THE COMET:

A

LARGE LITHOGRAPHIC MAP

OF THE TRUE

COURSE OF ENCKE'S COMET,

WITH A

LETTER TO THE MEMBERS OF THE ROYAL ASTRONOMICAL SOCIETY.

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"THE SOLAR SYSTEM AS IT IS, AND NOT AS IT IS REPRESENTED."

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184. a. 30.

A LETTER

ROYAL ASTRONOMICAL SOCIETY.

Gentlemen,

As almost every attempt to compute the return of any important comet has been hitherto a failure, much to the discredit of the system of astronomy now in vogue; and which, by way of distinction, is termed "Physical Astronomy," you will, I trust, do the subject the justice to examine the facts I shall present you in these pages, with a view to determine how far they are founded in truth, and how much they are, therefore, worthy of consideration.

Having, in my work on the Solar system,* proved that it is a necessary consequence of the discovery by Sir W. Herschel, that the sun has a *proper* motion in space, that the other bodies of the system must move forward in the same direction as the sun ; and that they do so move, and in cycloidal curves, I shall now

* The Solar System as it is, and not as it is represented.

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proceed to shew that comets, in so far as they are connected with the Solar system, must, and do move at the same mean rate, and in the same direction as the sun, and his attendant planets, and their satellites. The curves in which these bodies, the comets, move, are not, however, exactly such as those performed by the planets; but are of a less regular character, and may be termed "HELICOID CYCLOIDS."

I shall not enter here into general reasoning, to prove that in whatever direction the sun is found to move forward in space, the whole of the other bodies of the system must certainly move in the same direction, or otherwise they would undoubtedly part company. But I shall at once call your attention to the map of the motion of Encke's Comet from the 8th of November, 1838, to the 1st of June, 1839, as determined from the Ephemeris, by the compilers of the Nautical Almanac for 1842. Before doing this, however, I will explain the system and principle on which I have drawn that map; which will enforce a conviction that the map really does accurately depict the relative positions of the comet, the earth, and the sun, at regular intervals of time; commencing at midnight on the 8th of November, 1838, and ending at midnight on the 1st of June, 1839.

The motion of the sun through space I have shewn to be really and truly from the east towards the west; which, as it is the very contrary to that which seems, or appears, to be the case in the heavens, it may be well

here to repeat more fully, and explain in a manner that defies dispute.

It is well known that the annual motion of the sun through the heavens *appears* to be from west to east, or, " in the order of the signs," as it is termed. But all believers in the doctrine of an elliptical motion of the earth about the sun, confess that this is due to the *real* motion of the earth in the opposite direction, Hence we are all agreed that the earth moves towards the *west.* But as the proper motion of the sun is now admitted, it follows that the sun also must and does move towards the west; because, if it did not move in the same direction as the earth, the two bodies must part company ; which they do not.

This being understood, we may now refer to the map. The line contained between the words " sun's course," represents the line of the sun's motion, which, for the sake of harmony with our mode of writing, and so to prevent confusion, has been reversed, and made to appear as if the sun really moved from left to right, when facing the north, which the upper part of the map is meant to represent. No error can arise from this circumstance, if this fact be borne in mind.

The Ephemeris of Encke's Comet is given in the Nautical Almanac for 1842, from the 1st of August, 1838, until the 1st of June, 1839. But for the purpose I have in view, which is to shew the real and true curve which the Comet forms in space, and

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to demonstrate that that curve is, in consequence of the proper motion of the sun, very far removed from being an ellipse, and is, indeed, a HELICOID CYCLOID curve; for that purpose, I say, the map may be safely confined to the motion during the before named 205 days.

On the left hand side of the map, the body of the sun has been depicted, when in 26 deg. of SCORPIO, on the night of the 18th of November, 1838; and again introduced at intervals of thirty days from that date until its entrance into the sign Cancer, on the night of the 21st June, 1839. This has been done merely to guide the eye.

The principle on which the relative position of the Comet has been determined is as follows:— Having marked the place of the sun on the 8th of November, 1838, which is marked as " ♍ 16 deg." I lay off the line from the sun to the earth at that point, being 46 deg. from the point ♈, the zero point of longitude, which is ever to be found on the right hand, as the sun is ever moving forward in that direction. The proportion of the sun's motion in the time that it moves through 90 deg. of longitude is to the earth's mean distance from the sun, as 2·3 to 1. This is the scale on which the map is constructed. The earth's distance from the sun is represented by two inches; and the sun's motion over 90 deg. of longitude, from the 16th deg. of Scorpio, to the 16th deg. of Aquarius is two inches, into 2·3 = 4 inches

and 6-tenths. The little variation in the earth's distance from the sun has not been attended to on this small scale, as it can lead to no sensible error in the line of the Comet's course.

We find the Earth's place, therefore, at midnight on the 8th of November, shewn to be at *a*, which is exactly two inches from the place of the Sun, and at an angle of 46 degrees from his course; which will be found to be the case, if a line be drawn to represent the radius vector from the place of the Sun marked " ♏ 16 deg." to the place of the Earth marked *a*. Now to determine the place of the Comet at the same moment, I refer to the Ephemeris given in the Nautical Almanack for 1842, which gives the log. of the Comet's distance from the Sun, at midnight, November 8th, 1838, to be 9·985400; which gives the distance to be = ·9669 ; which, multiplied into 2, = 1·9338 inch, the exact distance the Comet is laid down from the place of the Sun on the map. In like manner the logarithm of the Comet's distance from the Earth, at the same time, is given, as 9·342953, which gives the distance = ·2203, and this, multiplied into 2, gives the distance in inches = ·4406, which is the exact distance the Comet is represented to be from the Earth at the above period. If the extent of 1·9338 inches be taken in a pair of dividers, and therewith, one foot being placed on the point representing the centre of the Sun, marked " ♏ 16 deg., and a circle be drawn, or part of a circle, it will go through

the centre of the Comet; and if the distance of ·4406 be then taken, and with one foot in the centre of the Earth at a, we draw a circle, it will intersect the other circle in the centre of the Comet. The intersection point of these two circles must be and is, therefore, represented to be the centre of the Comet.

To determine the place of the Comet on the 18th of November, 1838, we find the logarithm of the Comet's distance from the Sun to be 9·900279, and that of its distance from the earth to be 9.451901. The first gives the number $=$ ·7949, and the other is ·2831. These being multiplied by 2, give the distance from the sun to be 1·5898 inches, and from the earth ·5662 inches; which will, as before, be found to be the exact place of the Comet for 18th of November, 1838.

Now to find the Comet's place at any other period for which the data have been given in the Nautical Almanack, we have only to find the Sun's place on the line of his course for any given day, and lay off the Earth's place at an angle of longitude differing 180 deg. from the longitude of the Sun, and at a distance of two inches from the place of the Sun's centre; and then to strike a circle, having the radius equal to the Comet's distance from the Sun, and another circle with a radius equal to the Comet's distance from the Earth. The point wherein these circles intersect each other is the centre of the Comet. I shall give one more ex-

ample only: the place of the Sun on the 27th January, 1839, was Aquarius, 7 deg.; the Earth must be represented in the opposite point, the 7th deg. of Leo, or 127 degrees of longitude from ♈ 0 deg. 0 min.; and it will be found at *i;* being two inches from the place of the Sun at Aquarius, 7 deg. The log. of the Comet's distance from the Sun = 9·978401; gives distance = ·9515 × 2 = 1·9030 inches. The log. of Comet's distance from the Earth = 0·262916, gives distance = 1·832 × 2 = 3·664 inches, and the Comet will be found laid down on the map at these several distances from Earth and Sun.

To determine the Comet's place at the Perihelion, which was midnight of the 18th December, 1838, when the Sun's place was ♐ 26 deg. 42 min. I lay off from this point a line at the angle of the longitude of the Perihelion = 157 deg. 27 min. 34·8 sec.; and on that line I measure off the Comet's distance from the Sun. The logarithm of the Comet's distance is given = 9·536761, which gives the distance = ·3442 × 2 = ·6884 inches. This is the place the Comet will be found on the map, marked December 18th, and at the letter P. And on each subsequent tenth day the Comet's place has been thus determined on the map, until the 1st of June, 1839. A dotted line, joining each of these places, must, therefore, be admitted to represent truly the actual course of the Comet from the 18th of December, 1838, until the 1st of June, 1839. The only objection that I can conceive to this is, that it

may be said that the Comet does not move in the same plane as the Earth and Sun do; and that, therefore, the curve will not be correct. I admit the objection, for what it is worth; but as the Comet is in its south node on the same day it is in Perihelion, it is extremely near to the same node the whole time to which the map refers; and even in the month of May, 1839, it would not have left the plane of the Earth and Sun more than about 5 or 6 degrees. This fact, therefore, will not vitiate the curve I have drawn to any appreciable extent. It remains a very close and almost perfect representation of the true and real motion of the Comet during a portion of more than six months of its period.

The line of the so-called major axis of its ellipse, has been drawn from the point P, where it is in Perihelion, to the point A, where, if the sun remained stationary, *it would arrive at its Aphelion point.* To determine the length of this line, I take the mean of five lengths of the semi-axis major, from DAMOISEAU's analysis, which is equal to 2·221165. This doubled and multiplied again into $2 = 8·884660$ inches, as it will be found to measure on the map.

The first thing that will strike your attention is that the Comet arrives beyond A, its supposed Aphelion point, and crosses the line of the supposed major axis of its ellipse, midway between its places on the 7th and the 17th of April; viz., on the 12th of April. This is rather under (six days under) *four* months

from the Perihelion period of the 18th of December.
Now, it ought to be about one half of its period
(which is about 40 months, viz., 1207 days) in reach-
ing the Aphelion point; that is to say, 20 months;
instead of which it is not one-fifth part of this time.
This shows that, in consequence of the motion of the
sun forward in space, from the *focus* of the Comet's
supposed ellipse, where it is found at the time of the
Perihelion, on the 18th of December, the Comet
departs altogether from the line of the periphery
of that supposed ellipse and pursues an independent
course, from P until it reach A, as above described,
and then on to the point in its course marked "June
1." It thus is seen to move in a curve, which from
its tortuous character from P until it returns to P
again, I term a *Helicoid Cycloid.* Let it be desig-
nated as it may, one thing is certain regarding it;
viz., that it is *not* any one of the curves of conic sections;
for it is assuredly neither a circle, an ellipse, a para-
bola, nor a hyperbola. But as it is a principle of the
Newtonian law of gravity that all gravitating bodies,
which move in each others neighbourhood, must of
necessity form one of the curves, "whose forms are
limited to those figures known in geometry by the
general name of conic sections," and as this body
called Encke's Comet, does not fulfil this condition, it
is palpably evident that *it is not a gravitating body !*
Hence gravity, as a law, if it exist at all, is not certainly
an universal law.

Thus you will perceive that the neglect of the *results* of the "proper motion" of the sun, while admitting, as all astronomers do, its reality, has led to the most mistaken notions, and the most erroneous and unfounded ideas regarding this cometary body. It has been declared to move always in an ellipse about the Sun, while in reality it is now proved that it does nothing of the kind. It has been supposed to recede from the Sun to the whole extent of its supposed major axis, less only the Perihelion distance, or $4\cdot442330. - \cdot3442 = 4\cdot098130$ times the distance of the Earth from the Sun, being about 389,322,350 miles ; whereas, its distance from the sun on the 1st June, 1839, was computed to be only 235,742,500 miles ; and it is not at all probable, from the form of the curve it describes, that it ever very much exceeds that distance. If it even reach the distance of 250,000,000 miles, its mean distance will not be quite so great as that of the planet Mars. It has been believed to move through space, when near its Perihelion, at a rate far exceeding its motion at any other time, which does not at all appear to be the case. All these gross errors have arisen from believing that the Comet moved in an ellipse, some small portion of which I have described on the left hand side of the map. It will easily be seen how fallacious that idea of the Comet's motion is, when its supposed place on the 7th of April, 1839, in that ellipse, is compared with its true and real place, as seen near A on the map.

On the mode of determining a Comet's return to the
Perihelion, and of ascertaining its position, and
when and how long it may be visible ; and on the
proof of its being subject to no " attractions."

Having shewn the fallacy of the theory which
teaches that Encke's Comet moves in an ellipse, and
having proved that its real and certain course through
the regions of space, in company with the Sun and .
the planets, is a curve of *helicoidal* character, not far
removed from a planetary cycloid, being somewhat
like the curve of the course of the asteroid Juno, I
shall now proceed to shew the simple mode by which
we may determine the return of the Comet to its
Perihelion and visible appearance from the Earth, by
means of an orthographic projection.

Encke's Comet having been first noticed in 1786,
and again in 1795, drew the attention of *Encke*,
Mossotti, and *Damoiseau*, from whose " analysis " the
following table of its *apparent* elliptic elements has
been taken.

Passage of Perihelion.	Mean Diurnal Motion.	Semi-axis Major.	Eccentricity.	Long. of Perihelion.
1805. Nov. 22·006	1073" ·4877	2·218912	·8464567	156°· 43′ · 0″
1819. Jany. 27·752	1076 ·7791	2·214388	·8484517	156 ·59 · 1
1822. May 24·494	1069 ·4158	2·224542	·8445479	157 ·11·29
1825. Sept. 16·784	1070 ·0690	2·223636	·8449784	157 ·14·30
1829. Jany. 10·573	1069 ·5570	2·224346	·8446862	157 ·18·35

	Long. of Node.	Inclination.
1805	334° · 18′ · 29″	13° · 35′ · 44″
1819	334 · 27 · 36	13 · 38 · 33
1822	334 · 19 · 32	13 · 22 · 25
1825	334 · 22 · 8	13 · 23 • 29
1839	334 · 24 · 15	13 · 22 · 34

In addition to which information, the N. Almanac for 1842 tells us that the following are its " Elements."

1838, December 19th 0h., Berlin Mean Time.

Mean Aomaly	0°· 0′· 0″· 59
Mean Daily Motion	1071″· 18372
Long. of the Perihelion ...	15° 727′ 34·8 } From Mean Equinox
Long. of the Ascending Node	334 36 31·8 } of Dec. 19, 1838.
Inclination	13 21 29·0
Angle of Eccentricity ...	57 41 44·0

MOTION DIRECT.

The period from 1805, Nov. 22·006 to 1858 Oct., 18·5, which is the day for which its present Perihelion has been determined and published by Professor Encke, is 19323·30435 days; which divided by 16, the number of times it has returned, gives us exactly 1207·70652 for its mean period, during 53 years. But as it is well known that " the periods are continually diminishing," it may be well to examine the rates at which it seems to have returned, in fractions of this portion of time. If we take the time from its observed Perihelion in 1805, to that computed for it in 1838, viz., during 33 years, we have 12079·777 days; which when divided by 10, gives us 1207·9777 days for its mean period during those 33 years. And if we take the time from its return (computed) in 1838, to its computed return in 1858, viz., 20 years minus two months, we find it to be 7244,016 days, which again, when divided by 6, the number of its returns, we find to give 1207·336 for its mean period. Then 1207·9777 — 1207·336 = ·6417, for its *accelleration*. And this last sum gives, when divided by 6, the small

fraction of ·10695 of a day = 2h. 34m., for its present diminution of period, on each return. Then if from 1207·336 days, its present period, we take ·10695, we get 1207·22905 for its next period; therefore, if it return to the perihelion at midnight, on the 18th October, 1858, as I believe that it should do, we are to expect it to be there again on the 7th February, 1862, at 17h. 30m. p.m. The next period, being again diminished by ·10695 of a day, will be only 1207 days and 8 hours; and the next only 1207 days, and a few minutes.

Now here it will strike everybody that this process of determining the time of the return of this, Encke's comet, is so simple that a young lady from a boarding school may effect it just as well as the ablest astronomer, with a vast display of very interesting, no doubt, yet in this case, very ridiculous algebraic symbols, and mathematical machinery. I am sure, gentlemen, you will feel obliged to me for proving to the world that this part of your system of astronomy will be the better for being ventilated. The process will no doubt destroy every vestige of that preposterous mass of mystery which has surrounded your science since the days of the mighty Newton.

No doubt you may have persons among your very learned body who may cavil at all this, and may say "Ah, but do we not determine the time of the Comet's *true* perihelion to be different from that of its mean period of return to the sun? Do we not show, that

owing to the 'attractions of the Planets,' the Comet is not always *exactly* the same distance from the Sun, but may be found at a somewhat different angle and a different distance from that body at every different return?' Softly, if you please, gentlemen. Allow me to remind you, that you cannot, and do not, never did, and never will *observe* the Comet when it arrives nearest the Sun. You cannot *see* it at that moment, nor for some days before or after the perihelion, because of the splen-- dor of the sun's rays. You can only *compute* its place ; which is a very different thing from being able, actually, to see the Comet at the time. And as you make your computations on the false Newtonian principle of its motion or course being elliptical, you will excuse me if I venture to tell you that I have no faith in them, and that I think it is your duty to honestly examine how far you are still in the gulph of error and delusion.

To assist you in breaking through the clouds of confusion which the false assumption of Newton—that the glorious sun (the focus of all the planetary and cometary ellipses with which you deal), is stationary,— has engendered, I will now undertake to prove to you, first, that Encke's comet is *always* to be found at the same distance from the sun, and in the same heliocentric longitude, when at the same distance, in time, from the perihelion. Second, that it is also found to have always the same heliocentric latitude when at the same distance in time from the perihelion, saving

E

1861

M

72.^d

N

47.^d
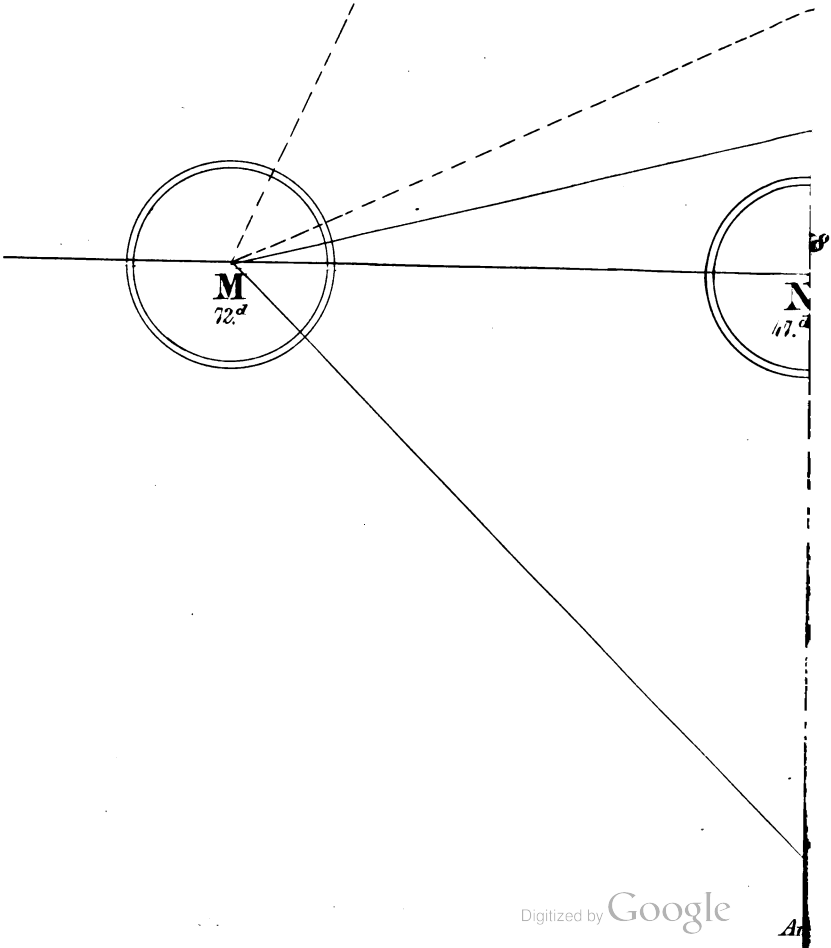
only the small decrement that arises from the obliquity of its course being in a constant state of diminution. Third, that its Heliocentric place at any time, having been well ascertained by observation, no other formula is requisite to determine its Geocentric position at any future time, when it may return to the same point relative to its Perihelion, than the solution of two plane triangles. As a corollary to the above propositions, it will follow that, just as by the map I have shewn it impossible for the Comet to move in an ellipse, so it is now shewn that, since it is never drawn out of its regular course, there can be no such things as the " attractions of the planets," of which astronomers speak, so far as relates to this Comet.

To prove the first of these points, I beg to refer you to the diagram (see figure 1) where the circles marked $M N O P$ represent the places of the Sun as follows: M. the Sun's place at midnight, 7th October, 1838, just 72 days before the Comet was computed, according to the Ephemeris in the Nautical Almanac for 1842, to return to its Perihelion. N. the Sun's place at midnight on the 1st November, 1838, when the Comet was 47 days antecedent to its Perihelion. O. the place of the Sun on the 28th November at midnight, 1838, when the Comet was 20 days from the Perihelion. And P the place of the Sun when the Comet was *at* the Perihelion, on the 18th December, 1838, at midnight.

You will find in this diagram six distinct plane

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triangles, which are marked in couples, having reference to each other, besides one triangle in dotted lines on the right. First Couple marked A. A'. Second Couple marked B.B'. Third C.C'. The first triangle is formed by the Sun at M, the Earth at A, and the Comet at S. And before we notice the others, we will explain the particulars of this triangle, as on it much of our future argument will depend. The line M. N. O. P. represents a portion of the Sun's path through space, from midnight on the 7th October, 1838, to midnight on the 18th December, 1838, just 72 mean solar days. The scale on which the whole of the diagram is formed, is as follows :—The Sun has been proved to move through space at the rate of 100,000 miles per hour, which gives an amount of 2,400,000 for his daily motion, which is for ten days 24,000,000 of miles ; and this is shewn by $\frac{48}{40}$ of an inch ; thus each 40th of an inch represents half a million of miles. When I speak, therefore, of "parts," while treating of this diagram, I must be understood to mean by each "part" the one 40th part of an inch; and when I mention the length of a line in parts and decimals, I mean so many 40th parts of an inch, equivalent to so many times 500,000 miles.

The first of the six triangles, or that marked A, re-presents then the places of the Sun, the Earth, and Encke's Comet, at midnight, on the 7th October. 1838. The line from M to A is drawn at an angle of 14° 15'. 55" from the course of the Sun from M to P ;

which is the angle of the Sun's longitude at the time,* minus 180,° to represent the heliocentric longitude of the earth. The length of the line is determined thus : The logarithm of the Sun's distance being 9·99937, the distance comes out ·99855, which I multiply into 190, that represents the " parts" contained in the mean distance of the Sun from the Earth, and I get 189·7245 as the length of the line M. A. I ascertain the geocentric longitude of the Comet at the above time, as follows :—

The Nautical Almanac for 1842 gives the right ascension of the Comet at the time, 2h, 18m. 9s.·37, and the declination=44.° 5'. I shall not on this occasion give the well-known mode of determining the geocentric longitude and latitude from that right ascension and declination ; but merely say that they come out as follows :—Long.=47.° 45.' 11."—and Lat.= 28.° 25.' 41" N.

Then Log. Earth's distance from Comet=9·738666
  „   Log. Cosine of Lat.   9·944194

  „   Log. *reduced* distance=·481792 = 9·682860
                       Log. 190=2·278754

          Log. A.S.=91·5408=1·961614
       Then Log, Cos. Lat. A.C.=0·005806
        „ Log. Sine Lat,   =9·677658

    Log. "Elevation" 49·55388=1·695078

This is the " elevation " of the Comet above the

* I have taken here the *apparent* longitude.

plane of the Earth's course. To find the *Heliocentric* Lat. of the Comet.

To Log. Sun's distance from Comet 0·161105
Add Log. 190   2·278754

Sun's distance from Comet. } $=$2·439859. Its (A.C.) 7·560141
=275·333 " parts."

Plus Log. " Elevation " 1·695078

Log. Sine *Hel. Lat.*=10° · 22′ · 6″ · 5=9·255219

We next find M.S. or the distance of the Sun from the Comet, *reduced* to plane of Earth's course, thus :

Log. Sun's dist. Comet 2·439859
Log. Cos. Hel. Lat.=9·992850

Log.M.S.=270·8375=2·432709

We have it now in our power to find the angle A. M. S. which when added to the Heliocentric longitude of the Earth, gives us the Heliocentric longitude of the Comet ; as follows :

The side M.A. + A.S.=281·2662 Log. A.C.=7·550883
    „   M.A. — A.S.= 98·1846 Log.   =1·992043
Long. Sun =194° · 15′· 55″
Long.Comet— 47 · 45 · 11

"Elongation"=146 · 30 · 44
or M.A.S.   180 · 0 . 0

2) 33 · 29 · 16=unknown angles
   16 · 44 · 38   Log. Tangent 9·478350
    5 · 59 · 43   Log. Tangent=9·021276
   10 · 44 . 55=A.M.S.
   14 · 15 · 55=Heliocentric Long. Earth.
   25 · 0 · 50=Heliocentric Long. Comet.

We have now the following particulars of the position of Encke's Comet at midnight on the 7th October, 1838, at Greenwich, as *computed* by the compilers of the Nautical Almanack for 1842.

1st. Geocentric Long.$=47°$. 45′ 11″ } $=$ R.A. 2h. 18m. 9s·37 &
2nd. Geocentric Lat.$=28°$ · 25′ · 41″N. } Dec. 44°· 5′ · 0″·4 N.

3rd. Log. of Comet's distance from the Earth$=9·738666$

4th. Comet's true distance from the Earth$=104·09245$ parts$=$ 52,046,225 miles.

5th. Comet's distance from Earth, reduced to plane of Earth's course$=91·5408=$A S.

6th. Comet's "Elevation" above the plane of Earth's course$=$ 49·55388$=$24,776,940 miles.

7th. Comet's *Heliocentric* Longitude$=$25° · 0′ · 50″

8th. Comet's *Heliocentric* Latitude$=$10° · 22′ · 6″ · 5

9th. Do. Log. of dist. from Sun$=$0·161105

10th. Do. true dist. from Sun$=$275·333427$=$137,666,713·5 miles

11th. Do. distance from Sun reduced to plane of Earth's course$=$ 270·8375$=$M.S.

The next thing will be to examine the amount of the evidence, that with reference to the *Sun*, these positions of the Comet, *are always found to recur*, except the regular decrease of the heliocentric latitude, whenever the said Comet returns to the like distance *in time* from its perihelion. And if we find that such is the case, like as I have demonstrated, that Mars, and Venus, and the Earth, do always return to the same heliocentric longitudes, when at the same distance from their several equinoxes, I hope you will be prepared to adopt the doctrine that the Planets and Comets move in *regular* and *unvarying* courses, and to abandon the fond delusion that both Planets and Comets are for ever darting to and fro, and obeying

no end of " attractions" from the other planets and
their satellites, which false notion has arisen from the
desire to make the mere *appearance* of elliptical orbits
be taken for a reality, which it is not, as it has arisen
from neglect of due consideration of the observer's *own
motion* through space ; just as we may delude ourselves
when we regard fixed objects, apparently whirling
round, in consequence of our rapid motion on a rail-
way. In short, the discovery that the Sun moves
through space, at the rate of 100,000 miles per hour
and takes the earth with it through 875,696,000 miles
in a year, will not only overthrow the darling error of
astronomers that the earth and planets, Comets, &c.,
move in ellipses, but it wholly destroys the inferences
drawn from observations on the parallax of fixed stars.
These have been made upon the assumption that the
earth moves through a lineal measure of space equal to
190 millions of miles in a year ; whereas it moves five
times as far ! Alas ! for all the presumed proofs that
such and such fixed stars are at such and such dis-
tances ! They must be enormously farther off. The
universe must, indeed, be altogether past our finding
out.

I must now, gentlemen, draw your attention to the
triangle A' M. S. It is the partner triangle of that
which we have been regarding hitherto. It was formed
by the earth just 20 years, minus two months, subse-
quently to the time of the former one. It shews the
place at midnight, 7th August, 1858 (or strictly speak-

ing, at 13h. 15m. P.M. that day), when Encke's Comet was computed to be again 72 days antecedent to its perihelion. The earth, at the time, is represented at A′ being in 315.° 9.′ 55.″ heliocentric longitude ; and of course removed 44.° 50′ 5″ from the sun's course, as you will find it represented in the diagram. The length of the line M.A′ is found at once from the longitude of the radius vector of the earth, given in the Nautical Almanac, to be 192·6068. That of the line M. S. we have already determined to be 270·8375, as it repre-sents the distance of the Sun from the place of the Comet, when reduced to the plane of the earth's course. The angle contained between these two lines is the difference of the heliocentric longitude of the Comet's place at midnight, 7th October, 1838, and the helio-centric longitude of the earth at 13h. 15m. P.M., 7th August, 1858.

Thus Heliocentric Long. Comet's place=25° · 0′ · 50″
Add for Subtraction 360 · 0 · 0
——————
385 · 0 · 50
Heliocentric Long. of Earth, 7th Aug. '58=315 · 9 · 55
——————
69 · 50 · 55

With these two lines, viz., M. S. = 270.8375, and M. A′. = 192·6068, and their included angle= 69°. 50′. 55″., we find the angle A, to be 68° 39′. 59″, which is the angle of "elongation" of the Comet from the Sun ; and which being taken from the Sun's longi-tude 135° 9′. 55″., leaves the *geocentric longitude of the Comet*=66°. 29′. 56″. Now if we desire the *geo-*

centric latitude of the Comet, we have only to add the log. arith. comp. of A'. s. to the log. of the " elevation," and we have the log. tan. of the same; which, by this process, I find to be 10° 17'. 21". N.

But we know that this latitude cannot be quite correct; because, as the inclination of the course or orbit is known to be diminishing, the latitude of the Comet must diminish in proportion, at all times. Hence I correct it in this manner. The actual diminution of the inclination from 1819 to 1838 was 17.' 4.", or just 53.9" yearly. The mean inclination in those years was 13.° 30." Therefore, I say, " As. 13.° 30' : 53.9" : 10.° 22.' 6.5" : 37.", the yearly diminution of heliocentric latitude, which, multiplied by 20, gives the Comet's heliocentric lat. in Aug., 1858= 10.° 9.' 46·5." And if the hel. lat. require this reduction, an angle of *geocentric* lat. of 10.° 17.' 21. will require to be reduced in proportion. Thus 10.° 22.' 6·5" : 12.' 20" : : 10.° 17.' 21" : 12.' 14." Then 10°. 17.' 21"—12." 14 = 10.° 5.' 7·", the *corrected* geocentric latitude of the Comet. It was *observed* to be 10.° 4.' 55". Thus we have these quantities, long. 66.° 29.' 56.", and lat. 10.° 5.' 7" N. to determine the right ascension, and declination of the Comet on the 7th August, 1858, at 13h. 15m. P.M.

They come out, Right Ascension. =4h. 10m. 32 ·5s. Dec. 31°· 20'· 7"N.

And Prof. Encke's Assistant *observed* R.A. =4h. 12m. 42s. Dec. 31°· 25'· 0"

Diff·= „ 2m. 9·5s. Diff. „ 4'· 53"

Here, then, gentlemen, you see the triumph of the simple theory of an undeviating non-elliptical, and regular course for this Cometary body. And you perceive also that to determine its place at any time, when it has been *once* observed, or well and correctly computed, we require nothing more than the adoption of the simple, ancient and infallible principles of *plane trigonometry ;* a science far too much neglected since the days when Newton introduced his newly invented modes of computation ; without which, we are continually told, the world could know nothing of astronomy, forsooth ! But to which I attribute the absurd delusion of the Planets and Comets moving in elliptical orbits, instead of their real and true courses of *cycloid* or *helicoidal-cycloid* curves, which can no longer be denied, now that I have shewn that, quite independent of " the attractions of the planets," and of any elliptical motions, I am able to compute the heliocentric longitudes, latitudes, and radii vectores of all the planets and the Earth ; and also, as above, the heliocentric longitude and latitude of any Comets, the perihelion periods of which have been observed.

But you may object that " one swallow does not make the summer," and may imagine that it is only a mere coincidence that the Comet *happened* to be in the same heliocentric longitude and latitude, and at the same distance from the Sun on the 7th August, 1858, that it was in on the 7th October,

1838. I pray you, however, not to lay this flattering unction to your souls; for there can be no such thing as *chance* in the matter; as will appear evident, if you remember that the results could not be such as I have shewn them to be, if the Sun did not really move and the Earth along with him, in the manner I have described, viz., towards the *west* continually and very nearly in a right line, differing only therefrom by the annual angle of the precession, or 50 seconds yearly. And as the mean annual motion of the Sun and the Earth through space has been proved to be 875,696,000 miles, it follows that from October 7th, 1838, until August 7th, 1858, they had moved through the amazing space of 17,367,974,000 miles, that is, over seventeen thousand millions of miles! This is about 183 times the distance of the Sun from the Earth. And through this vast distance we find the Comet has accompanied them, and, wonderful to tell, is found precisely in the *same* position, as relates to the Sun! There are more such " Swallows," however, in store for your observation; to indicate that the Summer Sun of Truth has at length broken through the Clouds of Keplerian and Newtonian error; which have kept the world in darkness even until now. The *second* couple of triangles in this figure will shew you the relative position of the Sun, the Earth, and Encke's Comet at midnight on the 1st November, 1838, and again on the 1st Sep-

tember, 1858, at which periods the Comet was equally distant, viz., 47 days distant from its Peri-helion.

It will not be necessary to go again through all the computations as we did in the first pair of tri-angles; but we will slightly trace the facts, how-ever. If you will cast your eyes upon the triangle in which the place of the Earth is marked B, you will therein find the Sun at N, advanced forward in his course towards the west, from his place at M, just 25 days' motion from the 7th October, to the 1st November, 1838. The distance he moves in that time is sixty millions of miles; which, on the scale of half-an-inch to ten millions of miles, gives us just 3 inches; which will be, on the scale we have been using, 120 parts. Then the Sun being at that time in long. 219.° 9.' 10·5″ the Earth is laid off at an angle of 39.° 9.' 10·5″, being 180° from the Sun's longitude. And at a distance of 188.41, which is deduced from the log. of the Earth's dis-tance, viz., 9·996351. Then from the R. Asc. and declination of the Comet given in the N. Almanac for 1842, and which are 20h. 55m. 54·24s. and + 64.° 52.' 52·2″ I find the Comet's *geocentric* lon-gitude 344.° 46.' 23.″, from which, taking the Sun's longitude, as above, we have the angle of "Elon-gation,"=125.° 37.' 13·5″. This is the angle N. B. S.' the Earth being marked B, and the Comet S.'

Then to find the distance of the Comet from the

Earth *on the plane of the Earth's course*, I first find
the Comet's *geocentric* latitude ; which is 72.° 12'.47".
N. and to its log. cosine I add the log. of the Earth's
true distance, viz., 9·370973 and it gives ·071771833,
which, multiplied into 190, produces the *reduced* dis-
tance required, viz., 13·6376648, the number of
parts to be laid off on the line B. S.' to mark the
place of the Comet.

Having laid down the Comet's place thus, at S',
I draw the line S.' N. to describe the line of the
heliocentric longitude of the Comet. Knowing the
two lines N. B. and B. S.' and the angle N. B. S.'
contained between them, we are able to determine
the length of this line, which is found to be 197·135
parts. The angle B. N. S.' taken from the angle of
the Earth's heliocentric longitude, leaves the angle
of the heliocentric longitude of the Comet, which is
found to be 35°. 55.' 42·75." It is not necessary to
go into the question of the latitudes at present ; but
we will now proceed to determine how far the
Comet is removed from this identical place, as re-
gards the Sun, just 20 years minus 2 months after-
wards ; when at the same distance in time, viz., 47
days from its perihelion.

The sister triangle to N. B. S.' is that marked N.
B.' S.' and in it the Earth's place is laid off at an
angle 180° from the Sun's true longitude, which is
159°. 11'. 1·29", at midnight, 1st September, 1858.
The Earth's longitude, therefore, is 339.° 11'. 1·29",

and it forms an angle with the Sun's course (always to
♈ 0.°0'.) as may be seen, of 20.°48.'58·31." The
log. of the Earth's distance from the Sun is 0·0036785
which gives us the line N B'=190·6989 parts. Then
we have this line and the line N S'=197·135 parts,
and the angle contained between them, viz., the
heliocentric longitude of the Earth, minus that of
the Comet, or 35.°55.'42·75",—339.°11.'1·29"=56°
44.'41·46", with which we find the angle N B' S',
which is the angle of "Elongation"=63.°1.'32."
This taken from the longitude of the Sun gives us
the *geocentric* longitude of the Comet=96.°9.'39."

Now, we have no *observation* to compare this with;
but as Professor Encke has published *his compu-
tation* of the R. A. 6.°31.'25·23", and declination
35.°27.'3·6" N.* we deduce from *that* the geocentric
longitude of the Comet=96.°32.'23"; which differs
only from what I make it, 22' 34" ! Thus again we
have the Comet as near as possible in the very same
place it was in when at the same distance from its
perihelion, just twenty years ago, during which it
has been six times through its course. How many
million chances to one have we, by the doctrine of
probabilities, against these remarkable results? And
do they not confirm my theory that this Comet
moves in a *regular* and *undeviating* course about
the Sun?

I now come to the last couple of triangles in the

* See "Standard," August 31st, 1858.

diagram (fig. 1.). That which is marked O. C. S", describes the relative position of the Sun, the Earth, and Encke's Comet, twenty days before its perihelion, viz. : at midnight, on the 28th November, 1838. It will not be necessary to travel over the same ground again, as to the calculations. The data from the N. Almanac for 1842 are these : R. Asc. = 16h. 11m, 41°.03s, declination—0.° 54." 53.9" log. dist. from the Sun 9.788219, and log. dist. from the Earth 9·619002. From these I deduce its geocentric longitude = 241.° 5'. 28.", and geocentric latitude = 19.° 53.' 20." N. The log. of the Earth's distance from the Sun was 9·993873, from which we get the line C. O,= 187·3381 ; the line C. S" represents the Comet's distance from the Earth, when reduced to the plane of the Earth and Sun ; it is found to be 74·31, in parts, or 40ths of an inch. The Sun's true longitude ·246.° 22.' 0"—241.° 5'. 28" = 5.° 16'. 32.", the angle between these two lines, and which is the angle of " Elongation." With these, we may ascertain the distance of the Comet from the Sun, (on the plane of the Earth's course) or line S" O. to be 113·5848 parts. We also determine the angle C. O. S" to be 3.° 26.' 55.", which, added to the heliocentric long. of the Earth, viz., 66.° 22'. 0"= 69.° 48.' 55." the *heliocentric long. of the Comet.* From this take the heliocentric long. of the Earth, 28th September, 1858, at midnight, and which is 5.° 32.' 11.,"; and there remains the angle

O. C.' S."= 64.° 16.' 44." ; which, with the two sides by which it is included, viz.. O. C.'= 190·2085 (being the distance in " parts " of the Earth from the Sun at the last date,) and S" O. = 113·5848, we obtain the angle of "Elongation," O.C.'S."=35.°59'.2" which taken from the Sun's longitude 185.°32'. 11.", leaves, for the *geocentric longitude of the Comet,* 149.°33'. 9." at midnight, 28th September, 1858.

Again, we lack any *observation* by which to judge of the correctness of this result, (in fact I write this on the 13th September, ten days before the time,) but we have Prof. Encke's Ephemeris of the Comet, given in the *Standard,* August 31st, 1858, which is R. A. = 10h. 21m. 46·22s, and declination = 19.° 9' 37·1" N., by which we deduce the *geocentric* longitude of the Comet = 150.° 15'. 47." ; differing in longitude, only 42.' 38." from the place it was in twenty years, less two months, before. Here the difference is slightly greater than on the other occasions, to which I have directed your attention ; but you will please to remember that we are not building on the solid foundation of accurate " observations " of the Comet's place on either occasion, whether 28th November, 1838, or 28th September, 1858 ; but have to erect our edifice on the loose and sandy ground of *computations* made on the principle of the elliptic theory ; which are avowedly only " approximations," to guide the observer whereabouts to search for the Comet. No, no, you gentlemen astronomers of the Newtonian School, cannot ven-

ture to say, " *here* will be the Comet at such and
such a time." But you think it is a very good hit,
if you can discover it within a degree or so of the
place your previously computed Ephemerides point
out. For instance, the Nautical Almanac for this
year 1858, gives what the editor of that work calls
at page 571 an " approximate " Ephemeris of De
Vico's Comet for the year 1855.

Now if my theory be founded, as I expect it is,
in truth and common sense, it will determine the
place of any Comet exactly, and with confidence,
to the very nick of time and place, at any future
period, when once the perihelion period has been
correctly observed. And to do this, we require no
elaborate tables, nor the introduction of " high
analysis," which shuts out the far greater portion of
even educated men from all participation in these
researches, and the enjoyment of the elevating
feelings, which the examination and contemplation
of the wondrous works of God engender.

To put these opinions to the test, we will, if you
please, solve the following problem on the " Cycloid
system." Let it be required to know the geocen-
tric latitude and longitude* of " Encke's Comet,"
seventy-two days before its return to its perihelion
in 1862 ? The perihelion will be, as I have said
before, at 17h. 30m. p. m., 7th February, 1862 ;
therefore, the time named will be the 27th November,
1861, at 17h. 30m. p. m. At which time 1 contend

* From which to determine the right ascension and declination.

that the Comet, after travelling again more than over seventeen thousand millions of miles, will return to the same identical angle of longitude, and same distance from the Sun, (if allowance be made for the decrement of latitude) as it was seen on 7th August, 1858, and as I conclude it to have *really been* on the 7th October, 1858.

Now this problem really may be solved very closely by projection; that is, by merely drawing a diagram, if we be at the trouble to draw it on a scale sufficiently large, and with scarcely any calculations at all.

The Earth's longitude, at the time indicated will be the Sun's *true* longitude 246.° 0.′ 36·38,″—180.° = 66.° 0.′ 36·38.″, from which take the heliocentric longitude of the Comet, 7th October, 1838, at midnight, = 25.° 0.′ 50., and you have the angle E. M. S. on the right hand side of the diagram, drawn with dotted lines, = 40.° 59.′ 46·38.″ You have also the side M S = 270.8375, and the side M. E. = 187·362. This last is had at once from the log. of the radius vector, given in the Nautical Almanac = 9.9939284.

Then M. S. + M. E. = 458·1995 Log. A: C. = 7·338945
 180°   And M. S.—M. E.= 83·4755 Log.   1·921559
 40·59′·46·38″

2/139· 0 · 13 · 62 = unknown angles.

 69· 30 · 6 · 81 = Log. Tangent.   ...   ...   0·427306
 25· 58 · 50   = Log. Tangent.   ...   ...   9·687810

 95· 28 · 56 · 81 = "Elongation."
246· 0 · 36 · 38 = Sun's true Long.

341· 29 . 33 · 19 = *Geocentric Long. of Comet* required.

This is all that is necessary to find the longitude; but to ascertain the R. asc. and declination, we must first find the latitude of the Comet, as seen from the Earth.

Hel. Lat. of Comet, 7th Oct., 1838=10° · 22′ · 6 · 5″
Annual correction   37″ × 23 yrs.= „ --14 · 11

$\overline{\qquad\qquad}$

Hel. Lat. required=10· 7· 55·5 Log.Tan. 9·252137

$\overline{\qquad\qquad}$

Log. M. S.   2·432709

$\overline{\qquad\qquad}$

Log. of " Elevation"=1·684846
Log. (A. C.) E. S.=7·748399

15° · 10′ · 20″ N.=Geo. Lat.* of Comet=Log. Tan.=9·438245

These quantities of latitude and longitude give the right ascension of the Comet to be 22h. 28m. 41·51s. and the declination 6.° 47.′ 5″. N., therefore, at 17h 30m. P. M., on the 27th November, 1861. And if there be no error in the computed place of its body for the 8th October, 1838, at midnight, as given in the Nautical Almanac for 1842, I feel confident that it will appear accordingly. But a few seconds of error in arc may arise from my taking the *apparent* longitude of the Sun at midnight, 8th October, 1838, instead of the *true* longitude ; which occurs from my being in the country while writing this tract, and being away from my books, and so obliged to take the Sun's longitude from a *White's* Ephemeris. Not being a professional astronomer, I have no authorities to refer to for past *observed*

* The *geocentric* latitudes of the Planets may be found in the same simple manner.

places of this Comet, and so to compare them with one another, and with my computations. But I now submit to you, gentlemen, that I have brought under your notice evidence that cannot be denied, or pooh poohed. And allow me to say, that if this be attempted, then at some distant day, when the young and rising astronomers of the world condemn you for neglecting to notice these fundamental truths of solar, planetary, and cometary motion, you will have the additional stigma attached to your names, that your prejudices so blinded your eyes, as to lead you to sin against light and knowledge, and common sense.

Before I conclude this letter, permit me to add a few words on the opinions of other and more able astronomers than myself, on the subject of Comets. The following extract is from "Astronomical Essays," by the late George Adams, page 165. "The number of the Comets is certainly very great, considerably beyond any estimation that might be made from any observations we now possess." [It seems to me that there is no ground for this exaggerated idea of the number of Comets. If Encke's Comet move as I insist it must do, then it may be seen at other parts of its course than when near the perihelion; but would always, in such case, from ignorance of its true motion, be taken for a new Comet.] "Though *astronomers* have bestowed much labour in calculating the periods of Comets, and much attention to account for their phenomena, yet experience bears

D 2

no testimony in favour of their opinions; nor have modern calculators had better success. Indeed, the immense distances to which they are supposed to run out are entirely hypothetical." [This I quite agree in. There is no reason why Kepler's rule should not apply to Encke's Comet; which would give its mean distance from the Sun only about 211 millions of miles;—but little more than double that of the Earth.] "There are those who do not think *the present astronomy of Comets well established;* and as so many small ones are frequently seen, they think that no-thing can be determined with any certainty, till some better marks are discovered for distinguishing one from another, than any at present known; and that even the accomplishment of Dr. Halley's prediction is uncertain; for it is very singular that, out of four years, in which three Comets appeared, the only one in which no Comet was to be seen, should be that very year in which the greatest astronomers that ever existed had foretold the appearance of one; and, in accounting for its non-appearance, Mr. Clairault would have been equally supported by cometic evi-dence, whether he had concluded the Comet to have been retarded or accelerated by the action of Jupiter or Saturn. A Comet appeared in 1757, as well as in 1755; and had he determined the retardation of the Comet to be twice as great as he did, another ap-peared in 1760 to have verified his calculations."

And yet, gentlemen, in spite of these opinions, put

forward as far back as 1812, and notwithstanding the now admitted fact, that the Sun moves forward in space, and does not remain stationary, as the great Newton erroneously imagined; and that I have shown, a year ago, that his motion in one year, is to the Earth's mean distance from him as 9·2 to 1 ; a fact that none of you have ventured to *deny;* in spite of all this, I find the " Evening Star" of the 15th Sept., 1858, con-tains an assertion that " the path of Donati's Comet appears to be very well represented by a parabolic orbit, and consequently is not likely to revisit these parts of space for a few hundred years." And this piece of absurdity is put forth by one of your officers ; your " Foreign Secretary," I believe, or something of that sort. " A parabolic orbit," forsooth ! Why, does not Mr. Hind know (I am sure he does), that if the Sun, the focus of that parabola, be in motion—as it is known to be—that such a figure can never possibly be formed by the Comet? Again, he speaks of its revisiting these parts of space, " and that, in a few hundred years." Surely if the Sun and the system move on in space, then, even if the Comet were to return to the vicinity of the Sun, it would not be " in those parts of space ;" for if " the few hundred years" be only *three* hundred, the Sun must, in that time, " move on" some 264 thousand millions of miles !

<div style="text-align:center">

I have the honor to be,

Gentlemen,

Your obedient Servant,

R. J. Morrison.

</div>

A POSTCRIPT TO THE PUBLIC.

It may not be uninteresting to inform the good easy public, how the new theory of astronomy I have been induced to advance, in consequence of the discovery that Sir W. Herschel made, and Sir John Herschel has since confirmed, viz., that the sun has a motion of his own, and is not merely the cause of motion to the planets, himself stationary all the while, has been received by the astronomers and others, whose more especial business it was to attend thereto. The result has confirmed the observation of a French writer, that " La dernière faute qu'on pardonne, est celle d'annoncer des verités nouvelles." The simple history of the affair is, that having been taught astronomy at an early age, and compelled to learn " to work a day's work," as is termed the custom of sending into the captain on board a man-of-war, an account of the ship's latitude, longitude, course made good, and bearings and distance of the nearest land, &c., at the early age of twelve years, I had always a *penchant* for the science. I followed this up, and have practised it now for more than fifty years ; during which I have given public lectures (gratuitously), on [numerous occasions, on every branch of astronomy, in many parts of this country. But in the course of my lectures I had some misgivings about the motion of the moon ; first arising, I think, from what Mr. Fer-

guson has long ago written on the subject. At length I got so far as to draw very large diagrams of the course of the earth and moon, about twenty-six yards in length. I then perceived that it was *impossible* that the moon could move *round* the earth, while the earth was supposed to be moving *round* the sun, at the rate of some 68,000 miles an hour. I soon perceived that my "new ideas," were treated like heterodox opinions in religion ; and that instead of thanking me for endeavouring to shew the public "new truths," they only scoffed where they could not argue. I then turned to the scientific world, and in 1837, laid my diagrams, or at least asked permission to lay them, before "the British Association for the *Advancement* of Science." Surely, I thought, these men will *examine* my discoveries, and shew me their errors, if there be any. No such thing. Dr. Whewell at once told me that they did not want to unsettle established doctrines ! So that here, again, truth was to be sacrificed to the fear of un-settling established opinions. But I persevered, and studied the matter more and more, and examined every system of astronomy I could hear of; especially Mr. Prescott's "Mosaic" system, by which he teaches that the sun and moon go round the earth as a centre, and that the planets go round the Sun as a centre. This is very plausible, and he brings out the longitudes and the moon's place beautifully. But his ideas of parallax are overthrown, I think, by very numerous facts. However, he was an able man, and his writings very soon convinced me of the fallacy of the Keplerian and New-tonian principles of astronomy. Reflection on Sir W. Herschel's discovery of the proper motion of the sun through space, en-tirely destroyed all faith in such manifest absurdity as that the sun could move *onwards* in space, and yet the earth and planets form ellipses around him. I never dishonoured the character of

that able man, Sir Isaac Newton, for, with all his faults and all his weakness of mind on many points, he was still a very able man. I never treated his memory with such disrespect as to think he was stolid enough to have passed by the discovery of THE SUN'S MOTION had he known it; and not to have at once seen that it overthrows all his otherwise well-founded ideas of gravity and attraction. No, no ; that imbecility is left to would-be philosophers in the present day, who, content to swear by the *name* of Newton, never venture to *test* the great doctrines of his Principia by the side of that stupendous cosmical fact.

To proceed with my little narrative. I found it more difficult to pull down than to build up. It was not till I had examined the matter for over twenty years that I resolved to put forth my work, entitled, "The Solar System as it is ; and not as it is Represented." The reception it met was just such as this miserable, novel-reading, money-grubbing, tuft-hunting generation might be expected to bestow. My publishers went through the regular routine. They sent fifty-five copies gratis to the " gentlemen" of the press ; some of whom seem to have thought they were not for "review," but for sale, for there were some found in a few days on bookstalls, uncut, and for sale, at 5s., though just published at 9s. ; of course nobody buys books to dispose of, at half-price, or even less, without even cutting open. Where then could these copies have come from but from the "gentle- men" of the press ? Of all the fifty-five, there were only three who thought fit to notice such a matter-of-course thing as a work on the motion of the sun, and the setting forth new prin-ciples of astronomy. Some even of those who had " promised" to do so, did not care to keep their promise ; one of whom was the editor of the *Morning Star.* Let me do full justice to those who did notice it. The *Literary Gazette* gave a sketchy ac-count, and ended by advising me to publish a .new nautical

almanac on my system ! The *Liverpool Daily Post* said all that a paper of that class could be expected to do. The *Athenæum* gave a very fair notice, though it cavilled a little, as such writers feel called on to do. But the editor, admitting that if the system move at all, it must move as I say it does, tells the world that everybody knew it beforehand ! Strange that no book on astronomy should ever say anything about it ! He then fights off from the consequences, by saying that the student perfectly well understands that the *elliptical* orbit of the earth about the sun, is a "*relative* orbit." Now, here is a strange thing ! Metaphysics teach that a body cannot be in *two places* at the same time. A corollary of this is, that a man cannot walk in *two roads* at the same time, nor a planet move in *two courses* at the same time. If, therefore, I prove that the earth moves in a cycloid about the sun, as is admitted, surely, *that* is its actual orbit "*relative* to the sun." It can have no second orbit. Any other can only exist in the *imagination* of astronomers ; it is not an absolute *ens*, existing in nature.

To be brief, Newton founded his "Principia," or system of astronomy, on two *assumptions*, now shewn to be fallacious.

1st. That the sun is stationary, which is now *disproved*.

2nd. That the planets were originally "pushed" forward in space, which has *never been proved*—

The "cycloid system," on the contrary, *assumes* nothing. It has absolutely *proved*.

1st. That the sun moves—*how* he moves—the *rate* at which he moves.

2nd. That the planets move—*how* they move—the *rate* at which they move.

3rd. That comets move in *regular* curves, as do the planets.

4th. That none of these bodies are subject to the attraction of gravitation.

The reader will not be surprised to find that these "new truths" were refused to .be listened to by the Committee of Section A., at the British Association in Dublin, last year.

After taking every precaution to be in time, and after interviews with the local secretaries, who gave me very civil promises and finding the time going by, and no notice taken of my. paper, I handed in the following letter to the President of the Section, whom I was told, by one of the officers, exercised an authoritative power in these matters.

TO THE REV. J. R. ROBINSON, D. D.

14, *Clare-street, Dublin,*
1*st September,* 1857.

SIR,

I trust you will excuse my applying to you on the subject of a Paper I have before the Committee, Section A. I am anxious to have it read before the Section, not from personal vanity, but because friends who have heard it, believe that my discoveries, in the fundamental parts of astronomy, are more important to the interests of society than any which have been made, since the days of Kepler and Newton. I need only name the *nature, direction,* and *rate* of the sun's motion through space ; and the accurate determination of the sun's place and of the heliocentric longitudes of the planets, by plane trigonometry, to draw your attention.

It is my wish that the British Association should have the credit of promulgating these discoveries ; but, if refused to be heard by my own countrymen, I shall be unwillingly obliged to lay them before the French Institute.

My Paper will occupy only some ten minutes, and the illustrations by large diagrams, which I have prepared, perhaps as

much more. Therefore, I hope the Committee will sanction my Paper being placed early on the list for to-morrow.

> I am, Sir,
> Yours faithfully,
> R. J. MORRISON, Lieut. R.N.

To this civil epistle I received *no reply*, which just proves that men may be well versed in the "high mathematics," without being at all versed in the laws of courtesy and good manners. It shews also that I am guilty of three things *not* to be pardoned, viz., 1st. Of an attempt to overthrow the cherished errors of the Newtonian system of astronomy. 2nd. That I have presumed to throw the *mysteries* of that science overboard, by shewing that *all its great problems* may be solved by plane trigonometry ; and that thus the high and mighty dons and priests of science may come down from their thrones and open their temple to the vulgar multitude of mankind. 3rd. That I have dared to do all this, not being " a Professor." Faugh ! This is the unkindest cut of all. Alas ! for poor human nature !

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 desire to embrace them, easy and simple ; so that he who runs may read. That in good, sober truth, the inventions of "flux-ions," 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, Bacon, and a thousand other great astrono-

mers, knew nothing of them. Eclipses, occultations, the positions of the planets, the motions of the fixed stars, the whole of practical navigation, the grand phenomenon of the " course of the sun," and now 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 right 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.

Note.—In using the term "*plane* trigonometry," I mean only thereby " the measuring of *plane* triangles," without algebra, or anything else but simple arithmetic and the use of logarithms

LOGARITHMS, &c.,

DATE.	LOGARITHM OF DISTANCE OF ENCKE'S COMET FROM THE	
	EARTH	SUN.
1838.		
Nov. 8.	9·342953	9·985400
„ 18.	·451901	·900279
„ 28.	·619002	·788219
Dec. 8.	·790797	·643363
„ 18.	·959296	·536761
„ 28.	0·086192	·629249
1839.		
Jan. 7.	·165906	·776140
„ 17.	·221258	·891211
„ 27.	·262916	·978401
Feb. 6.	·295243	0·046827
„ 16.	·320337	·102431
„ 26.	·339446	·148886
March 8.	·353411	·188546
„ 18.	·362777	·222986
„ 28.	·367995	·253303
April 7.	·369435	·280284
„ 17.	·367377	·304518
„ 27.	·362156	·326449
May 7.	·354117	·346423
„ 17.	·343656	·364716
„ 27.	·331374	·381546
June 1.	·324777	·389471

DATE.	LOG. DIST. SUN.	LOG. DIST. EARTH.	APPARENT DECLINATION. (° ′ ″)	APPARENT RIGHT ASCENSION. (H. M. S.)
1838 Oct. 7.	0·161105	9·738666	+44. 5. 0·4	2. 18. 9·37
Nov. 1.	·033835	·370978	64. 52. 52·2	20. 55. 54·24
„ 28.	9·788219	·619002	−0. 54. 53·9	16. 11. 41·08
Dec. 18.	·586761	·959296	21. 20. 58·2	16. 17. 28·31