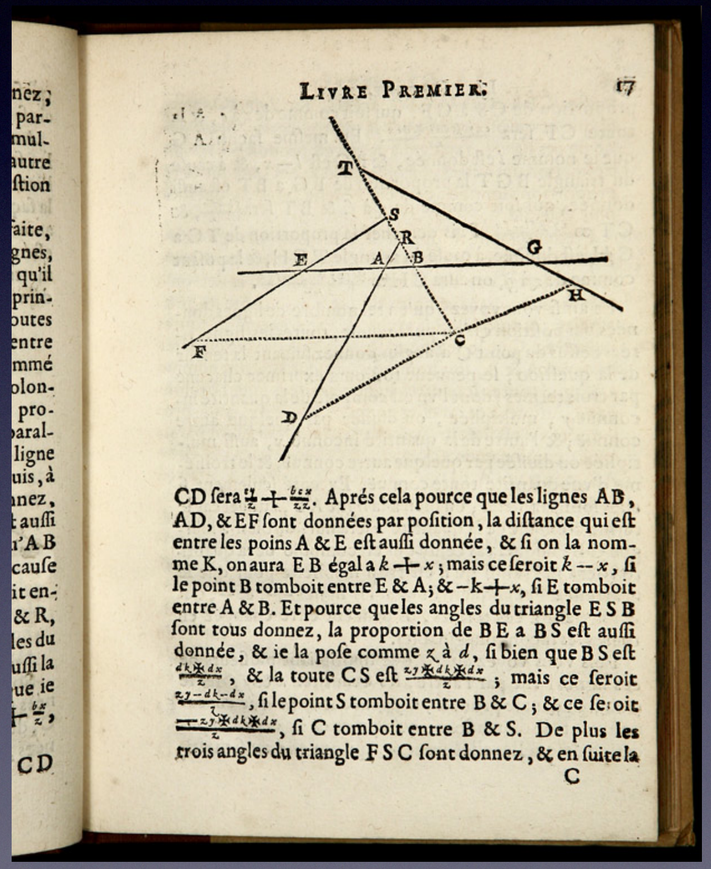
Rationalism

HZT4U1 - Mr. Wittmann - Unit 3 - Lecture 2



LIVRE PREMIER. 17

CD ſera $\frac{ny}{z} + \frac{bx}{zz}$. Aprés cela pource que les lignes AB, AD, & EF ſont données par poſition, la diſtance qui eſt entre les poins A & E eſt auſſi donnée, & ſi on la nomme K, on aura E B égal a $k + x$; mais ce ſeroit $k - x$, ſi le point B tomboit entre E & A; & $-k+x$, ſi E tomboit entre A & B. Et pource que les angles du triangle E S B ſont tous donnez, la proportion de B E a B S eſt auſſi donnée, & ie la poſe comme z à d, ſi bien que B S eſt $\frac{dk+dx}{z}$, & la toute C S eſt $\frac{zy+dk+dx}{z}$; mais ce ſeroit $\frac{zy-dk-dx}{z}$, ſi le point S tomboit entre B & C; & ce ſeroit $\frac{-zy+dk+dx}{z}$, ſi C tomboit entre B & S. De plus les trois angles du triangle F S C ſont donnez, & en ſuite la

C

Descartes, **La géométrie**

No fact can be real and no statement true unless it has a sufficient reason why it should be thus and not otherwise.

-Gottfried Leibniz

I call him free who is led solely by reason.

-Baruch Spinoza

Is Reason the Source of Our Knowledge?

- c.1604
- Galileo's scientific revolution lead philosophers to rethink established intellectual assumptions.
- Many intellectual, scientific, and religious upheavals happening at that time.


OXYGENTHIEVES
PRESENTS...

RATIONALISM

- At least some knowledge and truths comes from reason, without the aid of sensory perception
- Absolute knowledge of reality is not a product of experience
- But depends solely on our mental processes.
  - i.e. valid argument guarantees that its conclusion is true, if its premises are true.

RATIONALISM (continued)

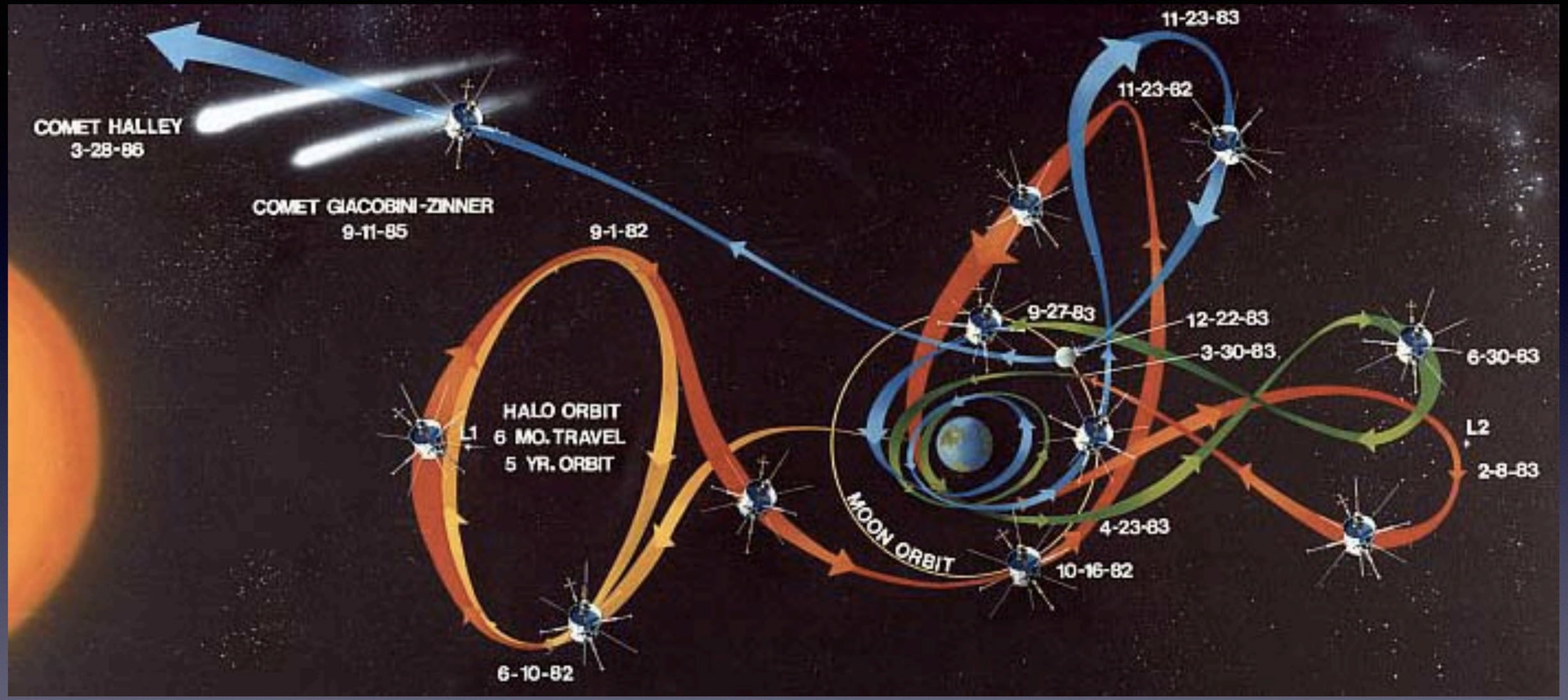
- For example…
- Mathematical knowledge is acquired by reasoning alone without observation of the world, yet it tells us how the world works.

If 2 = 

and 3 = 

than 2+3=5 (

)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HALO ORBIT
6 MO. TRAVEL
5 YR. ORBIT
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MOON ORBIT
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9-27-83
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12-22-83
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6-30-83
L2
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Western Rationalist Philosophers

Plato (c.428–348 BCE)

Saint Augustine (354–430)

Rene Descartes (1596-1650)

Benedict Spinoza (1632–1677)

Anne Conway (1631–1679)

Gottfried Wilhelm Leibniz (1646–1716)

Georg Hegel (1770–1831)

Innate Ideas & Thoughts

- **Plato**: born with fully formed innate **ideas,** hidden in our minds, which experiences unlock

- **Later philosophers**: only innate **thoughts** are in our minds, without observing them in the world

- Most rationalists believe some innate thoughts are...

    1. basic principles of logic, arithmetic and math

    2. axioms of geometry (triangle has 3 sides)

    3. basic rules of science (every effect must have a cause)

Indian School of Jainism

- **Shankara** (788–822)
- Knowledge of ultimate reality could only be acquired through reasoning.
- We have the knowledge of an object in our minds before our senses perceive it.
- Our perception of the object merely serves to uncover the innate knowledge of that object.
- Our minds, not limited by time or space, hold complete knowledge of everything in the universe.

Priori Knowledge

- Reason, without sense experience, gives us knowledge of truths about the world
- So basic, that all our sensory knowledge depends on our prior knowledge of these truths
- Necessarily true and deductive, not inductive
    - i.e. math, logic, theoretical physics both large and small
        - At least one of any two contradictory propositions must be false.
        - No proposition can both be and not be true at the same time
        - every effect has a cause
        - the shortest distance between two points is a straight line
        - the universe follows the same laws in all of its parts

Rene Descartes

- 1596-1650
- Tried to determine the difference between what is believed and what is truly known.
- Step-by-step mathematical reasoning method to determine self-evident, and axiomatic truths about the universe.
- For example ***cogito ergo sum***

Rene Descartes (continued)

- Sense perception can be confusing
- Example of a piece of solid wax and melted wax
- The mind knows the wax is the same when it melts, but which to the senses looks completely different.
- Descartes argues that reason, without the aid of the senses, is able to acquire knowledge of the wax.
- Thus only clear and distinct ideas in our minds provide genuine knowledge.
- Thus, the mind or reason is the ultimate basis of knowledge.

Rene Descartes (continued)

- **Extreme Rationalism**
- Knowledge of God
- Imperfect human can’t conceive of a perfect concept (God)
- The source of such an idea must be something perfect (God)
- Therefore, God must exist


OXYGEN THIEVES
PRESENTS...

Leibniz's Tendencies

(1) *if* $y = y_1 + y_2$, *then* $\frac{dy}{dx} = \frac{dy_1}{dx} + \frac{dy_2}{dx}$;

(2) *if* $y = ky_1$, *then* $\frac{dy}{dx} = k\frac{dy_1}{dx}$;

(3) *if* $y = y_1 y_2$, *then* $\frac{dy}{dx} = y_1\frac{dy_2}{dx} + y_2\frac{dy_1}{dx}$;

(4) *if* $y = \frac{1}{y_1}$, *then* $\frac{dy}{dx} = -\frac{1}{y_1^2}\frac{dy_1}{dx}$;

(5) *if* $y = \frac{y_1}{y_2}$, *then* $\frac{dy}{dx} = \left(y_2\frac{dy_1}{dx} - y_1\frac{dy_2}{dx}\right)\Big/ y_2^2$;

(6) *if y is a function of x, and z a function of y, then*

$$\frac{dz}{dx} = \frac{dz}{dy}\frac{dy}{dx};$$

(7) $$\frac{dy}{dx} = 1\Big/\left(\frac{dx}{dy}\right).$$

- Gottfried **Leibniz** (1646–1716)
- Not born with ideas or thoughts, but **tendencies** that form ideas
- Experiences gradually shape these tendencies and turn them into fully formed ideas

Leibniz Video

THE END