 | +0.1 | 7.9 | 7.3 | 0.0 | +2 |
| | | | | | | | +34 | −60 |

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18.2

26.9

23.1

16.0

20.1

23.0

28.5

31.7

30.5

32.7

29.3

36.4

29.9

32.2

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Dec. 14, 1882.

| Transit- | Est. | α | α-α | | Est. | δ | δ-δ +38 -60 |
|---|---|---|---|---|---|---|---|
| 0h 30m 36s.0 | | 0h 30m 35s.9 | +0.1 | -0.3 | 0.6 | 1.2 | -0.6 -4 |
| 56.2 | 7.3 | | | | | | |
| 31 8.9 | | 31 8.2 | +0.7 | +0.3 | 6.8 | 6.9 | -0.1 +1 |
| 12.1 | 2.0? | | +3.7 | | | | |
| 29.0 | 6.9 | | | | | | |
| 32 26.5- | | | | | 7.3 | | |
| 36.1 | | 32 35.8 | +0.3 | -0.1 | 3.3 | 8.4 | -0.1 +2 |
| 45.9 | 7.3 | | | | | | |
| 51.1 | | 50.4 | +0.7 | +0.3 | 10.3 | 10.8 | -0.5 -2 |
| 55.8 | 9.3 | | | | | | |
| 33 1.9 | | 33 2.1 | -0.2 | -0.6 | 6.2 | 6.6 | -0.4 -1 |
| 6.5- | 10.3 | | +4.3 | | | | |
| 24.0 | 6.2 | | | | | | |
| BB 34 24.3 | | 34 23.7 | +0.6 | +0.2 | 8.2 | 8.8 | -0.6 -3 |
| 35- 8.0 | 8.2 | | | | | | |
| 30.3 | | 35 29.9 | +0.4 | 0.0 | 5.8 | 5.7 | +0.1 +4 |
| 31.5- | | | | | 1.0 | | |
| 38.9 | | 37.7 | +1.2 | +0.8 | 9.0 | 9.0 | 0.0 +3 |
| 45.8 | | 45.0 | +0.8 | +0.4 | 9.6 | 9.6 | 0.0 +3 |
| 52.5- | 1.0 | | | | | | |
| 86 6.9 | 9.0 | | | | | | |
| 12.6 | 6.0 | | | | | | |
| 18.5- | 9.6 | | | | | | |
| 53.8 | | 36 53.1 | +0.7 | +0.2 | 7.8 | 7.4 | +0.4 +7 |
| 37 1.5- | | 37 1.0 | +0.5 | 0.0 | 4.2 | 2.3 | [+1.9] +22 |
| 17.5- | 7.8 | | | | | | |
| 24.4 | 4.2 | | | | | | |
| A 38 22.9 | | 38 22.8 | +0.1 | -0.4 | 4.0 | 4.3 | -0.3 0 |
| 26.6 | | 23.6 | 5.7 | | | 4.0 | |
| 46.0 | 4.0 | 25.9 | +0.7 | +0.2 | 6.5 dbl. | 6.6 | -0.1 +2 |
| | | | | | | | +60 -70 |

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20.1

19.4
19.7

15.4

22.1

43.7

42.3
21.0
28.0
32.7

23.7
22.9

23.1
41.4

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Dec. 14, 1882.

| Transit- | Est: | α | γ − α | | Est: | δ | δ − δ +60 −70 |
|---|---|---|---|---|---|---|---|
| 0h 39m 3.1s | | 0h 39m 2.8s | +0.3 | −0.2 | 7.2 | 7.6 | −0.4 −1 |
| 8.0 | 6.5 | | | | | | |
| 24.8 | 7.2 | | | | | | |
| 58.5 | | 57.9 | +0.6 | +0.1 | 6.0 | 6.4 | −0.4 −1 |
| 40 26.1 | 6.0 | | | | | | |
| 46.0 | | 40 45.3 | +0.7 | +0.2 | 5.1 | 5.6 | −0.5 −2 |
| 41 6.2 | | 41 5.7 | +0.5 | 0.0 | 7.0 | 7.3 | −0.3 0 |
| 9.2 | 5.1 | | | | | | |
| 23.5 | 7.0 | | | | | | |
| 28.0 | | 28.1 | −0.1 | −0.6 | 2.2 | 2.2 | 0.0 +3 |
| 34.8 | | 34.4 | +0.4 | −0.1 | 2.8 | 3.2 | −0.4 −1 |
| 59.0 | 2.8 | | | | | | |
| 42 8.7 | 2.2 | | | | | | |
| 8 48.1 | | 42 42.9 | +0.2 | −0.3 | 4.3 | 4.4 | −0.1 +2 |
| 50.3 | | | | | 7.2 | | |
| 43 4.0 | 7.2 | | | | | | |
| 17.8 | 4.3 | | | | | | |
| 24.0 | | 43 23.5 | +0.5 | 0.0 | 1.7 | 1.8 | −0.1 +2 |
| 48.4 | 1.7 | | +3.8 | +0.42 | | | |
| 55.4 | | 55.0 | +0.4 | −0.1 | 1.0 | 1.6 | −0.6 −3 |
| 44 16.8 | 1.0 | | +5.5 | | | | |
| 45 19.8 | | 45 18.7 | +1.1 | +0.5 | 10.5 | 10.9 | −0.4 −1 |
| 32.0 | 10.5 | | | | | | |
| 46 40.8 | | | | | 2.2 | | |
| 44.7.2 | | | | | | | |
| 54.0.1 | | | | | | | |
| 56.0.2 | | | | | 10.5 | | |
| 47 8.6 | 10.5 | | | | | | |
| 52.8 | | 47 52.5 | +0.3 | −0.3 | 2.2 | 2.4 | −0.2 +1 |
| 55.0 | | | | | 7.0 | | |
| 48 10.6 | 2.2 | | | | | | +68 −79 |

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1882phae.proj.1431.



21.7

27.6

23.2

17.3

35.7

24.2

34.7

13.7

19.4

21.4

12.2

14.6

17.8

19.9

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1882phae.proj.1431.



Dec. 14, 1882.

| Transit- | Est: | $\alpha$ | $\gamma - \alpha$ | Est: | $\delta$ | $\delta - \delta$ +68 -79 |
|---|---|---|---|---|---|---|
| $0^h\ 48\ 14.9$ | 7.0 | $0^h\ 48^m\ 14^s.3$ | +0.6 0.0 | 6.8 | 6.9 | -0.1 +3 |
| 20.6 | | | | | | |
| 38.2 | 6.8 | | | | | |
| 49 16.8 | | 49 15.6 | +1.2 +0.6 | 8.2 | 8.5 | -0.3 +1 |
| 24.0 | | | | | | |
| 30.0 | | | | 6.0 | | |
| 40.3 | | 39.9 | +0.4 -0.2 | 5.0 | 5.4 | -0.4 0 |
| 46.8 | 6.0 | | | | | |
| 50.4 | 8.2 | | | | | |
| A 50 20.2 | 5.0 | | | | | |
| 56.0 | | | | 5.1 | | |
| 59.7 | | | | 7.6 | | |
| 51 5.5 | - - - - - | 51 2.5 | +3.0 +2.4 | 4.5 - - - | 8.3 | +1.2 +1.6 |
| 13.5 | 5.1 | | | | | |
| 18.3 | 7.6 | | | | | |
| 24.6 | 4.5 | | | | | |
| 31.8 | | | | 8.0 | | |
| 37.1 | | | | 9.6 | | |
| 41.1 | | 40.6 | +0.5 -0.1 | 0.0 | 0.4 | -0.4 0 |
| 52.2 | 8.0 | | | | | |
| 5-2 3.7 | 9.6 | | | | | |
| 14.6 | 0.0 | | | | | |
| B 53 3.3 | | 53 2.4 | +0.9 +0.2 | 7.4 | 7.6 | -0.2 +2 |
| 6.8 | | | | 3.0 | | |
| 25.0 | 3.0 | | | | | |
| 29.9 | | 29.1 | +0.4 +0.1 | 7.0 | 7.3 | -0.3 +1 |
| 36.6 | 7.4 | | +~~0.2~~ ~~0.69~~ | | | |
| 53.7 | 7.0 | | | | | |
| 54 17.0 | | 54 16.9 | +0.1 -0.6 | 0.9 | 1.6 | -0.7 -8 |
| 25.6 | | | | 4.1 | | |
| 38.8 | | 38.4 | +0.4 -0.3 | 3.0 | 3.9 | -0.9 -5 |

+75 -87

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1882phae.proj.1431.



23.3

33.6

16.8
39.9

17.5
18.6
19.1

20.4
26.6
33.5

33.3
18.2

23.8

24.1
20.5
20.7

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1882phae.proj.1431.



Dec. 14, 1882.

| Transit- | Est | α | γ−α | | Δ1: | δ | δ−δ | +75° −87 |
|---|---|---|---|---|---|---|---|---|
| h m 0 54 41.1 | 09 | | | | | | | |
| 46.1 | 4.1 | | | | | | | |
| 57.0 | | 0h 54m 56.5s | +0.5s | −0.2 | 2.3 | 2.4s | −0.1 | +3 |
| 57.5 | ~~4.2~~ 3.0 (2) | | | | | | | |
| 55 15.4 | 8.3 | | | | | | | |
| 19.2 | | 55 18.5 | +0.7 | 0.0 | 5.9 | 6.2 | −0.3 | +1 |
| 50.4 | 5.9 | | | | | | | |
| 56 7.8 | | 56 6.9 | +0.9 | +0.2 | 10.0 | 10.7 | −0.7 | −3 |
| 33.0 | 10.0 | | | | | | | |
| 35.0 | | | | | 6.0 | | | |
| | | 35.6 | | | | −0.1 | | |
| 40.0 | | | | | 8.5s | | | |
| 53.2 | 6.0 | | | | | | | |
| 57 0.7 | 8.5 | | | | | | | |
| 37.1 | | 57 | | | | | | |
| 38.4 | | 37.9 | +0.5s | −0.2 | −0.8 | 0.2 | −0.5s | −1 |
| 57.1 | 8.3 | | | | | | | |
| 58 14.6 | −0.3 | | | | | | | |
| 50.5s | | 54 50.3 | +0.2 | −0.5 | 0.2 | 1.8 | −1.6 | −12 |
| 53.4 | | 52.4 | +1.0 | +0.3 | 7.5s | 7.7 | −0.2 | +2 |
| 59 19.5s | 0.2 | 59 19.1 | +0.4 | −0.3 | 2.8 | 3.0 | −0.2 | +2 |
| 29.0 | 7.5 | | ~~+4.7~~ +0.5 | | | | | |
| 30.8 | | 30.0 | +0.8 | +0.1 | 7.4 | 7.5s | −0.1 | +3 |
| 50.5s | 3.0 | | | | | | | +86 −103 |
| 58.0 | 7.4 | | +11.3 | | | | | |

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1882phae.proj.1431.



87

184

31.2

25.2

18.2

20.7

36.2

29.0

35.6

31.0

27.2

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# Series 9

Dec. 15, 1882.

| Transit | Est. | α | | Δα | | Est. | δ | Δδ | |
|---|---|---|---|---|---|---|---|---|---|
| 23h 51m 11.0s | | 23h 51m | 11.1 | -0.1 | -0.1 | 9.5 | 9.7 | -0.2 | +4 |
| 17.7 | | | 17.8 | -0.1 | -0.1 | 9.8 | 10.1 | -0.3 | +3 |
| 29.8 | | | 29.7 | +0.1 | +0.1 | 8.7 | 9.4 | -0.7 | -1 |
| 35.3 | 9.5 | | | | | | | | |
| 39.0 | 9.8 | | | | | | | | |
| 52 1.0 | 8.7 | | | | | | | | |
| A 37.7 | | 52 | 38.1 | -0.4 | -0.4 | 9.8 | 10.3 | -0.5 | +1 |
| 52.2 | 9.8 | | | | | | | | |
| 53 1.7 | | 53 | 1.7 | 0.0 | 0.0 | 9.2 | 9.6 | -0.4 | +2 |
| 35.5 | 9.2 | | | | | | | | |
| 56.2 | | | 56.6 | -0.4 | -0.4 | 1.7 | 1.8 | -0.1 | +5 |
| 54 12.7 | | 54 | 12.5 | +0.2 | +0.2 | 4.5 | 4.9 | -0.4 | +2 |
| 20.4 | 1.7 | | | | | | | | |
| 32.5 | | | 32.5 | 0.0 | 0.0 | 10.2 | 10.6 | -0.4 | +2 |
| 33.8 | 4.5 | | | | | | | | |
| 57.7 | | | 57.8 | -0.1 | -0.1 | 5.0 | 5.6 | -0.6 | 0 |
| 58.5 | 10.2 | | | | | | | | |
| 55 9.1 | | 55 | 8.9 | +0.2 | +0.2 | 4.9 | 5.5 | -0.6 | 0 |
| 17.2 | 5.0 | | | -0.6 | | | | | |
| 24.4 | 4.9 | | | | | | | | |
| 35.7 | | | 35.7 | 0.0 | 0.0 | 0.8 | 1.4 | -0.6 | 0 |
| 55.6 | | | | | | 5.3 | | | |
| 56 2.1 | 0.8 | | | | | | | | |
| 12.5 | 5.3 | | | | | | | | |
| 19.9 | | 56 | 19.7 | +0.2 | +0.1 | 7.6 | 8.3 | -0.7 | -1 |
| 48.0 | 7.6 | | | | | | | | |
| 46.8 | | | 46.6 | +0.2 | +0.1 | 0.7 | 1.6 | -0.9 | -2 |
| 57 6.0 | 0.7 | | | | | | | | |
| 20.0 | | 57 | 19.7 | +0.3 | +0.2 | 0.4 | 1.4 | -1.0 | -4 |
| 39.1 | 0.4 | | | | | | | +19 | -8 |

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24.3

21.3

21.3

14.5

33.8

24.2

21.1

26.0

19.5

15.3

26.4

16.9

23.1

19.2

19.1

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Dec. 15, 1882

| | Transit- | Est. | α | γ - α | | Est. | δ | δ - δ | +19 | -8 |
|---|---|---|---|---|---|---|---|---|---|---|
| | 23h 57m 59.2s | | 23h 57m 59.4s | -0.2 | -0.3 | 0.4 | 1.3 | -0.9 | | -3 |
| | 58 15.0 | 0.4 | | | | | | | | |
| B | 57.1 | | 58 57.5 | -0.4 | -0.5 | 6.9 | 7.3 | -0.4 | +2 | |
| | 59 16.0 | 6.9 | | | | | | | | |
| | 21.8 | | 59 21.5 | +0.3 | +0.2 | 1.8 | 1.9 | -0.1 | +5 | |
| | 22.4 | | 22.3 | +0.1 | 0.0 | 7.8 | 8.3 | -0.5 | +1 | |
| | 41.3 | 1.8 | | | | | | | | |
| | 48.7 | 7.8 | 48.5 | +0.2 | +0.1 | 9.3 | 9.9 | -0.6 | 0 | |
| 0 | 0 10.1 | | 0 0 9.9 | +0.2 | +0.1 | 2.7 | 3.2 | -0.5 | +1 | |
| | 14.4 | 9.3 | | +~~0.9~~ | | | | | | |
| | 48.6 | 2.7 | | | | | | | | |
| | 58.6 | | 58.4 | +0.1 | 0.0 | 7.7 | 8.3 | -0.6 | 0 | |
| 1 | 30.6 | 7.7 | | +0.4 | | | | | | |
| A | 2 47.0 | | 2 46.8 | +0.2 | +0.1 | 7.5 | 8.0 | -0.5 | +1 | |
| 3 | 7.6 | 7.5 | | | | | | | | |
| | 19.1 | | 3 19.0 | +0.1 | 0.0 | -0.1 | 0.7 | -0.8 | | -2 |
| | 35.0 | | 34.9 | +0.1 | 0.0 | 5.0 | 5.5 | -0.5 | +1 | |
| | 46.8 | -0.1 | | | | | | | | |
| | 51.0 | 5.0 | | | | | | | | |
| 4 | 0.0 | | 4 0.1 | -0.1 | -0.3 | 0.3 | 1.0 | -0.7 | | -1 |
| | 19.0 | 0.3 | | | | | | | | |
| | 27.8 | | 27.7 | +0.1 | -0.1 | 3.0 | 3.7 | -0.7 | | -1 |
| | 29.2 | | 28.9 | +0.3 | +0.1 | 4.8 | 5.0 | -0.2 | +4 | |
| | 36.8 | | 36.9 | -0.1 | -0.3 | 3.8 | 4.2 | -0.4 | +2 | |
| | 48.5 | 3.0<br>4.8 | | | | | | | | |
| | 52.0 | 3.8 | | | | | | | | |
| B | 5 44.9 | | 5 44.6 | +0.3 | +0.1 | 5.8 | 6.4 | -0.6 | 0 | |
| | 47.2 | | 46.8 | +0.4 | +0.2 | 5.0 | 5.5 | -0.5 | +1 | |
| | 0.6 | 5.8<br>5.0 | | +~~1.4~~ | | | | | | |
| 6 | 4.8 | | 6 4.6 | +0.2 | 0.0 | 7.8 | 8.4 | -0.6 | 0 | |
| | | | | | | | | | 337 | -15 |

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15.8

18.9

19.5

26.3

25.7

38.4

32.0

20.6

27.2

16.0

19.0

20.7.

19.3

15.2

15.7

13.4

27.0

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Dec. 15, 1882.

| | Transit – | Est: | α | γ – α | | Est: | δ | δ – δ | |
|---|---|---|---|---|---|---|---|---|---|
| | $0^h\,6^m\,14.6$ | | $0^h\,6^m\,14^s.5$ | +0.1 | −0.1 | 5.7 | 6.5 | −0.8 | −2 |
| | 28.0 | 5.7 | | | | | | | |
| | 31.8 | 7.8 | | | | | | | |
| | 7 32.0 | | 7 31.7 | +0.3 | +0.1 | −0.4 | 0.2 | −0.6 | 0 |
| | 57.0 | −0.4 | | | | | | | |
| | 9 0.9 | | 9 0.7 | +0.2 | 0.0 | 5.8 | 6.5 | −0.7 | −1 |
| | 4.9 | | 4.6 | +0.3 | +0.1 | 0.6 | 1.3 | −0.7 | −1 |
| | 14.5 | 5.8 | | | | | | | |
| | 23.1 | 0.6 | | | | | | | |
| A | 10 0.6 | | 10 0.5 | +0.1 | −0.1 | 9.6 | 10.0 | −0.4 | +2 |
| | 5.9 | | 5.8 | +0.1 | −0.1 | 6.7 | 7.4 | −0.7 | −1 |
| | 20.0 | 9.6 | | | | | | | |
| | 36.9 | | 36.4 | +0.5 | +0.3 | 4.5 | 4.7 | −0.2 | +4 |
| | 39.1 | 6.7 | 39.8 | +3.1 | | | 6.2 | | |
| | 11 25.1 | 4.5 almost 1st bright. | | | | | | | |
| B | 12 38.3 | | 12 38.2 | +0.1 | −0.1 | 7.0 | 7.6 | −0.6 | 0 |
| | 49.0 | | 48.8 | +1.9 +0.2 | +0.2+ 0.0 | 2.4 | 2.9 | −0.5 | +1 |
| | 13 0.0 | 7.0 | | | | | | | |
| | 11.7 | 2.4 | | | | | | | |
| | 48.4 | | 13 48.2 | +0.2 | −0.1 | 9.9 | 10.5 | −0.6 | 0 |
| | 14 10.0 | 9.9 | | | | | | | |
| | 14.6 | | 14 14.0 | +0.6 | +0.3 | 0.7 | 1.4 | −0.7 | −1 |
| | 33.4 | 0.7 | | | | | | | |
| | 16 15.8 | | 16 15.3 | +0.5 | +0.2 | 7.3 | 7.7 | −0.4 | +2 |
| | 21.3 | | 20.8 | +0.5 | +0.2 | 1.3 | 2.0 | −0.7 | −1 |
| | 38.3 | 7.3 | | | | | | | |
| | 43.4 | 1.3 | | | | | | | |
| | 17 24.1 | | 17 24.2 | −0.1 | −0.1 | 5.9 | 6.6 | −0.7 | −1 |
| | 18 0.2 | 5.9 | | | | | | | |
| | 38.8 | | 18 38.2 | +0.6 | +0.3 | 5.1 | 5.9 | −0.8 | −2 |

+37 −15

+46 −25

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13.4

25.0

13.7

18.2

19.4

33.2

48.2

21.7

22.7

21.6

18.8

22.5

22.1

36.1

22.7

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Dec. 15; 1882.

| Transit- | δ sl: | α | γ − α | | δ sl: | δ | ε − δ +46 −25 |
|---|---|---|---|---|---|---|---|
| 0h 19m 1.5s | 5.1 | | | | | | |
| 21.1 | | 0h 19m 20.8s | +0.3 | −0.0 | 8.6 | 9.4 | −0.8 −2 |
| 42.7 | 8.6 | | | | | | |
| 45.5 | | 45.0 | +0.5 +0.2 | | −0.7 | −0.2 | −0.5 +1 |
| 20 5.4 | −0.7 | | | | | | |
| A 29.8 | | 20 | | | 8.8 | | |
| 42.8 | | ~~03.0~~ 43.0 | −0.2 ~~+3.3 −0.3~~ | −0.5 | 0.2 | ~~1.1~~ 1.1 | −0.9 −0.3 |
| 44.3 | 8.8 | | | | | | |
| 53.7 | | 53.3 | +0.4 +0.1 | | 1.2 | 2.2 | −1.0 −4 |
| 21 0.8 | | | +3.8 | | 5.0 | | |
| 8.1 | 0.2 | | | | | | |
| 12.1 | 1.2 5.0 | | | | | | |
| 22 58.1 | | 22 52.9 | +0.2 | −0.2 | 9.0 | 9.4 | −0.4 +3 |
| 23 11.0 | | 23 10.6 | +0.4 0.0 | | 1.8 | 2.5 | −0.7 0 |
| 14.0 | 9.0 | | | | | | |
| 22.0 | | 21.5 | +0.5 +0.1 | | 6.2 | 7.1 | −0.9 −2 |
| 31.0 | 1.8 | | | | | | |
| 43.3 | | 42.9 | +0.4 0.0 | | −0.2 | 0.5 | −0.7 0 |
| 46.1 | 6.2 | | | | | | |
| 24 13.7 | −0.2 | | | | | | |
| B 25 13.8 | | 25 13.2 | +0.6 +0.2 | | 4.4 | 5.0 | −0.6 +1 |
| 39.0 | 4.4 | | | | | | |
| 55.4 | | 55.3 | +0.1 | −0.3 | 7.6 | 8.2 | −0.6 +1 |
| 26 26.0 | 7.6 | | | | | | |
| 27 46.9 | | 27 46.5 | +0.4 0.0 | | 8.3 | 9.3 | −1.0 −3 |
| 28 15.5 | 8.3 | | | | | | |
| 41.9 | | 28 41.7 | +0.2 | −0.2 | 0.1 | 1.2 | −1.1 −4 |
| 51.3 | | 51.2 | +0.1 | −0.3 | 4.5 | 4.9 | −0.4 +3 |
| 29 15.8 | 0.1 | | ~~+3.9~~ | | | | |
| 18.0 | 4.5 | | | | | | +55 −40 |
| A | | | | | | | |

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21.6

19.9

14.5

25.3

18.4

11.3

20.9

20.0

24.1

32.4

25.2

30.6

28.6

33.9

26.7

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Dec. 15 1882.

| Transit- | Est. | α | ∂-α | | Est. | δ | ∂-δ | +55 -40 |
|---|---|---|---|---|---|---|---|---|
| 0h 30m 23.8s | | 0h 30m 23.5s | +0.3 | -0.1 | 6.7 | 7.3 | -0.6 | +1 |
| 36.1 | | 35.9 | +0.2 | -0.2 | 0.3 | 1.2 | -0.9 | -2 |
| 54.7 | 6.7 | | | | | | | |
| 31 8.8 | | 31 8.2 | +0.6 | +0.1 | 6.2 | 6.9 | -0.7 | 0 |
| 11.2 | 0.3 | | | | | | | |
| 24.7 | 6.2 | | | | | | | |
| 32 36.2 | | 32 35.8 | +0.4 | -0.1 | 2.6 | 3.4 | -0.8 | -1 |
| 50.5 | | 50.4 | +0.1 | -0.4 | 10.0 | 10.8 | -0.8 | -1 |
| 56.9 | 2.6 | | | | | | | |
| 33 2.8 | | 33 2.1 | +0.7 | +0.2 | 5.8 | 6.6 | -0.8 | -1 |
| 8.6 | 10.0 | | | | | | | |
| 25.7 | 6.8 | | | | | | | |
| 34 24.0 | | 34 23.7 | +0.3 | -0.2 | 7.9 | 8.8 | -0.9 | -2 |
| 35 6.8 | 7.9 | | | | | | | |
| 30.3 | | 35 29.9 | +0.4 | -0.1 | 4.9 | 5.7 | -0.8 | -1 |
| 38.0 | | 37.7 | +0.3 | -0.2 | 8.0 | 9.0 | -1.0 | -3 |
| 45.0 | | 45.0 | 0.0 | -0.5 | 8.5 | 9.6 | -1.1 | -4 |
| 36 5.0 | 8.0 | | ~~+0.3~~ | | | | | |
| 11.0 | 4.9 | | | | | | | |
| 16.2 | 8.5! | | | | | | | |
| B | | | | | | | | |
| 53.3 | | 36 53.1 | +0.2 | -0.3 | 7.5 | 7.4 | +0.1 | +8 |
| 37 0.5 | rej. | 37 | | | | | | |
| 1.5 | | 1.0 | +0.5 | 0.0 | 3.4 | 2.3 | +1.1 | +18 |
| 18.9 | 7.5 | | +6.9 | | | | | +82 -55 |
| 22.5 | 3.4 | | | | | | | |

Reexamined state at 0h 38m 22.8s +4' 18" and two following. In place of first two, only one was seen.

Reexamined region around estab. star at 0h 10m 39.8s +6' 14" but no star seen as found.

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.40

30.9

2 35.1

15.9

1 20.7

1 18.1

1 22.9

2 42.8

1 40.7

3 27.0

4 31.2

25.6

21.0

.55

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# Series 10

Dec. 15, 1882. 2nd sheet.

| Transit- | Est: | α | γ-α | | Est: | δ | ε-δ | |
|---|---|---|---|---|---|---|---|---|
| 0h 30m 23.2s | | 0h 30m 28.5s | -0.3 | -0.2 | 7.0 | 7.3 | -0.3 | +4 |
| 35.9 | | 35.9 | 0.0 | +0.1 | 0.8 | 1.2 | -0.4 | +3 |
| 54.4 | 7.0 | | | | | | | |
| 31 8.3 | 0.8 | 31 8.2 | +0.1 | +0.2 | 6.5 | 6.9 | -0.4 | +3 |
| 26.2 | 6.5 | | | | | | | |
| A 32 25.1 | | | | | 6.8 | | | |
| 35.6 | | 32 35.8 | -0.2 | -0.1 | 2.6 | 3.8 | -1.2 | -7 |
| 41.5 | 6.8 | | | | | | | |
| 50.5 | | 50.4 | +0.1 | +0.2 | 10.2 | 10.8 | -0.6 | +1 |
| 54.6 | 2.6 | | | | | | | |
| 33 2.0 | | 33 2.1 | -0.1 | 0.0 | 6.0 | 6.6 | -0.6 | +1 |
| 9.4 | 10.2 | | | | | | | |
| 20.9 | 6.0 | | | | | | | |
| B 34 23.3 | | 34 23.7 | -0.4 | -0.3 | 8.1 | 8.8 | -0.7 | 0 |
| 35 4.4 | 8.1 | | | | | | | |
| 30.0 | | 35 29.9 | +0.1 | +0.2 | 5.0 | 5.7 | -0.7 | 0 |
| 37.6 | | 37.7 | -0.1 | 0.0 | 8.0 | 8.9 | -0.9 | -2 |
| 45.0 | | 45.0 | 0.0 | +0.1 | 9.0 | 9.6 | -0.6 | +1 |
| 36 4.3 | 6.0 | | ~~-0.6~~ | | | | | |
| 8.7 | 5.0 | | | | | | | |
| 14.3 | 9.0 | | | | | | | |
| 53.0 | | 36 53.1 | -0.1 | 0.0 | 7.6 | 7.4 | +0.2 | +9 |
| 37 1.0 | | 37 1.0 | 0.0 | +0.1 | 8.3 | 2.3 | [+1.0] | +17 |
| 13.6 | 7.6 | | | | | | | |
| 16.5 | 3.3 | | | | | | | |
| | | | | | only one star seen | | | |
| 38 22.5 | | 38 22.8 | -0.3 | -0.2 | 9.2 | 4.3 | -1.1 | -4 |
| 25.8 | | 23.0<br>25.9 | -0.1 | 0.0 | 5.7 | 4.0<br>6.6 | -0.9 | -2 |
| 40.2 | 3.2 | | | | | | | |
| 39 2.7 | 5.7 | 39 2.8 | -0.1 | 0.0 | 6.5 | 7.6 | -1.1 | -4 |
| 23.6 | 6.5 | | | | | | | +22 -19 |

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31.2

32.4

17.9

16.4

19.0

18.9

18.9

41.1

38.7

26.7

29.3

20.6

15.5

17.7

36.9

20.9

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Dec. 15. 1882. 2nd sheet.

| Transit- | Est: | α | γ - α | Est: | δ | δ - δ +22 -19 |
|---|---|---|---|---|---|---|
| 1 0h 39m 57.8 | | 0h 39m 57.9 | -0.1 -1.5 0.0 | 5.7 | 6.4 | -0.7 0 |
| 40 22.8 | 5.7 | | | | | |
| 45.1 | | 40 45.3 | -0.2 -0.1 | 5.0 | 5.6 | -0.6 +1 |
| 55.0 | | | | 8.0 | | |
| 41 5.0 | | 41 5.7 | -0.7 -0.6 | 6.6 | 7.3 | -0.7 0 |
| 8.1 | 5.0 | | | | | |
| 13.3 | 8.0 | | | | | |
| 22.1 | 6.6 | | | | | |
| 28.0 | | 28.1 | -0.1 0.0 ~~-0.7 -0.19~~ | 1.0 | 2.2 | -1.2 -5 |
| 34.3 | | 34.4 | -0.1 0.0 | 2.4 | 3.2 | -0.8 -1 |
| 53.6 | 2.4 | | | | | |
| 58.0 | 1.0 | | | | | |
| 42 42.8 | | 42 42.9 | -0.1 0.0 | 3.0 | 4.4 | -1.4 -7 |
| 49.7 | | | | 6.7 | | |
| 43 4.4 | 6.7 | | | | | |
| 17.3 | 3.0 | | | | | |
| 23.8 | | 43 23.5 | +0.3 +0.4 | 0.9 | 1.8 | -0.9 -2 |
| 39.0 | 0.9 | | | | | |
| 55.1 | | 55.0 | ~~+0.1~~ 0.0 ~~0.0 +0.2~~ | 0.7 | 1.6 | -0.9 -2 |
| 44 15.0 | 0.7 | | | | | |
| A 45 18.8 | | 45 18.7 | +0.1 +0.2 | 10.2 | 10.9 | -0.7 +1 |
| 36.8 | 10.2 | | | | | |
| 46 18.6? | | | | | | |
| 32.5? | | | | | | |
| 47 52.5 | | 47 52.5 | 0.0 +0.1 | 1.5 | 2.4 | -0.6 +2 |
| 54.7 | | | | 6.0 | | |
| 48 10.3 | 1.5 6.0 | | | | | |
| 14.3 | | 48 14.3 | 0.0 +0.1 | 5.8 | 6.9 | -1.1 -3 |
| 33.5? | | | | | | |
| 34.0 | 5.8 | | | | | +26 -39 |

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25.0

23.0
18.3
17.1

30.0
19.3

34.5
14.7

15.2

19.9

18.0

17.8
15.6

19.7

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Dec. 15, 1882. 2nd sheet.

| Transit | Est: | α | γ - α | Est: | δ | δ - δ' +26 -39 |
|---|---|---|---|---|---|---|
| h m s | | h m s | | | ' | |
| 0 49 15.5 | | 0h 49m 15.6 | -0.1 0.0 | 7.6 | 8.5 | -0.9 -1 |
| 29.8 | | | | 5.2 | | |
| 40.1 | | 39.9 | -0.2 -0.1 | 4.9 | 5.4 | -0.5 +3 |
| 47.0 | 5.2 | | | | | |
| 50.5 | 7.8 | | -1.1 | | | |
| 50 12.5 | 4.8 | | | | | |
| B 57 5.1 | | 51 2.5 | +2.6 +2.7 -0.1 -0.01 | 3.7 | 3.3 | +.4 +1.2 |
| 23.7 | 3.7 | | | | | |
| 31.3 | | | | 7.7 | | |
| 37.1 | | | | 9.2 | | |
| | | 40.6 | | | 0.4 | |
| 48.5 | 7.7 | | | | | |
| 58.3 | 9.2 | | | | | |
| 53 2.1 | | 53 2.4 | -0.3 -0.2 | 7.3 | 7.6 | -0.3 +5 |
| 29.0 | | 29.1 | -0.1 0.0 | 6.9 | 7.3 | -0.4 +4 |
| 35.5 | 7.3 | | | | | |
| 51.5 | 6.9 | | | | | |
| 54 16.5 | | 54 16.9 | -0.4 -0.4 | 0.6 | 1.6 | -1.0 -2 |
| 25.0 | | | | 3.4 | | |
| 37.4 | inj. | | | | | |
| 38.1 | 0.6 | 34.4 | -0.3 -0.3 | 3.2 | 3.9 | -0.7 +1 |
| 44.0 | 3.4 | | | | | |
| 54.6 | 3.2 | | | | | |
| 56.8 | | 56.5 | +0.3 +0.3 | 1.5 | 2.4 | -0.9 -1 |
| B 55 12.1 | 1.5 | | | | | |
| 18.6 | | 55 18.5 | +0.1 +0.1 | 5.3 | 6.2 | -0.9 -1 |
| 47.4 | 5.3 | | | | | |
| 56 7.0 | | 56 6.9 | +0.1 +0.1 | 10.0 | 10.7 | -0.7 +1 |
| 28.0 | 10.0 | | | | | |
| 34.4 | | | | 5.0 | | |
| 35.9 | | 35.6 | +0.3 +0.3 | -0.5 | -0.1 | -0.4 +4 |

+4.4 -3.4

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35.0
17.2
32.4

18.6

17.2
21.2

33.4
~~32.5~~ 22.5

21.6
19.0

16.5

15.3

28.8

21.0

15.4
26.9

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Dec. 15, 1882. 2nd sheet.

| Transit | Est: | α | α-α | Est: | δ | δ-δ | +44 | -44 |
|---|---|---|---|---|---|---|---|---|
| $0^h\ 56^m\ 39^s.4$ | | | | 8.0 | | | | |
| 49.8 | 5.0 | | | | | | | |
| 57.6 | 6.0 | | | | | | | |
| 57 2.0 | -0.5 | | | | | | | |
| 37.3 | | $0^h\ 57^m\ 37^s.9$ | -0.6 -0.6 | -0.4 | 0.2 | -0.6 | +3 | |
| 58 9.8 | -0.4 | | ~~-0.9~~ -0.7 | | | | | |
| 38.0 | | | | 5.0 | | | | |
| 49.8 | | 58 50.3 | -0.5 -0.5 | 0.0 | 1.8 | -1.8 | | -9 |
| 52.8 | | 52.4 | +0.4 +0.4 | 7.2 | 7.7 | -0.5 | +4 | |
| 54.7 | 5.0 | | | | | | | |
| 59 12.5 | 0.0 | | | | | | | |
| 19.0 | | 59 19.1 | -0.1 -0.1 | 2.4 | 8.0 | -0.6 | +3 | |
| 30.0 | 7.0 | 30.0 | 0.0 0.0 | 7.0 | 7.5 | -0.5 | +4 | |
| 41.5 | | | | 7.5 | | | | |
| 44.5 | 2.4 | | | | | | | |
| 54.7 | 7.0 | | | | | | | |
| 57.8 | 7.5 | | -1.1 | | | — | | |
| A A 1 1 88.3 | | 1 1 33.2 | +0.1 +0.1 | 2.5 | 8.5 | -1.0 | | -1 |
| 46.3 | | 46.3 | 0.0 0.0 | 8.0 | 9.4 | -1.4 | | -5 |
| 55.7 | | | | 2.6 | | | | |
| 2 3.3 | 2.5 | | | | | | | |
| 10.0 | 2.6 | | | | | | | |
| 14.0 | 8.0 | | | | | | | |
| 52.7 | | | | 2.2 | | | | |
| 3 6.3 | 2.2 | | | | | | | |
| 22.1 | | 3 21.9 | +0.2 +0.2 | -0.9 | -0.1 | -0.8 | +1 | |
| 30.5 | | | | -0.2 | | | | |
| 41.1 | -0.9 | | | | | | | |
| 47.8 | | 47.2 | +0.1 +0.1 | 0.7 | 1.9 | -1.2 | | -3 |
| 50.3 | -0.2 | | | | | | +59 | -62 |
| 4 12.2 | 0.7 | | | | | | | |

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18.2

32.5

16.7

22.7

37.2

25.5

24.7

16.3

30.0

27.7

14.3

13.6

19.0

19.8

24.9

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Dec. 15, 1882. 2nd sheet.

| Transit | Est. | α | δ − α | | Est. | δ | δ − δ | +59 −62 |
|---|---|---|---|---|---|---|---|---|
| h m s | | h m s | | | | | | |
| 1 5 19.0 | | 1 5 14.5 | +0.5 +0.4 | | 3.4 | 4.5 | −1.1 | −2 |
| 57.8 | 3.4 | | | | | | | |
| 58.4 | | 58.1 | +0.3 +0.2 | | −0.4 | 0.2 | −0.6 | +3 |
| 6 17.0 | | 6 17.0 | +1.0 0.0 | −0.1 | 0.0 | 0.9 | −0.9 | 0 |
| 19.0 | −0.4 | | | | | | | |
| 34.5 | 0.0 | | | | | | | |
| B B 54.0 | | 54.1 | −.1 | −.2 | 5.5 | 6.5 | −1.0 | −.1 |
| 7 23.4 | 5.5 | | | | | | | |
| 35.9 | | 7 35.6 | +0.3 +0.2 | | 5.1 | 5.9 | −0.8 | +1 |
| 52.6 | | | | | | | | |
| 52.6 | 5.1 | | | | | | | |
| 8 46.0 | | 8 39.9 | +0.3 +0.2 +0.1 0.0 | | 5.0 | 5.7 | −0.7 | +2 |
| 9 7.5 | 5.0 | | | | | | | |
| 23.1 | | 9 23.3 | −0.2 +1.4 | −0.3 | 2.8 | 3.9 | −1.1 | −1 |
| 43.3 | 2.8 | | | | | | | |
| 10 14.0 | | | | | 5.2 | | | |
| 34.2 | 5.2 | | | | | | | |
| 11 2.0 | | | | | 8.8 | | | |
| 23.2 | 8.8 | | | | | | | |
| 35.5 | | | | | 5.3 | | | |
| 48.6 | | 11 43.5 | +0.1 0.0 | | 2.7 | 4.1 | −1.4 | −4 |
| 58.3 | 5.3 | | | | | | | |
| 12 2.0 | 2.7 | | | | | | | |
| 13 33.1 | | 13 33.1 | 0.0 | −0.1 | 2.7 | 4.2 | −1.5 | −5 |
| 50.0 | 2.7 | | | | | | | |
| 14 42.9 | | 14 42.5 | +0.4 +0.3 | | 5.5 | 6.7 | −1.2 | −2 |
| 15 5.4 | 5.5 | | | | | | | |
| 25.0 | | 15 24.8 | +0.2 +0.1 | | 8.7 | 9.9 | −1.2 | −2 |
| 45.1 | K. disap. | 45.1 | 0.0 | −0.1 | 9.4 | 10.5 | −1.1 | −1 |
| 16 9.9 | | | | | 7.8 | | +65 | −79 |

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62
2

32.8

20.6
17.5

29.4

16.7

27.5

20.2

20.2

21.2

17.8
18.4

16.9

22.5

49.8

34.1 14.1

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Dec. 15, 1882. 2nd sheet:

| Chronom. | Obs't. | $\alpha$ | $\gamma - \alpha$ | | | Obs't. | $\delta$ | $\delta - \delta$ | +65 −79 |
|---|---|---|---|---|---|---|---|---|---|
| h m s | | | | | | | | | |
| 1 16 14.8 | 8.0 | | | | | | | | |
| 20.0 | | 1h 16m 18.9 | +1.1 | +0.9 | | 4.9 | 5.9 | −1.0 | 0 |
| 24.0 | 7.8 | | ~~+2.0~~ | | | | | | |
| 35.7 | 4.9? | | | | | | | | |
| 44.8 | 4.9? | | | | | | | | |
| 17 10.2 | | | | | | 1.0 | | | |
| 22.0 | | | | | | 8.5 one b. | | | |
| 26.7 | | 17 26.7 | 0.0 | | −0.2 | 0.0 | 0.9 | −0.9 | +1 |
| 20.6 | 1.0 | | | | | | | | |
| 47.0 | 0.0 | | | | | | | | |
| A 18 4.1 | | 18 4.1 | 0.0 | | −0.2 | 5.4 | 6.4 | −1.0 | 0 |
| 30.2 | 5.4 | | | | | | | | |
| 40.9 | | 40.7 | +0.2 | 0.0 | | 2.3 | 3.1 | −0.8 | +2 |
| 19 5.4 | 2.3 | | | | | | | | |
| 47.0 | | 19 47.0 | 0.0 | | −0.2 | 0.5 | 1.6 | −0.9 | +2 |
| | | | +2.0 | | | | | | |
| 20 0.2 | 0.5 | | | | | | | | |
| 85.4 | | 20 24.9 | +0.5 | +0.3 | | 6.3 | 7.4 | −0.9 | +2 |
| 45.5 | 6.3 | | | | | | | | |
| B 21 16.4 | | 21 16.3 | +0.1 | | −0.1 | 4.2 | 5.0 | −0.8 | +3 |
| 27.4 | | 27.5 | −0.1 | | −0.3 | 0.2 | 1.4 | −1.2 | +1 |
| 42.4 | 4.2 | | | | | | | | |
| 51.8 | 0.2 | | | | | | | | |
| 55.0 | | | | | | 7.0 | | | |
| 56.5 | | | | | | 10.0 | | | |
| 22 15.5 | 7.0 / 10.0 | | | | | | | | |
| 23.1 | | 22 23.2 | −0.1 | | −0.3 | 2.6 | 3.9 | −1.3 | −2 |
| 46.2 | 2.6 | | | | | | | | |
| 23 41.0 | | 23 | ~~37.1~~ 38.3 / 41.0 | 0.0 | −0.2 | 3.0 | 0.8 / 4.1 | −1.1 | 0 |
| 57.6 | | | ~~57.4~~ 57.3 | +0.3 | +0.1 | 5.0 | ~~4.2~~ 6.1 | ~~+1.5~~ −1.1 | ~~+19~~ 0 |
| 58.9 | 3.0 | | | +0.2 / +0.6 | ~~0.0~~ 0.09 | | | | +95 −81 |

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15.7 or 24.8

10.4

G.C. 304

20.3

26.1

24.5

13.2

20.1

26.0

24.4

20.5

19.0

23.1

17.9

29.5

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Dec. 15, 1882. 2nd sheet:

| Manail- | Sdl: | α | γ − α | | Sdl: | δ | δ − δ +95 −81 |
|---|---|---|---|---|---|---|---|
| 1 24h 12.6 | | +24 11.0 | +0.6 | +0.4 | 9.0 | 9.9 | |
| 12.8 | | 12.5 | +0.1 | −0.1 | 4.5 | 5.7 | −1.2 |
| 27.1 | 5.0 | | | | | | |
| 33.8 | 9.0 | | | | | | |
| 38.4 | 4.5 | | | | | | |
| 55.5 | | 55.3 | +0.2 | 0.0 | 5.1 | 6.4 | −1.3 −2 |
| 25 7.5 | | 25 7.1 | +0.4 | +0.1 | 0.0 | 1.0 | −1.0 +1 |
| A 27.3 | 5.1 | | | | | | |
| 46.0 | 0.0 | | | | | | |
| 58.2 | | 57.7 | +0.5 | +0.2 | 9.9 | 10.9 | −1.0 +1 |
| 26 4.8 | | | | | 10.0 | | |
| 28.8 | 9.9 | | | | | | |
| 34.9 | 10.0 | | | | | | |
| B 27 14.1 | | 27 14.0 | +0.1 | −0.2 | −0.6 | 0.2 | −0.8 +4 |
| 20.9 | | | | | 10.2 | | |
| 33.5 | −0.6 | | | | | | |
| 41.8 | | | | | 1.0 | | |
| 47.6 | | 47.1 | +0.5 | +0.2 | 5.3 | 7.4 | −2.1 −9 |
| 49.4 | 10.2 | | | | | | |
| 55.2 | 1.0 | | | | | | |
| 28 10.1 | | | | | 7.3 | | |
| 17.1 | 5.3 | | | | | | |
| 30.2 | 6.0 | | | | | | |
| 37.8 | | 28 37.5 | +0.3 | 0.0 | 1.8 | 3.1 | −1.3 −1 |
| 53.4 | 1.8 | | | | | | |
| 29 13.0 | | 29 12.7 | +0.3 | 0.0 | 5.6 | 7.1 | −1.5 −3 |
| 33.6 | 5.6 | | | | | | |
| 59.9 | | 59.5 | +0.4 | +0.1 | 4.5 | 5.4 | −0.9 +3 |
| 30 7.4 | | 30 7.3 | +0.1 | −0.2 | 8.0 | 4.3 | −1.3 −1 |
| 26.9 | | 26.4 | +0.5 | +0.2 | 4.0 | 5.2 | −1.2 0 |

+106 −102

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22.2
25.6

31.8
38.5

29.6
30.1

19.4
28.5

13.4
29.5

15.6

20.6

31.3
21.0
23.6

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Dec. 15, 1882. 2nd sheet:

| Transit - | Est: | α | γ - α | | Est: | δ | ε - δ | +106 -102 |
|---|---|---|---|---|---|---|---|---|
| h 30m 28.4s | 3.0 | | | | | | | |
| 31.2 | 4.5 | | | | | | | |
| 50.5 | 4.0 | | | | | | | |
| A A 31 20.7 | | | | | -0.5 | | | |
| 32.2 | -0.5 | | | | | | | |
| 43.4 | | 1h 31m 49s.0 | +0.4 | +0.1 | 9.3 | 10'.4 | -1.1 | +1 |
| 32 13.4 | 9.3 | | | | | | | |
| 33.8 | | | | | 5.1 | | | |
| 49.2 | 5.1 | | | | | | | |
| 52.1 | | 32 52.2 | -0.1 | -0.5 | 0.3 | 2.0 | -1.6 | -4 |
| 33 20.0 | 0.3 | | | | | | | |
| 22.5 | | 33 22.3 | +0.2 | -0.2 | 7.8 | 9.3 | -1.5 | -3 |
| 25.0 | | 24.5 | +0.5 | +0.1 | 1.8 | 2.8 | -1.0 | +2 |
| 40.5 | | 39.8 | +0.7 | +0.3 | 4.0 | 5.0 | -1.0 | +2 |
| 44.5 | 7.8 | | | | | | | |
| 51.0 | 1.8 | | | | | | | |
| B 34 10.8 | | 34 10.6 | +0.2 | -0.2 | 7.0 | 8.2 ~~7.8~~ | -1.2 ~~-2.2~~ | 0 ~~-10~~ |
| 13.1 | | | | | 8.5 | | | |
| 19.9 | 4.0 | | | | | | | |
| 32.0 | 7.0 / 8.5 | | | | | | | |
| 51.8 | | 51.6 | +0.2 | -0.2 | 6.2 | 7.6 | -1.4 | -2 |
| 35 2.0 | | | | | 9.3 | | | |
| 11.6 | 6.2 | | | | | | | |
| 17.5 | 9.3 | | | | | | | |
| 25.0 | | 35 24.5 | +0.5 | +0.1 | 9.8 | 10.7 | -0.9 | +4 |
| 42.7 | | | ~~+0.2~~ | | 6.0 | | | |
| 57.5 | 9.8 | | | | | | | |
| 59.9 | 6.0 | | | | | | | |
| 37 41.4 | | 37 40.9 | +0.5 | +0.1 | -0.6 | 0.0 | -0.6 | +7 |
| 38 8.0 | -0.6 | | | | | | | +122 -121 |

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11.5

30.0

15.4

27.9

22.0

26.0

39.4

21.2

18.9

19.8

15.5

32.5

17.2

26.6

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Dec. 15. 1882 2nd sheet.

| Transit- | Est: | $\alpha$ | $\gamma-\alpha$ | | Est: | $\delta$ | $\delta-\delta$ +122 -121 |
|---|---|---|---|---|---|---|---|
| h m s | | | | | | | |
| 1 38 31.1 | | 1 38 30.7 | +0.4 | -0.1 | 5:1 | 6.4 | -1.3 0 |
| 48.3 | | 47.8 | +0.5 | 0.0 | 4.9 | 5.8 | -0.9 +4 |
| 58.4 | 5:1 | | +4.6 | | | | +126 -121 |
| 39 13.5 | 4.9 | | | | | | |

B
B

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1882phae.proj.1431.



-121

27.3
25.2

121

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