DIRECTION OF TIDES

According to ‘MATTER (Re-examined)’

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Abstract: This article attempts to give a simple and logical explanation to the mechanism of shift in directions of tides on planetary bodies. It is based on a radically different dynamics, presented in book ‘MATTER (Re-examined)’ [1]. Linear motion of a planetary body changes symmetry of additional distortions in universal medium about it. Asymmetry of latticework-squares in planetary body’s matter-field (about direction of ‘central force’) shifts direction of its action, which in turn shifts zenith points of tides from local meridians (facing sun or moon) and on opposite side. Real orbital motion of a spinning macro body enhances deflection of tides from local meridian. Currently, directions of deflections of tides are misinterpreted to suit observation.

Keywords: Tides, tidal mechanism, deflection of tide.

Introduction:

It is observed that zenith points of terrestrial tides do not coincide with local meridian where sun or moon is present. This is usually attributed to friction between water and land masses of earth. This is not so. Even if a planetary body is wholly fluid, changes in directions of tides will appear. Change in directions of tides is caused by the fact that direction of action of an effort need not always be wholly in the direction of its assumed application [1]. Changes in directions of tides are local phenomena related only to parameters of spinning planetary body. Hence, magnitudes or sources of external efforts or parameters of their source macro bodies do not affect changes in apparent deflections of tides.

Alternative concept, presented in 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 universal medium that fills entire space (outside basic 3D matter-particles) without voids. It performs all actions, currently assigned to apparent interactions between matter-bodies. Universal medium, in and about a macro body, contain sufficient distortions to sustain its integrity and state (of motion). This part of universal medium is matter-field of macro body. Actions by efforts ('forces') are performed by transfer of distortions in latticework-structures of matter-field. During transfer of distortions in universal medium, 3D matter-particles in the region are carried along with distortions.

This article deals with macro bodies. All movements are with respect to absolute reference, provided by universal medium. Figures, in this article, are not drawn to scale. They are depicted to make actions and phenomena distinct and clear. Only those distortions in matter-field, which are required to produce whole-body motion (in a plane) are represented in figures. Distortions in matter-field, maintaining steady state (of motion) and integrity of 3D matter-particles and macro body, as 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 nature of distortions rather than their shapes or orientations in universal medium. They may be understood as resultant shapes of all latticework-squares in universal medium about the macro body, with respect to actions considered.

Transfer of effort through matter-field:

Figure 1 shows parts of matter-fields (of three macro bodies, in a plane) under action by external efforts (shown by thick vertical arrows). Matter-field, A, belongs to a macro body that is static with respect to universal medium (intrinsic distortions in all matter-fields are ignored). An external effort, shown by thick black arrow at top of matter-field is transmitted through it without changes. Transmitted external effort is represented by thick black arrow at bottom. This helps to produce pure linear motion of macro body, with respect to universal medium, by carrying 3D matter-particles along with distortions. Whole of external effort is utilized to produce linear motion of macro body.

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

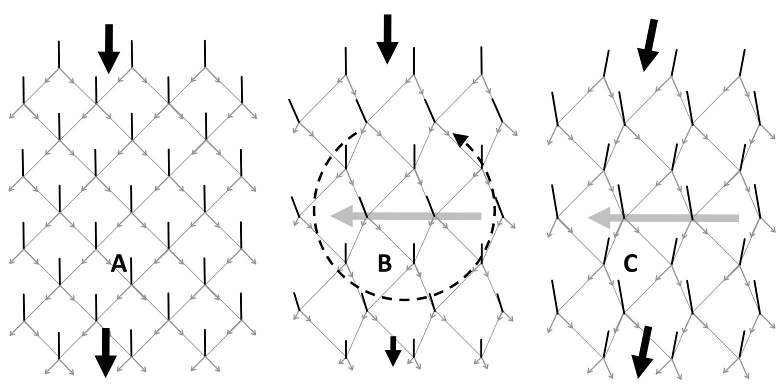

Figure 1

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

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

Figure 2 represents part of matter-field in equatorial plane of a rotating macro body that is moving at a constant linear speed (same as 'C' in figure 1). Because of linear motion, latticework-structures of its matter-field are distorted. Magnitude of distortion corresponds to macro body's linear speed.

Vertical red line is in reference direction. Thick grey arrow shows direction of linear motion. Distorted latticework-squares are symmetrical to 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 reduce in magnitudes, as explained above. A vertical external effort, deflected from blue line, is not fully effective on macro body.

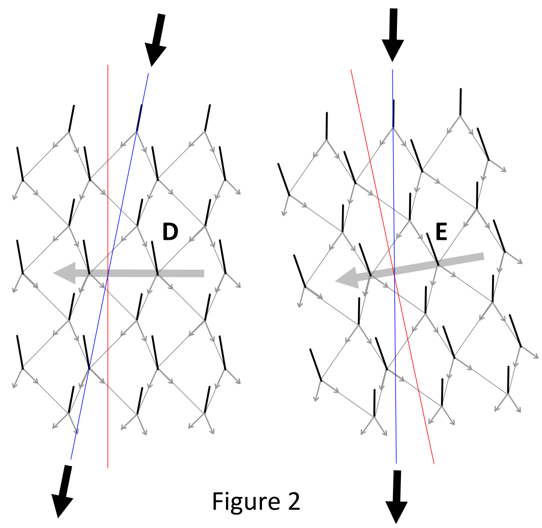

Figure 2

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 certain angle so that blue line (about which latticework-squares are symmetrical) coincide with direction of external effort. By this deflection red reference line has deflected to new position, before external effort is fully effective on macro body, as shown in figure E. It is apparent that in a spinning macro body, fully effective action is delayed from (lags behind) reference line. Similarly, for same parameters of macro body, if direction of external effort is opposite, it is apparent that fully effective action is advanced from (leads ahead) reference line.

Direction of tides:

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

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

Direction of angular shift from local meridian:

Large circle in figure 3 represents equatorial plane of spinning spherical earth, moving linearly in its real orbital path. Earth is shown near outer datum point on its real orbital path (on outer side of sun's median path, away from galactic centre). Thick curved arrow shows resultant path of earth's combined motion. Curved path's centre of curvature (centre of rotation of earth) is very far (below) from it. Diametrically opposite points on equatorial surface of earth at 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 zenith points, in latticework-structure of matter-field in earth's equatorial plane. Rectangles in dashed lines, A and C, represent distorted latticework-squares of matter-field at local meridian. All latticework-squares in earth's matter-field are, more or less, distorted identically to provide its combined (linear and spin) motion. Shorter thick arrows near 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 radius of curvature of earth's real orbital path, which continuously varies. [When moon is considered as central body, direction of 'central force' depends of position of moon on its real orbital path with respect to earth]. Within variations of direction of 'central force' on earth, direction of 'central force' can also be considered in various directions towards planetary body's center of rotation. Hence during half-cycle of real orbital path, when earth is on outer side of sun's median path, 'central force' is downwards (towards galactic centre), as shown in figure 3.

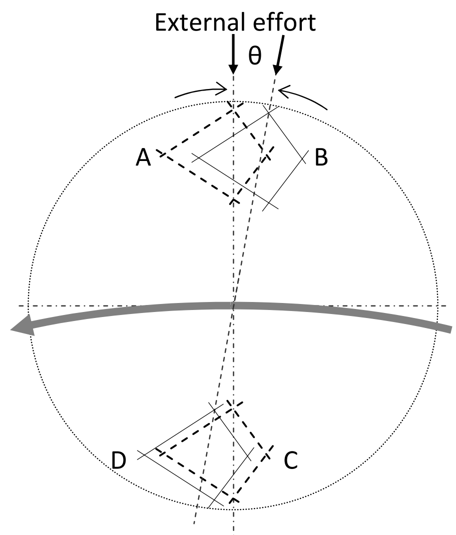

Figure 3

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

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

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

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

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

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

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

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

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

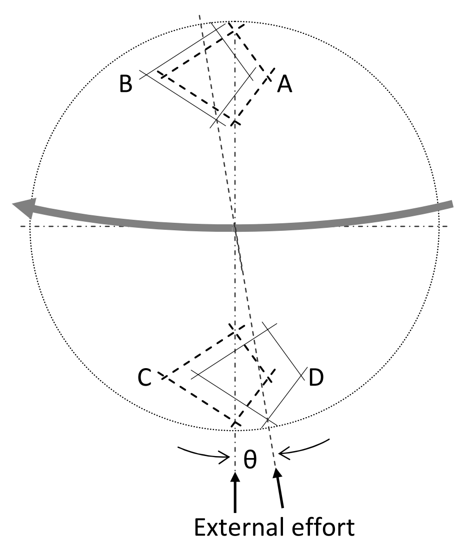

Figure 4

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

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

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

Whole of 'central force' acts along its direction of application. No part of 'central force' is used to deflect 3D matter-particles angularly. Hence, high tide occurs at this point. When latticework-square D is in line with 'central force', in vertical direction, local meridian of observer lags behind in direction opposite to earth's spin motion. Therefore, observer notices that high tide leads ahead of local meridian occupied by him, when 'central force' is applied away from galactic centre (towards centre of curvature of earth's real orbital path).

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

Action of gravitational attraction is instantaneous on changes of macro bodies' parameters. Hence, there is no time lag between development of tide and relative positions of moon or sun. Their apparent positions in relation to earth may, some times, differ from real positions. These apparent positions of moon or sun cannot be considered for gravitational actions. Hence, there can be no time delay due to present and apparent positions of moon or sun to develop tides.

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

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

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

During (solar) half-yearly period, when earth's real orbital path is on outer side of sun's median path

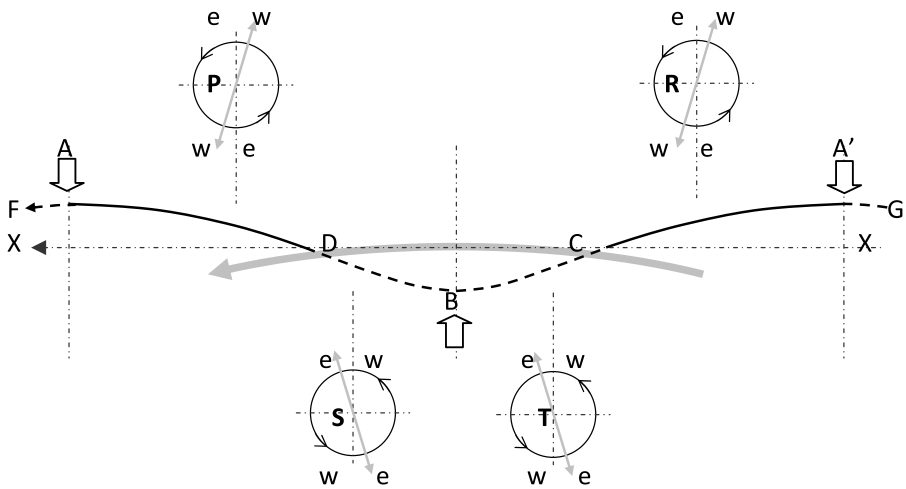

Figure 5

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

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

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

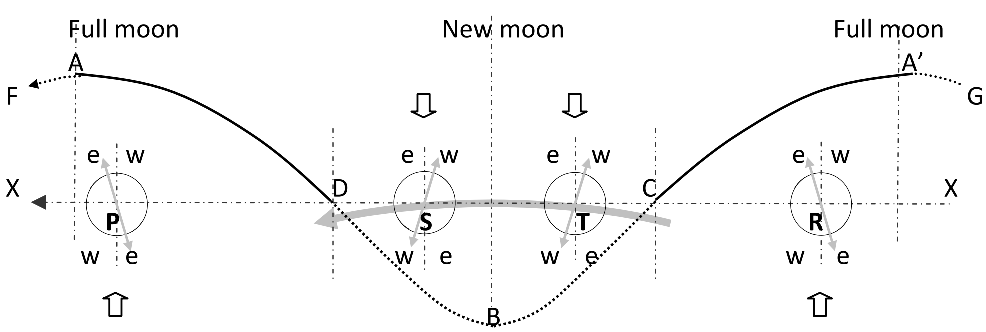

Figure 6

Consequently, directions of deflection of lunar tides deflect in directions, opposite to solar tides, as shown in figure 6. Accordingly, earth's position at P in quadrant from D to A and at R in quadrant from A' to C, lunar tides on earth are deflected eastward from 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 local meridian.

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

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

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

If there are more than one 'central force' on a spinning planetary body, each of them produces its own set of tides, independently. If directions of tides (produced by different 'central forces' are near, they create resultant tides which are arithmetical sum of independent tides on planetary body. Summation gives rise to spring and neap tides on earth. Effect of spring or neap tides are greatest when moon and sun are in a straight line (called 'syzygy') with earth, which occurs during a full moon, new moon, and during lunar and solar eclipses.

Absolute linear speed of sun is determined equal to 250000 m/sec. Accordingly, depending on position of earth on its orbital path with respect to sun, earth's absolute linear speed vary between 220000 m/sec and 280000 m/sec. This makes corresponding changes in magnitude of angular shift of zenith point of tide from local meridian. Angular shift of tidal zenith point on earth depends only on parameters of earth. Hence, irrespective of source of external effort acting on earth, all terrestrial tides are shifted identically. [External efforts on earth are applied by universal medium in the direction of central bodies, which provide shadow in universal medium for development of gravitational attraction. Sun or moon do not directly apply any effort on earth, instead, they cause 'central forces' on earth by universal medium]. Magnitudes of deflection of tides from local meridian depend on 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 sun. Similarly, moon's orbital path appears as an ellipse around earth. Appearances of tides (different from real condition) further change directions, 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 sun as he sees it. To an observer, sun appears to move around earth in westerly direction. After advent of heliocentric planetary system, notion of sun moving around earth was changed to motion of earth around sun in easterly direction. Although, no free macro body can orbit around another moving central body, notion of earth orbiting around sun in easterly direction is still maintained. This misconception is the cause of many misunderstandings in celestial mechanism. In order to satisfy this fallacy, directions of some of earth-related motions are arbitrarily changed by observer.

In figure 7, XX shows part of sun's median path in space. Earth's real orbital path about moving sun is shown by 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 inner datum point (point in real orbital path, where earth's absolute linear speed is lowest). Grey arrows, parallel to central line show directions of earth's relative linear motion, in each quadrant, with respect to sun.

As earth moves in its real orbital path, from inner datum point B to outer datum point A, it is behind the sun. 'Central force' on earth, towards sun (being prominent) accelerates earth in forward direction; towards outer datum point A. Direction of earth's relative linear motion, with respect to sun, is in the same direction as direction of 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 local meridian, 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 at D to outer datum point A, solar tides are deflected westward from local meridian, as shown by P in figure. During earth's travel from inner datum point B to location at D, solar tides are deflected eastward from local meridian, as shown by S in 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 direction of motion of a 3D matter-particle on earth's surface. Since spherical earth has spin motion, relative to space, east-west directions depend on instantaneous location of a surface-point on earth.

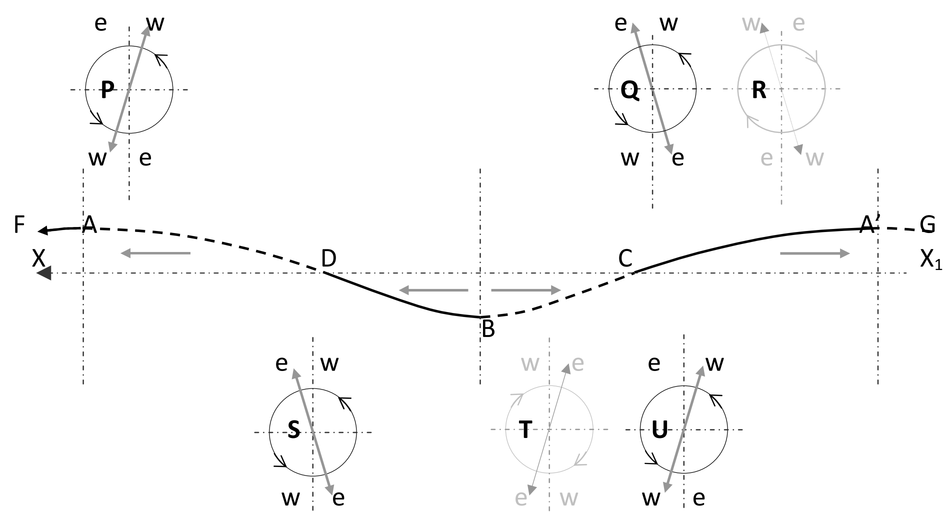

Figure 7

From outer datum point A' to inner datum point B on earth's real orbital path, in figure 7, earth is in front of sun. 'Central force' on earth, towards sun (being prominent) decelerates earth in its forward motion. Direction of earth's relative linear motion, with respect to sun, is in opposite direction (towards X_1) to direction of sun's motion along its median path; towards X. Earth appears to approach sun. Linear motion of sun is to advance towards X, while earth appears to move (relatively) in opposite direction towards X_1, shown by grey arrows parallel to central line. By using relative motion of earth with respect to sun, direction of earth's real motion in space is reversed. This assumption has changed shape of earth's orbital path from a wavy line about sun's median path to an ellipse around sun. Apparent elliptical orbit corresponds to our observation and hence, is usually considered true.

By this consideration, 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 figures at locations at T and R. By reversing directions of earth's motions, not only earth's linear motion but its spin motion also is reversed. Changes in linear and spin motions are shown in dim figures T and R. Assumed reversal of spin motion are shown by clockwise arrows on circles of figures T and R. As there is no other reference, except sun, we do not notice any change in earth's linear motion.

Direction of earth's spin motion is related to earth's spin axis. As long as direction of spin axis does not change, reversal of 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 assumption to change of directions of earth's motions attempted earlier). East-west directions of earth's spin motion are changed back to suit observation, related to earth's spin axis. These changes are incorporated in figures at locations at Q and U. By doing so, direction of earth's spin motion is restored to reality, while keeping 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 local meridian of observer. Tides appear to east of local meridian (they appear earlier than sun reaches local meridian).

At location U, relative deflections of solar tides have changed westward. During earth's travel from location at C to inner datum point B, solar tides tend to lag behind local meridian of observer. Tides appear to west of local meridian (they appear later than sun has crossed local meridian). Although reality is different, this is what we observe and believe to be true. Summarizing the above;

From outer datum point at A' to location at C, solar high tides occur before sun reaches local meridian of a place. Solar tides are deflected in easterly direction as shown in figure Q.

From location (C) to inner datum point (B), solar high tides occur after sun has crossed local meridian of a place. Solar tides are deflected in westerly direction as shown in figure U.

From inner datum point (B) to location (D), solar high tides occur before sun reaches local meridian of a place. Solar tides are deflected in easterly direction as shown in figure S.

From location (D) to outer datum point (A), solar high tides occur after sun has crossed local meridian of a place. Solar tides are deflected in westerly direction as shown in figure P.

Corresponding high solar tides appear on opposite side of earth also.

Apparent direction of Lunar tides:

Figure 8 shows real orbital motion of moon about earth, when earth is moving in its real orbital path on outer side of sun's median path. Moon travels in wavy path, GA'CBDAF, while earth moves along central line X'X in its orbital path about sun. To an observer on earth, moon appears to move around earth in westerly direction. Directions of earth's motion, relative to moon, appear as indicated by grey arrows along central line.

From moon's outer datum point A' (full moon) to moon's inner datum point B (new moon), moon is in front of earth. 'Central force' on earth, towards moon, accelerates earth in the direction of moon's motion. Earth appears to move towards moon, which is in front of earth. Directions of deflections of lunar tides are as explained above, with respect to figure 6.

Between moon's inner datum point B (new moon) and moon's outer datum point A (full moon), moon is behind earth. 'Central force' on earth, towards moon, decelerates earth in direction opposite to moon's motion. Earth appears to move away from moon (in opposite direction to moon's motion), which is behind earth. Earth and moon appear to move in opposite directions. This appearance, created by assumption of earth being a static macro body and considering relative displacements of moon as sole dynamic action in system, creates moon's apparent orbital motion in elliptical orbit around earth.

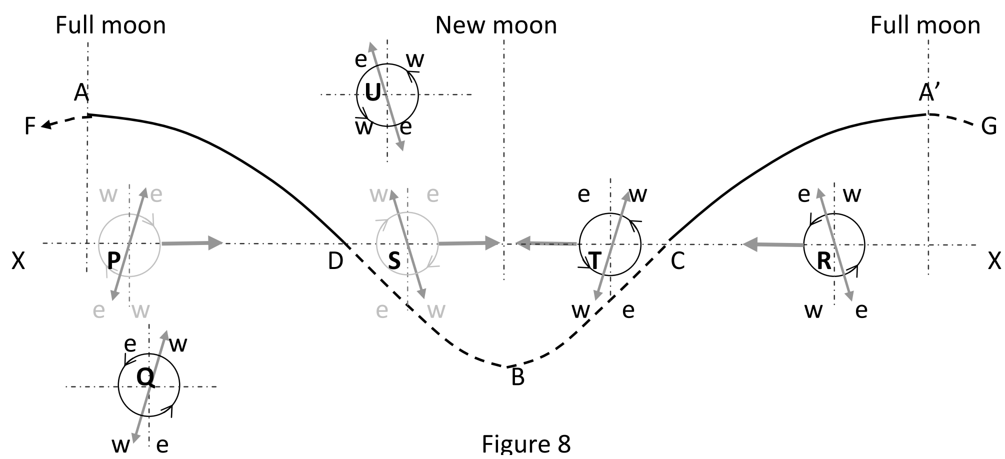

Figure 8

Directions of earth's real motions are reversed to suit observation as shown by dim circles, P and S. By doing so, not only direction of earth's linear motion is reversed but direction of its spin motion is also reversed. Further, 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 outer datum point at A' to third-quarter phase at C, lunar high tides occur before moon reaches local meridian. Lunar tides are deflected in 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 moon has crossed local meridian. Lunar tides are deflected in westerly direction as shown in figure T.

From new moon at inner datum point B to first-quarter phase at location D, lunar high tides occur before moon reaches local meridian. Lunar tides are deflected in easterly direction as shown in figure U.

From first-quarter phase at location D to full moon at outer datum point A, lunar high tide occur after moon has crossed local meridian. Lunar tides are deflected in westerly direction as shown in figure Q.

Corresponding high lunar tides appear on opposite side of earth also. During earth's travel within sun's median path in space, phases of moon related to above descriptions are reversed. Consequently, relative position of moon with respect to earth and direction of deflection of 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 direction of 'central force' is perpendicular to planetary body's orbital path. With respect to tides on earth, this condition can be satisfied only under condition that earth's orbital path is circular around sun and moon's orbital path is circular around earth. In reality, earth's real orbital path zigzags about sun's path and 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 corresponding orbital path. At all other points in real orbital path, angles between direction of linear motion and direction of 'central force' vary between 0° and 90°.

Direction of earth's real orbital path deflects to a maximum of about 6° on either side of sun's median path. Sun's median path is common to all macro bodies in solar system. Latticework-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 deflections of high tides from local meridian.

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

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

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

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

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

Conclusion:

Depending on linear speed of a macro body, direction of action of an external effort differs from direction of its application. Absolute linear motion of a spinning planetary body and curvature of its real orbital path produce angular shift of tides from (local) meridian, facing central body. In 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 earth's orbital path about sun's median curved path has greater effect on displacement of tide from local meridian than earth's absolute linear speed. Phenomenon of tides on planets should be interpreted on facts rather than on their appearances.

Reference:

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

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