

W. H. H. H.
H. H. H. H.

Models spins⁹
Lined 14 Mars Street
West Cornhill Street

Of Comets

Appears at first like a small
star seen from a long way down - but
increases in Magnitude & beauty
and brightens - moves towards the
sun - tail projected in a direction
opposite to the sun - length & breadth
of the tail depend on the Perihelion
When the Comet approaches the sun,
the tail always follows the comet.
When the Comet recedes from the sun
the tail precedes the comet -
Tail convex towards those parts
to which the comet moves - Convex
side brighter and better defined than
the concave side - Comets move
in all directions - in very long Ellipses

round the Sun in one year
 - Distance regulated by the same
 laws as those of the Planets.
 - Comets never seen thro' all their
 orbits only in that part nearest
 the sun - The Ellipses whose
 foci are at a very great distance
 from one another differ very little
 from a parabola - Calculations
 of very Excentric Ellipses reduced
 to parabolas easier - Newton's
 problem about trajectories -
 Aristotle thought Comets were
 in the highest parts of our Atmosphere
 - This very small decimal Part
 can have considerable Annual
 Parallax demonstrable that they

are higher than the moon and
 in the regions of the Planets
 - Other Comets have
 been observed in our System
 the period of three are known
 1531 } The period 75 years
 1607 } The 2^d distance to the
 1612 } least 60 to 1 - The 3^d
 1759 } light and heat to what
 + 1535 } 3600 to 1
 1537 } Period 75 years
 1661 } 129, 100
 + 1759 } 10,000 : 1
 4240 } This is varied
 531 } 576 20,000 : 1
 1106 } 400,000,000 : 1
 1650 }
 + 2256 }

The Great Comet in the year 1680
was of the Sun from his surface
to find was 2000 times greater
than our hot Sun - Now this is
found - That of Summer is of
winter water. And from the same
quarter than boiling water -
That in the inverse proportion of
the square of the distance -

There have been 3 opinions about
Comets - 1st That they are meteors which
are generated and perish. - 2^d That
they come from the regions of the
fixed stars and are sent on their
progress thro' the planetary spheres
but they never return - 3^d That
they are ethereal bodies revolving
about the sun in very irregular orbits

The last is the best -
Comets appear successively with
a regularity of time
- These opinions concerning
the nature of Comets -

Ist That they were only rays
of the sun propagated thro' the
transparent head of the Comet
II. That they arose from the refra-
ction of the light in its passage
from the head of the Comet to the
earth -

III. Comets are the same continu-
ally arising from the head of
the Comet and going off in a
direction opposite to the sun.

The two first opinions are evident
by all former - Sir J. Newton
accepts the last - It thinks the
Amount of Comets tails is owing
to their being rarer and lighter
than the solar atmosphere
which he supposes them
surround a tail in the neigh-
bourhood of the sun. The same
heat expels from the comets
through a few thin vapours more
opposite direction to the sun, they
become tails by reflecting the sun
rays at their periphery amidst the
solar atmosphere whose density he
supposes greater than that of
the tail, like smoke upon a chimney

So? Newtons account of the
tail of Comets liable to many
and some of them, consensus can be
doubted -

A body moving in a medium
of greater density, with a very great
velocity, will meet with a great
resistance.

Every body which reflects must
also reflect the rays of light.
The above Propositions applied
to the motion of Comets -

The conclusion is, that the tails
of Comets do not consist of aqueous
or other vapours thrown off by the
heat of the sun, and moving by the
superior gravity of the surrounding

Meteor were this Meteor. The
tail would always be left behind
the comet, at least it would be
longer in its approach, than in its
recess from the Sun, this however
is not the case — A candle moves
through the air — flame follows it —
— Comets tail longest a little after
it has passed the Perihelion —

Electrical Hypothesis

Moon
Period. Revⁿ 27 7 43
Synod. — 29.12

Orbit Elliptical — Earth
in the focus —

Mean Dist: 240,000
or 30 Diameters of the Earth

+ Annual motion of the
earth the cause of the Diff.
between the Periodic Syno-
dical of the moon —

+ turns on her axis in
one week — ~~Placed~~ ^{moved} ~~the~~ by
the weight ^{of the}
same side to the earth.

Illustrated by a candle
— both hemispheres never
seen to the earth —

Moon resembles the Earth

1. Globular form —
like the Moon a flat
surf. never visible before
the end of her first and
after the begin^g of her
fourth quarter — app: and
dis: app: almost invisible
never

2. Moon gets her light
— receives her light from
the sun — otherwise she
would appear transparent
at all times — never so at
full —

3. Day and night — one
in the month

4. Irregularities of Surface
light and shade -
- Mountain - valleys
best observed in the first
and last quarters -
- boundary not regular
nor circular - Mountain
now measured - 3 miles

5. Same year the same
as that of the earth
- Sun's apparent motion
nearly the same
in the earth and Moon

6. Earth a moon to the
Moon - At times larger
motion in the same ob-
served - Dictionary -
- a good deal for the Moon

~~The fixed stars~~

Moon differs from the
earth

1. Little variety of seasons
axis inclined - $2^{\circ} 10'$
- Torrid Zone $4^{\circ} 20'$
broad

2. No atmosphere heard
by the revolution of the
stars and her surface al-
ways clear - No other
moons atmosphere or
has below or her axis
and her surface that is
equal - $\frac{1}{2}$ mile - Thus
of us are

3. No Seas - Both parts
of water would, somehow
reflect the sun's image
- shadows in the dark
parts unequal

Consequences

1. No winds or rain
2. Inhabitable, dry
3. No fire - Electricity
4. No vegetables
5. Stars seen at midday
6. No twilight
7. No thunder lightning
8. No rain bow - Circumstances
9. Quick transition from
darkness to light -
10. Volcanic appearance

11. Size of the Moon, Jupiter
Saturns

in Moon --
Libration
Nutation --

Fixed Stars --
-- Place the same appearance
whether seen from the sun
or the earth -- appear at
rest -- Proper name as some
are said to be --
-- Distances unknown --
Catalogue of the Stars --
-- Magnitudes -- 7 magnitudes
Names -- Clusters or Constellations
Ancients divided that part
of the heavens into which
they were acquainted into
forty eight constellations
-- twelve new constellations

These constellations received
names from the objects they
were famous to represent —
— First Nelson: Chiffhounds
— Zodiac signs now divided
— Vespert of water — Motion
through the Zet unequal —
— Catalogues

Papparchus 150 A. C. 1022
Ptolemy — 130 A. C. 1026
Tycho Brahe 1600
Keplerus 1670
Hammeler 1690 3000

This list by far the most
exact — 20 times the number

in Hammeled observed by
the Telescope —
In the Sign Taurus 140
have been observed by
Hammeler —
Fixed Stars appear best
through a Telescope than
through the naked eye. —

— The luminous Bodies
— Stars centers of systems
— Place at unequal dist.
from the earth.
New Stars — cloudy —
x Orions sword —

Solar and Syderial Time

Sun appears to move the
stars by almost a Degree
every day - Hence the stars
rise &c. near 4 minutes
sooner every night -

$3^{\circ} 56'' =$ sun's motion in

a Day. This motion irregul.
Diff. Distances from the sun.

Diurnal motion of the
earth perfectly equal - sun
+ earth's motion cause of diff. of day & night

- Motion of regular times
clocks -

Equation of time

2 Causes

1. Unequal Velocity of the center
 2. Obliquity of the Ecliptic
- Equatorial Difference $16' 15''$

15 April 15 June

31 August 24 December

X Longitude

X Spots on the Sun

X twilight

Transit of Venus
Earth is a point when
seen from the sun - but
Venus is sometimes near
to time near the earth
than the earth is to the sun.
I speculate, at a distance
will observe Venus on diff.
parts of the ~~Earth's~~ Sun's
surface at the same
time - This difference is
called the parallax of the Venus

Semi-Distance Determined
by the Effect of Semi-Alt.
on the moon - Dr. Stewart
- When the Distance of
one planet is known, all
the rest can be discovered
by the universal law which
regulate observe $P^2 \propto D^3$
The time of Venus's motion will
be different by motion to the
horizon at different hours
of the day -

Chronology —

A Day the first Division
of time — Month — Year
Periods — Cycles —

Length of the Julian year
365. 4

True year — — 365. 5. 49

Now determined —

Leap year —

— Dominical Letter —

— Shifts backwards —

$\frac{365}{7} = 52 - 1$ Day over

This shifts new years Day

forward a Day every year
year begins and ends with
the same day. —

— Solar Cycle 28 years —

— Lunar Cycle — Indiction

— Epact —

— Weeks derived from
Revelation or the appearance
of the moon. —

Julian period 7890 —

Ecliptic Cycle not exact.

Chronology —

A Day the first Division
of time — soon Multiplied
Two part — longer necessary
The relation of the moon
of time another series a
years — years —
some logical thinking
in —
Babylonian a hundred
of years — the year
in the middle of
a century —
Plants growing over
time in this order
Sun, Venus, Mercury, Mars
Saturn, Jupiter, Uranus

... of Monday —
... a manifest law
... the formation —
... of
... Day of the
... and
... the arrangement
... to the
... of the world
... —
... the
... —
...
...
... the God of heaven
...
... between
... and
...
... —

... from the ...
... from ...
... ..

Astrology

Sun - Moon, Mercury
Mars, Venus, Jupiter
Saturn

Solar Spots
... from east to
west - 12¹/₂ days - ...
... on his axis in
25 days - spots adhere
to the sun - they appear
and disappear in equal
spaces of time - spots
broadest on the middle of
the disk - hence the sun is
... a globe - spots
... in time a little
curved their track is never
straight except in two days
to view the distinct from each
other - hence we learn that
the sun axis is not perp:
to the Ecliptic 5^o ...

When Gall: first pointed the
Telescope to the sun he counted
50 spots on his surface
From 1650 to 1670 there was
never seen above 2 at a time
frequently none -

The same spot will continue
sometimes for several rev-
olutions of the sun - at other
times a spot will disappear
in half the time revolution
Quasars sometimes in
the middle of the disk -
Sometimes they begin their
existence a number of
small spots join and form
one large ^{spot} one. At other
times a large spot is ob-
served gradually to divide

and be divided into a number
of spots -

Spots are cavities - the bright
sides - black spot in the
middle - Spots so large
as to hold several each -

Handwritten text at the top of the right page, possibly a title or header.

- Eclipses -

Shadows - Earth - Moon

Longitudinal

Some happen

that expand all metals
and contracts

In a warm climate the
ball is enlarged, the pores
and veins opening unconquered
retained, the air illuminated
the result is that the
gas flows

Difference of time given
P. J. Long, and the sea

Longitude by
the Moon

Moon moves in her
orbit about 2' in the hour

That Gravity extends from
every body in the system to
the greatest distance in the
great things on which the New
Philosophy turns, and proved
by the most obvious induction

But this is incompatible
with absolute rest —

— Gravitation gone abroad in
the universe — all the systems
would attract and begin to
move towards each other
Even those bodies which are vi-
sible in the remotest ^{regions} corners
of space on the very verge of creation
would leave their stations in
absolute space and, with a
velocity continually accelerated,
would move on towards the
Point of general tendency, so

But after a series of ages had
elapsed all the liberties of nature
all the glories of creation would
perish in one universal ruin.
On the tremendous sheet of so
many opposing worlds

A supposition, or a riza-
tion of the power wisdom and
goodness of the supreme being
that we cannot possibly enter
tain it.

By which a hot controversy
in nature is thus prevented.

Infinite Systems -
propagated force -

Why not suppose the
same cause introduced into
the universal system, why
not suppose our Solar System

to worship one grand universal
System all moving round
some far distant center according
to the laws of the Gravitation

— Grand Description of the uni-
verse. Whole host of heav-
ens one great sphere blaze of
stars all in rapid motion round
the great center of creation.

Not from analogy alone
— Much direct proofs -

Problems of some Stars
— Dimensions of the center

Great being who commands
into existence such a being
But here the utmost stretch

of human imagination falls infinitely
short of the sublime object

The souls labors and struggles
with the idea but in vain

As presented with the grandeur
of the object she sinks down
again to this little spot of earth
when returning into herself she
finds there deeply impressed what
she has only had to contemplate
the incredible idea of infinite
admiration.

Planets inhabited
- Plants animals - Jovian
- turn round their axes
- revolve round the sun
- moons - Mountains and
- valleys
- of what are light of their
- axes inhabited
- of what use to us the Salt
- or even the fixed stars
- No objections from the
- of distance of life

Construed that the planets
are all inhabited with an
endless variety of

But what is the figure of
their bodies, what the powers
of their forces Do they exist
and in what manner are
they employed, to these questions
we ~~do~~ must have it in
our power to give any
solution in this world

Impossible to explain
From the limited nature
of our own powers we advance
slowly in the acquisition ^{of knowledge} It
is necessary that we attend
but to few objects at once in
order to progress in knowledge
Had we been indulged in a cor-
respondance with the planets

The affair of life might have
appeared trifling, in the compass
the duties incumbent upon us
as members of society must
have suffered by it.

But shall our views be for
ever confined to this little
Globe? Shall we never have
a communication with the remote
bodies in the universe?

Have we been conducted
to this little eminence for
no purpose, we have had a
glimpse of those distant worlds
and shall we never enjoy
a nearer prospect of them?
Shall we never have it in
our power to converse with
our brethren inhabiting
the other bodies of our System?

It is not suitable to that
goodness that shines in every
part of creation that our curiosity
should have been raised so
high to be disappointed in the
end. That we should have
had powers and faculties
bestowed upon us which,
being capable of perpetual
progressive improvements
can never have their full
exercise in this life.

Did our existence terminate
in the grave, and the Spi-
ritual part perish with the
mortal part, would the
marvellous power of the body
never have been created in
vain the beautiful frame
of nature had never been
unfolded.

Conclusion

The present only the instance
of our being the Power of our
country - that we are directed
to a higher and a nobler
sphere of action where our
~~power~~ powers shall be
greatly enlarged and our
knowledge in proportion
to our powers -

Indoctrines

To enlarge the mind and
banish those prejudices which
we have imbibed with our
education or habituation of
The man on whom this
pleading, study has its due
influence consider himself
as a citizen of the world,
and looks upon every man
of whatever country and
whichever religion as his
brother is it not enough
that he wears the human
form that he is assimilated
with all our principles
conscience of his own country
and principles of the origin
from whom it sprung -

That he is our fellow traveller
And life, and to descend with
us into the same humble si-
lent habitation that we see
her provided for all her children
— And is it not more than
enough — that when the
sun shall be struck from
the center and the mighty
chain of attraction which
binds the system shall
be torn a sunder, when the
Guardian Angel of nature
shall drop the last tear
over a falling world, and
bid an eternal farewell
to his favourite charge —
— when a voice from the throne
shall proclaim the final

Dissolution of the system, and
arrant the planets in the
mass of their rapid career
In this awful situation it is
surely more than enough that
he is to stand with us the last
chord, and be a fellow spec-
ator of the last fringe of exist-
ence, and for ought we
know our incomparable
comp. & that the various
regions of that undivided
universe are all but the
a ² ~~the~~ ^{most} ~~least~~ ^{conspicuous}

Books

Gregorius work 3

Martin's work 3

First Astronomy 2

Gregorius Dittus

De la quatr. Espr, Phil^o

Gravesande Natural^o

Halskains lecturas

Principy and Frankl^o

Smith and Purshy 2^o

De la Lum. Nat^o 4^o

Nature Displayed

Dehans work

Fontenest. Philosoph^o

Dictionary

Solar System

Periods

Mercury	—	3 Months
Venus	—	7
Earth	—	12
Mars	—	2 years
Jup	—	12
Sat	—	30
G. Sat	—	82

— How Snow —

Rotations H O H

Mer - 25 6 - 27 12

Venus

+ 23 40

Earth - 24 -

Mars - 24 40 -

Jupi: 9 56

Sat: 10 1/2

G. S.

Distances

Planet	Emp	Real	Unit
Mer	4	37	millions
Venus	7	69	millions
Earth	10	95	millions
Mars	15	145	millions
Jupi	52	495	millions
Sat	95	900	millions
G. S.	180	1800	millions

Cannon ball

Planet	Years
Mer	16
Earth	23
Mars	34
Jupi	118
Sat	210
G. S.	400

Magnitudes

	From	1100,000
Sun	890,000	1100,000
Mercury	3,000	
Venus	9,000	
Earth	7,970	1
Mars	5,400	
Jup	94,000	1,000
Sat		
G. S.		

Suppose the Earth	1
Then the Sun	9 ft
Mercury	42 ft
Venus	
Mars	
Jup	10 ft
Sat	
G. S.	

Suppose the Diam. of the Earth 1 inch

	Then the Distance of
Mercury	387 feet
Venus	733
Earth	1000 ft
Mars	1523
Jup	5207
Sat	9540
G. S.	10,000

From the above the circumference of the G. S. is 23 English miles

Light and Heat

Mercury	7
Venus	2
Earth	1
Mars	$\frac{1}{2}$
Jup.	$\frac{1}{2}$
Sat.	20
J. S.	1
	90
	91
	360

Time in which the
planets ^{will} fall to the sun

Mercury	15 13
Venus	39 17
Earth	64 10
Mars	121
Jup.	290
Sat.	760
J. S.	

Moon to the Earth in 4: 21

Inclinations of Orbits
to the ecliptic

Mercury	7°
Venus	3 20
Earth	5
Mars	1 50
Jup.	1 20
Sat.	2 20
J. S.	

Inclination of Axes
to the ecliptic

Mercury	
Venus	
Earth	
Mars	
Jup.	
Sat.	
J. S.	

Proportional Gravity
on the Surface

Satellites
Emp. 1
2
3
4

Saturn, 0
1 - 22 - 2, 32, 2 to 77

Four of Saturn's Satellites
4 Satellites discovered (1805)
by D. Herschel. The
former two are found
to move retrograde and
the latter two in
orbits almost at right
angles to the primary orbit

Brown Blacksmith

Whitcomb Street