INDUCTIVE TABLE OF ASTRONOMY.

Observed Phenomena (top row)

- THE EARTH appears to be immoveable.
- THE STARS keep their relative places in the vault of the sky, and, with the SUN and MOON, rise, move, and set.
- THE MOON's bright part is of the shape of a ball enlightened by the Sun.
- THE MOON's Eclipses occur when she is full.
- ECLIPSES OF THE SUN AND MOON often occur.
- THE MOON rises and sets at different times and places. Her course among the Stars varies.
- THE PLANETS are morning and evening Stars: are direct, stationary, and retrograde.
- THE SUN rises, culminates, and sets in different times and places at different seasons: different CONSTELLATIONS are visible at night.
- THE TIDES ebb and flow.

First inductions

- *Chaldns.* The Sphere of the Heavens appears to make a Diurnal Revolution.
- *Greeks.* The Moon receives her light from the Sun.
- *Greeks.* The Moon's Eclipses are caused by the Earth's Shadow.
- *Chaldns.* The Moon's Eclipses follow certain Cycles.
- *Greeks.* The Moon appears to revolve monthly in an oblique orbit, which has Nodes and an Apogee.
- *Chaldeans.* The Planets have proper motions and certain Cycles.
- *Pythagoras.* The Sun appears to move annually in an Ecliptic oblique to the diurnal motion.
- The places of Stars are determined by their LONGITUDE measured from the Equinox.

Further observations

- The forms and dist. of known parts of the earth are such as fit a convex surface.
- The visible Pole of the Heavens rises or drops as we travel N. or S.
- The boundary of the Earth's Shadow is always circular.
- By observations of Eclipses, the Moon's Nodes and Apogee revolve, and her motion is unequal according to certain laws.
- By observations of the Planets, their progressions, stations, retrogradations.
- By observations of the Sun, his motion is unequal according to certain laws.
- By observations, Longitudes of Stars increase.
- By observations, the Tides depend on the Moon and Sun.

Greek theories

- *Aristotle?* The Earth is a *Globe*, about which the sphere of the Heavens performs a *Diurnal Revolution.*
- *Hipparchus.* The Moon appears to move in an *Epicycle* carried by a *Deferent*: the *Velocity of Apogee and Nodes* determined.
- *Eudoxus.* The Planets appear to move in Epicycles carried by *Deferents.*
- *Hipparchus.* The Sun appears to move in an *Eccentric*, his *Apogee* being fixed.
- *Hippar.* There is a *Precession of the Equinoxes.*

- By additional observations, the Moon's motion has another inequality. Evection.
- By additional observations, the Planets' motions in their Epicycles are unequal according to certain laws.
- By additional observations, the Sun's Apogee moves. *Albategnius.*

- *Ptolemy.* The Moon appears to move in an *Epicycle* carried by an *Eccentric.*
- *Ptolemy.* The Planets appear to move in *Epicycles* carried by *Eccentrics.*

- *By the nature of motion, the apparent motion is the same whether the Heavens or the Earth have a diurnal revolution: the latter is simpler.*
- *By the nature of motion, the apparent motion is the same if the Planets revolve about the Sun: this is simpler.*
- *By the nature of motion, the apparent motion of the Sun is the same if the Earth revolve round the Sun: this is simpler.*

The Heliocentric Theory

Copernicus. The Earth and Planets revolve about the Sun as a center in Orbits nearly circular. The Earth revolves about its axis inclined to the Ecliptic in a constant position, and the Moon revolves about the Earth. The *Heliocentric Theory* governs subsequent speculations.

- Retaining Moon's Eccentric and Epicycle; By additional observations, the Moon's motion has other inequalities.
- Retaining but referring to the Sun as center the Planets' Epicycles and Eccentrics and the Annual Orbit;
- Retaining obsns. Earth's Aphelion revolves.

- *Tycho.* Moon's *Variation; Unequal Motion of Node; Change of Inclination.*
- By calcns. of the periodic times and distances.
- By additional observations and calculations.
- By additional observations and calculations.
- Planets' Aphelia revolve. Jupiter and Saturn's motions have an inequality deps. on their mutual positions.
- The WEIGHT of bodies dimin. in going towards the Equator.
- THE SATELLITES of Jupiter and Saturn revolve according to Kepler's Laws.

- *Horrox. Halley.* The Moon moves in an *Ellipse* with variable *axis* and *eccentricity.*
- *Kepler.* Distances cubed are as times squared.
- *Kepler.* Areas described by Planets are as times.
- *Kepler.* Curves described by Planets are ellipses.
- *Newton.* Earth is oblate.

By Mechanics

- *By Mechanics.* *By Mechanics.* *By Mechanics.* *By Mechanics.* *By Mechanics.* *By Mechanics.* By Mechanics. *By Mechanics.* *By Mechanics.* *By Mechanics.*

- *Newton.* Moon is attracted by the Earth.
- *Newton.* Moon's inequalities produced by attraction of Sun.
- *Newton. Wren Hook.* Sun's Force on different Planets is invers. as the square of distance.
- *Newton.* Planets are attracted by the Sun.
- *Newton.* Sun attracts Planets invers. as square of distance.
- *Newton.* These inequalities are produced by mutual attraction of the Planets.
- Precession of Equinoxes is produced by attraction of Moon and Sun on oblate Earth.
- Tides are produced by attraction of Moon and Sun on Sea. *Explanation imperfect.*
- Diminution of gravity and oblateness of Earth arise from attraction of parts.
- *Newton.* Jupiter and Saturn attract their Satellites inversely as the square of the distance, and the Sun attracts Planets and Satellites alike.

Fall of heavy bodies.

- *Newton.* Earth attracts Moon invers. as square of distance.
- *Newton.* Sun attracts Moon.
- *Newton.* Sun attracts Planets inversely as the square of the distance.
- *Newton.* Planets attract each other.
- *Newton.* Moon and Sun attract parts of the Earth.
- *Newton.* Moon and Sun attract the Ocean.
- *Newton.* Parts of the Earth attract each other.

Newton. All parts of the Earth, Sun, Moon, and Planets attract *each other* with Forces inversely as the squares of the distances.

Newton. THE THEORY OF UNIVERSAL GRAVITATION.
(All bodies attract each other with a Force of *Gravity* which is inversely as the squares of the distances.)