

DIRECTION OF TIDES

According to 'MATTER (Re-examined)'

Nainan K. Varghese, matterdoc@gmail.com

<http://www.matterdoc.in/>

Abstract: This article attempts to give a simple and logical explanation of the mechanism of the shift in directions of tides on planetary bodies. It is based on radically different dynamics, presented in the book 'MATTER (Re-examined)'. Linear motion of a planetary body changes the symmetry of additional structural distortions in the universal medium about it. Asymmetry of latticework-squares in planetary body's matter-field (about direction of 'central force') shifts the direction of its action, which in turn shifts zenith points of tides from local meridians (facing the sun or the moon) and on opposite side. Real orbital motion of a spinning macrobody enhances deflection of tides from the local meridian. Currently, the directions of deflections of the tides from the local meridian are misinterpreted to suit the observation.

Keywords: Tides, tidal mechanism, deflection of tide.

Introduction:

It is observed that zenith points of terrestrial tides do not coincide with the local meridian where the sun or moon is present. This is usually attributed to the friction between water and land masses on Earth. This is not so. Even if a planetary body is wholly fluid, changes in the direction of tides will appear. Change in directions of tides is caused by the fact that the direction of action of an effort need not always be wholly in the direction of its assumed application. Changes in the directions of tides are local phenomena related only to the parameters of a spinning planetary body. Hence, the magnitudes or sources of external efforts or parameters of their source macrobodies do not affect the changes in the apparent deflections of tides from the local meridian.

An alternative concept, presented in the book 'MATTER (Re-examined)', envisages a universal medium made of structure-less quanta of matter, in 2D latticework formations – 2D energy-fields. 2D energy-fields in all possible planes, together, form a universal medium that fills the entire space (outside basic 3D matter-particles) without voids. It performs all actions currently assigned to the apparent interactions between 3D material bodies. Universal medium, in and about a macrobody, contains sufficient structural distortions to sustain the macrobody's integrity and state (of motion). This part of the universal medium is the matter-field of the macrobody. Actions by efforts ('forces') are performed by the transfer of structural distortions in the latticework structures of the matter-field. During the transfer of structural distortions in the universal medium, 3D matter-particles in the region are carried along with the structural distortions.

This article is about macrobodies and their movements with respect to an absolute reference, provided by the universal medium. Figures in this article are not drawn to scale. They are depicted to make actions and phenomena distinct and clear. Only those structural distortions in the matter-field, which are required to produce whole-body motion (in a plane), are represented in figures. Structural distortions in the matter-field, maintaining steady state (of motion) and integrity of 3D matter-particles and the macrobody as a whole, are ignored. Directions of latticework-squares of 2D energy-fields, shown in figures, are chosen for ease of representing them. They are intended to show the nature of structural distortions rather than their shapes or orientations in the universal medium. They may be understood as the resultant shapes of all latticework-squares in the universal medium about the macrobody, with respect to the actions considered.

Transfer of effort through matter-field:

Figure 1 shows parts of matter-fields (of three macrobodies, in a plane) under action by external efforts (shown by thick vertical arrows). Matter-field, A, belongs to a macrobody that is static with respect to the universal medium (intrinsic structural distortions in all matter-fields are ignored). An external effort, shown by a thick black arrow at the top of the matter-field, is transmitted through it without changes. Transmitted external effort is represented by a thick black arrow at the bottom. This produces pure linear motion of the

macrobody, with respect to the universal medium, by carrying constituent 3D matter-particles along with the structural distortions. The whole external effort is utilized to produce the linear motion of the macrobody.

Matter-field, B, belongs to a macrobody that is moving at a constant linear speed, as represented by the thick grey arrow. An external effort, as shown by the thick vertical arrow, acts on the upper part of the matter-field. Due to the asymmetry of latticework-squares to the direction of external effort, the magnitude of effort is progressively reduced as it is transmitted through each latticework-square in the matter-field. The distance through which the structural distortions are transmitted is limited. Magnitude of external effort, transferred beyond the part of the matter-field, is less than the original, as represented by a small vertical arrow at the bottom. Additionally, the transmission of structural distortions through structurally distorted latticework-structures tends to apply a torque due to the angular deflection of the transmitted effort to rotate the macrobody, as shown by the circular arrow.

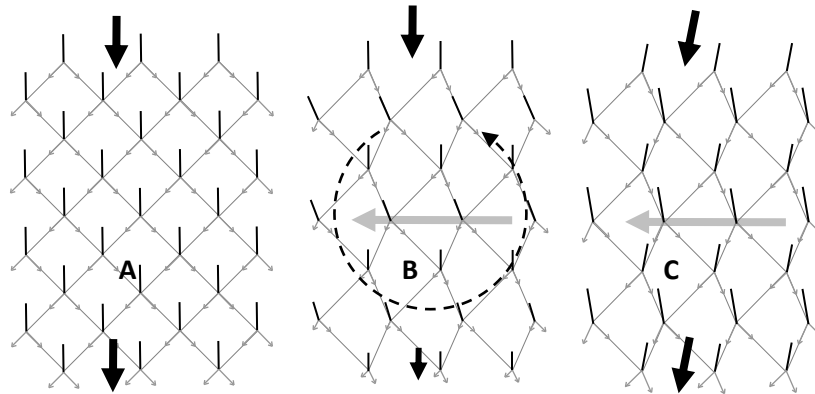


Figure 1

If the macrobody is very large, so that additional structural distortions in the universal medium about it due to external effort cannot be transmitted throughout its matter-field, the external effort is unable to produce a linear displacement of the macrobody. The entire additional work, invested by the external effort, will be stored in the macrobody's matter-field as pressure energy. If the macrobody is reasonably large, so that a certain part of additional structural distortions by the external effort is passed through its matter-field, the macrobody may gain linear displacement corresponding to this part of additional structural distortions in the matter-field. The remainder of the additional structural distortions will be stored in the matter-field as pressure energy. Linear speed, gained by the macrobody in the direction of the steady external effort, and its rotary motion depend on its absolute linear speed and the size of its matter-field.

Part C of the figure shows the same part of matter-field B in similar conditions. It belongs to a macrobody that is moving at a constant linear speed, as represented by the thick grey arrow. An external effort, as shown by the thick arrow, acts on the upper part of the matterfield of the macrobody, at an angle to the vertical. Deflection of external effort is such that its direction of action is symmetrical about the arms of latticework-squares in the matter-field at their junction-points. The resultant efforts at all other similar junction-points in the latticework structure of the matter-field are similar in magnitude and direction. As can be seen in the figure, structural distortions in the matter-field due to the external effort are freely transmitted through this part of the matter-field without any modification, as shown by the arrow at the bottom of the figure. The external effort is able to produce linear motion of the macrobody, corresponding to the magnitude and direction of external effort. This phenomenon of change in the direction of action causes the leading and lagging of terrestrial tides from the local meridian.

Figure 2 represents part of the matter-field in the equatorial plane of a rotating macrobody that is moving at a constant linear speed (same as 'C' in figure 1). Due to the linear motion, the latticework structures of its matter-field are structurally distorted. The magnitude of structural distortion corresponds to the macrobody's linear speed.

The vertical red line is in the reference direction. The thick grey arrow shows the direction of linear motion. Structurally distorted latticework-squares are symmetrical to the blue line and its parallels. Hence, only those external efforts, which are in the direction of blue lines (as shown by thick arrows in Figure D), are able to transmit without loss of magnitude. External efforts in other directions decrease in magnitude, as

explained above. A vertical external effort, deflected from the blue line, is not fully effective on the macrobody.

Let us consider an external effort in vertical direction, as shown in figure E. Its magnitude and action are fully effective only after matter-field has turned through a certain angle so that the blue line (about which latticework-squares are symmetrical) coincides with the direction of external effort. By this deflection, the red reference line has deflected to a new position, before the external effort is fully effective on the macrobody, as shown in Figure E. It is apparent that in a spinning macro body, fully effective action is delayed from (lags behind) the reference line. Similarly, for the same parameters of macrobody, if the direction of external effort is opposite, it is apparent that fully effective action is advanced from the (leads ahead) reference line.

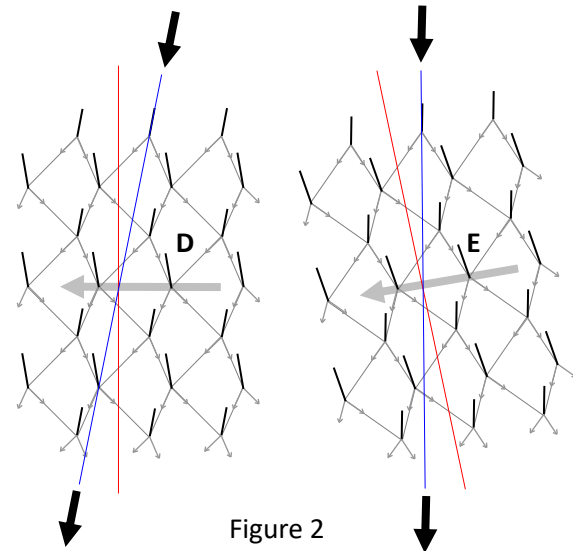


Figure 2

Direction of tides:

The Sun, the central body of Earth's orbital motion, moves at an absolute linear speed in space. Depending on the relative position of Earth in its orbital path (with respect to the sun), the magnitude and direction of Earth's absolute linear speed vary, within certain limits, from the sun's linear speed. However, both the sun and Earth travel in the same mean direction at the same mean linear speed. Similarly, the Earth and the Moon travel in the same mean direction at the same mean linear speed. This makes corresponding changes in the structural distortions in Earth's matter-field. Irrespective of the relative positions of central bodies (with respect to earth, both the sun and moon act as central bodies), high tides on earth take place at meridians, where the directions of 'central forces' are symmetrical about the latticework-squares in its matter-field. Accordingly, the zenith points of terrestrial tides shift from the local meridian, where the central bodies appear.

The magnitude of the angular shift of the tidal zenith point depends only on the parameters of Earth's motion. Hence, irrespective of the source of external effort on Earth, all terrestrial tides are shifted identically. Magnitudes of deflection depend on the Earth's absolute linear speed and relative direction of the 'central force'. Since the magnitude of the shift is a function of the Earth's parameters, it is identical for both lunar and solar tides. Their apparent relations to the sun or moon are only due to 'central forces' developed in relation to these macrobodies. The magnitude of the shift of the tide is with respect to the Earth's centre of rotation. An observer on Earth views the tides with respect to Earth. The observer is also moving with the Earth at its absolute linear and spin motions. Hence, the displacement of the tide from the local meridian with respect to the Earth's spin axis is also of the same magnitude. At different points on Earth's real orbital path, angular deflection of the zenith point with respect to Earth's matter-field may vary, corresponding to the angular difference between the direction of Earth's linear motion and directions of 'central forces'.

Direction of angular shift from local meridian:

The large circle in Figure 3 represents the equatorial plane of a spinning spherical Earth, moving linearly in its real orbital path. Earth is shown near the outer datum point on its real orbital path (on the outer side of the Sun's median path, away from the galactic centre). The thick curved arrow shows the resultant path of Earth's combined motion. The curved path's centre of curvature (centre of rotation of the Earth) is very far (below) from it. Diametrically opposite points on the equatorial surface of the Earth at the ends of its vertical diameter may be considered as local meridian (upper point during night and lower point during day), from where tides are observed.

We shall consider one latticework-square each, at the zenith points, in the lattice structure of the matter-field in Earth's equatorial plane. Rectangles in dashed lines, A and C, represent structurally distorted latticework-squares of Earth's matter-field at the local meridian. All latticework-squares in Earth's matter-field are, more or less, structurally distorted identically to provide its combined (linear and spin) motion.

Shorter, thicker arrows near the local meridian represent one set of external linear efforts on earth in two downward directions, slightly deflected from each other.

'Central force' (a push effort), on Earth, is towards its central body, along the radius of curvature of Earth's real orbital path, which continuously varies. [When the moon is considered as the central body, the direction of 'central force' depends on the position of the moon on its real orbital path with respect to the Earth]. Within the variations of direction of the 'central force' on earth, the direction of 'central force' can also be considered in various directions towards the planetary body's center of rotation. Hence, during the half-cycle of the real orbital path, when Earth is on the outer side of the Sun's median path, the 'central force' is downwards (towards the galactic centre), as shown in Figure 3.

Although the direction of 'central force' is directly downwards, as shown by the vertical arrow on the left, structurally distorted latticework-squares in Earth's matter-field are not symmetrical about the direction of 'central force'. Highest tides occur at surface points, where the structurally distorted latticework-squares in the matter-field are symmetrical about the direction of 'central force'. Therefore, an observer standing on Earth sees the highest tide lag behind the local meridian. This is a mere appearance. Zenith points of tides always take place, where the latticework-squares in the matter-field are symmetrical about the direction of external effort. As far as Earth's matter-field is concerned, its latticework-squares are symmetrical about the direction of 'central force' at a place, before or after the local meridian, occupied by the observer. It is the observer's local meridian that has shifted from the meridian where the tide occurs.

When the observer is in line with the central body, directly on the opposite side of the Earth (daytime), latticework-squares of matter-field at the local meridian are again not symmetrical with the direction of 'central force'. Latticework-squares of matter-field at the local meridian become symmetrical about the direction of 'central force' only when the observer is away from the local meridian. The observer sees this change as an angular shift in the location of the tide from the local meridian occupied by him.

Let us consider the action of downward (as shown in figure 3) 'central force' on a latticework-square A in Earth's matter-field. At its position at A, the action of 'central force', shown by a vertical arrow, through the upper arms is angularly asymmetrical about the direction of 'central force'. Effort transmitted through the upper junction-point is divided unequally along the arms of the latticework-square. 3D matter-particles, in contact with this latticework-square, additionally (over and above earth's spin motion and radial motion towards the central body) experience an anti-clockwise deflection as well as downward linear motion. Maximum tidal effect occurs, where no part of the 'central force' is used for the angular deflection of the 3D matter-particle's path. Since the 'central force' is not fully effective in the downward direction on latticework-square A, high tide cannot occur at this position (local meridian).

As the Earth rotates, an observer at A is carried forward. After some time, the latticework-square, situated at B, comes to occupy a position in line with 'central force'. [Displacement of latticework-square B in anti-clockwise direction to the vertical is shown in the figure by a clockwise shift of direction of 'central force', by arrow on right]. In this position, the upper arms of latticework-square B are angularly symmetrical about the direction of 'central force'. 'Central force' acting through the upper junction-point is distributed equally along both arms of the latticework-square. Resultant of efforts, transmitted through both arms, is in the same direction as the original direction of the 'central force'.

The whole of the 'central force' acts along its direction of application. No part of 'central force' is used to deflect the paths of 3D matter-particles, angularly. Hence, high tide occurs at this point. By the time latticework-square B comes in line with the 'central force', in vertical direction, the local meridian of the observer has moved ahead in the direction of Earth's spin motion. Therefore, the observer notices that high tide lags behind the local meridian occupied by him, when the 'central force' is applied towards the centre of curvature of the Earth's orbital path.

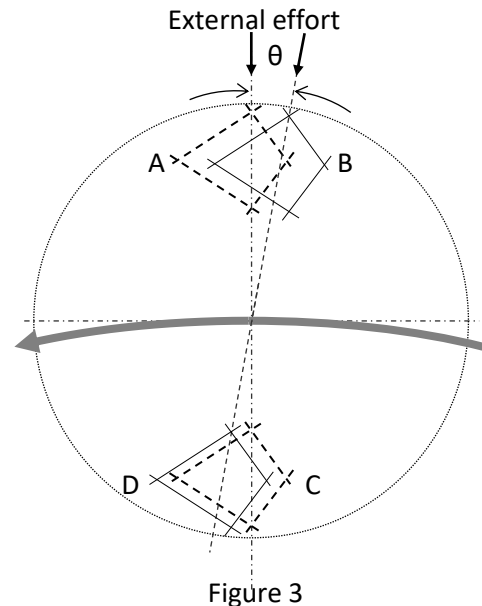


Figure 3

Two other latticework-squares, C and D, on the opposite side of Earth (daytime), facing the sun, are also shown in the figure. The 'central force' acts on them in a similar manner as explained above. High tide lags the local meridian by almost the same angle as high tide on the night side of the Earth.

During the next half-yearly orbital period, when Earth is on the inner side of the central body's median path (nearer to the galactic centre), the 'central force' on Earth (which is acting radially towards the Sun) is directed away from the galactic centre. Here, the action of 'central force' is in the opposite direction, towards the centre of Earth's real orbital path. The large circle in Figure 4 represents the equatorial plane of Earth, moving linearly in its real orbital path. Descriptions of the figure are identical to those for Figure 3.

Shorter arrows near local meridians represent one set of external linear efforts on the planetary body in two upward directions slightly deflected from each other. During the half-cycle of the orbital path, when Earth is on the inner side of the Sun's median path, the direction of the 'central force' is upwards, as shown in Figure 4.

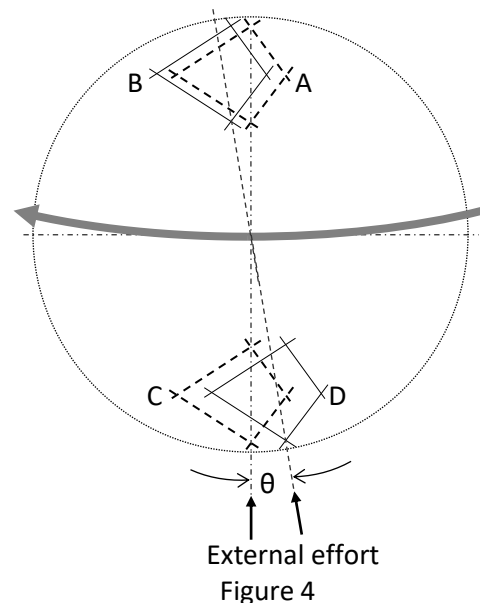
Although the direction of 'central force' is directly upwards, as shown by the vertical arrow on the left, structurally distorted latticework-squares in the matter-field of Earth are not symmetrical about the direction of 'central force'. Highest tides occur at surface points, where structurally distorted latticework-squares in the matter-field are symmetrical about the direction of 'central force'. Therefore, an observer standing on Earth sees the highest tide lead the local meridian. This is a mere appearance. Zenith points of tides always take place, where the matter-field's latticework-squares are symmetrical about the direction of external effort. As far as Earth's matter-field is concerned, its latticework-squares are symmetrical about the direction of 'central force' at a place, before or after the meridian occupied by the observer. It is the observer's local meridian that has shifted from the real local meridian, where the tide occurs.

When the observer is in line with the central body, directly facing it, latticework-squares of matter-field at the local meridian are again not symmetrical with the direction of 'central force'. Latticework-squares of matter-field at the local meridian become symmetrical about the direction of 'central force' only when the observer is behind the meridian. The observer sees this change as an angular shift in the location of the tide from the local meridian occupied by him.

Let us consider the action of upward (as shown in figure 4) 'central force' on a latticework-square C in Earth's matter-field. At its position at C, the action of 'central force', shown by a vertical arrow, on the lower arms is angularly asymmetrical about the direction of 'central force'. Effort transmitted through the lower junction-point is divided unequally along the arms of the latticework-square. 3D matter-particles, in contact with this latticework-square, additionally (over and above Earth's spin motion and radial motion towards the central body) experience a clockwise deflection as well as an upward linear motion. Maximum tidal effect occurs, where no part of the 'central force' is used for the angular deflection of the 3D matter-particle's path. Since the 'central force' is not fully effective in the upward direction on the latticework-square C, high tide cannot occur at this position (local meridian).

As the Earth rotates, an observer at C is carried forward. However, some time before the observer reached position C, the latticework-square, situated at D, was occupying a position in line with the 'central force'. Displacement of the latticework-square D in a clockwise direction to the vertical is shown in the figure by an anti-clockwise shift of the direction of the 'central force'. In this position, the lower arms of latticework-square D are angularly symmetrical about the direction of the 'central force'. The 'central force' acting through the lower junction-point is distributed equally along both arms of the latticework-square. Resultant of efforts, transmitted through both arms, is in the same direction as the original direction of 'central force'.

The whole of the 'central force' acts along its direction of application. No part of the 'central force' is used to deflect 3D matter-particles angularly. Hence, high tide occurs at this point. When the latticework-square D is in line with the 'central force', in the vertical direction, the local meridian of the observer lags



behind in direction opposite to Earth's spin motion. Therefore, the observer notices that high tide leads ahead of the local meridian occupied by him, when the 'central force' is applied away from the galactic centre (towards the centre of curvature of Earth's real orbital path).

Two other latticework-squares, A and B, on the opposite side of the earth (daytime), facing the sun, are also shown in the figure. The 'central force' acts on them in a similar manner as explained above. High tide leads ahead of the local meridian by almost the same angle as high tide on the night side of the Earth.

The action of gravitational attraction is instantaneous in response to changes in macrobodies' parameters. Hence, there is no time lag between the development of the tide and the relative positions of the moon or sun. Their apparent positions in relation to the earth may sometimes differ from their real positions in space. These apparent positions of the moon or the sun cannot be considered for gravitational actions. Hence, there can be no time delay due to the present and apparent positions of the moon or sun to develop tides.

Figure 5 shows Earth's real orbital path, GA'CBDAF, about the sun for one solar year. From A' to C and from D to A, the Earth moves in a real orbital path on the outer side of the Sun's median path. From C to D, Earth moves in a real orbital path on the inner side of the Sun's median path. The arrow on the central line shows the direction of the sun's motion in space (as a straight line). The thick grey curved arrow represents the direction of Earth's resultant motion (linear motion + spin motion) in its real orbital path. Block arrows show directions of the 'central force' on Earth towards the sun.

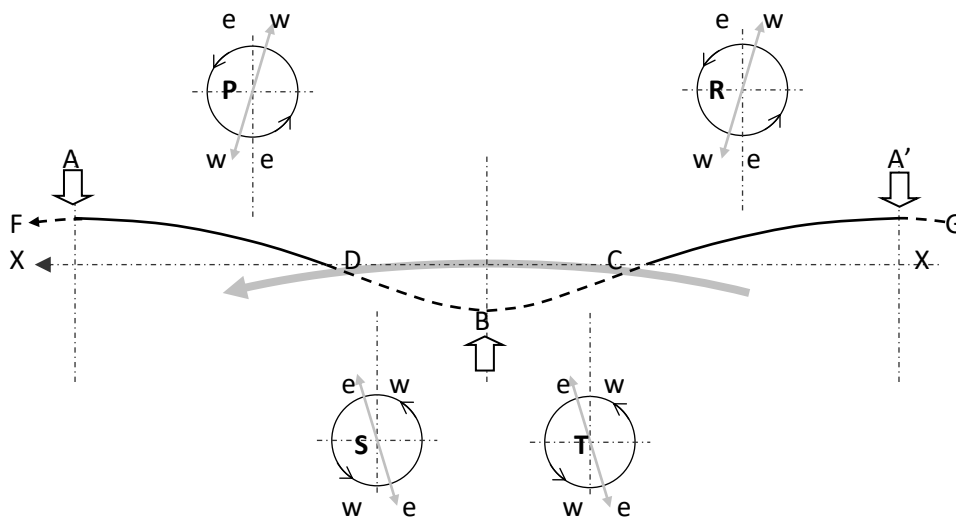


Figure 5

'Central force' on earth is a push force, applied from the side away from the central body towards the central body. One cycle of Earth's real orbital path may be divided into four quadrants, A' to C and D to A, on the outer side of the central body's median path, and C to B and B to D, on the inner side of the central body's median path. Small circles represent the Earth in regions corresponding to various quadrants of its real orbital path. Arrows on small circles show the direction of Earth's spin motion, and double-headed arrows across small circles show deflection of solar tides with respect to the local meridian in each quarter of the real orbital path. Relative direction on Earth's equator is denoted by the letter e for east and the letter w for west.

In a real sense, the deflection of solar tides with respect to the local meridian is always as shown in this figure and as explained above. In the positions of the Earth at R in the quadrant A' to C, and at P in quadrant D to A, solar tides on Earth are deflected westward from the local meridian. Hence, in these quadrants of real orbital path, solar tides on Earth lag behind the local meridian. Observer is ahead of high tides. In positions of the Earth at S in quadrant from B to D, and at T in quadrant from C to B, solar tides are deflected eastward from the local meridian.

During (solar) half-yearly period, when Earth's real orbital path is on the outer side of the Sun's median path (on the side of the outer datum point), Earth is farther than the Sun, from the centre of the Sun's median curved path around the galactic centre. 'Central force' on Earth is from its side away from the galactic centre. During this six-month period, solar tides tend to lag behind the local meridian of the observer. Tides appear to the west of the local meridian (they appear later than the sun has crossed the local meridian).

During (solar) half-yearly period, when Earth's real orbital path is on the inner side of the Sun's curved median path (on the side of the inner datum point), Earth is nearer than the Sun to the centre of the Sun's median curved path around the galactic centre. The 'central force' on Earth is from its side nearer to the galactic centre. During this six-month period, solar tides tend to lead ahead of the local meridian of the observer. Tides appear to the east of the local meridian (they appear earlier than the sun reaches the local meridian).

Deflections of lunar tides are also formed in a similar manner. One cycle of Earth's real orbital path about the Sun is much larger than one cycle of the Moon's real orbital path about Earth. Hence, a small part of Earth's real orbital path can be assumed as a straight line, compared to the Moon's real orbital path about Earth. To understand the deflections of lunar tides, with respect to Figure 6, the Earth may be assumed as the central body that moves in a linear path XX in the direction of the arrow on it. Correspondingly, the moon moves along its real orbital path GA'CBDAF about Earth's median path in space. As we are considering the tides on Earth, the relative direction of the 'central force' on Earth reverses towards the moon (from the central body towards the planetary body).

Consequently, directions of deflection of lunar tides deflect in directions opposite to the solar tides, as shown in Figure 6. Accordingly, Earth's position at P in the quadrant from D to A, and at R in the quadrant

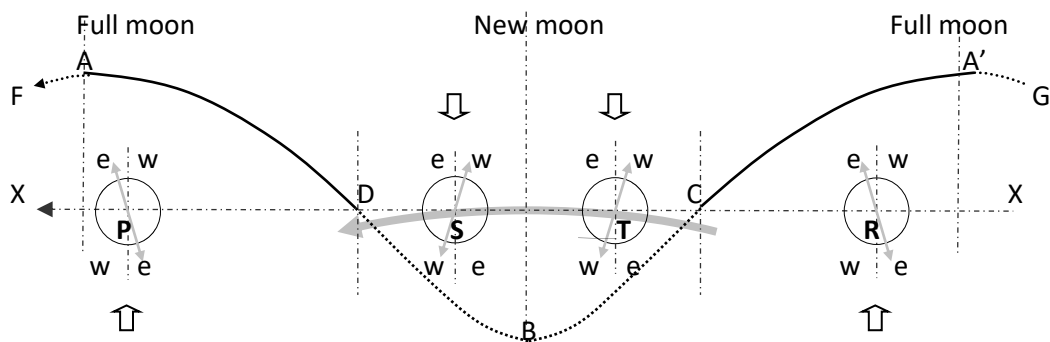


Figure 6

from A' to C, lunar tides on Earth are deflected eastward from the local meridian. In position at S in quadrant from B to D and at T in quadrant from C to B, lunar tides are deflected westward from the local meridian.

During a (lunar) half-monthly period, when the moon is near the inner datum point in its real orbital path about Earth (it is within Earth's curved orbital path), the moon is nearer to the centre of Earth's real orbital path about the Sun (galactic centre). 'Central force' on Earth from the Moon is in the direction away from the galactic centre. ['Central force' is a push-effort on Earth's side, away from the moon, towards the moon]. During this (lunar) half-monthly period, lunar tides on Earth tend to lag behind the local meridian. Lunar tides appear to the west of the local meridian of the observer (they appear later than the moon has crossed the local meridian).

During a (lunar) half-monthly period, when the moon is near the outer datum point in its real orbital path about Earth (it is outside Earth's curved orbital path), the moon is farther from the centre of Earth's real orbital path about the Sun (galactic centre). 'Central force' on Earth from the Moon is from the farther side, in the direction towards the galactic centre. During this (lunar) half-monthly period, lunar tides on Earth tend to lead ahead of the local meridian. Lunar tides appear to the east of the local meridian of the observer (they appear earlier than the moon reaches the local meridian).

Explanation of lunar tide, in relation to figure 6, is for the Earth's motion in its real orbital path on the outer side of the Sun's median curved path. During Earth's travel on its real orbital path on the inner side of the Sun's median curved path, the phases of the moon, relative to an observer on Earth, change. Place marked in figure as 'Full moon' becomes 'New moon,' and the place marked as 'New moon' becomes 'Full moon'.

If there is more than one 'central force' on a spinning planetary body, each of them produces its own set of tides, independently. If the directions of tides (produced by different 'central forces' are near, they create resultant tides which are the arithmetical sum of independent tides on the planetary body. Summation gives rise to spring and neap tides on Earth. The effect of spring or neap tides is greatest when the moon and

sun are in a straight line (called 'syzygy') with the Earth, which occurs during a full moon, new moon, and during lunar and solar eclipses.

The absolute linear speed of the sun is determined to be equal to 250000 m/sec. Accordingly, depending on the position of the Earth on its orbital path with respect to the sun, Earth's absolute linear speed varies between 220000 m/sec and 280000 m/sec. Corresponding changes happen in the magnitude of the angular shift of the zenith point of the tide from the local meridian. The angular shift of the tidal zenith point on Earth depends only on the parameters of the Earth. Hence, irrespective of the source of external effort acting on Earth, all terrestrial tides are shifted identically. [External efforts on earth are applied by the universal medium in the direction of central bodies, which provide a shadow in the universal medium for the development of gravitational attraction]. The sun or moon does not directly apply any effort on earth; instead, they cause 'central forces' on earth by the universal medium. Magnitudes of deflection of tides from the local meridian depend on the Earth's location on its real orbital path.

To an observer on Earth, Earth's orbital path does not appear as a wavy line in space, but it is observed as an elliptical path around the Sun. Similarly, the Moon's orbital path appears as an ellipse around Earth. Appearances of tides (different from the real condition) further change directions, depending on how tides on Earth are viewed by an observer on Earth.

Apparent direction of Solar tides:

An observer on Earth judges Earth's orbital motion about the sun as he sees it. To an observer, the sun appears to move around the Earth in a westerly direction. After the advent of the heliocentric planetary system, the notion of the sun moving around the Earth was changed to the motion of the Earth around the sun in an easterly direction. Although no free macro body can orbit around another moving central body, the notion of Earth orbiting around the Sun in an easterly direction is still maintained. This misconception is the cause of many misunderstandings in celestial mechanics. In order to satisfy this fallacy, directions of some of the earth-related motions are arbitrarily changed by the observer.

In Figure 7, XX shows part of the sun's median path in space. Earth's real orbital path about the moving sun is shown by the wavy line GA'CBDAF. Points A and A' are outer datum points (points in real orbital path, where Earth's absolute linear speed is highest), and point B is an inner datum point (point in real orbital path, where Earth's absolute linear speed is lowest). Grey arrows, parallel to the central line, show the directions of Earth's relative linear motion, in each quadrant, with respect to the sun.

As the Earth moves in its real orbital path, from the inner datum point B to the outer datum point A, it is behind the sun. 'Central force' on earth, towards the sun (being prominent), accelerates the earth in the forward direction, towards the outer datum point A. The direction of Earth's relative linear motion, with respect to the sun, is in the same direction as the direction of the sun's motion along its median path; towards X, as shown by grey arrows. Directions of Earth's spin and deflection of solar tides from the local meridian,

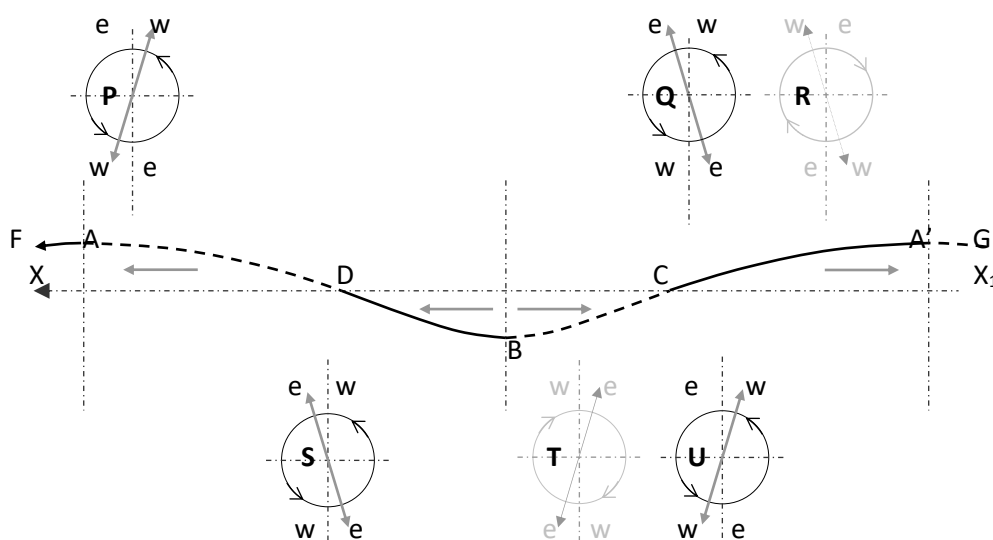


Figure 7

as shown by Earth's locations at P and S, are identical to those described above in conjunction with Figure 5.

During Earth's travel from location D to outer datum point A, solar tides are deflected westward from the local meridian, as shown by P in the figure. During Earth's travel from inner datum point B to location D, solar tides are deflected eastward from the local meridian, as shown by S in the figure.

North-south directions in space are oriented with respect to Earth's spin axis, and this orientation is considered true throughout space. Unlike north-south directions, east-west directions have no definite orientation in space. These are indicated by the direction of motion of a 3D matter-particle on Earth's surface. Since the (spherical) Earth has a rotary motion, relative to space, east-west directions depend on the instantaneous location of a point on the surface of the Earth.

From the outer datum point A' to the inner datum point B on Earth's real orbital path, in Figure 7, Earth is in front of the sun. 'Central force' on Earth, towards the sun (being prominent), decelerates the Earth in its forward motion. The direction of Earth's relative linear motion, with respect to the sun, is in the opposite direction (towards X1) to the direction of the sun's motion along its median path; towards X. Earth appears to approach the sun. The linear motion of the sun is to advance towards X, while the Earth appears to move (relatively) in the opposite direction towards X1, shown by grey arrows parallel to the central line. By using the relative motion of the Earth with respect to the sun, the direction of Earth's real motion in space is reversed. This assumption has changed the shape of Earth's orbital path from a wavy line about the sun's median path to an ellipse around the Sun. The apparent elliptical orbit corresponds to our observation and hence is usually considered true.

By this consideration, the Earth appears to move from inner datum point B to outer datum point A'. Earth's motions are reversed by this supposition, as shown by the figures at locations T and R. By reversing the directions of Earth's motions, not only Earth's linear motion but also its spin motion is reversed. Changes in the linear and spin motions are shown in dim figures T and R. Assumed reversal of spin motion is shown by clockwise arrows on the circles of the figures T and R. As there is no other reference, except the sun, we do not notice any change in Earth's linear motion. The direction of Earth's spin motion is related to Earth's spin axis. As long as the direction of the spin axis does not change, reversal of the direction of Earth's spin motion is against what is observed. In order to avoid this discrepancy, we resort to one more assumption to change (or undo part of the assumption to the change of directions of earth's motions attempted earlier). East-west directions of Earth's spin motion are changed back to suit the observation related to Earth's spin axis. These changes are incorporated in the figures at locations Q and U. By doing so, the direction of Earth's spin motion is restored to reality, while keeping the direction of Earth's linear motion in reverse. At location Q, relative deflections of solar tides have changed eastward.

During Earth's travel from outer datum point to location at C, solar tides on Earth appear to lead ahead of the local meridian of the observer. Tides appear to the east of the local meridian (they appear earlier than the sun reaches the local meridian). At location U, relative deflections of solar tides have changed westward. During Earth's travel from location C to the inner datum point B, solar tides tend to lag behind the local meridian of the observer. Tides appear to the west of the local meridian (they appear later than the sun has crossed the local meridian). Although reality is different, this is what we observe and believe to be true. Summarizing the above, from the outer datum point at A' to location at C, solar high tides occur before the sun reaches the local meridian of a place. Solar tides are deflected in an easterly direction, as shown in figure Q. From location (C) to inner datum point (B), solar high tides occur after the sun has crossed the local meridian of a place. Solar tides are deflected in a westerly direction, as shown in Figure U. From the inner datum point (B) to location (D), solar high tides occur before the sun reaches the local meridian of a place. Solar tides are deflected in an easterly direction, as shown in Figure S. From location (D) to outer datum point (A), solar high tides occur after the sun has crossed the local meridian of a place. Solar tides are deflected in a westerly direction, as shown in figure P. Corresponding solar high tides appear on the opposite side of the Earth also.

Apparent direction of Lunar tides:

Figure 8 shows the real orbital motion of the moon about the Earth, when the Earth is moving in its real orbital path on the outer side of the Sun's median path. Moon travels in a wavy path, GA'CBDAF, while Earth moves along the central line X'X in its orbital path about the Sun. To an observer on Earth, the moon appears to move around the Earth in a westerly direction. Directions of Earth's motion, relative to the moon, appear as indicated by the grey arrows along the central line. From the moon's outer datum point A' (full moon) to the moon's inner datum point B (new moon), the moon is in front of Earth. 'Central force' on earth,

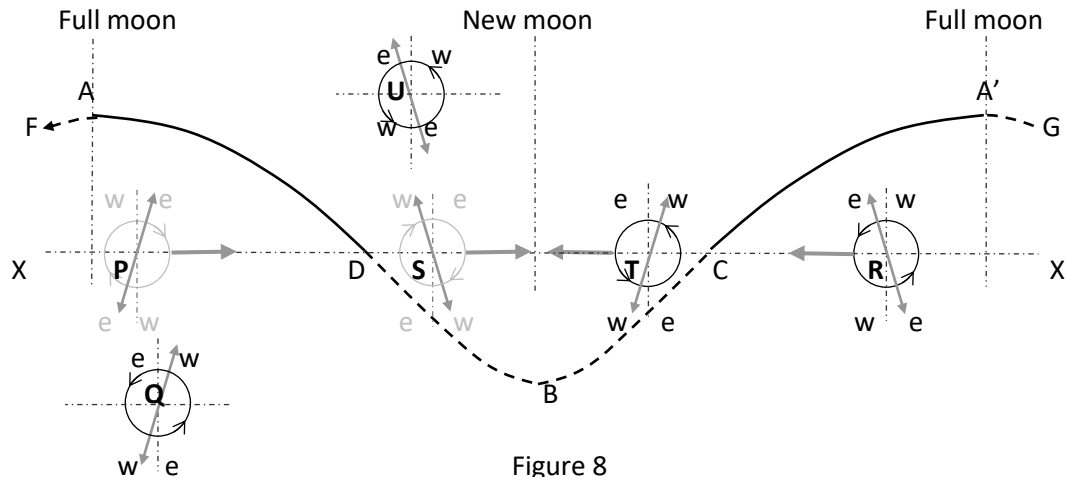


Figure 8

towards the moon, accelerates the earth in the direction of the moon's motion. Earth appears to move towards the moon, which is in front of the Earth. Directions of deflections of lunar tides are as explained above, with respect to Figure 6. Between the moon's inner datum point B (new moon) and the moon's outer datum point A (full moon), the moon is behind Earth. 'Central force' on earth, towards the moon, decelerates the earth in a direction opposite to the moon's motion. Earth appears to move away from the moon (in the opposite direction to the moon's motion), which is behind Earth. Earth and the moon appear to move in opposite directions.

This appearance, created by the assumption that the Earth is a static macro body and the relative displacements of the moon as the sole dynamic action in the system, creates the moon's apparent orbital motion in an elliptical orbit around the Earth. Directions of Earth's real motions are reversed to suit observation, as shown by dim circles, P and S. By doing so, not only is the direction of Earth's linear motion reversed, but the direction of its spin motion is also reversed. Further, the direction of earth's spin motion is again reversed to suit observation as shown in circles Q and U. Resulting appearances of deflections of lunar tides are shown by grey double headed arrows across circles Q, U, T and R. Summarizing the above; From full moon at the outer datum point at A' to the third-quarter phase at C, lunar high tides occur before the moon reaches local meridian. Lunar tides are deflected in an easterly direction, as shown in figure R. From third-quarter phase at C to new moon at inner datum point B, lunar high tides occur after the moon has crossed the local meridian. Lunar tides are deflected in a westerly direction, as shown in figure T. From the new moon at the inner datum point B to the first-quarter phase at location D, lunar high tides occur before the moon reaches the local meridian. Lunar tides are deflected in an easterly direction, as shown in the figure U. From first-quarter phase at location D to full moon at the outer datum point A, lunar high tide occurs after the moon has crossed the local meridian. Lunar tides are deflected in a westerly direction, as shown in Figure Q.

Corresponding high lunar tides appear on the opposite side of the Earth. During Earth's travel within the Sun's median path in space, the phases of the moon related to the above descriptions are reversed. Consequently, the relative position of the moon with respect to the Earth and the direction of deflection of the lunar tide on Earth should be considered accordingly.

Effect of orbital motion on deflections of tides:

Magnitudes and directions of shift of tides, as explained above, are satisfied only when the direction of the 'central force' is perpendicular to the planetary body's orbital path. With respect to tides on Earth, this condition is satisfied only under the condition that Earth's orbital path is circular around the sun and the moon's orbital path is circular around Earth. In reality, Earth's real orbital path zigzags about the Sun's path, and the Moon's real orbital path zigzags about Earth's path. Consequently, directions of respective 'central forces' (with respect to Earth's path) change through a full circle, during every corresponding orbital period. 'Central force' is perpendicular to Earth's path only at two points (at outer and inner datum points) in the corresponding orbital path. At all other points in the real orbital path, angles between the direction of linear motion and the direction of 'central force' vary between 0° and 90° .

The direction of Earth's real orbital path deflects to a maximum of about 6° on either side of the Sun's median path. Sun's median path is common to all macro bodies in the solar system. Lattice-work-squares in Earth's matter-field (additionally) deform through a maximum of 6° on either side about their (steady state)

median deflection. As additional deformation of latticework-squares in Earth's matter-field is the cause of terrestrial tides, any type of additional deformation of latticework-squares is likely to affect the deflections of high tides from the local meridian.

Additional deformation of latticework-squares in Earth's matter-field due to the Earth's real orbital motion enhances the deflection of high tides from the local meridian. Accordingly, depending on the location of the Earth in its real orbital path, deflection of solar high tides from the local meridian of an observer increases up to about 9° , where the angular deflection of the real orbital path from the sun's median path is highest. (At points, where Earth's real orbital path crosses the Sun's median path – in case of solar tides, and at points, where Earth crosses the Moon's real orbital path – in case of lunar tides, in space).

At these points, only about one-third of the total deflection of high tide is caused by additional structural deformations in the Earth's matter-field, and the rest of the deflection is caused by the curvature of the Earth's real orbital path. The magnitudes and directions of the shift of the solar tides also vary between a minimum and a maximum during one solar year.

The magnitude of the angular shift of lunar tides varies from one lunar month to another lunar month, completing one cycle in one solar year. The magnitude of deflection of terrestrial tides varies within an angular sector of either side of the local meridian. The magnitude of deflection at any time depends also on many other factors, such as: the locations of the Earth and moon in their respective real orbital paths, the relative direction of their orbital motion, etc.

Zenith points of terrestrial tides, at any point on Earth's equator, shift from the local meridian (facing the central body) by an angle of 2.76° (approximately). Since the shift is a function of Earth's parameters, the magnitude of the shift is identical for both lunar and solar tides. This value is with respect to the centre of rotation of Earth's real orbital path. An observer on Earth views tides with respect to Earth. Observer is also moving with the Earth at its absolute linear speed. Hence, the displacement of the tide from the local meridian with respect to Earth's spin axis is also of the same magnitude.

Considering ideal orbital conditions, the magnitude of deflection of terrestrial tides varies within an angular sector of 17.52° about the local meridian. The magnitude of deflection at any time depends on the location of the Earth and the moon in their respective real orbital paths.

Conclusion:

Depending on the linear speed of a macro body, the direction of action of an external effort differs from the direction of its application. Absolute linear motion of a spinning planetary body and curvature of its real orbital path produce an angular shift of tides from (local) meridian, facing the central body. In the case of terrestrial tides, this is further modified to suit our observations by assumptions. Directions of apparent shift of tides do not conform to their real deflections. Curvature of the Earth's orbital path about the Sun's median curved path has a greater effect on the displacement of tide from the local meridian than the Earth's absolute linear speed. The phenomenon of tides on planets should be interpreted based on facts rather than appearances.

Reference:

- [1] Nainan K. Varghese: *MATTER (Re-examined)*, <http://www.matterdoc.info>

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