SUPERMOONS AND OTHER SUN-MOON CONCEPTS
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Tidal Force

There is some talk right now about the so-called "Supermoon" (a term coined by astrologer Richard Nolle) happening tomorrow on the Full Moon of March 19th. Since I probably won't live forever I thought this would be a fine time to share with my astrology friends some basic information on the Moon. I will give the low-hanging fruit first so you non-astrologer friends can ignore the fine print further down. It should not interest you. So let's talk about the tidal force component.

This is a purely modern calculation that I have studied because it is inherently interesting and may be something we should be looking at. In the last 20 years or so, scientists too have become more aware of lunar effects on the earth and its inhabitants. In general, much of this research may be summed up and is expressed in the combined solunar gravitational force.

This unique measure includes both terrestrial and solar gravitational influence in a single indicator, incorporating the effects of the accelerated orbital motion of the moon and the closeness of the separation-interval at perigee-syzygy, the consequence of a coincident sun-Moon alignment in celestial latitude or declination, and the perturbed motion of perigee subject to increased solar gravitational force when perigee-syzygy occurs near the time of perihelion. In brief, this is the most accurate single indicator for lunar gravitational forces that are exerted on us each moment of the day and night.

As listed here, this is a number from 0% (lowest force) to 100% (highest force). This number represents a number of solunar forces mentioned above in their somewhat complex interplay. The resulting total force creates the tides and whatever pressures and forces the Sun and Moon exert on the Earth and ourselves. This represents a scientifically calculated number that actually gives a good idea of how these combined forces wax and wane throughout the year. As you can see the combined tidal force reached a peak yesterday March 17th although it will be high for the next several days.

Tidal Vector Force March 2011

28|Tu|2011-03-01| 8%
29|We|2011-03-02| 8%
30|Th|2011-03-03|12%
01|Fr|2011-03-04|16%
02|Sa|2011-03-05|19%
03|Su|2011-03-06|20%
04|Mo|2011-03-07|21%
05|We|2011-03-09|24%
06|Th|2011-03-10|32%
07|Fr|2011-03-11|43%
08|Sa|2011-03-12|56%
09|Su|2011-03-13|69%
10|Mo|2011-03-14|82%
11|Tu|2011-03-15|91%

12|We|2011-03-16|97%
13|Th|2011-03-17|99%
14|Th|2011-03-17|98%
15|Fr|2011-03-18|96%
16|Sa|2011-03-19|95%
17|Su|2011-03-20|95%
18|Mo|2011-03-21|96%
19|Tu|2011-03-22|96%
20|Tu|2011-03-22|92%
21|We|2011-03-23|85%
22|Th|2011-03-24|74%
23|Fr|2011-03-25|62%
24|Sa|2011-03-26|49%
25|Su|2011-03-27|38%
26|Mo|2011-03-28|28%
27|Tu|2011-03-29|20%
28|Th|2011-03-31|17%

For those interested, this tidal force factor can be found here for 150 years in the book “Dharma Practice Calendar” from which some of this material is listed:

http://astrologysoftware.com/books/index.asp?orig

PLEASE SHARE THIS INFO

That was the short explanation. Astrologers might like to know a bit more so here it is:

Lunar Phenomena

Here are some very interesting facts about the moon and its relationship to the earth. A lot of this was programmed and released in a program called Time Cycles (written by myself) some years ago. No longer available, it is important that these concepts be made available again in terms of a computer program. Technically oriented astrologers may want to consider the following and what it could mean. Here are the ideas:

The Pull of the Moon

The Moon's pull is strongest when it is nearest, and that happens when it is straight up or overhead (Moon up). This point is called the zenith. A second strong point occurs when the Moon is at the opposite point or beneath us at a point called the nadir (Moon down). The Moon is weakest in radial upward force when it is on either horizon, rising or setting. At these times the radial force is directed downwards toward the center of the Earth.

Moon Up / Moon Down

When the Moon is at the zenith, or overhead, gravitational force is at its strongest and it pulls us up, ever so slightly. When the Moon is at the nadir (on the other side of the Earth from us), a special form of centrifugal force, stronger than gravity, and pushes us out or away from the surface of the Earth. In other words, the effect of the Moon at zenith or nadir is to lift us up or away from the surface of the Earth, but for different reasons.

The two points during the day when the Moon is up or down are when the radial lunar force is at a maximum. However, sometimes the pull of Moon up is greater than that for Moon down, and vice versa. This variation depends upon what is called the diurnal inequality, which varies during the course of a month. This diurnal inequality is responsible for the difference in the height of successive high tides and depends upon which part of the ecliptic the Moon is located.

The Moon in the Signs

When the Moon is in the equinoctial signs, Aries and Libra, the pull of Moon up is the same as that of Moon down for a given day. However, when the Moon is in the solstitial signs, Cancer and Capricorn, the pull is unequal. When the Moon is above the equator and in the sign Cancer, the pull at Moon up is always stronger than the pull at Moon down. When the Moon is below the equator and in the sign Capricorn, the pull at Moon down is always stronger than the pull at Moon up.

Geographic Latitude

You geographic latitude will affect how unequal the Moon Up and down can be. If I am here in Big Rapids at almost 44 degrees of latitude North and the Moon has a declination of minus 28 degrees (which it can reach), then at Moon up, the angle between my zenith (Moon up) and the Moon is some 72 degrees. However, some 12 hours later, when the Moon is at my nadir (Moon down), the angle between my nadir's latitude (40 degrees South) and the declination of the Moon at - 28 degrees is only some 16 degrees. At this time, the Moon down pull will be much stronger than the Moon up pull.

Moon on the Horizon

The Moon is weakest, as mentioned, when it is on the horizon, either rising or setting, each day. However, this too varies during the month depending on the declination of the Moon. The closer the Moon comes to your own geographic latitude, the stronger the effect. Therefore, if you are residing in a northern latitude, the Moon will be closer to you in the ecliptic sign Cancer and this will cause the Moon to be somewhat stronger at Moonrise and set.

Gravitational Force

Both the Sun and Moon exert a gravitational pull on the Earth. Although the Sun is much more massive, its greater distance results in the gravitational pull of the Moon being almost twice that of the Sun. In any case, we experience their combined effect rather than each singly. This effect varies with the monthly lunar cycle.

New and Full Moons

At New and Full Moons, the combined pull of the Sun and the Moon is greatest. This pull is weakest at the lunar quarters. Therefore, this pull waxes and wanes with the month. It is strongest at new moon, grows weaker at First Quarter, is strong again at the Full Moon and then weak at Fourth Quarter, and on around. At New and Full Moon, the Moon's tidal effect is, in effect, added to the solar effect and the resultant tractive force is increased in the ration 3:2 , the tide-generating force of the Sun being one half that of the Moon. During the First and Last Quarters, when the Moon and Sun are some 90 degrees apart, the resultant tractive force is roughly one half of the lunar force alone.

This combined solar/lunar force is subject to some variation (other than that already pointed out) due to the fact that the Moon can have latitude above or below the ecliptic. The Moon's orbit can reach some 5 degrees above or below the plane of the Earth's orbit, the ecliptic. Where the Moon crosses the ecliptic are what are called the ascending and descending nodes of the Moon. At these points (twice a month), the combined force of the Sun and Moon is greatest.

The Tidal Vector in Detail

So far we have discussed something of the effects of the Moon as it transits overhead, beneath our feet. Or on the horizon each day. Yet it is the combined vector force of the Sun and Moon that produces the strongest pull that we feel during any 24 hour period. Keeping track of this vector force is a little complicated, and that is where a computer really helps. It does it for us. In fact the program will keep track of the Sun, Moon singly or their combined vector. In any case, here are the various components that the program will calculate and graph:

Radial component

This is the tidal component that lifts us away from the face of the Earth at zenith and nadir passage. You will note that there are two periods each day (zenith & nadir) when this component reaches a maximum value and that, depending on your geographic latitude, these are often unequal in magnitude. At the rising and setting points in the daily cycle, the effect is to push us down towards the center of the Earth. At all other points, aside from the above mentioned four, the effect is transverse or horizontal:

Horizontal component

In addition to the vertical or radial tidal components, there are horizontal or transverse forces that push and pull us across the surface of the Earth in various directions. The Earth’s rotation produces semidiurnal changes in the tide-generating forces both in direction and magnitude.

East/West horizontal component

These forces reach zero values at zenith, nadir, rising and setting times and become strongest at the intermediate times (45 degree points) between the above four events. These horizontal components vary depending upon the geographic latitude. In a 24 hour period, the effect of the horizontal component is as follows:

Starting from Moon up, the transverse pull grows stronger to the West, reaches maximum magnitude some 45 degrees (3 hours) after Moon up, and fades until we reach the point at which the Moon is setting at which time the horizontal force has again dropped to zero. After this we are pulled to the East, dropping off again at Moon down. At this point, a Westerly pull is again felt, diminishing to zero at Moonrise. After Moonrise, we experience an Easterly pull, reaching a peak some three hours before the Moon is at our zenith, and dropping to zero at the zenith point.

North/South horizontal component

These forces also have a North South component that varies on a 24 hour basis. It is much like the East/West component, and functions as follows. There is no North/South component for places located along the equator. In other latitudes, the force vector describes an ellipse. At Moon up and Moon down, it is directed toward the South, while at Moonrise and Moonset it is directed toward the North. The North/South component is of the same order of magnitude as the East/West component.

The Declination Cycle

The monthly cycle (tropical month of 27.32 days) of lunar declination contributes to the overall tidal effects. The closer the Moon comes to being overhead, the more powerful are its effects. If we live in the northern hemisphere, then when the Moon rides high above the celestial equator, when it is in the sign Cancer, it will comes closest to our own geographic latitude, and to being overhead. This effect can further be enhanced when the latitude of the Moon reaches its maximum value of some 5 degrees. Thus the total declination of the Moon can reach some 28 1/2 degrees above and below the ecliptic. This happens (North or South) once in about 18.6 years.

Perigee/Apogee

These are the points when the Moon, due to its non-circular orbit, is closest and furthest (respectively) to the Earth. The Moon moves at its greatest speed when it is at perigee and at its slowest when furthest from the Earth at apogee. The gravitational pull of the Moon is much stronger at perigee than at apogee.

The apogee/perigee points (the line of asides that connects them) are not fixed along the ecliptic, but move slowly forward along the ecliptic over a nine year period.

Lunar Speed

In addition, this line of apsides also fluctuates backwards and forwards in the ecliptic slightly with a period of 31.81 days. This is due to the eccentricity of the Moon's orbit, and this fluctuation is called evection. The resulting effect is the Moon speeds up and slows down at different rates in the four weeks from one perigee to the next.

The Moon's speed is also affected by the lunar phases, since the Sun's pull on the Moon is different in the various lunar quadrants. The Moon moves faster from the Last Quarter to the New Moon, and slower from the New Moon to the First Quarter. It also speeds up from the First Quarter to the Full Moon, and slows down from the Full Moon to the Last Quarter.

The Nodal Cycle.

The greatest possible astronomical tide-generating force occurs when, at the same time, the Sun is a perigee, the Sun and Moon are at Full or New Moon and both the Sun and Moon have zero declination. This happens about once in 1600 years, 250 B.C., 1400 A.D, and it will happen around 3300 A.D.

Major Tide-related Phenomena

Semi-Diurnal (12 hr., 25 min.) Time between Moon up and Moon down caused by the rotation of the Earth.

Diurnal (24 hr., 50 min.), time between succeeding upper and lower transits of the Moon caused by rotation of the Earth and declination of Sun and Moon.

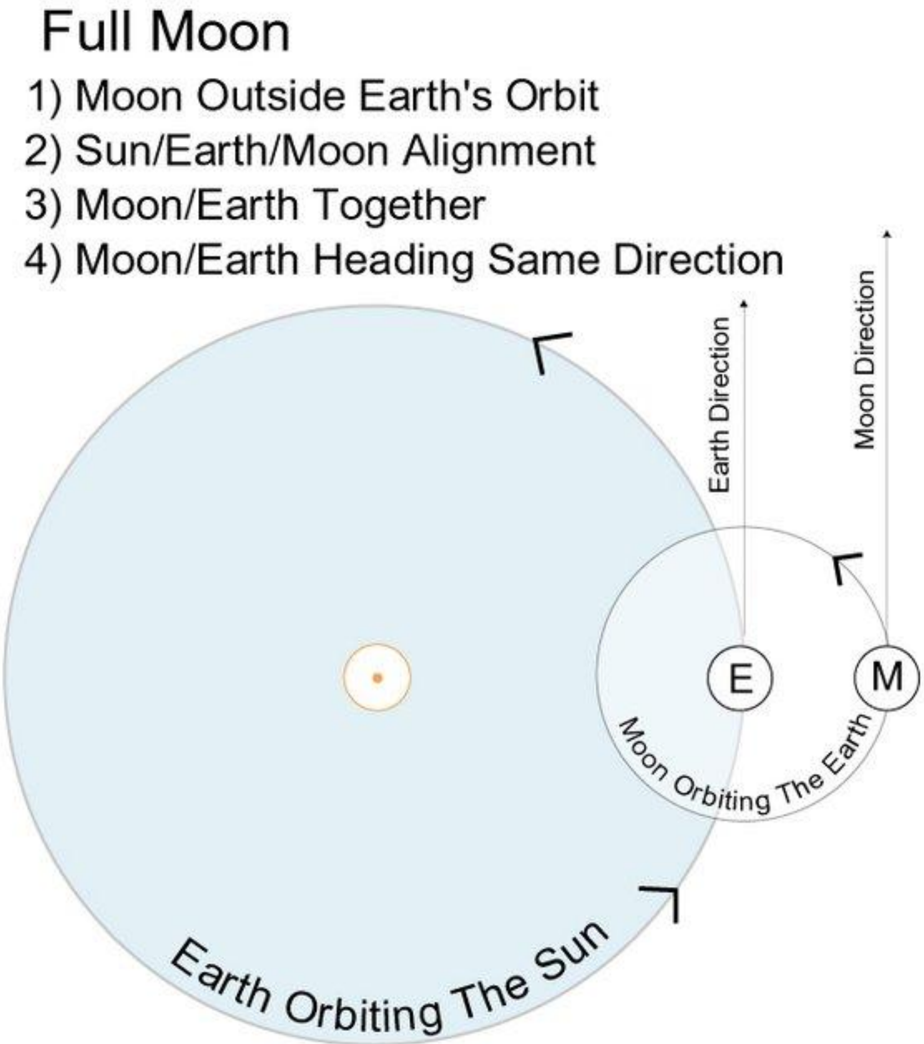
Interval between spring tides (14.76 days average), time from New Moon to Full Moon or vice versa caused by the phase relation between the Sun and Moon.

Lunar fortnightly (13.66 days), time for moon to change declination from zero to maximum and back to zero caused by the varying declination of the Moon.

Anomalistic month (17.55 days), time for moon to go from perigee to perigee caused by the ellipticity of the Moon's orbit.

Solar semi-annual (182.6 days), time for Sun to change declination from zero to maximum and back to zero caused by the varying declination of the Sun.

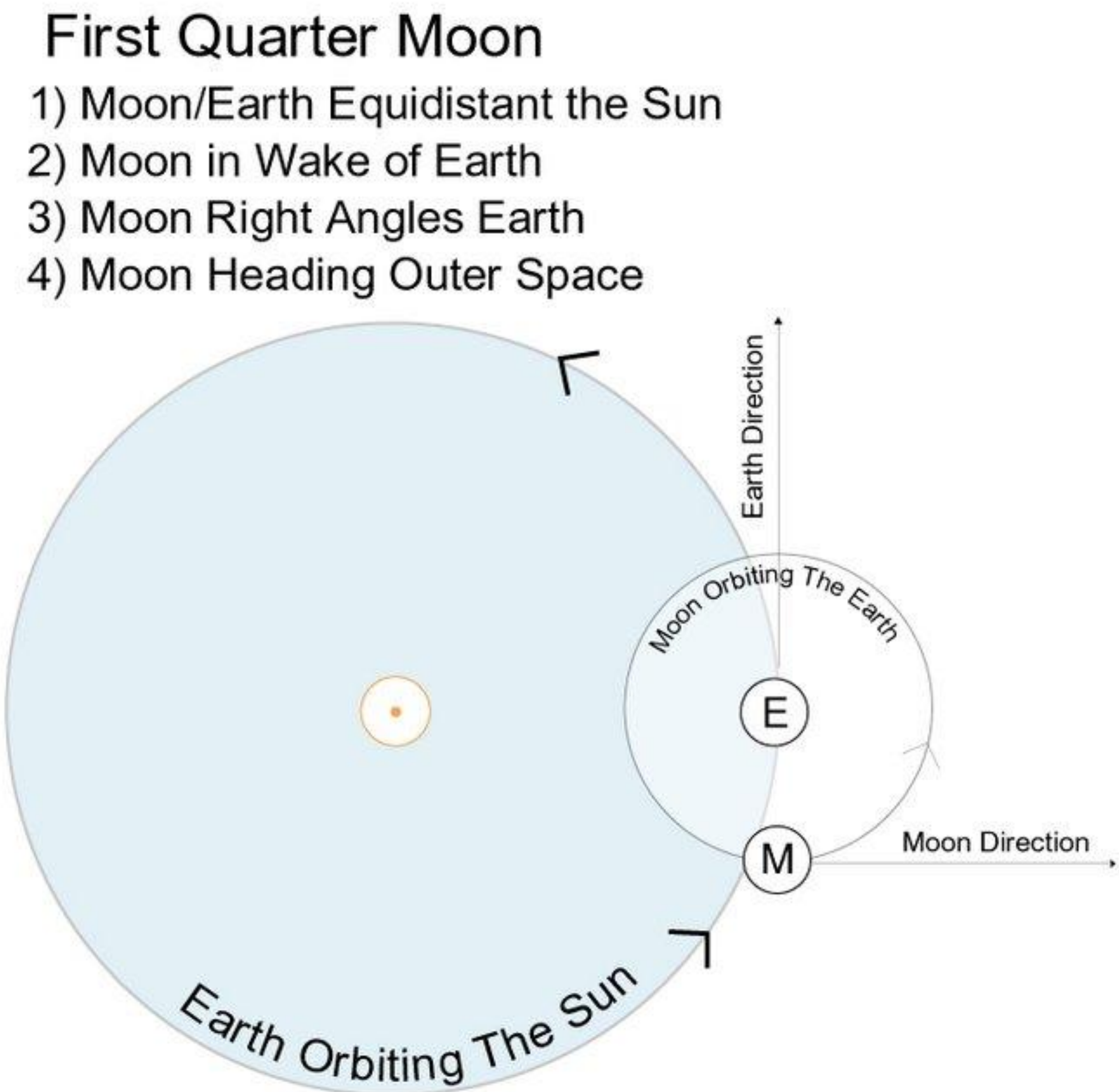
Anomalistic year (365.26 days), time for the Earth to go from perigee to perigee caused by the ellipticity of the Earth's orbit.



We know the Moon orbits the earth each month, shuttling between the earth and the Sun and between the Earth the outer planets, the nearest one which is Mars. It is useful to visualize how the Moon moves in relationship to being inside and outside the position of the earth in its own orbit. Think on these diagrams.

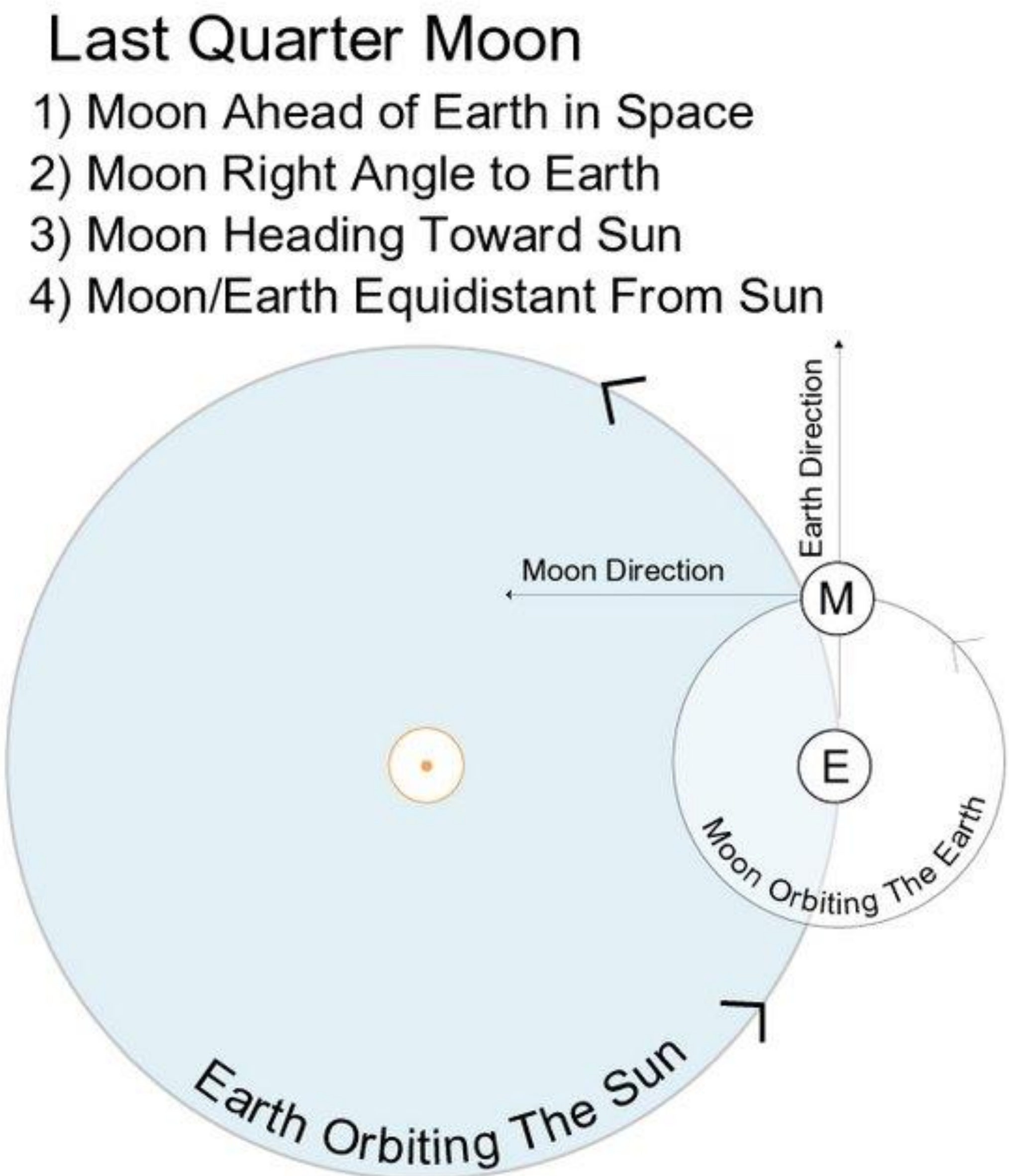
Full Moon

Here the Moon is on the outermost side of its orbit, aligned with the earth and the Sun. Notice that the direction and momentum of the Moon is the same as that of the earth. The earth is in the same degree of the zodiac as the Moon. — with Shekem S-maa Kheru.



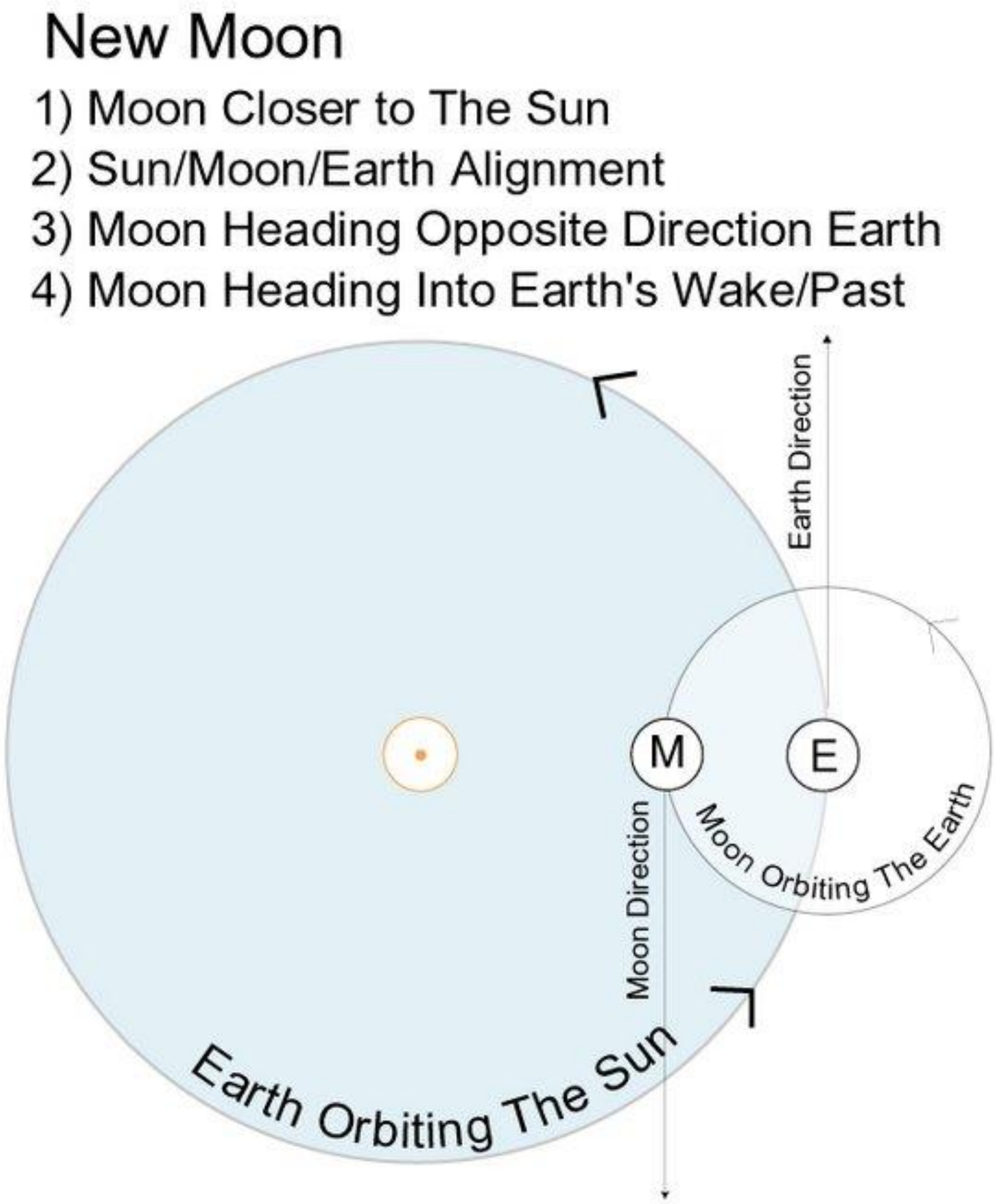
First Quarter

Here the Moon is balanced between the inside and the outer side of the earth's orbit and moving toward the outward side at right angles to the motion of the earth itself. The Moon is behind in the zodiac to the position of the earth.



Last Quarter

Here the Moon is balanced between the inside and the outer side of the earth's orbit and moving toward the inward side of the earth's orbit, at 90 degrees to the orbit of the earth. Also note that the Moon is ahead of the earth in the zodiac at this point.



New Moon

Above is a diagram of the moment of New Moon, when the Sun and Moon are aligned inside the earth’s orbit. Note that at the New Moon the Moon is heading in the exact opposite direction to that of the earth, after plunging toward the Sun in the 4th Quarter. The Earth and Moon are in the same degree of the zodiac.