

THE NEW PRINCIPIA;

OR,

True System of Astronomy.

IN WHICH

THE EARTH IS PROVED TO BE THE *STATIONARY* CENTRE
OF THE SOLAR SYSTEM;

AND THE SUN IS SHEWN TO BE ONLY 365,006 MILES
FROM THE EARTH,

AND THE MOON ONLY 32,828.5 MILES DISTANT;

WHILE

THE SUN TRAVELS YEARLY IN AN ELLIPSE AROUND
THE EARTH,

THE OTHER PLANETS MOVING ABOUT THE SUN
IN ELLIPSES ALSO.

By R. J. MORRISON, F.A.S.L.,
COMMANDER, R.N.

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אֶתְחַנּוּן תִּבֵּל בִּלְתַּחְמוּט.—*Heb. Bib.*, xciii Psalm, 1 verse.

"*Etenim firmavit orbem terræ, QUI NON COMMOVEBITUR.*"—*Vulgate Version.*

"Car certainemēt il a affermy le mōde, lequel NE SE BOUGE POINT."—
JACQUES DE BAY, translation of the Bible, Ides of March, 1572.

"The world [earth] also is *stablished*, that it CANNOT BE MOVED."—
xciii Psalm, 1 verse. Also xvi Psalm, 10 verse.

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THE NEW PRINCIPIA,

ETC.

INTRODUCTION.

THERE are three classes of men to whom I may address the observations contained in the following work. These are the scientific world, the non-scientific world, or general readers, as they are termed, and finally the masses. The first are so immersed in self-esteem that they would not condescend to examine either facts or arguments by which I propose to shew that the system they follow is fallacious; and they have adopted modes of calculating so generally unknown to the other two classes, that if I were to address myself to them, I must confine myself to very few readers, whose prejudices I am hardly sanguine enough to suppose I can by any means overthrow. As, however, the truths that I teach are of the utmost importance to society, I in no way despair, that since in the end these scientific men will die, in their room will arise a set of astronomers who will see the absurdity of the whole system taught by Newton, and will adopt so much of the "true system of astronomy" as may merit that appellation. The masses, who must ever be hewers of wood and drawers of water, can never be educated up to the point that will enable them to decide wherein lies the truth; but they must ever believe whatever facts or whatever inductions their teachers may see fit to impose on their understandings. Hence it is to the second class of mankind—the very numerous, well-educated men, who make no kind of pretension to be scientific, in the sense in which that word is popularly understood—that I appeal; and, if I

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mistake not, it will appear in the long run that scientific education is no protection against error; and that it is quite possible for clever men to devote their whole lives to the *scientific* study of astronomy, and, by relying on the *prestige* of a name, assumed to be great, and imagined to be held by a master of nature, so far as to do away with the necessity of personal investigation of the bases on which their science is founded, to be deeply, nay irrecoverably, sunk in errors; or, as I may term it, drowned in fallacies, and, as it were, suffocated in absurdities.

I shall beware not to word my writings so as to offer any the least insult to these men; because I have once long believed as they still do. Sent to sea, when only eleven years of age, I began the study of astronomy at the early age of twelve, and for upwards of sixty years I followed it as taught by Newton. I have, indeed, practised it extensively; yet, like very many others, I never had the least idea of investigating the *foundations* of the science. I took all that matter for granted, and inasmuch as the results, in general, agreed with the phenomena observed, I came to the fallacious conclusion, that not only the results were satisfactory, but that the first principles were *true*. Yet, I have lived to feel assured, that the leading principles of the Newtonian philosophy, especially as regards the distances of the several bodies of the solar system, are utterly and monstrously false.

This declaration I should hesitate to make, if I had not a very large mass of evidence to offer in its support. This will be given in the following pages; but in this place, it may not be amiss to ask the public, who uphold the system of Newton, to reflect a little, which they never can yet have done, on the great and overwhelming *absurdities* in which it demands belief. Of these I will here name a few only. It is taught that the earth goes round the sun once each year, being at a distance from that body of nearly 95 mil-

lions of miles. It follows that twice each year the earth is removed double that distance, or 190 millions of miles from its place. Yet we are informed that this vast and tremendous distance makes no kind of difference in the appearance of the fixed stars, as a rule; and that the Pole Star, for instance, does not appear to be removed even the *fraction* of a second from its place at the vernal equinox, when the earth has reached its destination at the autumnal equinox; being 190 millions of miles from one point to the other. Now the tangent of *one* second= $a. c.=5.314300$

$$190,000,000 \text{ miles, Log.}=8.2787536$$

$$\text{Log. } 39,191,000,000,000=13.5931836$$

This is the distance the Pole Star should be from the earth, even if there were *one* second of parallax, which, I again say, there is not; and, therefore, the Pole Star must be supposed to be much farther away. Now this distance, in plain English, is above *thirty-nine billions one hundred and ninety-one thousand of millions of miles!* Is there not something quite as absurd in this as in the old heathen assertion that the earth itself was supported on the back of a very large tortoise? Does it not contradict all our experience of the character of nature? Does not nature ever work with the most perfect economy of power? Yet here we find an enormous expenditure of power; the spreading out, as it were, the curtain of nature to an inconceivable and unmeasurable extent, *uselessly*. Is it not far more reasonable and satisfactory to think and believe, that the reason we can discover no kind of parallax in the Pole Star is, not that it exists at this wondrous distance, but that the earth *does not move at all* from its place at the vernal equinox; and that, therefore, there should needs be no kind of parallactic angle formed with the star?

Another absurdity, still more glaring (and greatly more astonishing to find men of talent adopting without the slightest misgiving) is the distances said to be *observed* of

the fixed stars in general. This is in a great degree fanciful; yet they do pretend, that the *light* of each star, according to the power of the telescope by which it is viewed, indicates its distance. And upon this exceedingly vague system did Lord Rosse (the very ablest of our modern observers) declare that stars had been seen, the *light* of which must have taken *three million five hundred thousand years* to reach the earth * The astounding doctrine included in this wild assertion cannot be well understood without reflecting that the rate of this *light's* motion is, in round numbers, nearly 200,000 miles in a second! If any person will have the curiosity to multiply $200,000 \times 60 \times 60 \times 24 \times 365$, he will find that the light travels in *one* year, *six billions three hundred and seven thousand two hundred millions of miles!* He has next to multiply this enormous amount into 3,500,000, and he will have a row of figures, containing 19 digits and expressing *two trillions two hundred and seven thousand four hundred and twenty billions of miles*, which Lord Rosse declared the *rays* of those stars travelled before they became visible to this earth!

Is there any possible amount of absurdity that can surpass this declaration? Oh, yes! there is. And we may find it in the words of the great calculator, Newton, himself. He says (p. 64 *Syst. World, Davis's edit.*), that, "at the distance of 4,000 miles from the earth, the air is 73,907,000,

* Sir W. Hamilton's wonders. He stated, 14th December, 1846, at the R. I. Academy, that light occupies "more than five centuries in travelling from the Star Alcyone to us!" He said, the sun moves "about 8 geographical miles in a second;" which is 28,800 miles per hour. But Lord Wrottesley, at Oxford, 27th June, 1860, declared it moves "about 18,000 miles an hour."—"Bessel computes this velocity to be three times that of our own earth in its proper orbit," says De Quincey (*Miscellanies*, p. 187). This will be 204,000 miles an hour. The astronomers are all at sea on these subjects.

independent calculation for the purpose of determining the true distance of the sun and moon. Newton himself was extremely hazy about the sun's distance. In his third letter to Dr. Bentley, written six years after he had published his *Principia*, he says, "Your assuming the *orbis magnus* 7,000 diameters of the earth wide, implies the sun's horizontal parallax to be half a minute. Flamsteed and Cassini have of late *observed* it to be about 10", and thus the *orbis magnus* must be 21,000, or, in a rounder number, 20,000 diameters of the earth wide. *Either* computation I think will *do well*, and I think it *not worth while to alter your numbers*." Here, in effect, he tells Bentley that he might consider the sun's distance either 28 or 84 millions of miles—that *either* would *do well*! This shews that a difference of 56 millions of miles was, in his opinion, of no consequence. As to the moon's distance, he appears to have adopted Ptolemy's idea; but he never seems to have perceived the *undeviating fallacy* of the system of parallaxes, nor to have invented any kind of independent method of computing the moon's true distance. How far I have succeeded must be judged by the results. These are visible in the simple, short and easy method by which I determine the times of the eclipses of the moon, using only 14 logarithms; whereas the orthodox system requires as many as 36 logarithms.

Some half century back, a work was published by *Mr. B. Prescott*, of Liverpool, which he termed "The Inverted Scheme of Copernicus." It contains much that is very suggestive, and to it I am indebted for some of my methods of calculating. But unfortunately Mr. Prescott fell into a similar error with the modern astronomers; only that he took the distances of the sun and moon as much too small as they have done too great, and he erroneously considered that both sun and moon moved in perfect circles. I convinced myself that, in any case, this was wrong, and I at length devised

my method of determining the distance of the moon, which gives us very readily the times and extent of her eclipses. *This is the base on which I would establish the solar system.* It will be seen that I have computed the distance of the sun on the same principle; and taking that distance, I obtain thereby *the diameters of the orbits of the planets Mars, &c.*, which agree with the same worked out according to Sir John Herschel's method. I account for the stationary positions and retrograde motions of Mars, Venus, and all the other planets, with extreme exactness. And finally I work out the longitudes and latitudes of the sun and planets with the utmost accuracy, and perfectly independent of any fallacious ideas of mutual attraction, or other whimsical notions of gravitation.

There is little doubt, that my avoiding algebra and the calculus, and laying my ideas before the public in plain digits, will assist in the spread of a general knowledge of astronomy. But, of course, those men who have devised and upheld those systems of calculating, and thereby thrown dust in the eyes of the public, and kept millions from a knowledge of the wonders of God's creation, will treat my plain system with contempt and contumely. Indeed, I rather prefer that they should do so, as their enmity is more to be desired than their advocacy; which, in any case, might be expected to be hollow and unreliable. Let them, therefore, have recourse to ridicule, abuse and vituperation; since I am well assured that the cause of truth, pure and unadorned truth, will ever, in the end, rise victorious over all the floods of malice, and uninjured by all the venom of despair. The Rev. Raby Williams, in his "*Systematic View of the Revealed Wisdom of the Word of God*," says, "When it is required of the solar system, to solve the apparent stationary position of the North Star, notwithstanding the varying situations of the earth, it unblushingly asserts—yet what indeed it must assert—that the diameter of the earth's orbit,

190 millions of miles, bears no *proportion* to the inconceivable distance of the Polar Star. It must be evident then that the *bulk* or *magnitude* of the Polar Star must, from this rule, be correlative to its distance; and consequently that 190 millions of miles is inadequate to the measure of the imperial assumption! It is impossible to express this error in stronger terms than what itself doth use, in evidence of its own presumed veracity. * * The deception permitted *must have its day*, and the folly enhanced its dominion decreed." On these statements it has been well remarked, that "Newton's doctrines led the way to the re-establishment of the doctrine of *self-forming atoms* and *self-motion*; which Laplace completed; who sneered at Newton's ideas of the *agency* of an *intelligent being*. And the atheist Mirabaud triumphantly declares for the doctrine of self-forming atoms—praises the IMMORTAL NEWTON—and scouts the idea of an Almighty Creative Power distinct from matter." Yes, Mr. Williams, "the deception permitted will have its day!"

Some persons may object to my doctrine, that the earth is at rest in the centre of the solar system; and ask, how then is it supported, and why does it not fall, progress forward or move backward, in space? The only answer I think necessary to give to these questions is, that they apply far more forcibly to the case of the sun, in the Newtonian hypothesis; because the sun is declared to be above 111 times greater in diameter than the earth; and its bulk is declared to be to that of the earth as 1,384,472 to 1. Of course, if we feel any difficulty in imagining how this monstrous mass of mountain, rock and seas can be supported on "nothing," we must be utterly lost in wonder as to how the sun can be so supported. But the Newtonians very wisely give this question the go-by, and no doubt their atheistic friends and upholders will be very angry with me for even alluding thereto. The old philosophers seem to have long ago, in some measure, answered

this objection. They asked, why the earth should fall in one direction without apparent cause, more than in any other direction? And as none could answer this, they silenced the first enquirers; though they left the problem wholly unsolved, as we must do in our day and generation. On this subject, I quote from Mr. Prescott (p. 6, *On the Motion of the Sun*). "The Bible, Aristotle, and Ptolemy, teach that the earth is *at rest*; and they support this doctrine with facts and substantial evidence." And, speaking afterwards of these old philosophers, the writer observes, that "considerable faults they doubtless possess; but compared with the light, fluctuating and preposterous conceits of the modern sciolists, they are like majestic rocks towering above the rippling waves of the ocean, while the ephemera impudently buzz and flutter in the sunbeams around their awful summits."

Very many of Newton's theories are dropping out of existence. He taught that the light of the sun—pure white light—consisted of *seven* colours, which when combined formed white light. Well, but recently it has been demonstrated that the said white light consists of *three* colours only, which are blue, yellow and red; and now, still more recently, has it been of course *demonstrated*, that these three colours are in reality but *one*; and this is thought to be yellow! So that white is yellow and yellow is white; that is, if you will believe it. Truly will our children say, "Surely our fathers have inherited lies, vanity, and things wherein there is no profit!"

The chief dogma of Newton is, that "each particle of matter attracts all other particles in the universe, in the inverse ratio of the distances from each other!" So that every particle of matter in a sack of flour attracts every particle in the miller's snuff-box, and *vice versâ*. How wonderfully this clears up the mystery of creation, and makes all that was hitherto full of doubt as plain as a pikestaff!

The philosophy of the old world, when the Scriptures were written, was very different. "The works of the LORD are done in judgment from the beginning, and from the time he made them, he disposed the parts thereof. They neither labour, nor are weary, nor cease from their works. None of them *hindereth another*, and they shall *never disobey his word*."—*Eccl.*, xvi, 26, 27. Whence we may be sure that all perturbation, derangement and destruction, from the imaginary power of attraction, gravitation and repulsion, are nothing else than the dreams of a crazy and imperfect mind.

If we believe the Scriptures, then we must believe that the "instruments of light," as they should be called, were placed in the firmament for lights and for measurement of times and for seasons. We are naturally led to inquire of the vast magnitudes and immense distances which the imaginations of the theorists have assigned. But Newton, after all, could go no farther than lead to this sorry and lame conclusion, "that the *power of gravity* was sufficient to give the planets a motion in a *straight line*; but that it required the *power of the Almighty* to deflect that motion into an orbit." Yet do the foolish followers of Newton go very much farther, and refer *all* motion and nearly all formation to the power of gravity alone!

When will the public learn, read, and inwardly digest the fact, that God, in His wisdom and goodness, has made all things connected with the universe, so far as the ken of man may or should desire to embrace them, easy and simple; so that he who runs may read? That in good, sober truth, the inventions of "fluxions," and "the calculus," and all the bugbears of the "higher branches of the mathematics," which deter many thousand men of ordinary education from lifting the veil that shrouds the great truths of God's creation, as seen in astronomy, are utterly unnecessary, and, therefore, impertinent. Hipparchus, Eudoxus, Ptolemy,

Copernicus, Kepler, Bacon, and a thousand other great astronomers, knew nothing of them. Eclipses, occultations, the positions of the planets, the motions of the fixed stars, the whole of practical navigation, the grand phenomena of the "course of the sun," and the returns of the comets, may all and every one of them be as accurately, nay, *more* accurately, known without the farrago of mystery the mathematicians have adopted to throw dust in the eyes of the people, and so to claim honours to which they have no just title. Time, the great innovator, bearing in his hand the glorious banner, inscribed, "The Liberty of the Press," will hurl before his feet the names of men who now stand high in the ranks of science, if they wickedly presume to withstand the evidence of plain and simple facts, and so to deprive the bulk of mankind of knowledge, both rich and rare, which Providence deigns to offer for their moral advancement; will hurl, I say, the names of these men down to the unutterable contempt of an enlightened posterity.

THE TRUE DISTANCE OF THE MOON FROM THE EARTH
DEMONSTRATED TO BE ONLY 32,828.5 MILES.

"There are many learned, worthy and pious men, who, without having examined for themselves, hold a sort of general belief in the truth of Sir Isaac Newton's system, under an impression that he, or his followers, have mathematically proved the distances and magnitudes of the bodies upon which they treat."—*The System of the Universe*, p. 26.

Such was my own case for nearly sixty years of my life. But when I was fortunately led to examine for myself, I soon detected its enormous blunders. The celebrated *figure* made use of by Newton in *proposition 1, theorem 1*, on the "Invention of Centripetal Forces," is manifestly dependant on the *assumed* fact that the earth is infinitely *less in size* than the sun. For the words of the proposition are, "Let a centripetal force act at once, *with a strong impulse*." But the sun being, as I contend, much less than the earth, there is no sign or proof of "a *strong impulse*," and, therefore, this *figure* proves nothing. Now the whole of the subsequent reasoning becomes vitiated in consequence, and remains inconclusive. We are driven therefore to the reception of the idea that some other force than this "centripetal force" is that which keeps the sun and planets moving in their several orbits. What this is may be gathered from my observations under the head of the sun.

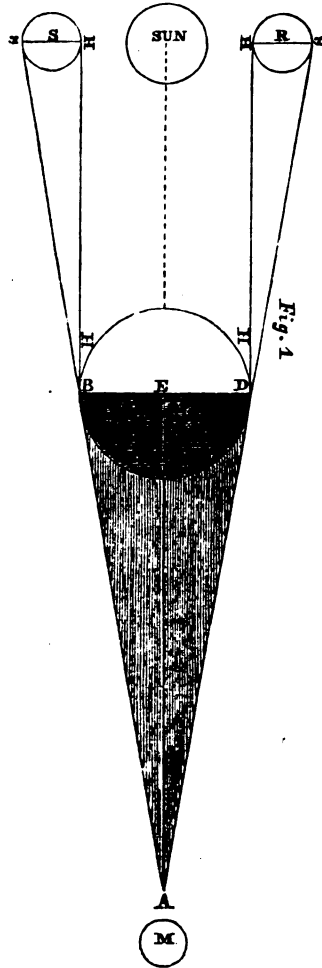
At page 225 of Sir John Herschel's work on astronomy (1835) he says, "Owing to the great size of the earth, the cone of its *umbra* (by which he means the length of its *shadow*) always projects far beyond the moon." Not a word does he say of how long this shadow really is. And we have failed to discover any book that professes to teach astronomy that does so. Sir John, however, tells us (p. 213) that "the distance of the moon from the earth is concluded

from its horizontal parallax," which he afterwards declares to be *about* 237,000 miles.

We give (p. 14) a diagram to prove the length of the said shadow of the earth, which, in reality, falls 10,000 miles short of the moon's distance as given above. Yet, as we see plainly that the moon does really pass through the shadow during an eclipse, we have evidence that the astronomers do not know the *true* distance of the moon. In this diagram let B. E. D. represent the earth; the lines H. H. and H. H. the horizon; A. the apex or point of the shadow; R. the sun, when rising, at D.; and S. the sun, when setting, at the opposite side of the earth, B. The true place of the sun at the instant will be at "SUN;" but owing to *refraction* he will be elevated above the horizon, line H. H., and will appear at R. Yet at the same instant he will be also elevated, after he has in reality set, to S., and will appear above the horizon. Now, the whole correctness of our computation, as to the length of the shadow, will depend on the *amount* of refraction; or, in other words, on the extent of the angle H. D. x , and the other similar angle H. B. x . Much might be said to prove this angle to be far greater, but we prefer to take the orthodox statement. At page 156, table xxii, is given in "*Nautical and Astronomical Tables* for the use of Nautical Men, Astronomers, and Others,"* the semidiurnal arc of the sun, when on the equator= $6^h 4^m$. This arc, if there were *no* refraction, would, of course, be exactly 6 hours. The 4 minutes are allowed for the refraction. We accept this, then; and we take the angle H. D. x =4 minutes=1 degree. It follows that the line E. D.=the semidiameter of the earth, or 3962·824 miles; and the angle E. A. D.= 1° , it being the same as H. D. x .

* By Olinthus Gregory, Esq., LL.D., &c., W. S. B. Woolhouse, Esq., F.R.A.S., and James Hann, Esq.

Then Log. <i>Tan.</i> 1° a. c.	1.758079
Log. E. D. 3962.824	3.598005
Length of A. E. 227,030	<u>5.356084</u>



By this it seems that it is impossible the apex of the earth's shadow, A., can be more than 227,030 miles from E., the centre of the earth. Yet we have seen that the mean

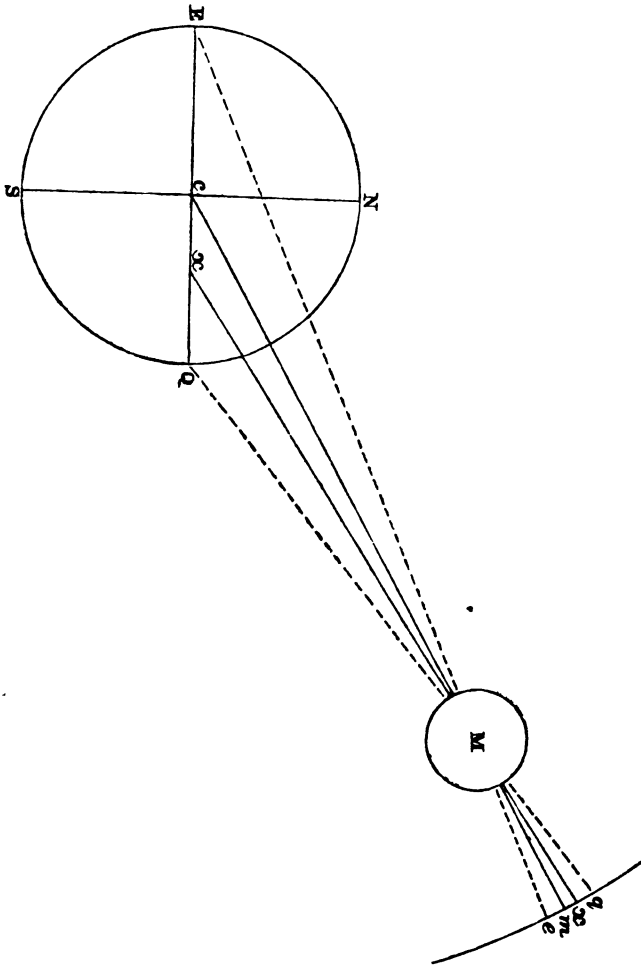
distance of the moon is called 237,000 miles. The difference is 9,970 miles, that the moon is *beyond the apex of the earth's shadow*. This would be at M. In this case there never could be any eclipse of the moon. There *is* such an eclipse frequently, and therefore the astronomers are proved to know very little about the distance of the moon. How then do they calculate eclipses so correctly? By taking an assumed distance (which is false) and by assuming other of the elements, they contrive to make the results agree. They take four minutes, or one degree, for Refraction, when it suits them, and thus blow *hot*; but when it suits, they take 33' for the Refraction, and thus blow *cold*.

The methods by which astronomers profess to determine the distance of the moon are very complex and full of fallacy. The result is, that they differ enormously in the distance of the moon. The Rev. S. Vince, in his work, in 1801, gives the distance as 239,029 miles; while in the synoptical table of Sir John Herschel's work on astronomy, in 1835, he states the distance as 59·982175 equatorial radii of the earth. This gives us the mean distance = 237,700 miles. This differs from Vince by 1,329 miles; and it differs from the text of Sir John's work, page 214, where it is "59·9643 of the earth's equatorial radii, or about 237,000 miles." This differs 700 miles from himself; and 2,029 miles from Professor Vince. The only remark I shall make is, that they cannot both be right.

I shall now explain the simple principle upon which I determine the distance of the moon to be only 32828·5 miles. The chief evidence of its correctness is the exactness of my calculation of an eclipse of the moon.

In the diagram hereto annexed, let the large circle represent the earth, and the smaller one the moon, when on her northern tropic; that is, when she is $23^{\circ} 27' 15'' + 5^{\circ} 18' = 28^{\circ} 45' 15''$ north of the line E. Q., which represents the equator.

Fig. 2



If the eye observe the moon from Q., it will see her at *q*.; and if at the same instant she be observed from E., she will be seen at *e*.; while an observer at *x*. will see her at *x*.; and another in the centre of the earth at *c*. will see her at *m*.; this being the true place of her longitude at the time. Now the curved line *q. x. m. e.* will be the line in which the moon will move in longitude. If the moon did not move

at all, then the observer at Q. being brought in twelve hours, by the rotation of the earth, to the point E., the angle E. M. Q. would measure the extent of his motion; nor would the interim motion of the moon (if she did move) at all affect the amount of this angle, or the amount of actual displacement of the observer at Q., who would have changed his place from Q. to E., which is the equatorial diameter of the earth. Hence it must be manifest, that if an observer at X. remove to C., the angle his motion will produce will be X. M. C.; and the motion of the moon in the mean time will not in the least affect the amount of that angle. But, if we take E. Q. = 7925.648, then $x. c. = \frac{E. Q.}{120} = 66.047$ miles.

It may be seen that the time required to produce the displacement of the observer at Q., when moving towards E., is twelve hours. We have, therefore, to divide twelve hours by 120 also, which gives six minutes; the time that X. takes to remove to c., during which the angle x. M. m. is formed in longitude. It is found, that when the moon is at her *maximum* distance, the amount of her motion in longitude, in twelve hours, is about $5^{\circ} 53' 49''$; and when at her *minimum* distance, it is about $7^{\circ} 41' 11''$. These numbers, divided by 120, will give severally $2' 56.541''$, and $3' 50.6''$; which are the *several extents of the angle* X. M. C. when the moon is moving at her slowest rate and at her quickest rate. Now the angle M. C. X. = $28^{\circ} 45' 15'' + X. M. C.$ ($= 2' 56.541''$) = $28^{\circ} 48' 11.541''$, taken from $180^{\circ} = M. X. C. = 151^{\circ} 11' 48.459''$. Then we say, that the sine of $2' 56.541''$: X. C. = 66.047 miles :: sine of M. X. C. = $151^{\circ} 11' 48.459''$: the side C. M. = 37,180 miles. This is the *maximum* distance of the moon.

To find the *minimum* distance, we say that M. C. X. = $28^{\circ} 45' 15'' + 3' 50.6'' = 28^{\circ} 49' 5.6''$; which, taken from 180° , = M. X. C. = $151^{\circ} 10' 54.4''$. And then we say that "the sine of $3' 50.6''$: X. C. = 66.047 miles :: sine of M. X. C. =

D

151° 10' 54.4" : C. M.=28,477 miles," which is the *minimum* distance of the moon.

The mean of these numbers 37180 and 28477=32828.5, which is the MEAN DISTANCE of the moon. The sum of the numbers is 65,657, and their difference is 8703.

Evidence of the correctness of the above computations.

1st. As $\sqrt{\text{maximum distance}}=37180$: $\sqrt{\text{minimum distance}}=28477$:: *maximum* semidiameter of $\text{☾}=1007''$: *minimum* semidiameter of $\text{☾}=881.3''$. Ditto by *Nautical Almanac*=881.1".

2nd. As sum of the distances=65657 : difference of the distances=8703 :: semidiameter at *mean* distance : difference of semidiameter=125.475". Ditto by *Nautical Almanac*=126".

3rd. As *maximum* distance=37180 : mean distance=32828 :: *maximum* motion in twelve hours=27671" : mean motion in twelve hours=24432". Ditto by *Nautical Almanac*=24428".

4th. As *maximum* semidiameter=1007" : $\sqrt{\text{maximum distance}}=37180$ miles : *minimum* semidiameter=881.1" : $\sqrt{\text{minimum distance}}=28464$ miles. Ditto by me=28477 miles.

We find the *true* semidiameter of the moon thus :—
 $\sqrt{\text{maximum distance}}$: maximum apparent semidiameter ::
 $\sqrt{\text{mean distance}}$: 946.61"=apparent semidiameter at *mean* distance. Then $\log. \text{mean distance} + \log. \tan. 15' 46.61'' = \log. \text{true semidiameter} = 150.66$ miles. This, doubled, gives the *true* diameter of the moon=301.32 miles.

The diagram of the eclipse of the moon, 17th January, 1870, given at page 20, will enable the reader to follow my method of computing an eclipse of the moon. The letter C. denotes the centre of the shadow ; B. the moon's place at the *beginning* ; M. her place at the *middle*, and E. her place at the *end*. The letter F. gives her place at the

moment of full moon ; and S. is necessary to compute the magnitude of the eclipse.

How to find the time of an Eclipse of the Moon, on the 17th January, 1870, at Greenwich ; the MEAN distance of the Moon being 32,828·5 miles.

Find the radius of the earth's shadow where the moon crosses it, by this analogy :—"The $\sqrt{\text{mean distance}}$ is to the *mean radius** as the $\sqrt{\text{of the distance at the full moon}}$ is to the radius required."

Or, take the constant log. - - - - - 0·4264743

Add log. of moon's semidiameter }
= 955·7" } 2·9803216

Radius required - - 2551·5 = 3·4067959

The side B. C. = 3507·2

Lat. \nearrow at $\varphi = 369·73''$ L. 2·5678847 = C. F.

Constant log. - - - 9·9978725

C. M. = 2·5657572 = 367·92

Sum. 3875·12 Log. 3·5882852

Diff. 3139·28 Log. 3·4968301

2)7·0851153

Moon's motion in long. in the hour } Log. = B. M. 3·5425576

of full moon—the sun's ditto } 1913·8" Log. *a.* — 3·2818966

1^h 49^m 21^s = 8225 = 0·2606610

C. F. = Log. 2·5678847

Constant log. 8·9944968

M. F. = 1·5623815

— Log. *a.* = 3·2818966

Full Moon 2^h 45^m 12^s

8·2804849 = 019076 = + 1 9

Nautical Almanac begins 0^h 57^m 0^s 2 46 21 = *Middle*

Middle - - - - - 2 46 24 1 49 21

Ends - - - - - 4 35 48 0 57 0 *Begins*

4 35 42 *Ends*

* The *mean radius* = 2527·23".

Then C. B.—C. M. (—Semidiameter δ) =

M. S. = 2183.68" Log. 3.3391691

—Diameter δ = 1911.4 Log. 3.2813516

1.1424 = 0.0578175

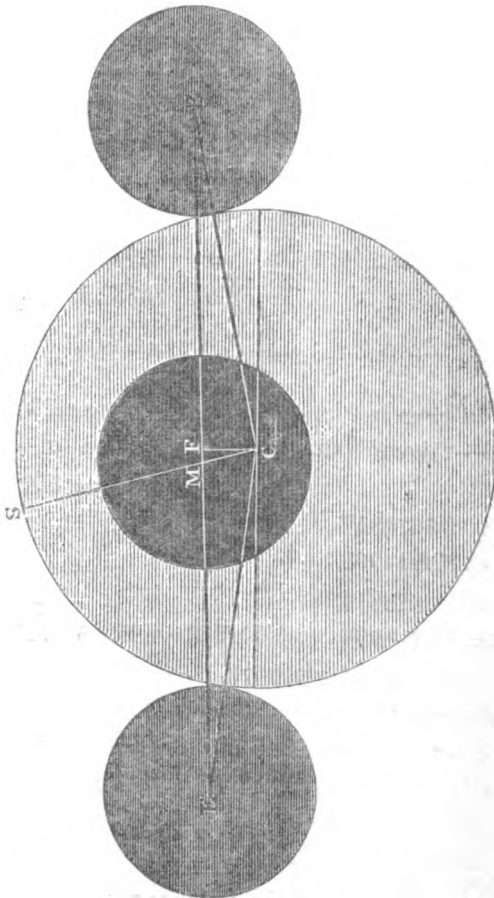
.5

1.6424 = Magnitude of Eclipse

The Nautical Almanac gives 1.653 (δ diameter = 1)

.0106 difference.

Fig. 3



*Calculation of the Eclipse of the Moon for January, 27th, 1869.**

Constant log. - - - 0.4264743	
Add log. of moon's semidiameter } = 999.2" }	2.9996524
Radius required - - - 2667.6	3.4261267
The side B. C. - - -	= 3666.8
Lat. D at δ 2768.65" log. 3.4422680 = C. F.	
Constant log. 9.9978725	
3.4401405	= 2755.17 = C.M.
Sum. 6421.97	log. 3.8076683
Diff. 911.63	log. 2.9598180
	2) 6.7674863
	Log. B. M. = 3.3837431
Moon's motion in long. in the hour of } full moon—sun's ditto }	2102.8" log. a—3.3227980
	1 ^h 9 ^m 2.3 ^s = 1.15065 = 0.0609451
C. F. = Log. 3.4422680	Full moon 13 ^h 30 ^m 24 ^s
Constant Log. 8.9944968	+ 7 48.2
M. F. = 2.4367648	Middle = 13 38 12.2
— Log. a. = 3.3227980	1 9 2.3
7 ^m 48.2 ^s = 130007 = 9.1139668	Begins — 12 29 9.9
	Ends — 14 47 14.5

The seconds reduced to the nearest decimal of a minute, we have, for

Beginning 12 ^h 29.2 ^m	} which <i>exactly</i> agree with the Nautical Almanac.
Middle 13 38.2	
Ending 14 47.2	

Lastly, there is one other proof (though needless) of the correctness of my theory. The diameter of the moon has been shewn to be 301 miles. Now, if we take the time from the *Nautical Almanac* (1870), from the beginning of the eclipse till *the whole body* (B.) of the moon be eclipsed, we find it to be 1^h 0^m .4 = 3624 seconds. Then 3600^s : 1913.8" :: 3624^s : 1926.6"; and then I say (the moon's distance at

* This is sent me by a Yorkshire gentleman. -

the time being 32,195 miles, and consequently her entire revolution = 202,287 miles) that $360^\circ = 1,296,000'' : 202,287 \text{ miles} :: 1926.6'' : 301 \text{ miles}$; which is exactly *the diameter of the moon*. This demonstrates that my theory is, beyond dispute, perfectly and entirely correct, and that the moon is not larger than 301 miles in diameter, and, therefore, is no farther off the centre of the earth than 32,828.5 miles.

It would be a waste of words to add remarks here, by way of demonstrating the *startling fact* that these eclipses, coming out so exact, with the same given in the *Nautical Almanac*, shew, beyond dispute, that the moon *really and truly* is not more than 32,828.5 miles away from the earth. It follows inevitably, that the whole structure of the universe has been hitherto falsely and foolishly built up on the fallacious dreams of Newton; and has to be rebuilt and reconstructed on the basis of truth and facts.

ON THE TRUE DISTANCE OF THE SUN'S BODY FROM THE EARTH.

“Et quoniam eadem natura cupiditatem ingenuit hominibus veri inveniendi, quod facillime apparet, cum vacui curis, etiam quid in cœlo fiat, scire avemus; his initiis inducti omnia vera diligimus; id est, fidelia, simplicia, constantia; tum vana, falsa, fallendia odimus.”—CICERO, de fin. bon. et. mal. ii, 14.

“And forasmuch as Nature itself has implanted in man a craving after the *discovery of truth* (which appears most clearly from this, that, when unoppressed by cares, we delight to know even what is going on in the heavens), led by this instinct, we learn *to love all truth for its own sake*; that is to say, whatever is faithful, simple and consistent; while we hold in abhorrence whatever is empty, deceptive, or untrue.”

Now, as what I am going to bring forward is manifestly the *pure truth*, founded on the twin sciences of Geometry and Trigonometry, and in no way depends on the *fallacious*

observation of the sun made by astronomers, in which they, one and all, *assume* that he has little or no parallax, whereas it will be seen he has a very considerable parallax, I think I am entitled to claim the consent and approbation of all who *love truth for its own sake*.

Time out of mind have astronomers differed in many things; which is no proof of the correctness of the *principles* on which they found their science. But on no subject have they differed so much as on the distance of the sun; yet this is *the* thing they should have ascertained, for it lies at the very foundation of their science, being taken as the *measuring-rod*, by which to determine the distances, dimensions and velocities of all the other heavenly bodies.

The following is a list of the distances of the sun, and contains the amount as received by each astronomer of note:—

Hipparchus	1,586	} Semidiameters of the Earth.
Posidonius ..	13,141	
Ptolemy	1,210	
Albategnius	7,936	
Copernicus	942	
Kepler	3,438	
Ricciolus	7,600	
Newton, about.....	15,000	
Later Astronomers	21,000	
Sir John Herschel	23,984	}
Present amount by M. Le Verrier, about	22,984	

The following Lighthouses have been observed at the number of miles expressed against each; yet the *rotundity* of the earth should have concealed each by a number of feet, as named opposite. Now this is found by multiplying the number of miles (after deducting 4 miles in each case for the height of the eye) of distance into itself and into 8 inches, to find the number of inches, which must be reduced into feet.

The *Dunkirk* Light, coast of France, 194 feet high, is visible 28 statute miles, but should be 190 feet *below the water!*

The Light on Cape *Bonavista*, Newfoundland, is 150 feet high, and visible 35 miles, but should be 490 feet *below the water!*

The Light at *Ballycotton*, Irish coast, 230 feet high, is visible over 40 miles at sea; but ought to be 634 feet *below the horizon!*

The Light on the centre pier at Great Grimsby rises to the height of 300 feet, and can be seen 60 nautical or 70 statute miles. Yet this Light ought to be, at that distance, 2,604 feet *below the horizon!*

Thus, $70 - 4 = 66 \times 66 \times 8 = 34,848$ inches = 2,904 feet—300 feet (height of the tower) = 2,604 feet. The usual sum deducted for refraction is one-twelfth part; this would be 217 feet; and this leaves 2,387 feet, or 796 yards, that the Light should be *below the level of the water!*

How are we to account for this wonderful discrepancy? Only by the *refraction*, which, in these cases, as in all observations of the sun, far exceeds the amount usually allowed for.

To determine the true distance of the sun, we may refer to the same figure (page 16) as we did for shewing the distance of the moon; which her eclipses, coming out exactly right, have demonstrated to be correct. Let N. S. E. Q. represent the earth, and E. Q. the equator. Let M. shew the place of the sun when on the northern tropic, the angle M. c. Q. measuring $23^{\circ} 27' 15''$. In the diagram we may imagine a spectator at c., the centre of the earth, who will see the sun at m., in the curved line e. m. x. q. And we may imagine another at Q. who will see the sun at q. Another at x will see the sun at x., while one at E. will see the sun at e. in the said curved line. The extent of the sun's motion in longitude while moving from m. to x.

during *six minutes*, when he is entering Cancer, will be =14.398".

This angle we take, therefore, as representing that motion, during which he moves from *a.* to *c.*; which represents a distance of 66.047 miles; because, since the earth, in rotating on its axis, brings the point at Q. to the opposite point at E. in 12 hours=720 minutes, and $720^m : 7965.648 \text{ miles} :: 6^m : 66.047 \text{ miles}$.

This angle, therefore, we take for finding the length of M. c. in the diagram, which represents the distance of the sun, when entering Cancer.

The calculation :—

Dec. of ☉ $23^\circ 27' 15''$

$$\begin{array}{rcl}
 & + & 14.398 \text{ Sine } a. c. \quad - \quad - \quad - \quad 4.156370 \\
 180^\circ - & 23 & 27 & 29.398 \text{ Log. } 66.047 \text{ miles} & - & 1.819853 \\
 -90^\circ = & 66 & 32 & 30.602 \text{ Cosine} & - & - & - & 9.599970 \\
 \text{M. c. or dist. of } \odot \text{ in } \varpi & = & 376,861 \text{ miles} & = & \underline{5.576193}
 \end{array}$$

This, corrected for the apogee, = 376,965 miles.

Then, for sun's distance in ♊,

Dec. ☉ = $23^\circ 27' 15''$ in ♊.

$$\begin{array}{rcl}
 & + & 15.3687 \text{ Sine } a. c.* \quad - \quad - \quad 4.128100 \\
 180^\circ - & 23 & 27 & 30.3687 \text{ Log. } 66.047 \text{ miles} & 1.819853 \\
 -90^\circ = & 66 & 32 & 29.6313 \text{ Cosine} & - & - & - & 9.600018 \\
 \text{Dist. } \odot \text{ in } \jmath & 353,159 \text{ miles} & \underline{5.547971}
 \end{array}$$

This, corrected for the perigee, = 353,048 = *Min.*

376,965 = *Max.*

The Max.—Min. = 23,917 miles. $2)730,013$

365,006 = MEAN

Motion of the ☉ daily in ♊ = $61' 4.58''$

Do. do. do. in ϖ = $57' 12.08''$

$3 \cdot 52.50 = 232.5''$

DISTANCE

OF THE SUN.

* This is the motion of the sun in six minutes, when entering ♊.

Evidence of the Truth of the above Distances.

1st. As the mean <i>daily</i> motion of } the $\odot = 59^{\circ} 8.33'' = 3548.33''$ }	<i>a. c.</i> 6.449976
Is to the difference of motion } in \odot and $\text{Mars} = 232.5''$ }	2.366423
So is the mean distance of $\odot = 365,006$	5.562300
To the difference of dist. = 23.917	4.378699
Do. by me - - 23,917	
2nd. As the square root of Max. Dist. <i>a. c.</i> 376,965	7.211850
To the square root of Min. Dist. - 353,048	2.773916
So <i>Max.</i> Semidiameter of Sun = $978.2''$ -	2.990429
To <i>Min.</i> Semidiameter of Sun = 946.66	2.976194
Ditto by <i>Nautical Almanac</i> = 946	
	66 = difference.

Another analogy is this: "As the sum of the distances is to the difference, so is the *mean* of the semidiameters to their difference = $31.58''$;" which differs only .68 of a second from that of their difference = $32.2''$, by *Nautical Almanac*.

Again, and as remarkably exact as any other,

As the Max. dist of \odot - - =	376,965	<i>a. c.</i> 4.4236989
To the Min. dist. of \odot - - =	353,048	5.5478338
So is Max. motion of \odot <i>daily</i>	3664.58''	3.5640242
To Min. Motion of \odot do. =	3432.08	3.5355569

Here are *four* distinct tests, which prove the extreme accuracy of my numbers. I venture to say that no possible doctrine of probabilities can reconcile these *facts*, if truth be not their basis. I invite the great astronomers of our day to condescend to explain this mystery; or, if they are not able to do this, let them at least cease to mislead themselves and the public, by maintaining the preposterous absurdity that the sun is distant from the earth 91,328,600 miles, since it is now fully proved that it is in no case even *half a million of miles* away. Let them cease also to pro-

claim what have been justly called the "execrable superstitions" of Newton, that contradict the plain doctrines of Moses, which assert that the *Sun* and *Moon* were created to serve the earth, and for that only.*

It is manifestly *impossible* that these quantities should agree so *exactly* if the distances I have obtained were not, in reality, those that exist in nature. And, if this be the case, let the astronomers be pleased to explain the why and wherefore. But let them not shuffle off the question by denying the refraction I insist on, until they can explain how it is that those lighthouses are visible when they ought to be, by the rotundity of the earth, many hundred feet below the horizon!

The vulgar idea that the fact of modern astronomers bringing out the time of eclipses correctly is a proof of the truth of their system, is wholly unfounded. All astronomers, in all ages, did this more or less, when even their idea of the sun's distance was very different from the present. The Indians and the Chinese do this—foretel eclipses correctly—though their systems be very many ages older than Newton.

In this work it is seen that I also *foretel eclipses* quite as exactly as do modern astronomers, on the Newtonian system. Yet *they assume* that the *mean* distance of the moon is 237,000 miles; and I have *proved* that her true mean distance is only 32,828·5 miles. This it is obvious and manifest that I could not possibly do, if the moon really were at any other distance than that which I have shewn. But take a single stone from the Newtonian edifice, and the whole structure falls instantly to the ground; because the principle of *gravitation* binds the whole thing together, and that bond being broken by the removal of the moon from

* "God made two great lights, the greater light to rule the day and the lesser light to rule the night."—Gen. i, 14, 16.

its elements, the *fallacy* of the principle becomes palpably evident. It will be observed that in computing eclipses, I make no use whatever of the horizontal *parallax* of the moon; because I do not believe that it can ever be positively and correctly observed. And this fact of the uncertainty of all such *observations* it is that has misled modern men of science.

ON THE PLANET MARS, AND HOW TO DETERMINE THE EXTENT OF ITS ORBIT.

The only safe foundation on which to arrive at this important fact in the solar system, is observation of the number of minutes and seconds that the planet moves when at the point of conjunction with the sun, and the same at the opposite point. I have made a tolerably extensive examination of these motions, over a period of *sixty years*. It results, therefrom, that the average or mean of thirty oppositions gives $21' 41''$ as the amount; and the mean daily motion of the planet, when in conjunction of the sun, is $42' 38.4''$. The motion of Mars (apparent) is compounded of its own proper motion and the motion of the sun. By this we discover that its distance, when in conjunction with the sun, is very nearly five times greater than when it is in opposition. The exact ratio is as $4849''$ to $989.6''$. But to arrive at these distances, we must remember that the daily motion of the planet when in *opposition* to the sun, being *retrograde*, must be *added* to the daily motion of the sun, viz. $59' 8''$. This gives us $59' 8'' + 21' 41'' = 4849''$. In like manner, the motion of the planet, when in conjunction with the sun, must be *subtracted* from that of the sun, thus: $59' 8'' - 42' 38.4'' = 16' 29.6'' = 989.6''$. In the following calculation I take the *mean* motion of Mars, or that he would form about the sun, if he were to move in a perfect circle. I place one foot of the compasses in the circle that describes the sun

(marked S.) and the other in *a.*;* I then mark off an equal distance from S. to B.; I do the same thing with reference to *e.*, and mark off the like distance from S. to A.; then will A. B.=*a. e.*, and both will be equal to the diameter of the earth=7926 miles.

Now the *effect* of the distance A. *e.* ought to be equal to the *difference* between the apparent motion of Mars when in conjunction, and his apparent motion when in opposition. This is proved as follows:—

$$\begin{array}{rcl} \text{To S } a. & = & 361043 \text{ miles} \\ \text{Add S. B.} & = & 361043 \text{ do.} \\ \text{And A. B.} & = & \underline{7926} \text{ do.} \\ \text{A. } a. & = & \underline{730012} \text{ do.} \end{array}$$

Then say : “As the *difference* between the motions }
of Mars in opposition and in conjunction } = 3859.4”

Is to Mars’ motion in conjunction = 989.6

So is the *distance* of A. *a.*=730012 miles

To the *dist.* of Mars in opposition”= R. *e.*=187187 do.

Then to this distance add S. *a.*=361043 do.

Add also A. *e.*=A. B.= 7926 do.

The *Semidiameter of Mars’ orbit*=S. R.†=556156 do.

ON THE MOTION OF MARS WHEN IN CONJUNCTION AND WHEN IN OPPOSITION.

I have stated the distance of Mars when in opposition to be 187,187 miles. Then Mars S.=556,156+S. *a.* (=361,043) =Mars *a.*=917,199, the distance of Mars when in conjunction. We shall now see that his *apparent motion*, when in these points respectively, is in the inverse proportion of these distances; thus:—

$$\text{As } 917,199 : 187,187 :: 4849'' : 989.6''$$

* See the *large* diagram, *fig. 4.*

† It is worthy of remark, that the semiaxis of Mars, according to Sir John Herschel’s system, = $1.5236923 \times 365,006 = 556,157$.

Here again is an exact coincidence of numbers; which it would be perfectly puerile to pretend could come out of anything not founded in truth. This brief statement of indisputable *facts* I would recommend to the careful consideration of astronomers.

ON THE STATIONARY APPEARANCE OF THE PLANET MARS.

When this planet is at the distance of $136^{\circ} 48'$ from the sun, after his conjunction, he is found to be *stationary*, as refers to the fixed stars. This distance is taken from Laplace, but it may not be perfectly correct; yet the results I bring out are extremely so.

I first find the distance of Mars from the centre of the earth. In the triangle (*fig. 4*) P. shews the point that the planet becomes stationary at, E. the centre of the earth, and S. the sun. We have the angle S. E. P. = $136^{\circ} 48'$, the side S. E. = 365,006, and the side S. P. = 556,156 : the rest is found as follows :—

$$\text{As S. P. } 556,156 : \text{sine S. E. P. } 136^{\circ} 48' :: \text{S. E. } 365,006 : \text{sine S. P. E. } 26^{\circ} 41' 49''.$$

$$\text{Then } 180^{\circ} - \text{S. P. E. } 26^{\circ} 41' 49'' + \text{S. E. P. } 136^{\circ} 48' = \text{P. S. E. } = 16^{\circ} 30' 11''.$$

$$\text{As sine S. E. P. } 136^{\circ} 48' : \text{S. P. } 556,156 :: \text{sine P. S. E. } 16^{\circ} 30' 11'' : \text{P. E. } 230,788.$$

This is the distance of the *stationary point* P. from the centre of the earth E. Now as the observer, if placed at E., would not see the planet's motion *directly*, we must find the effect of the *oblique* motion, as viewed from E. when the planet is *stationary*. Well, as observed from E., the planet, on the day of the stationary position, appears to move $59' 8''$, which is the rate of the motion of the sun; and the angle c. E. P. represents $59' 8''$; so that while the planet moves from P. to *n*. in the orbit, it appears to the observer to pass from P. to *c*. through a portion of a circle of which E. is

the centre. We have, therefore, to find the difference between the *chord* of the arc P. *n.* and of the arc P. *c.* To do this we must find the length of the line E. *n.*

The angle S. E. P. = $136^{\circ} 48'$ — *n.* E. P. = $59' 8''$ = S. E. *n.* = $135^{\circ} 48' 52''$.

Then, as S. *n.* 556,156 : sine S. E. *n.* $135^{\circ} 48' 52''$:: S. E. 365,006 : sine S. *n.* E. $27^{\circ} 13' 17''$.

And 180° — S. *n.* E. $27^{\circ} 13' 17'' + 135^{\circ} 48' 52''$ = E. S. *n.* $16^{\circ} 57' 51''$.

Now as sine S. E. *n.* $135^{\circ} 48' 52''$: S. *n.* 556,156 :: sine E. S. *n.* $16^{\circ} 57' 51''$: E. *n.* 232,819.6.

Having now the distances E. P. and E. *n.* we find the length of the chord of the arc P. *n.* as follows:—

From	180°	0'	0''
Take	0	59	8
	2)179	0	52
	89	30	26

E. P. = 230,788

E. *n.* = 232,819.6

463,607.6 = the sum; and 2031.6 = the difference.

We say, As the sum 463607.6 : the difference 2031.6 :: tan. $89^{\circ} 30' 26''$: tan. $\frac{1}{2}$ diff. ang. $26^{\circ} 59' 57''$; and the sum of these tangents = $116^{\circ} 30' 23''$ = *n.* P. E.; whence we have 180° — *n.* P. E. + P. E. *n.* = $59' 8''$ = P. *n.* E. = $62^{\circ} 30' 29''$. Then we say, As sine *n.* P. E. = $116^{\circ} 30' 23''$: E. *n.* = 232819.6 :: sine P. E. *n.* $59^{\circ} 8'$: chord of P. *n.* = 4474.96.

Now draw the line P. *c.* perpendicular to *n.* E. and in the triangle P. *c.* E. we have the side P. E. = 230788 and the angles. Whence, we say that rad. : P. E. = 230778 :: tan. *c.* E. P. = $59' 8''$: P. *c.* 3970.21.

The apparent angular motions being inversely as the distances, and as the motion of Mars, when he appears stationary, is viewed from the surface of the earth at *o.*, at the distance of P. E. = 230788 — E. *o.* = 3963 = P. *o.* 226825, we must compare this with R. *e.* = 187187, thus :

As stat. dist. $P. o. = 226825$: opposition dist. $R. e. 187187$: :
 opposition motion $4849''$: stat. motion 4001.63 . This would
 be the *apparent* motion if seen *direct* ; but as it is *oblique*
 to the observer, we reduce it in the ratio of 4474.96 to
 4001.63 . Then, "As $4474.96 : 3970.21 :: 4001.63 : 3550.27''$
 $= 59' 10.27''$; which differs only $1.94''$ from the motion of
 the sun daily $= 59' 8.33''$.

This distinctly proves the position and the dimensions of
 the orbit of Mars to be such as I have stated them ; and the
 true cause of the apparent *stationary* appearance of Mars
 to be the fact that he appears to move just at the same rate
 as the sun moves from him, whence he seems to be *stationary*
 among the constellations.

This will be farther illustrated by the following diagram :
 —Let $T.$, *fig. 5*, shew the earth in the centre ; $A. P. U. C.$
 the zodiac ; and $D. E. g. h.$ the circle in which the *mean*
 motion of Mars is performed about the sun $S.$ At the same
 time that this centre moves round the circumference $S. R. n.$,
 we see the constellations, as well as the planets, move round
 the earth (apparently) every day. But we see also that the
 constellations appear to accomplish their revolution in less
 time than the planets, except when the planets are said to
 be *retrograde*. When Mars is at $d.$, in the line $T. U.$, about
 136° from the sun, his motion, and that of a fixed star (so
 called) at $U.$, appear to be *equal*, for both appear to move
 round the earth in 23 hours 56 minutes and 4 seconds ;
 namely, $U.$, in the circle $B. U. P.$, and $d.$, through the dotted
 circle $d. n. Q.$ Mars is then said to be *stationary*. As he
 advances in his own orbit from $d.$ towards $u.$, his distance
 from the earth diminishes daily, until he arrives at $u.$, when
 his distance from the earth is the least, and his circle of
 diurnal motion is then in the interior dotted circle, $u. x. a.$
 His motion in this case, instead of appearing *equal* to that
 of the fixed stars, seems to be *quicker*, because the circle of
 his diurnal motion is diminished ; so that, at the end of 24

hours, he appears to have advanced before the fixed stars $21' 41''$; and this is termed *retrograde*, or contrary to the order of the signs.

As Mars advances in his orbit from *u.* through *n.* to *D.*, his distance from the earth increases, and, therefore, his apparent motion gradually *decreases*, until he arrive at the point *E.* behind the Sun *S.*, when his motion is in the largest dotted circle, *E. L. M.* Now, whereas his motion when at *u.*, in 24 hours, was $21' 41''$ *before* the fixed stars, it now falls *behind* them, in the same space of time, $42' 38''$; and this is termed *direct*.

That the apparent motion of Mars, when in opposition, exceeds his apparent motion when in conjunction, in about the proportion of 5 to 1, is manifest from what follows:—

January 4th, 1867, 6 days before opposition,

Mars' longitude was	-	-	-	-	$3^s 22^d 51^m$
January 17th, 1867, 7 days after opposition	-				<u>3 17 43</u>
In 13 days Mars had exceeded the angular					
motion of the signs by	-	-	-	-	0 5 8
To which add the amount the signs advance					
in 13 days= $59' 8'' \times 13$	-	-	-	-	<u>0 12 49</u>
					<u>0 17 57</u>

But when this planet moves in the highest part of his orbit, as from *D.* to *F.*, he takes more than 74 days to make a progress even less than before.

November 26th, 1867, 37 days before con-

junction, the apparent place of Mars was	-				$8^s 13^d 30^m$
February 8th, 1868, 37 days after conjunction					<u>10 10 7</u>

Hence Mars had fallen back, according to the

order of the signs, in 74 days	-	-	-		1 26 37
This subtracted from the whole advance of					
the signs in 74 days= $74 \times 59' 8''$	-	-	-	-	<u>2 12 55</u>
					<u>0 16 18</u>

F

The difference shews the whole angular distance by which Mars, in 74 days, has exceeded 74 revolutions round the earth.

The cause of this difference is evident from the figure (5) annexed; which shews the true position of the circle of Mars. The angle C. T. A. subtends $56^{\circ} 37'$ of the Zodiac, through which Mars appeared to move in 74 days (from 26th November, 1867, to 8th February, 1868), when moving through the superior part of his orbit; but the portion of *his own orbit*, comprehended in the same angle, is about 82° , the arc D. F. And the arc of his orbit *g. h.* comprehended in the angle *g. T. h.* (which is equal to D. T. F.) is only a very small part of the arc D. F., as may be seen in the figure.

This explanation, in addition to the proof given by calculation, renders the doctrine of the *direct*, *retrograde* and *stationary* appearances of Mars to be clearly understood.

HOW TO FIND THE ORBIT OF JUPITER.

The motion of Jupiter is found to be, when in *opposition*, $7^{\circ} 54''$, and when in conjunction, $13^{\circ} 45''$. The former or *retrograde* motion, *added* to the daily motion of the sun, = $4022''$; the latter or *direct* motion, *taken from* the motion of the sun, = $2723''$. The difference of these is $1299''$. Then we say:—

As $1299'' : 2723'' :: 730,012 \text{ miles} : 1,530,271 \text{ miles}$, which is the *distance of Jupiter from the earth*, when in opposition from the sun, = R. *e.*, *fig. 4.** To this, if we add S. E. + E. *e.* = 368,969, we have 1,899,240 miles, for the *mean distance of Jupiter from the sun*, or his *semiaxis*. Now, if we multiply the figures given by Sir John Herschel (p. 416, *Treatise on Astronomy*), which are 5·202776, into the *mean distance of the sun*, or 365,006, we get 1,899,045; which agrees to within 195 miles with my calculation.

* This must be conceived to extend from *e.* to the circle of Jupiter.

To find the distance of Jupiter from the Earth, when in conjunction, &c.

$$\begin{array}{rcl}
 \text{To the distance in } \textit{opposition} & = & 1,530,271 \text{ miles} = \text{R. } e. \\
 \text{Add A. B.} = a. e. & = & - - - - - 7,926 \\
 \text{Add S. } a. & = & - - - - - 361,043 \\
 \text{Add also S. B.} & = & - - - - - 361,043 \\
 \hline
 \text{Distance in } \textit{conjunction} & = & 2,260,283
 \end{array}$$

Then we have:—Distance in conjunction = 2,260,283 : distance in opposition = 1,530,271 :: *motion* in opposition = 4022" : *motion* in conjunction = 2723".

This is another piece of evidence of the truth of my system; which I again commend to the examination of astronomers. Taking these numbers and working out the daily motion of Jupiter, when he *appears* to be stationary, if we allow the *mean* distance of the planet from the sun, at the time, to be $115^{\circ} 30''$, we get $3535.4''$; which agrees to within a very few seconds of the truth, and becomes farther evidence of the truth and reality of the system.

ON THE PLANET SATURN AND THE EXTENT OF HIS ORBIT.

The *mean* of a large number of years' observations of this planet's motion, when *direct*, in conjunction with the sun, is $7' 33''$; and that of his *retrograde* motion, when in opposition, is $4' 47''$.

To the mean motion *retrograde* = $4' 47''$

Add the daily advance of the sun = $59' 8''$

True apparent motion in φ = $63' 55'' = 3835''$

The mean motion *direct* $7' 33''$

Which subtract from the sun's $59' 8''$

True apparent motion in \oslash $51' 35'' = 3095$

Difference = 740

Now apply these quantities to the *figure* 4, as in the case

of Mars, and we have $740'' : 3095'' :: 730,012 \text{ miles} : 3,053,226 \text{ miles}$, which is equal to $R. e.$,* and is the true *distance* of Saturn from the earth, when at the *opposition*. To this distance add $e. a. = 7,926 \text{ miles}$ and $S. a. = 361,043 \text{ miles}$, and you have $3,422,195 \text{ miles}$ = the *semidiameter of Saturn's orbit*, or his mean *distance* from the sun.

Then $R. e. = 3,053,226 + a. e. = 7926 = R. a. = 3,061,152$; and this, taken from the *double* of the semidiameter of Saturn's orbit, will give us $3,783,238 = \text{Saturn } a.$, or the greatest mean distance of Saturn from the earth.

The apparent *distances* of Saturn in *opposition* and *conjunction* agree *exactly* with the apparent *motions* when in these points; for, as $\text{Saturn } a. = 3,783,238 : R. e. = 3,053,226 :: 3835'' : 3095''$.

And this *proves*, once more, that the mean *distances* from the observer are correct; for otherwise they could not agree with the mean *apparent motions*. Again I commend these facts to the attention of astronomers, and ask them to contradict them, if possible.

ON THE PLANET VENUS, AND HOW TO FIND THE EXTENT OF HER ORBIT.

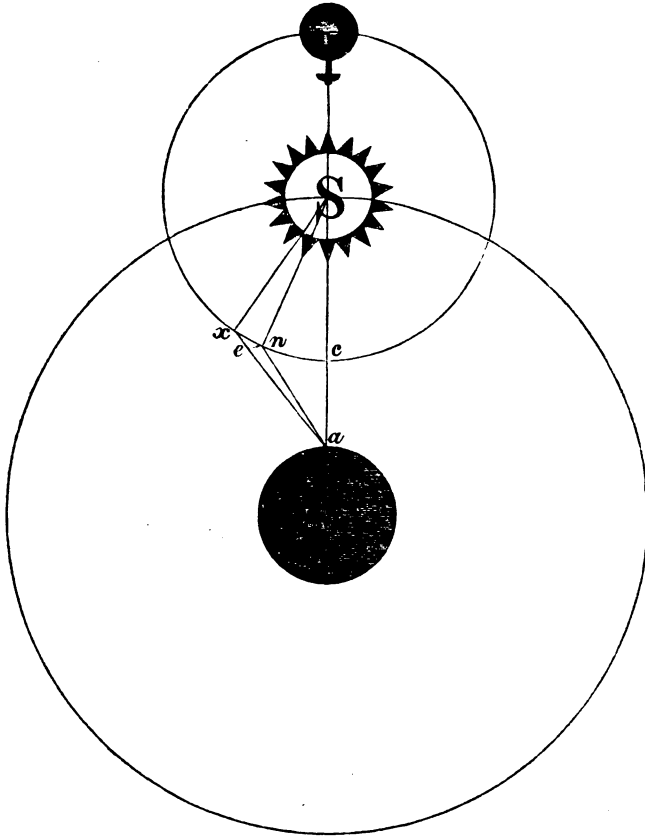
The *mean motion* of Venus has been shewn to be observed, when in inferior conjunction with the sun, $36' 47''$, and the same when in superior conjunction with the sun $74' 45''$. To the former (being *retrograde*) add the sun's daily mean motion, $59' 8''$, and we have $95' 55'' = 5755''$. From the latter *subtract* the sun's motion, and we have the separate motion $15' 37'' = 937''$. Now half the sum of these motions is $3346''$; and the difference between this *half* and the lesser motion is 2409 , which is equal to the *effect* of a distance equal to the semidiameter of the orbit of Venus.

Thus: As $3346'' : 2409'' :: 361,043 (=S. a. \text{fig. } 7) : 259938$,

* Continued to the circle of Saturn.

which is *the semidiameter of the orbit of Venus*.* Then $S. \varphi = 259938 + S. a. 361,043 = 620981$. And $S. a. - S. c. = 101105$ miles. And these numbers perfectly agree with the *observed motions*; for, as $\varphi a. = 620981$ miles : $c. a. = 101105$ miles :: the *max.* motion of φ $5753''$: the *min.* motion of Venus $= 937''$.

Fig. 7.



* Sir John Herschel gives the same as $\cdot 7233316$ of the distance of the earth from the sun. Then $365006 \times \cdot 7233316 = 264020$, from which take 3963, the semidiameter of the earth, and we have 260057; which differs only 119 miles from mine.

This is again another piece of irresistible evidence of the truth of my system. *Ex uno disce omnes.*

We will here examine the angle of greatest elongation of Venus.

Let a line be drawn from D. to *a*. (in the large diagram 4) a tangent to the orbit of Venus, and then the line D. S. will be at a right angle thereto. Then, as S. *a*. 361,043 : rad. :: D. S. 259938 : sine $46^{\circ} 3' 5''$. This is the angle of the mean greatest elongation of Venus; and it differs only $3' 5''$ from what Ptolemy declared it to be.

THE STATIONARY APPEARANCE OF VENUS EXPLAINED AND DEMONSTRATED.

Astronomers generally state that this planet is *stationary* when about 29° from the sun. That this is so I shall demonstrate and prove the reason why. In *fig. 7* let *a*. shew the place of the observer, S. that of the sun, and *x*. that of the planet. Then S. *a. x*. is an angle of 29° , the side S. *a.* = 361,343 miles, and the side S. *x.* = 259,938 miles. The other angles and the side *x. a.* are thus found:—

As S. <i>x.</i> = 259,938 <i>a. c.</i>	4.5851302	As sine S. <i>a. x.</i> 29°	0.3144290
Is to sine S. <i>a. x.</i> = 29°	9.6855710	Is to S. <i>x.</i> 259938	5.4148698
So is S. <i>a.</i> = 361,043	5.5575589	So sine <i>x. S. a.</i> $13^{\circ} 19' 43''$	9.3627380
Tosine S. <i>x. a.</i> = $137^{\circ} 40' 17''$	9.8282601	To <i>x. a.</i>	123605 = 5.0920368
S. <i>a. x.</i> = 29 0 0			
<i>x. S. a.</i> = 13 19 43			
<u>180 0 0</u>			
S. <i>a. x.</i> = $29^{\circ} - 59' 8'' = 28^{\circ} 0' 52'' =$ S. <i>a. n.</i>			

Now find the distance of *n. a.*

As S. <i>n.</i> = 259938 <i>a. c.</i>	4.5851302	As sine S. <i>a. n.</i> $28^{\circ} 0' 52''$	0.3281850
To sine S. <i>a. n.</i> $28^{\circ} 0' 52''$	9.6718150	Is to S. <i>n.</i> 259938	5.4148698
So is S. <i>a.</i> 361043	5.5575589	So sine <i>n. S. a.</i> $12^{\circ} 42' 26''$	9.3423620
To sine S. <i>n. a.</i> = $139^{\circ} 16' 42''$	9.8145041	To <i>n. a.</i>	121735 = 5.0854168

$$\begin{array}{r}
 S. a. n. = 28 \ 0 \ 52 \\
 n. S. a. = 12 \ 42 \ 26 \\
 \hline
 180 \ 0 \ 0
 \end{array}$$

Now to find the side $x. n.$ we say:—

$$\begin{array}{rcl}
 x. a. & = & 123605 \\
 n. a. & = & 121735 \\
 \text{As sum} & = & 245340 \quad a. c. \ 4.6102316 \\
 \text{To the diff.} & = & 1870 \quad 3.2718416 \\
 \text{So tan. } \frac{1}{2} \text{ unk. } \angle 's & = & 89^{\circ} 30' 26'' \quad 2.0654620 \\
 \text{To tan. } \frac{1}{2} \text{ diff.} & = & 41 \ 32 \ 51 = 9.9475352
 \end{array}$$

$$\begin{array}{r}
 \text{From } 180^{\circ} \ 0' \ 0'' \\
 \text{Take } 0 \ 59 \ 8
 \end{array}$$

$$2) 179 \ 0 \ 52$$

$$\text{Half} = 89 \ 30 \ 26 \text{ unk.}$$

$$131 \ 3 \ 17 = x. n. a.$$

$$0 \ 59 \ 8 = x. a. n.$$

$$47 \ 57 \ 35 = a. x. n.$$

$$180 \ 0 \ 0$$

$$\text{Then sine } x. n. a. = 131^{\circ} 3' 17'' \ a. c. \ 0.1225810$$

$$\text{Is to } x. a. = 123605 \text{ miles} \quad 5.0920368$$

$$\text{So is sine } x. a. n. \ 59' \ 8'' \quad 8.2355370$$

$$\text{To } x. n. = 2819.39 \text{ miles} = \underline{3.4501548}$$

Then for the side $e. n.$ we have the angle $e. a. n. = 59' \ 8''$,
the angle $e. n. a. = 90^{\circ}$, and the side $n. a. = 121,735$ miles.

$$\text{As rad. to } n. a. \ 121735 \text{ miles} \quad - \quad - \quad - \quad 5.0854168$$

$$\text{So is tan } e. a. n. \ 59' \ 8'' \quad - \quad - \quad - \quad 8.2356010$$

$$\text{To } e. n. = 2094.2 \text{ miles} = \underline{3.3210178}$$

Then we say:

$$\text{As } n. a. \ 121735 \ a. c. \quad - \quad - \quad - \quad - \quad 4.9145832$$

$$\text{To dist. } \varphi \text{ in Inf. } \angle = c. a. = 101105 = 5.0047727$$

$$\text{So is mot. of } \varphi \text{ in Inf. } \angle = 5755'' \quad - \quad 3.7600453$$

$$\text{To } 4779.7'' = \underline{3.6794012}$$

This last sum must be reduced in the ratio of $x. n.$ to $e. n.$

$$\text{As } x. n. = 2819.39 \ a. c. \ 6.5498452$$

$$\text{Is to } e. n. = 2094.2 \quad - \quad 3.3210178$$

$$\text{So } a. c. \ 4779.7'' \quad - \quad - \quad 3.6794012$$

$$\text{To } 3550.3 \quad - \quad - \quad \underline{3.5502642}$$

$$\odot \text{ daily mot.} = \underline{3548}$$

2.3. This agrees, to within this very

slight difference, with what we know that Venus ought to move, viz., the same as the daily motion of the sun; which causes her to appear, in reference to the sun, or to the stars from which the sun moves, to be STATIONARY.

N.B.—It will be seen that we have, in the above calculation, taken the *distance* of Venus from *a.*, the point of observation on the earth, to be 101105 miles, when she is in *inferior* conjunction, at *c.* in the diagram. This is taking the *mean* distance of Venus from S, the sun, to be 259938 miles. Then the *double* of this = $\varphi c.$ = 519876 miles, or the whole diameter of Venus' orbit + *c. a.* = 101105 miles = $\varphi a.$ = 620981 miles.

And then we find that, as $\varphi a.$ = 620981 miles *a. c.* 4.2069217

Is to *c. a.* = 101105 miles—5.0047727

So is the *max.* mot. of φ = 5755"—3.7600453

To the *min.* mot. of φ = 937" = 2.9717397

Herein is presented a *double* demonstration of the truth and reality of our numbers, for we prove that *no other distance* would fit the motion of Venus when apparently *stationary*; and then we prove also that this very distance exactly accords and agrees with the relative *motions* (OBSERVED) of the planet when in *superior* conjunction and when in *inferior* conjunction with the sun. How the astronomers can overcome this palpable evidence that Venus really is only at this short distance from the sun and the earth, and therefore that their ideas of her distance are built on the baseless fabric of a vision, we know not.

ON THE PLANET MERCURY AND ITS ORBIT.

The mean motion of mercury is about 58' 1" when in inferior conjunction with the sun, and *retrograde*; but when in superior conjunction, and *direct*, it is 111' 43".

The mean motion <i>retrograde</i> , in inf. $\odot = 58' \ 1''$	
Motion of the sun, <i>add</i> - - - - -	59 8
	<hr/> 117 9 = 7029''
Mean motion <i>direct</i> , in sup. \odot - - -	111 43
Motion of the sun, <i>subtract</i> - - - - -	59 8
	<hr/> 52 35 = 3155
	<hr/> 2)10184
	5092

Difference from former = 1937

Then we have, as with Venus, $5092'' : 1937'' :: 361043 : 137341$ miles, which is the *semidiameter* of the orbit of Mercury. Sir John Herschel gives the *mean* distance of Mercury as $\cdot 3870981$ of the earth's. Then $\cdot 3870981 \times 365\cdot 006 = 141261$; from which take the semidiameter of the earth, 3963, and we have 137298; which agrees with mine to within 43 miles.

As the circle marked E. in *fig. 6* represents the earth, so *a.* shews the place of the observer on the surface, S. the sun, and F. G. the semidiameter of the orbit of Mercury. The greatest elongation angle is found, as with Venus, thus:

As S. *a.* = 361043 : Rad. : : S. F. = 137341 : Sine S. *a.* F.
= $22^\circ 21' 31''$.

Ptolemy found this angle = $22^\circ 23' 30''$; and modern astronomers make it, I believe, = $22^\circ 30'$.

I here close this portion of my investigation. I might have gone into the question of the quadratures or square aspects of Mars, Jupiter and Saturn, and shewn thereby farther evidence of the orbits which have been delineated, being true, both in position and in dimensions; but I forbear, as this work is merely an *introductory essay*, and makes no pretensions to be an elaborate treatise on the important and interesting subjects on which it treats. And, moreover, I feel that, if the evidence given touching each of the planets be not sufficient to satisfy enquirers after

g

truth, so neither would be any degree of evidence that might be brought forward for that purpose.

Note on the Mean Distances of the Sun and its Mean Motions.

These are in inverse proportion. The following brief calculation shews this:—

Mean distance in summer solstice, or in apogee = 376965

Do. do. in winter solstice, or in perigee = 353048

Half 730013

= Mean distance 365006.5

Then mean distance—min. distance = 11958.5 = difference.

Then, "As the mean distance = 365006.5 = a. c. 4.4376994

Is to the difference = 11958.5 4.0776766

So mean *daily* mot. of \odot = 59' 8.33" = 3548.33" 3.5500240

To the difference of extreme }
and mean angular motions } = 116.25" = 2.0654000
= 1' 56.25"

To mean mot. = 59 8.33

Maximum = 61 4.58

Deducted = to the Minimum = 57 12.08

Difference = 3 52.5 = 232.5"

Then, "As mean daily motion of the }
sun = 59' 8.33" = 3548.33" } a. c. 6.4499760

To the difference of extreme }
angular motion = 232.5" } 2.3664230

So is my mean motion = 365,006.5 5.5623006

To the difference of distance = 23916.6 miles" 4.3786996

Do. by me - 23917

.4 difference.

And here I beg to call attention to the striking *fact*, that I arrive at this *difference* of distances by no cunning or conjuration, but by the simple and plain rules of trigonometry, worked out exactly in the same manner as in the case of the moon, which lead to her correct times of eclipses; and

which is hereby proved to be absolutely and exactly correct, by reference to the mean daily motion of the sun.

On the Dimensions of the several Planets.

The mean *apparent* semidiameters are as follows :—

Saturn=	8.25"	which gives his	true diameter=	273.392	miles.
Jupiter=	20.335	do.	do.	=374.378	„
Mars =	5.5	do.	do.	= 29.534	„
Venus =	17.45	do.	do.	= 61.066	„
Mercury=	4.2	do.	do.	= 14.6428	„

N.B.—It is this extremely *minute character* of Mercury that explains why he is so rarely to be seen. This is not owing entirely, as has been erroneously supposed, to the light of the sun. For if in the *fig. 6* we take *S. a.*, the distance of the sun from a spectator on the earth, to be=361,043 miles, and *S. F.* (the place of Mercury) to be=137,341 miles, then will *a. F. S.* be a right angle, and the angle *S. a. F.* will measure $22^{\circ} 21' 31''$, while *a. F.* will come out=333,901 miles. But taking *S. G.*=137,341 miles, we find the angle *S. a. G.* = $20^{\circ} 49' 37''$; which differs only $1^{\circ} 31' 54''$ from the angle *S. a. F.* in the other triangle; and the side *a. G.* in the mean time measures 386,282 miles, which exceeds *a. F.* by 52,381 miles. It is the fact, then, that Mercury is so small which renders him invisible at *G.*, while he may be seen plainly enough when he is at *F.*, which is 52,381 miles nearer to the eye; and this fact is not due to the difference of the angle only under which he is seen.

THE THEORY OF THE SUN'S MOTION ABOUT THE EARTH.

The sun may be considered as a vast mass of *positive* magnetic matter; and the earth as a large magnet. The north pole of the earth is *positively* magnetic; and when it points to the sun, the sun is *repelled* therefrom, according to

the well known law of magnetism. Hence in the summer the earth is at its *greatest distance from the sun*. The south pole of the earth is *negatively* magnetic, and when it points to the sun, that body is attracted to it, in accordance with the well known magnetic law. Hence in the winter the earth is at its *least distance from the sun*.

If this theory be correct, it will be found that the relative increase or decrease of the distance of the earth from the sun will bear a certain proportion to the *time* the sun occupies in passing from equinox to equinox alternately. Thus, as in the summer half-year, the sun is longer in passing from Aries $0^{\circ} 0'$ to Libra $0^{\circ} 0'$ than he is in the winter half-year in passing from Libra to Aries, so in the summer half-year he reaches the apogee, or *greatest distance*; while in the winter he reaches the perigee, or *least distance*. And as in the former case he is about 11958.5 miles *farther* from the earth than his mean distance, so in the latter case he is as much *nearer* the earth than his mean distance. Whence the range of the variation in distance is double the above sum, or 23917 miles. That the theory *is* correct, has been already, and will be farther demonstrated, by the following simple problems; most of them based on this theory, which are sufficient to compute correctly all the important points of the solar system, as relates to the sun, the earth, and the planets.

These problems are solved by direct and simple proportion, without any relation to algebraic formulæ, or series, &c., or any other thing than reference to triangles in a plane, and the aid of logarithms, so that they are open to the understanding of any well-instructed school-boy. The object of the author has been thereby to confute the impious pretensions of mathematicians, that *they* only are qualified to investigate and comprehend the wonders of God's creation, as shown in His *great* handiwork, the Solar System, of which this earth is the chief portion.

PROBLEMS FOR EXPLAINING THE PHENOMENA OF THE
SOLAR SYSTEM.

PROBLEM I.—*The Ecliptic Equation; and how to find thereby the Mean Equation of the Sun.*

The sun occupies a longer time in passing through the northern hemisphere than in passing through the southern hemisphere. The difference may be taken at 7·7275 days; which is the ecliptic equation. To turn this into an arc of the ecliptic, say: "As 365·242264 days are to 180°, so are 7·7275 days to 3°·8083=3° 48' 30".

Then $\frac{3^{\circ} 48' 30''}{2} = 1^{\circ} 54' 15''$, the Mean Equation of the Sun.

PROBLEM II.—*To find the "True" Equation of the Sun, operate as follows:—*

Half the Circle = 180°

Ecliptic Equation = 3·8083

As the square root of the *diff.* 176·1917 Log. a. c. 8·8770074

Is to the square root of the *sum* 183·8083 Log. - 1·1321825

So is the sine of the Mean Equation 1° 54' 15" Log. 8·5215025

To the sine of - - - - - 1° 56' 41" Log. 8·5306924
2)3° 50' 56"

Half is the "True" Equation = 1° 55' 28" which call T.E.

PROBLEM III.—*To find the Maximum and Minimum Angular Motion of the Sun.*

Rule.—Radius is to the sine of the true equation as the mean angular motion to the maximum increment of angular motion.

Thus: Log. sine T.E. 8·526069

Log. Mean Angular Motion 3548·33" = 3·550024

Log. Max. Increment 116·25 — 2·076093

Max. Ang. Motion . 3664·58

This is $1^{\circ} 1' 4.58''$; the amount of max. angular motion. The mean angular motion $= 3548.33'' - 116.25'' = 3432.08'' = 57' 12.08''$, which is the minimum angular motion.

PROBLEM IV.—*To find the Sun's Angular Motion at any time, the Sun's Longitude being given.*

Rule.—The log. sine of the true anomaly* + log. sine T. E. + log. mean angular motion = log. increment required. This applied to the mean angular motion gives the required angular motion.

Example.—At $11^h 8^m 30^s$ p.m., 22nd October, 1857, the sun's longitude was $209^{\circ} 30' 54''$: the longitude of the sun's perigee was $280^{\circ} 28' 42''$. Required his daily angular motion? $90^{\circ} - (280^{\circ} 28' 42'' - 209^{\circ} 30' 54'') = 19^{\circ} 2' 12'' =$

T. A. log. sine	- - - - -	9.513448
T. E. $1^{\circ} 55' 28''$ log. sine	- -	8.526101
Mean angular motion $= 3548.33''$ log.	-	3.550024
Increment required $= 38.86$ log.	-	1.589573
Angular motion required $= 3587.2$	$=$	59' 47.2"
Do. by Nautical Almanac	- - -	59' 49.6"

PROBLEM V.—*To find the Sun's Distance from the Earth at any time: and also his Semidiameter, the Sun's Longitude being given.*

Rule.—The log. sine T. A. + log. sine $\frac{T. E.}{2}$ + log. of mean distance of the sun = the "correction;" which, applied to the mean distance, gives the true distance.

Example.—Required the sun's true distance at mean noon at Greenwich, 6th October, 1869? And thence his semidiameter at the same time?

* The True Anomaly $= 90^{\circ} - (\text{longitude of perigee} - \text{sun's longitude})$ call this T. A.

The sun's perigee, long. = $280^{\circ} 10' 41.2''$

The sun's *true* longitude = $193 \ 16 \ 5.47$

$$\begin{array}{r} 86 \ 54 \ 35.73 \\ \hline 90 \ 0 \ 0 \end{array}$$

T. A. = $3 \ 5 \ 24.27$ sine = 8.7316360

$\frac{\text{T. E.}}{2} = 57' \ 44''$ sine = 8.2251325

Sun's *mean* dist. = $365006 = 5.5623000$

The "correction" = $330.42 = .5190685$

Sun's *true* distance = 364675.58 miles.

Now, to find the semidiameter, we must take the square roots of the distances *inversely* and correct these distances for the semidiameter of the earth.

Thus *max.* dist. = $376965 - 3963 = 373002$; and the *mean* dist. = 365006 plus the "correction" = $365336 - 3963 = 361373$.

Then $\sqrt{373002} = a. c. \quad - \quad - \quad 7.2141445$

To *max.* semidiameter $\quad - \quad 978.2'' = 2.9904277$

So $\sqrt{361373} \quad - \quad - \quad - \quad 2.7789778$

To sun's semidiameter $\quad = 962.83'' = 2.9835400$

Do. by *Nautical Almanac* = 962.8

$.03$ difference

Here we see that T. A. = the true anomaly, and T. E. = the *true* equation, are involved with the *mean* distance of the sun so completely, that it is manifest they must be entirely correct; or they could not bring out the sun's semidiameter so absolutely exact. Is not this evidence that the whole of the usual cumbrous computations, to effect the same point, are really and truly unfounded and foolish; and that the Newtonian system is a sheer piece of *invention*? How can the dream of "gravity" be maintained in defiance of plain facts like these? Every honest-minded man will at once acknowledge that there is, indeed, a volcanic force, an earthquake power of truth, in this one problem that no amount of sophistry can withstand.

PROBLEM VI.—*To determine the Longitude of the Sun from the Mean Equinox at any distant period, the Longitude at some similar epoch being given.*

Rule 1st.—Find the time of the given longitude from the nearest perigee or apogee of the sun, which call Δ . 2nd. Find the time of the required longitude from the nearest perigee or apogee, which make equal to Δ . 3rd. Add the amount of the motion of the perigee or apogee in the elapsed time—computed at the rate of $61.9''$ yearly—to the given longitude; the sum will be *the longitude required*.

Example.—Given, the sun's longitude, plus aberration= $20.5''$, at $3^h 42^m 29^s$, p.m., 13th November, 1805, mean time, $= 230^\circ 52' 5''$; required his longitude in November, 1859, when at an *equal distance* from the perigee?

By computation, or inspection of tables of mean motion, the sun's mean longitude and his perigee were found to agree at $3^h 7^m 50^s$, p.m., mean time, on the 31st December, 1805. Then, taking the date of the given longitude from this time, we find $\Delta = 47^d 23^h 25^m 21^s$. The sun's mean longitude and his perigee were again found to coincide at $3^h 42^m 36^s$, p.m., mean time, on the 1st January, 1860; from which date, taking Δ , we come to November, 1859, $14^d 4^h 17^m 15^s$, mean time. For this date we have to determine the sun's longitude. The period elapsed is 54 years.

Then to the given longitude in 1805*= $230^\circ 52' 5''$

Add motion of perigee $61.9'' \times 54 =$ 55 42.6

The longitude of the sun required 231 47 47.6

Ditto by Naut. Almanac - - 231 47 46.3

Thus, if the sun's longitude be deduced from observation of his declination daily, for one year, we may readily compute it for any previous or any future period, by the above easy process. And the fact of the longitude coming out in agreement with observation, on all occasions, is proof that *the sun*,

* Given in Vince's third volume of *Astronomy*, page 19.

in its course about the earth, moves through equal arcs of longitude in equal measures of time, computed from the sun's perigee or apogee each year. This again is evidence that the supposed "attraction of the planets" is a sheer fallacy; and thence, the "universal law of gravitation," supposed to be proved thereby, is shown to be so far utterly unfounded.

This method possesses a degree of brevity and clearness which will contrast very favourably with the clumsy and complex machinery by which the sun's longitude is computed on the Newtonian system.

PROBLEM VII.—*To find the Longitude of any Planet in its Orbit at any time, the Longitude at some similar portion of its period being given.*

1st. Find from the mean motions the distance in time of the period of the given longitude in the orbit, from the conjunction of the planet's mean longitude with its aphelion, or perihelion; which call the "Epoch."

2nd. Compute the amount of *motion* of the aphelion from the time of the given longitude to that of the required longitude; which, added to, or taken from, the given longitude, will show the longitude in the orbit *required*.

Example.—Given, the longitude of Mercury in his orbit at $5^{\text{h}} 17^{\text{m}} 19^{\text{s}}$, p.m., mean time, 3rd June, 1793*= $335^{\circ} 32' 57''$. Mercury was found to be by *mean* longitude in his aphelion, at $13^{\text{h}} 40^{\text{m}} 30^{\text{s}}$, p.m., 8th May, 1793; or $25^{\text{d}} 15^{\text{h}} 36^{\text{m}} 49^{\text{s}}$ from the time of the given longitude, which is the epoch. He was again in his aphelion at $10^{\text{h}} 45^{\text{m}} 36^{\text{s}}$, p.m., 6th March, 1857; to which time add the epoch, and we have April $1^{\text{d}} 2^{\text{h}} 22^{\text{m}} 25^{\text{s}}$ in 1857; for which time required his longitude?

* "Vince's Astronomy," vol. iii, p. 67.

The yearly motion of the aphelion of Mercury is $56''$, which multiplied into 63 years 10 months (the interval elapsed) = $59' 34.7''$; and this added to the given longitude produces the longitude *required* = $336^\circ 32' 31.7''$.

N.B.—To reduce this to the ecliptic, take the place of the node of Mercury, 1st April, 1857 = $46^\circ 38' 7''$, from the longitude in the orbit. The remainder, * = $289^\circ 54' 24.7''$, gives the “reduction to the ecliptic” = $+8' 15''$; and this, applied to the longitude in the orbit, gives the longitude from the *mean* equinox = $336^\circ 40' 46.7''$. To this apply the correction for “Nutation” = $-7.2''$ (*Vince*, vol. 3, p. 38), and you have the true heliocentric longitude of Mercury on the ecliptic = $336^\circ 40' 39.5''$. Ditto by Nautical Almanac, corrected by 2nd differences = $336^\circ 40' 35.5''$.

THE CALCULATION IN FULL.

Longitude of φ in his orbit $5^h 17^m 19^s$, p.m.,		
3rd June, 1793	- - - -	$335^\circ 32' 57''$
Yearly motion of aphelion of φ $56'' \times 63\frac{1}{2}$ =	+	$59' 34.7''$
Long. φ <i>required</i> in orbit, 1st April, 1857,		
at $2^h 22^m 25^s$, p.m.	- - - =	$336^\circ 32' 31.7''$
Reduction for $336^\circ 32' 31.7'' - \Omega 46^\circ 38' 7''$		
(Vince's Tables, p. 214)	- - - +	$8' 15''$
Mercury's Longitude from <i>mean</i> equinox =		$336^\circ 40' 46.7''$
Correction for nutation (<i>Vince</i> , vol. 3, p. 38)		$- 7.2''$
<i>True longitude Mercury on ecliptic</i> =		$336^\circ 40' 39.5''$

Example 2nd.—Required the heliocentric longitude of Mars on the 18th of April, 1857, at $8^h 35^m 55^s$, p.m., the longitude in his orbit at $11^h 8^m 20^s$, p.m., 13th November, 1800, being given; viz. = $49^\circ 10' 14.2''$?

• Ibid, p. 214.

THE CALCULATION.

Given, longitude δ in his orbit	-	-	-	49°	10'	14.2"
Interval of time=56y 5m 5d, motion of						
perihelion at 67" yearly	-	-	=	1	3	0.9
Longitude δ in orbit	-	-	-	50	13	15.1
Reduction to ecliptic	-	-	-		—	3.0
δ longitude from <i>mean</i> equinox	-	=		50	13	12.1
Ditto by Nautical Almanac	-	=		50	13	20.5
Difference	-	-		„	„	8.4

The fact being remembered that from 1793 to 1857, an interval of sixty-four years, Mercury went through his period of eighty-eight days 266 times, it is curious to find him forming the same angle with his equinox, to within the small motion of his aphelion; and we must admire how exactly this motion leads us to his heliocentric longitude after so great a lapse of time! In like manner the return of Mars, after fifty-seven years, to the same angle from his equinox, saving the small motion of his perihelion, and the close agreement of his longitude with that of observation (if the *Nautical Almanac* be correct), proves, beyond dispute, the *equable* movement of these planets in their orbits, scatters into space the futile doctrine of planetary attraction, and thus dissolves into its elements of fallacy the whole theory of gravitation.

Example 3rd.—Let it be required to know the longitude from the *mean* equinox of the planet Venus, at 1^h 18^m 11^s, p.m., mean time, June 23rd, 1690, New Style.

First, we find, by tables of *mean* motion, that Venus was in her aphelion, October 8th, at 7^h 24^m, p.m., 1690, being in longitude 307° 7' 42", and that this "epoch" was 107^d 6^h 5^m 49^s subsequent to the period for which the longitude is required. Then, in 1857, we find that Venus was again in aphelion, by mean longitude, at 4^h 8^m, p.m., 29th June. From this date take the above "epoch," and we have 13th March, 1857, at

22^h 2^m 11^s, p.m.; for which time the longitude of Venus from mean equinox (by *Nautical Almanac*) was = 137° 36' 14"

From October 8th, 1690, to 13th March, 1857 = 166y 5m, which multiplied by 48·6", the yearly motion of ♀ aphelion, is } = -2 14 48

Longitude required of ♀ from mean equinox = 135 21 26

N.B.—The result, computed by Mr. Vince, by the Newtonian system, is 135° 21' 39"*, differing only 13" from the above, which is a very minute disagreement in so long a period as 166 years and a half, nearly; during which Venus had travelled round the earth, with the sun, 190 millions 925,440 miles; and 272 millions of miles round the sun. The slight difference may be accounted for by the varying distance of Venus from the sun in that period.

PROBLEM VIII.—*To find the Distance of a Planet from the Sun at any time, the Longitude on the Orbit being given.*

1st. Find its distance in longitude from the aphelion or perihelion (whichever be nearest), and take it from 90°; which call *A*. 2nd. From its maximum distance take its mean distance, and you have the Increment; to the log. of which add the log. sine of *A*. The sum will be the log. of the "correction;" which, applied to the mean distance, will give the distance required.

Example.—Required the distance of Venus from the sun at 1^h 18^m 11^s, p.m., 23rd June, 1690, mean time, New Style; the longitude in her orbit being 135° 24' 11"?

The distance of the perihelion from Venus was then found by tables of mean motion = 8° 16' 42"; which, taken from 90°, leaves—

<i>A</i> = 81° 43' 18"	Log. sine	-	-	9·995452
	Log. of the decrement of ♀	·0050167†		7·700418
Correction -	=	·00496443	-	<u>7·695870</u>

* P. 73, 3rd vol. "Vince's Astronomy." † This is only an approximation.

Mean dist. φ = $\cdot 712147 - \cdot 00496443$
 φ dist. required = $\cdot 70718257 = 258126$ miles.

PROBLEM IX.—*To find the Heliocentric Latitude of any Planet at any time, the Longitude in the Orbit given.*

Rule.—To the log. sine of the maximum heliocentric latitude of the planet, add the log. sine of its distance from its node; the sum is the log. sine of the heliocentric latitude required.

Example.—Required the heliocentric latitude of Venus at $1^h 18^m 11^s$ p.m., 23rd June, 1690, N.S.

Long. in the orbit of φ = $135^\circ 23' 58''$

Long. of the node of φ = $73 \ 55 \ 33$

Dist of φ from node = $61 \ 28 \ 25$ Log. sine = $9\cdot 943805$

Max. Hel. Lat. φ - = $3 \ 23 \ 35$ Log. sine = $8\cdot 772214$

Hel. Lat. φ required = $2 \ 58 \ 51$ Log. sine = $8\cdot 716019$

Do., by Vince, vol. 3, p. 73 = $2 \ 58 \ 51$

We have now proved, by appeal to numerous and indisputable facts, that the highly complex mode of computation adopted by the Newtonian system, founded on the doctrine of enormous distances, is not at all necessary. It is manifest that the sun's longitude and the heliocentric longitude of the planets do vary by a given quantity, in a given period of time; and that the amount of that variation is exactly equal to the extent of the motion of their several aphelion points in that period of time. Hence it is clear, that if there were no motion in the aphelia, there would be no change in the amount of longitude; but that at the expiration of a given measure of time, computed from the conjunction of each planet with its aphelion, the arc of each planet's longitude in its orbit would be ever precisely the same. This at once proves that their motion in their several orbits is an *equable* and settled motion, and that it results from a force, or forces, also settled, equable and determined; and as such is the

evident fact, we see that the planets do not *attract* or draw each other out of their courses, either one way or the other, as regards their longitudes, latitudes, or distances from the sun. This supposed force of mutual attraction was invented to explain the deviations from a true ellipse, which, by the theory of centripetal and centrifugal motions, cleverly but falsely devised by Newton, the planets ought to follow; but which they evidently do not, though in *appearance* they seem to approach thereto.

THE PRECESSION OF THE EQUINOXES AND THE ALLEGED
ACTION OF THE MOON IN CAUSING THE SAME.

In speaking of this phenomenon, which “consists of a continual *retrogradation* of the node of the earth’s equator on the ecliptic,” Sir John Herschel,* after a lengthy and confused, but vain attempt at explanation, says, “the nodes of the rigid ring will retrograde, the general or average tendency of the nodes of every *molecule* being to do so.” [How *could* he get at the knowledge of this characteristic of these *invisible* molecules?] He goes on thus: “A *struggle* will take place by the counteracting efforts of the *molecules* contrarily disposed.” [Only fancy these pugnacious molecules, elbowing one another; some being for retrograding, some for forward motion—some conservative, doubtless, for standing still—exercising *free will* apparently?] The “general” tendency of “every” molecule is to “retrograde” quoth Sir John, yet there are *molecules* “contrarily disposed”—sad, sulky dogs! Awfully, ruinously contradictory all this! Well, let that pass, however, and let us come to the “inquiry of its cause.” “We must look,” says Sir John, “to the sun and moon for its explanation.”—“This will accordingly be found in *their* disturbing action *on the redundant matter* accumulated on the equator of the earth.” In a note (p. 331), Sir John says, that “no dynamical subject is open to more mistakes,” and,

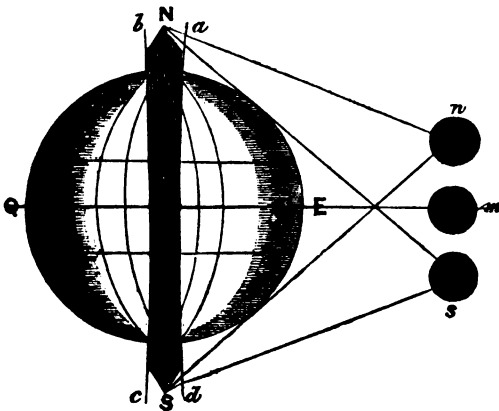
* Treatise on Astronomy. 1835, p. 330.

verily, we believe him. But if the Newtonian doctrine be true, that every particle (or molecule) of matter attracts every other particle in the universe, then what becomes of Sir John's molecules which are "contrarily disposed?" Can "every" particle *attract*, while *some* particles hold back and are "contrarily disposed?" The absurdity of the whole thing ought to have been plain to Sir John.

The effect of lunar nutation is wrapped up with that of precession, in such a manner, that I must here solicit attention to my view of its causes.

The diagram (*fig. 8*) will explain this easily. Let N. E. S. Q. represent the earth; N. S., the poles; and E. Q. the equator. Let *m.* represent the place of the moon when on the equator; and *n.* and *s.* her place when in her extreme north and south declination. If we regard the earth as a magnet, and its

Fig. 8.



north pole at N. to be *positively* affected, then will the moon's north pole at *n.*, if she be a magnet also, *repel* that of the earth to *b.*, and the south pole of the earth, *s.*, will point to *d.* The contrary will occur, when the moon reaches *s.*; for her south pole will then *repel* the south pole of the earth, *s.*, which will point to *c.*, and the north pole will reach *a.* Now, if these be facts in nature, the greatest effect on the

longitude of the sun, arising from the displacement of the earth's pole and consequent increase or decrease of declination, will be, not when the moon is in her node at *m*., on the equator, but when she is there, 3 signs away from the equator. The maximum of the lunar nutation is 18", in this case; and when on the equator, *nil*. And this is just the kind of result that the diagram shows us must take place, by the laws of magnetism.

CONCLUSION.

In concluding this little work, I beg to offer a few remarks, by way of drawing attention to the method I have pursued in conducting it to this point.

In the first place, I must remark, that I am perfectly well aware of the magnitude of the undertaking; which is nothing less than to overthrow the gigantic errors of those laws, as they are termed, thought to have been established by Newton, and to have been confirmed by many of his followers. I have felt that to hope for success in this stupendous undertaking, I must entirely avoid all assumptions, and bring forward nothing that I could not prove, step by step, as I proceeded. I have accordingly *assumed nothing* whatever in the course of my reasoning. I felt that this was absolutely necessary; and if I could not have avoided it, I should have abandoned the attempt altogether. In the introduction, I draw attention to what I conceive to be nothing better than enormous *absurdities* in the system of astronomy, as taught by Newton, and maintained by his followers in the present day. If I be altogether wrong, they may pass as very wonderful theories, unproved by facts, at any rate. By way of meeting the *assertions* of astronomers that they have determined the stupendous dis-

tances they contend for, to be correct ; and have established the parallaxes of the sun and moon accordingly ; I have shewn that in similar cases we find extraordinary results, which they have not and cannot explain. I, of course, allude to the fact, which is incontestable, that lighthouses are to be seen, all over the world, at distances which they could not be seen at for the intervening rotundity of the earth, owing to the extraordinary effects of *refraction*. I think I am entitled to conclude that the same effects of refraction have misled astronomers in their *presumed* correct observations of the sun and moon, &c., by which they pretend to establish their parallaxes. These I hold to be wrong, essentially ; and as the *source* of their errors is always the same, of course the results must be also. I have not *assumed* that the earth is *at rest* ; but I have proved that it must be so ; because, upon that theory only can we determine the distances of the heavenly bodies, so that their *observed motions* shall agree *exactly* with those distances. But if I were disposed to build this fact upon mere authority, I, at least, can claim the very highest for my purpose. I pass by the authority of Aristotle and Ptolemy, and the belief of a thousand great men since their day, that the earth really is *at rest*, and in the centre of the solar system ; and I claim the absolute and repeated declaration of King David in the 93rd and 96th Psalms. In both of these we find precisely the same words in the Hebrew, which are, אֶת־תִּכּוֹן תִּבֵּל בֶּל־אֶפְתָּח Aph thacun thabel, bel thamut ; “the earth is established and cannot be at all shaken.” The Vulgate renders the passage in the 93rd Psalm, by *Etenim firmavit orbem terræ, qui non commovebitur*. And the celebrated *Jaques de Bay*, in his translation, in 1572, has, “Certainemēt il a affermy le mōde, le quel *ne se bouge point*.” The authorised version has, “The world also is *stablished*,* that it cannot be

* See Note A, page 64.

moved." It is plain that these authorities point to the true reading, being that "*it cannot be AT ALL shaken.*" The Latin imports to stir, or budge *off the place*; and the Frenchman uses a French verb of precisely equivalent meaning. See Walker's Dict. to *budge*—"to stir or move off the place." Now the Hebrew לֹא *Bel* is more than a mere negation; for it imports *not*, and more, it expresses "*not, at all.*" The whole earth, or orbem terræ, cannot even be *shaken*, much less *moved off the place*, in which 'it was first *established*. And we know by experience, that however extensive may be any earthquake, it cannot shake the whole earth—much less can the earth be moved out of its original place. Yet Newtonian astronomers declare that this great mass of land and water moves at the mean rate of 68 thousand miles in every hour, coursing round the sun! Idle dreamers! King David, whose authority was quoted by the blessed Saviour, declares the reverse; and he assuredly, and most certainly, told no lie! I am fully aware of the modern scientific cant, that the Scriptures were not written to enlighten us on scientific questions. But I would ask, and I insist on an answer, are we to take it for granted, that the Divine Author intended us to be involved in enormous error, when, by the most trifling effort, he might have enlightened us and kept us in the narrow path of truth? Did He intend us to go wrong? Did He ever originate error? The very idea is monstrous, contemptible, blasphemous! Better than believe it possible, let us conceive that Newton and all his followers have been madly wrong, or foolishly inconsistent.

At page 12 it will be seen that I shew that in starting with his *first* proposition, Newton *assumed* what he had no right to assume. He took it for granted that the sun was very much larger than the earth; and hence he says, "Let a centripetal force act at once, with a **STRONG** impulse." But why did he not first prove that the sun was so large as to be capable of a *strong* impulse? Why? Because he was

not a practical astronomer, and really knew nothing of the true distance of the sun, and consequently nothing of its true magnitude. The proof of this is the fact, beyond dispute, that he tells Bentley that he "did not think it worth while to alter his numbers;" yet those numbers were 56 millions of miles, or more, in error. This determined me to seek some entirely independent method of determining the true distance of the sun.

To do this, however, it seemed right to me first to determine, by such a method, the true distance of the moon, because we have the means by which we may prove whether the distance arising be correct, which is the working out an eclipse of the moon. This I accordingly did, and found, thereby, that I had discovered the true method of determining the distance, inasmuch as it at once gave me the *exact* times of the beginning, middle, and end of such eclipses. And all this is effected, be it observed, without any reference whatever to the moon's parallax. Over and beyond *this* evidence of the moon's mean distance, the reader will find, at page 18, that there is abundant evidence of the distance being correct, by reference to the *motion* of the moon, and comparing it with her *distance*, both maximum and mean, &c. In the same way, page 21, it will be seen that the *true* diameter of the moon = 301 miles, is just that which comes out by reference to the time, = $60 \cdot 4^m$, that is occupied in an eclipse, from the moment the moon's body touches the shadow until her whole body is eclipsed. Now in all these facts, I discovered abundant reason for believing that the sun's distance would be found in precisely the same manner. And, after shewing the fallacy of the present system of deducing this important fact, by the striking truth of the lighthouses being elevated many hundred yards above the horizon by *refraction*, and after expressing my conviction that the observations of the sun are all *fallacious* in consequence of that refraction, I proceed, at page 24, to

deduce the sun's distance exactly in the same way I did that of the moon; and at page 26 I shew that the mean distance deduced, being 365,006 miles, is exactly correct by reference to the *daily* mean motion of the sun, and to his semidiameter, as compared with that given by the *Nautical Almanac*. See also page 42, on this subject. And here it must not escape observation that these facts arise spontaneously and are not in any way forced, or framed for the occasion.

I may mention here that the *apparent* semidiameter of the sun at the *mean* distance is $16' 2.56''$, and that hence his *real* diameter is 3,407 miles, or less than half that of the earth by 556 miles.

I next proceed to find the extent of the *orbit* of Mars, and his *mean* distances when in opposition and in conjunction, and we thence discover that his *apparent* motion when in those points is *exactly* proportionate to his *distances*, even to the fraction of a second. This ought to be the case, and it is the case; which is a distinct and decided proof of the truth of my system. The *stationary* appearance of this planet is next accounted for; and the result comes out to within less than two seconds of what it ought to be, which is the same as the mean daily motion of the sun, viz. $59' 8 33''$. This is also illustrated by a *figure*, which is given, and which explains the *direct*, *retrograde*, and *stationary* appearance of the planet. The orbit of Jupiter and that of Saturn are then demonstrated; and in each case we find, as with Mars, that the *distance* in conjunction is to the *distance* in opposition as the *motion* in opposition is to the *motion* in conjunction; and these motions agree, in each case, to the exact second.

The orbit of the planet Venus is next found; and the *greater* distance of Venus is seen to be to the *lesser* distance exactly as the *greater* mean *motion* of the planet is to the *lesser*. We then explain and determine the cause of the

stationary appearance of Venus, and we find that the result comes out to within two seconds the same as the sun's motion, which it should agree with. Now this may be considered as *doubly* demonstrative of the truth of the system; because no *other* distance could fit the motion of Venus, when apparently *stationary*; and yet this very distance agrees *exactly* with the *observed* motions of the planet when in superior conjunction and when in inferior conjunction with the sun.

The orbit of Mercury is next determined; and again, as with all the other planets, we find that its *major* distance, 498,354, is to its *minor* distance as its *maximum* observed motion, which is 7029", is to its *minimum* observed motion, 3155". This calculation was omitted in the text.

Having completed this part of my system, I go next to the "Theory of the sun's motion about the earth." And this I account for by the fact that the sun is a mass of *positive* magnetic matter, and that the northern hemisphere of the earth is the same. These two bodies being both *positive*, of course, repel each other; whence the sun is repelled from the earth, so soon as he passes the equator northwards. The contrary effect is observed when he passes it southwards, as he is then attracted to the earth. The proof of this theory is given in the Problems that follow. And I would especially draw attention to Problem V, where it will be seen that the *true* equation of the sun and the *true* anomaly are both combined to discover the sun's semidiameter; which comes out *exactly* in accordance with the same, as given in the *Nautical Almanac*. This it would be impossible for it to do, if the *true* equation and the *mean* distance of the sun were not what I declare them to be.

Lastly, I give rules for working out the longitudes * of the sun and planets, perfectly independent of gravity, or attrac-

* See Note B, page 64.

tion (which I disbelieve entirely), and by the examples offered I demonstrate that it is the motion of the aphelia of these latter bodies alone which leads to a knowledge of their longitudes at any time ; and this proves the *equable* movements of these planets in their orbits, and wholly overthrows and for ever destroys the gross illusion and gigantic fallacy of the theory of gravitation.

Let but this giant die—as die he must—for “the deception permitted will have its day ;” may I not say, “has had its day”? Let this giant die, and who does not then see, looming in the future, a thorough revulsion in the public feeling, an entire revolution in the doctrines of modern scientific men? They will be cured of their Newtonian fallacies and come back from believing in the atheistic folly of “atoms” and “atomic organization” to the universal belief in a Deity—the *immortal fountain* whence man received his form and his living principle.

But with what weapon shall he be slain, and wherewithal shall he be destroyed? Is he not clothed in the mail of insolent defiance, and are not his dimensions, like a mountain, enormous? Is he not backed and defended by a vast army of scientific men, covered with the panoply of so-called irresistible arguments, expressed with all the precision of the higher branches of the mathematics? Like the Philistine of old, are they not believed to be invulnerable? Wrapt in the garb of pride, wielding the two-edged sword of demonstration, are they not unaccustomed to be overthrown, and even unused to be attacked? Ay, indeed so. Yet there is a small, white stone, a pebble in the brook, in which runs the silver stream of *common sense*, and that stone is TRUTH. Smitten in the forehead by this weapon, this false Philistine shall fall ; and great will be the fall, like the overthrow of a huge mountain, of the system of delusion regarded as verity ; and astounding shall be its destruction. But on its vestiges shall be established a simple,

yet veracious method, by which all men of the most ordinary education shall understand astronomy, and bow their heads before the majesty of its ineffable Creator.

NOTE A.

This expression, though tolerably strong and pretty correct, does not give us the full force and meaning of the original Hebrew. The word תכון *thackun*, is given by *Johan. Coccel*, as signifying *librare*, to weigh or poise; but I prefer Parkhurst's idea, which is "to *regulate by weight, measure, or rule.*" In short to *fix* by measure or rule, so that it *cannot* be shaken. And if we adopt this meaning, we see at once the great fitness and propriety of the latter clause of the verse, which is *Bel thamut*—that cannot be *at all* shaken, or moved out of its place, in which it had been so *fixed* or established, or regulated. Thus in the xl c., 13 v., of Isaiah, we read *Mithacun ath reuch Jehovah?* Who hath *regulated*, or fixed the spirit of Jehovah? Also in Job, xxviii c., 25 v., we see the word *thacun* used "for weighing the waters by *measure*," that is, carefully and exactly. So that David could not have used any word more precisely significant of the earth being so *REGULATED*, or *FIXED*, that it cannot be *shaken*, still less moved out of its given place.

NOTE B.

The public generally believe that the longitudes of the heavenly bodies are calculated on the principle of Newton's laws. Nothing can be more false. This is confessed in Vince's *Astronomy*, 3rd vol., p. 2, where it is stated that the mean longitudes of the sun are "deduced from nearly *two thousand* observations." And at p. 20, it is confessed that the tables of the moon "are founded principally upon a series of more than *three thousand two hundred* observations made at Greenwich. And we find, in the same page, a letter from M. Delambre to Dr. Maskelyne, which states that from observations by him have been drawn "la plus exacte détermination des coefficients des équations lunaires et solaires, c'est là que nous avons trouvé la confirmation des inégalités que théorie peut bien indiquer, mais dont la valeur ne pourrait être fixée que par des calculs qui sont encore *au dessus des forces de l'analyse*; enfin, c'est à vous que nous devons la connoissance des mouvements et de toutes les constantes *que l'observation seule peut donner.*"

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THE END.