

Memoranda for Observers.

Standard Time of India is adopted in these Memoranda.

For the month of April 1915.

Sidereal time at 8 p.m.

| | | | | H. | M. | S. |
|-----------|-----|-----|-----|-----|-------|----|
| April 1st | ... | ... | ... | ... | 8 35 | 28 |
| „ 8th | ... | ... | ... | ... | 9 3 | 4 |
| „ 15th | ... | ... | ... | ... | 9 30 | 40 |
| „ 22nd | ... | ... | ... | ... | 9 58 | 16 |
| „ 29th | ... | ... | ... | ... | 10 25 | 52 |

From this table the constellations visible in India during the evenings in April can be ascertained by a reference to a Star Chart, as the above hours of sidereal time represent the hours of Right Ascension on the meridian

The Moon.

PHASES—

| | | | |
|-----------|----|-----------|----------------|
| April 7th | at | 1-42 A.M. | Last quarter. |
| „ 14th | „ | 5- 5 P.M. | New Moon. |
| „ 22nd | „ | 9- 9 „ | First quarter. |
| „ 29th | „ | 7-49 „ | Full Moon. |

OCCULTATIONS—

| | | | | | | | |
|-----------|----|------------|--------------|---------|--------|-----|--------|
| April 4th | at | 10-42 A.M. | Antares | Between | 0° | and | 73° S. |
| „ 9th | „ | 5-30 „ | Uranus | „ | 20° N. | „ | 62° S. |
| „ 17th | „ | 4-30 P.M. | The Pleiades | „ | 90° N. | „ | 38° N. |
| „ 25th | „ | 12-34 A.M. | Regulus | „ | 12° S. | „ | 78° S. |

CONJUNCTIONS—

| | | | | |
|------------|----|-----------|------------|------------------------|
| April 11th | at | 8-37 A.M. | with Venus | (Planet 2°-36' South.) |
| „ 11th | „ | 5-39 P.M. | „ Jupiter | „ 3°- 6' „ |
| „ 12th | „ | 3-34 „ | „ Mars | „ 4°-12' „ |
| „ 13th | „ | 7-19 A.M. | „ Mercury | „ 6°-14' „ |
| „ 20th | „ | 2-53 „ | „ Saturn | „ 5°- 0' „ |

The Planets.

The planets are all morning stars except Saturn and Neptune. At the beginning of the month, Mercury, Mars and Jupiter are all close together near the eastern boundary of Aquarius, rising a little more than an hour before the Sun, and preceded by Venus who rises in the same constellation about an hour earlier. Venus will be in conjunction with Jupiter on the 15th when only nine minutes of arc will separate the two planets.

Mars.—Position on the 15th R. A. 23° 57' Dec. 1°-24' S. in Pisces.

Jupiter.—Position on the 15th R. A. 23·11 Dec. 6°-13' S. in Aquarius.

Saturn.—Position on the 15th R. A. 5·48 Dec. 22°-37' N. in Taurus.

Uranus.—Position on the 15th R. A. 21·11 Dec. 16°-54' S. in Aquarius.

Neptune.—Position on the 15th R. A. 7·58 Dec. 20°-17' N. in Cancer.

For the month of May 1915.

Sidereal time at 8 p.m.

| | | | | H. | M. | S. |
|------------|-------------|-----|-----|-----|----|-------|
| <i>May</i> | <i>1st</i> | ... | ... | ... | 10 | 33 45 |
| " | <i>8th</i> | ... | ... | ... | 11 | 1 20 |
| " | <i>15th</i> | ... | ... | ... | 11 | 38 56 |
| " | <i>22nd</i> | ... | ... | ... | 11 | 56 32 |
| " | <i>29th</i> | ... | ... | ... | 12 | 24 8 |

From this table the constellations visible in India during the evenings in May can be ascertained by a reference to a Star Chart, as the above hours of sidereal time represent the hours of Right Ascension on the meridian.

The Moon.

PHASES—

| | | | | |
|------------|-------------|----------|------|----------------|
| <i>May</i> | <i>6th</i> | at 10-52 | A.M. | Last quarter. |
| " | <i>14th</i> | " 9- 1 | " | New Moon. |
| " | <i>22nd</i> | " 10-20 | " | First quarter. |
| " | <i>29th</i> | " 3- 2 | " | Full Moon. |

OCCULTATIONS—

| | | | | | |
|------------|-------------|---------|------|---------|--------------------------|
| <i>May</i> | <i>1st</i> | at 7-45 | P.M. | Antares | Between 8° N. and 61° S. |
| " | <i>6th</i> | " 12- 8 | " | Uranus | " 38° N. " 42° S. |
| " | <i>16th</i> | " 7-46 | " | Nath | " 34° S. " 62° S. |
| " | <i>22nd</i> | " 8-36 | A.M. | Regulus | " 40° S. " 78° S. |
| " | <i>29th</i> | " 6- 6 | " | Antares | " 11° N. " 58° S. |

CONJUNCTIONS—

| | | | | | |
|------------|-------------|----------|------|--------------|--------------------|
| <i>May</i> | <i>9th</i> | at 10-38 | A.M. | with Jupiter | (Planet 3°-53' S.) |
| " | <i>11th</i> | " 3-27 | P.M. | " Venus | " 6°-28' S. |
| " | <i>12th</i> | " 6-25 | " | " Mars | " 5°-38' S. |
| " | <i>15th</i> | " 7-46 | " | " Mercury | " 2°-51' S. |
| " | <i>17th</i> | " 2-30 | " | " Saturn | " 4°-36' S. |

The Planets.

Mercury—Is in superior conjunction with the Sun at 11-30 P.M. on the 1st and then becomes an evening star. From the middle of the month he will set more than an hour later than the Sun, increasing his distance until the 31st, when he will set an hour and half later.

Venus—A morning star, rises in Pisces about two hours before the Sun on the 1st. She moves into Aries on the 18th.

Mars—Keeps close to Venus throughout the month, the two planets being in conjunction on the 14th, when Venus will be $0^{\circ}-56'$ to the South of Mars. Position on the 15th R. A. $1^{\circ}22'$ Dec. $7^{\circ}-43'$ N.

Jupiter—Rises about three hours before the Sun on the 1st and about five hours before on the 31st. Position on the 15th R. A. $23^{\circ}33'$ Dec. $4^{\circ}-0'$ S. in Pisces.

Saturn—An evening star, moves out of Taurus into Gemini during the 1st week of the month. Position on the 15th R. A. $6^{\circ}1'$ Dec. $22^{\circ}-43'$ N.

Uranus.—Position on the 15th R. A. $21^{\circ}13'$ Dec. $16^{\circ}-47'$ S. in Capricornus.

Neptune.—Position on the 15th R. A. $8^{\circ}0'$ Dec. $20^{\circ}-14'$ N. in Cancer.

For the month of June 1915.

Sidereal time at 8 p.m.

| | | | | H. | M. | S. |
|------|------|-----|-----|-----|----|-------|
| June | 1st | ... | ... | ... | 12 | 33 58 |
| " | 8th | ... | ... | ... | 13 | 3 34 |
| " | 15th | ... | ... | ... | 13 | 31 10 |
| " | 22nd | ... | ... | ... | 13 | 58 45 |
| " | 29th | ... | ... | ... | 14 | 26 21 |

From this table the constellations visible in India during the evenings in June can be ascertained by a reference to a Star Chart, as the above hours of sidereal time represent the hours of Right Ascension on the meridian.

The Moon.

PHASES—

| | | | |
|------|------|--------------|----------------|
| June | 4th | at 10-2 P.M. | Last quarter. |
| " | 13th | " 12-27 A.M. | New Moon. |
| " | 20th | " 7-54 P.M. | First quarter. |
| " | 27th | " 9-57 A.M. | Full Moon. |

OCCULTATIONS—

| | | | | |
|------|------|--------------|---------|-------------------------------------|
| June | 25th | at 2-58 P.M. | Antares | Between 9° N. and $59'$ S. |
| " | 30th | " 4-59 A.M. | Uranus | " 63° N. " $18'$ S. |

CONJUNCTIONS—

| | | | | |
|------|------|--------------|--------------|-----------------------------|
| June | 6th | at 1-38 A.M. | with Jupiter | (Planet $4^{\circ}-38'$ S.) |
| " | 9th | " 7-25 P.M. | " Mars | " $6^{\circ}-1'$ S. |
| " | 10th | " 8-45 " | " Venus | " $6^{\circ}-38'$ S. |
| " | 14th | " 2-52 A.M. | " Saturn | " $4^{\circ}-16'$ S. |
| " | 14th | " 1-12 P.M. | " Mercury | " $4^{\circ}-18'$ S. |

The Planets.

Mercury—An evening star, is at greatest elongation $23^{\circ}-17'$ East on the 1st and will be visible during the first half of the month as he sets about an hour and a half after the Sun on the 1st and nearly an hour after on the 15th. He will be in inferior conjunction with the Sun on the 27th, and will then become a morning star.

Venus—Is a morning star rising in Aries about an hour and three quarters before the Sun on the 1st. She moves into Taurus before the middle of the month and will be in conjunction with the Pleiades on the morning of the 14th.

Mars—A morning star, rises from two and a half to three hours before the Sun as the month advances. Position on the 15th R. A. $2^{\circ}-51'$ Dec. $15^{\circ}-45'$ N. in Aries.

Jupiter—Also a morning star, will be in quadrature with the Sun on the 19th rising then at about midnight. Position on the 15th R. A. $23^{\circ}-40'$ Dec. $2^{\circ}-24'$ S. in Pisces, to the south of the Great Square of Pegasus.

Saturn—An evening star, sets about an hour and a half after the Sun on the 1st, but will be in conjunction with the Sun on the 28th and then becomes a morning star. Position on the 15th R. A. $6^{\circ}-18'$ Dec. $22^{\circ}-24'$ N. in Gemini.

Uranus.—Position on the 15th R. A. $21^{\circ}-12'$ Dec. $16^{\circ}-52'$ S. in Capricornus.

Neptune.—Position on the 15th R. A. $8^{\circ}-3'$ Dec. $20^{\circ}-5'$ N. in Cancer.

The Sun

Attains its maximum declination north, and enters the sign of Cancer at 5.59 p.m. on the 22nd, being the summer solstice.

For the month of July 1915.

Sidereal time at 8 p.m.

| | | | | | H. | M. | S. |
|-------------|-------------|-----|-----|-----|-----|----|-------|
| <i>July</i> | <i>1st</i> | ... | ... | ... | ... | 14 | 34 15 |
| | <i>8th</i> | ... | ... | ... | ... | 15 | 1 51 |
| | <i>15th</i> | ... | ... | ... | ... | 15 | 29 26 |
| | <i>22nd</i> | ... | ... | ... | ... | 15 | 57 2 |
| | <i>29th</i> | ... | ... | ... | ... | 16 | 24 38 |

From this table the constellations visible in India during the evenings in July can be ascertained by a reference to a Star Chart, as the above hours of sidereal time represent the hours of Right Ascension on the meridian.

The Moon.

PHASES—

| | | | |
|------|------|---------------|----------------|
| July | 4th | at 11-24 A.M. | Last quarter. |
| " | 12th | " 3- 0 P.M. | New Moon. |
| " | 20th | " 2-38 A.M. | First quarter. |
| " | 26th | " 5-41 P.M. | Full Moon. |

OCCULTATIONS—

| | | | | |
|------|------|--------------|---------|---------------------------|
| July | 10th | at 8- 3 A.M. | Nath | Between 35° S. and 62° S. |
| " | 23rd | " 1-47 " | Antares | " 4° N. " 65° S. |
| " | 27th | " 1-32 P.M. | Uranus | " 60° N. " 20° S. |

CONJUNCTIONS—

| | | | | |
|------|------|--------------|--------------|--------------------|
| July | 3rd | at 2-13 P.M. | with Jupiter | (Planet 5°-12' S.) |
| " | 8th | " 6-31 " | " Mars | " 5°-30' S. |
| " | 11th | " 1-43 A.M. | " Venus | " 4°- 7' S. |
| " | 11th | " 2-22 " | " Mercury | " 7°-57' S. |
| " | 11th | " 4- 4 P.M. | " Saturn | " 4°- 0' S. |
| " | 11th | " 11-31 " | " Jupiter | " 5°-29' S. |

The Moon will enter the Penumbra of the Earth, but not the Umbra, on the 26th at 5-30 P.M.

The Planets.

Mercury—Is now a morning star but too near to the Sun to be visible during the first week of the month. From then to the third week he may be visible, rising in Gemini a little more than an hour before the Sun.

Venus—Also a morning star, rises nearly an hour and a half before the Sun on the 1st in Taurus. She will move through Gemini during the month, and by the 31st she will rise less than an hour before the Sun.

Mars—A morning star, rises from three to three and a half hours before the Sun as the month advances. Position on the 15th R. A. 4-18 Dec. 21°-6' N. in Taurus, between the Pleiades and Aldebaran.

Jupiter—Will rise at about half an hour before midnight on the 1st and at about 9-30 P.M. on the 31st. Position on the 15th R. A. 23-56 Dec. 1°-50' S. in Pisces.

Saturn—Now a morning star, will be too near to the Sun to be visible until about the end of the month, when he will rise about two hours before the Sun. Position on the 15th R. A. 6-35 Dec. 22°-34' N. in Gemini.

Uranus.—Position on the 15th R. A. 21·9 Dec. 17°-10' S. in Capricornus.

Neptune.—Position on the 15th R. A. 8·7 Dec. 19°-52' N. in Cancer.

The Sun

Will be in apogee at 3-30 A.M. on the 6th.

For the month of August 1915.

Sidereal time at 8 p.m.

| | | | H. | M. | S. |
|---------------|-------------|--------|--------|----|----|
| <i>August</i> | <i>1st</i> | | ... 16 | 36 | 28 |
| " | <i>8th</i> | | ... 17 | 4 | 4 |
| " | <i>15th</i> | | ... 17 | 31 | 40 |
| " | <i>22nd</i> | | ... 17 | 59 | 16 |

From this table the constellations visible in India during the evenings in August can be ascertained by a reference to a Star Chart, as the above hours of sidereal time represent the hours of Right Ascension on the meridian.

The Moon.

PHASES—

| | | | |
|---------------|-------------|--------------|----------------|
| <i>August</i> | <i>3rd</i> | at 2-57 A.M. | Last quarter. |
| " | <i>11th</i> | " 4-22 " | New Moon. |
| " | <i>18th</i> | " 7-47 " | First quarter. |
| " | <i>25th</i> | " 3-10 " | Full Moon. |

OCCULTATIONS—

| | | | | |
|---------------|-------------|--------------|---------|---------------------------|
| <i>August</i> | <i>6th</i> | at 3-17 P.M. | Nath | Between 28° S. and 62° S. |
| " | <i>19th</i> | " 8-21 A.M. | Antares | " 3° N. " 67° S. |

CONJUNCTIONS—

| | | | | |
|---------------|-------------|-------------|-----------|--------------------|
| <i>August</i> | <i>6th</i> | at 4-9 P.M. | with Mars | (Planet 4°-22' S.) |
| " | <i>8th</i> | " 5-53 A.M. | " Saturn | " 3°-47' S. |
| " | <i>10th</i> | " 9-37 " | " Venus | " 0°-2' S. |
| " | <i>10th</i> | " 8-45 P.M. | " Mercury | " 1°-17' N. |
| " | <i>27th</i> | " 4-53 A.M. | " Jupiter | " 5°-27' S. |

The Moon will enter the Penumbra of the Earth, but not the Umbra, on the 25th at 3-30 A.M.

The Planets.

Mercury.—Will be in superior conjunction with the Sun on the 14th and will then become an evening star, but too near to the Sun to be visible during the month.

Venus.—Is still a morning star, but approaches superior conjunction with the Sun which will occur on the 12th of September, so this planet will hardly be visible during the month.

Mars—Also a morning star, rises from three and a half to four hours before the Sun. Position on the 15th R. A. 5·48 Dec. 23°-33' N. in Taurus.

Jupiter—Rises at about 9-30 P.M. at the beginning of the month and at about 7-30 at its close. Position on the 15th R. A. 23·52 Dec. 2°-25' S. in Pisces.

Saturn—A morning star, rises from two to three and a half hours before the Sun. Position on the 15th R. A. 6·51 Dec. 22°-19' N. in Gemini.

Uranus.—Position on the 15th R. A. 21·4 Dec. 17°-28' S. in Capricornus.

Neptune.—Position on the 15th R. A. 8·12 Dec. 19°-38' N. in Cancer.

The Sun.

There will be an annular eclipse of the Sun on the morning of the 11th, commencing at 1-26 A.M. in Longitude 145°-24' North and Latitude 22°-54' North, and ending at 7-18 A.M. in Longitude 122°-24' West and Latitude 22°-0' South. It will consequently not be visible in India.

For the month of September 1915.

Sidereal time at 8 p.m.

| | | | H. | M. | S. |
|-----------|------|--------|--------|----|----|
| September | 1st | | ... 18 | 38 | 41 |
| " | 8th | | ... 19 | 6 | 17 |
| " | 15th | | ... 19 | 33 | 53 |
| " | 22nd | | ... 20 | 1 | 29 |
| " | 29th | | ... 20 | 29 | 5 |

From this table the constellations visible in India during the evenings in September can be ascertained by a reference to a Star Chart, as the above hours of sidereal time represent the hours of Right Ascension on the meridian.

The Moon.

PHASES—

| | | | |
|-----------|------|--------------|--------------------------------|
| September | 1st | at 8-26 P.M. | Last quarter. |
| " | 9th | " 4-22 " | New Moon. |
| " | 16th | " 12-21 A.M. | First quarter. |
| " | 23rd | " 3- 5 P.M. | Full Moon. (The Harvest Moon). |

OCCULTATIONS—

| | | | | | |
|-----------|------|--------------|--------------|---------|-------------------|
| September | 1st | at 2-16 A.M. | The Pleiades | Between | 83° N. and 50° N. |
| " | 2nd | " 11-14 P.M. | Nath | " | 32° S. " 62° S. |
| " | 15th | " 1-42 " | Antares | " | 8° N. " 60° S. |
| " | 20th | " 2-41 A.M. | Uranus | " | 51° N. " 27° S. |

CONJUNCTIONS—

| | | | | |
|------------------|-------------|---------------|-----------|--------------------|
| <i>September</i> | <i>4th</i> | at 12-34 P.M. | with Mars | (Planet 2°-45' S.) |
| " | <i>4th</i> | " 7-36 | " Saturn | " 3°-32' S. |
| " | <i>9th</i> | " 5-53 | " Venus | " 4°-17' N. |
| " | <i>11th</i> | " 11-20 A.M. | " Mercury | " 3°-51' N. |
| " | <i>23rd</i> | " 6-53 | " Jupiter | " 5°-11' S. |

The Planets.

Mercury—Now an evening star, sets about an hour later than the Sun on the 1st and about an hour and a half later on the 30th, so he will be visible in clear skies throughout the month. He will be in conjunction with Spica in Virgo at 8-30 P.M. on the 21st, the star being only one minute of arc to the south of the planet. He will be at greatest elongation east 26°-2' on the 28th.

Venus—Is a morning star until the 12th, when she will be in superior conjunction with the Sun, and then becomes an evening star again, but too near to the Sun to be visible during the month.

Mars—Is a morning star rising four hours before the Sun on the 1st and nearly five hours before by the 30th. Position on the 15th R. A. 7·14 Dec. 22°-59' N. in Gemini. He will be in conjunction with Saturn on the 11th at 4-32 A.M.

Jupiter—Will be in opposition to the Sun on the 17th, rising at sunset on that evening and being on the meridian at midnight. Position on the 15th R. A. 23·39 Dec. 3°-55' S. in Pisces, below the Great Square.

Saturn—Is a morning star. Position on the 15th R. A. 7·3 Dec. 22°-3' N. in Gemini.

Uranus.—Position on the 15th R. A. 20·59 Dec. 17°-49' S. in Capricornus.

Neptune.—Position on the 15th R. A. 8·16 Dec. 19°-25' N. in Cancer.

The Sun.

The Sun will enter the sign of Libra at 8-54 A.M. on the 24th being the autumnal equinox.

