

## 12-14 HUNDREDS - WORLD BEFORE GALILEO

### I MAJOR FACTORS BEHIND GALILEO

1. Trade - Travel → discovery of other worlds:
  - Crusades, Arab blockade of trade routes
  - Discovery of people Theophrastus said couldn't exist.  
eg. too hot below equator. No Christian below equator could → resurrection.
2. Rediscovery of Aristotle:
  - Averroes (Arab Philosopher): 1) necessity of world 2) Primacy of reason 3) Nature of human intellect
  - 1) Necessity of World vs Christian - God decided. World contingent on God.  
Aristotle - Natural Causation. (if necessitarianism - NO PURPOSE - only running down)  
Primacy of Reason vs Christian "revelation" is primary over reason.  
Theology is primary over philosophy
  - 3) Nature of Intellect. Monopsychism. No place for faith. Can work only with reason. No need for faith, assumptions.
  - 4) Restores concern with this world - less with other world. Experimental approach.

### II SCIENCE BEFORE GALILEO

1. Sought to Explain Things in terms of PURPOSES - "why?"  
Saw world as part of a divine plan (God has a plan for —)  
Augustine.
2. TRUE FORM = OUTER APPEARANCE ↔ INNER MEANING  
eg. Acorn → tree (fulfills purpose) ← MEANING → Less affected by fall & sin.  
Human → Actus (?) No Sin → loss of purpose Church shows Man has PURPOSE
3. GOD IS PURPOSEFUL CREATOR. ∴ He is behind all Purpose  
Nature - Nature & hierarchy of beings. Humans at top  
- Story is redemption of human souls.  
{ - Scene of drama  
- Also sees it as a source of temptation, fallen earth. Struggle to overcome it.
4. Aquinas: synthesises Faith & Science. But at expense of observation. Uses Reason. Ptolemaic & Aristotelian:  
tries to bring together Faith & Reason (not observation)

Trichostema (C. 11)

- 1) ...
- 2) ...
- 3) ...

- 1230 ...
- 1231 ...
- 1232 ...
- 1233 ...
- 1234 ...

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4) ... ..

A. 11/12

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# History of Astronomy

## GALILEO

- Invented telescope
- Discovered moons of Jupiter (Galilean moons - 4 moons)
- Discovered sunspots
- Discovered that Venus has phases (like the moon)
- Discovered that Saturn has rings
- Discovered that the Milky Way is made of stars
- Discovered that the Earth is not a perfect sphere
- Discovered that the Earth is not a perfect sphere
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NEWTON 1642-1727 ENGLISH MATHEMATICIAN

1. Reason → insight for efficient Cause.

God: ⇒ <sup>FATH</sup> Final or ultimate Cause <sup>of nature</sup> shifted to a "force" idea  
of God. God no longer person involved in our salvation. <sup>God is the Great Designer rather than God is the Saviour</sup>

Nature → as a source of theological knowledge. God is  
new order, comparable to Mathematics the supreme example  
of order in science.

1.3

For Newton Science a way to know God. Later it became  
the prime way to know God (History lost out to Science).  
The new drama is nature not human history.

2. Newton's Method

- 2.1 Galileo's method <sup>Book</sup>
  - ① ~~observation~~ controlled observation.
  - ② Experimentation.
  - ③ Reasoning

2.2 Formulated these into principle → published Principia:

The Mathematical Principles of Natural Philosophy 1687.

- Systematized Galileo.
- stressed Mathematical Laws. Assumes all laws reducible to math formulas.
- Saw himself as only describing & not explanation.  
∴ early phenomenologist

3. ~~3.1~~ Saw Nature like a Machine

3.4 Saw Scientific knowledge as exhaustive

3.2 Saw ~~God~~ all creation as single harmonious whole - no inherent duality of  
SN: heaven & earth.

3.3 <sup>beginning of</sup> Loss of revelation as valid source of knowledge.

3.4 God is "intelligent" creator. Stress on mind as hybrid.  
Know God through own intelligence.

3.5 See God as immanent "law". See God in the process of nature.  
Unitarian. Not Christian. Part of Puritan scientist group.  
Common New vocations were of God - "priests" of God: or Gen.  
God in design. ~~to~~

3.6 Nature complete - not striving towards an end  
No final cause, no purpose in being. Only being itself.

3.7 Seeds of Universalism. All religions historical accidents.  
Beneath a reasonable faith that is in all religions. The  
"essence" of Christianity is this - order of nature (Gen 1-2:1) Creator, God.

3.8 Universal religion

- 1. existence of God
- 2. immortality of soul - survival of <sup>Survives</sup> Medievel faith. But survival  
is platonic, not Christian. <sup>what survives is</sup> Soul = alone reason. <sup>From</sup> Descartes (?)
- 3. Obligation to morality (S.F. into God's world - don't desert d. ... Morality ~~is~~  
requires rational analysis)

3.9 Product. Humanitarianism. Focus on Man as supreme creature.  
Glory in Humans. Exemplify Sin

3.10 Same religion for science but at a loss of much of Christian  
content of religion.

[Note Reformation still going on as a parallel movement  
to science with little contact with science]

# 18th Century: REACTION TO ENLIGHTENMENT

## 1. SCIENTISTS

- Man perfectible by reason. Not only nature but also society. *Condorcet*  
on this. <sup>Newton</sup> Technology of natural world → Technology of society.
- Emphasis on finding natural. *Descartes* - nature = order beneath appearance. *Sociology* - society = order beneath society. *But* below appearance. *Lot* nature. ∴ Society = distortion of natural human. *Natural laws of Economics* - supply & demand.  
*U.S. Revolution* - *Minimim* government → natural society = good.
- *Revered* in modern society = *psyche* energy → *free* *occupation* *Freud* *reduced* control of *superego* (culture). *Human* goal - *perverted* & *corrupted* by society. *Rousseau* recommends *son* to be educated in forest, & country *off* *raised* in country, *only* *adapt* to city. *off* *raised* in city *never* be what *intended* to be.
- *Optimism* not *sin* is our problem.  
*Optimism*, *Expectation* of *Progress*.  
*Kingdom* of *God* = *Kingdom* built on earth by science. *Utopia* there.
- religious *tolerance*. *Affirmed* *immortality*, *Positive* *affirmation* of *human* *dignity*.  
*No* *dogmatism*. *Anti* *orthodoxy*.

## 2. Romantics: (Walter - Pöhl etc)

- *rejected* *ideal* *enlightenment* - *accepted* *assumptions* of *enlightenment*
- *rejected* *application* of *scientific* *approach* to *human* *society*.
- *returned* to *intuition*, *experience*, *feelings* which *Descartes* *attempted* to *brush* *out*.
- *accused* *enlightenment* of *rationalistic* (reason) *reductionism*.  
Can't study *humans* in same way you study *nature*.
- *Goethe's* *Faust* - *scientist* who was *empty* → *turned* to *religion*.
- to *direct* *scientifically* is to *murder*.
- *Sought* (1) *FREEDOM* vs (Determinism)  
(2) *Individuality* vs (Collectivities) not *standardizable*. *Meaning*: *stressed* *unique* *of* *each* *person*  
(3) *wholeness* vs (Reductionism) *No* *Phobias*.  
↳ *1st* *degree* *separation* *unresolved*.
- *Assumption*: *Look* for *god* in *nature* & *world*. *But* not by *reason* or *order*. *But* by *experience*, *senses*, *feelings* (*mysticism*, - *[Kant* - *by* *will*])
- *Learn* "Culture of *Nature*" as is - *don't* *change* *world*.

- (Religionists)
3. Pietism - in Germany & England. Not in France (Catholic country)
- Protestantism more open to science. Concern to make religion & individualism
  - France → humanism.
  - Pietism reaction to rationalism, Lutheran scholarship in Germany to deist formalism (Congregational) in England.
- Community living - movements. Recover vitality / faith - deconstructed dogma & reason & structures. Stressed faith experience

→ Wesleyan revivals. Oxford chaplain. Felt something missing. Group at Oxford systematic search for clues & divine guidance. "Methodist" derivative statement of New group = hard rules & methods for everything. Term not set. Pre revival. Missionary to Georgia. Met Moravians on ship - quiet faith in storm. May 23 1739 attended prayer meeting in Aldersgate. → felt forgiveness. ∴ Experience of Grace = basic appeal.

→ Sanctification the goal. Progress ≅ sanctification. Utopia in heaven. Humanism can make progress

→ Perfectionist concern → social concern. Anti-slavery.

→ Luther - Sinners after death God gives you new heart & you should → righteous

Wesley → strive to be perfect sinners before death.

#### 4. Philosophers

[Locke - tabula rasa]

4.1 Hume: a British Associationist; Reason is falsely based.

Reason if it thought it discovered essence via math etc. - was misguided.

- ~~Content~~ Content of mind only by experience. No innate ideas

- ~~Laws~~ we state = summaries of these experiences (habits). Mind can do nothing but summarize exp. of sense.

∴ Devaluated basis of science.

[ - Wundt: how does mind take sensation & convert it into an idea ]

- Saw mind as only noting a) sequentiality b) simultaneity

- Math only a tool - not innate.

- Mind organizes but does not get ideal types & universals.

- Validity of any idea must be based on tracing it back to sense experience

Positivism.

- additive view - separate disjointed experience.

- ∴ can make no statement of ultimate cause ~~and~~ efficient causes. can't see ultimate cause

can't see present cause - only inference. Have seen clock make → do it so can't infer clock from a world. But have not seen God make world so can't infer God from a world.

- appears contingent not continuous
- correlation, not causation
- laws of nature not universals but patterns observed.
- Science = regularities not necessities.
- puts science in mind of scientist. Description not discovery.
- cannot be skeptical in every day life - & live. Can only be so in scientific analysis.
- world less like a clock - more like an animal. Principle of order is within & not without. claims spirit at best.
- at best infer a finite god - who is all good but not all powerful.
  - [like God is all good but not all powerful - or all powerful but not all good.]
- Skeptical

42 Kant ( -1804)

- undetermined natural theology. A game of belief to give room for faith.
- Sense God in conscience

- Mind = organizes sense experience.
  - = mind has an innate order that it imposes an ordering, data (mathematical)
  - = mind orders in terms of Categories. Looks at dynamics of mind.

- Time: sequentiality, simultaneity.
- Space: here/there, big/small.
- Causality: mind imposes this. Science = predictability
- Substance: what thing is made of. Denotation of its parts

Piaget counters all these. Studied under Alfred Binet

who defines it as ability to solve problems.

Assimilation = old way applied to new experience. - in a stage

Accommodation = acquisition of new learning - stage change

Retire fully, free himself from "institution".

- We can never know thing as such
- We can only see world ~~in~~ with mental spectacles.
- Science = study of spatio-temporal relations
- No 1:1 relation of laws of science to reality
- Religion can't be talked about from scientific language.

- { Scientific Reason → Belief

{ Practical Reason - theoretical principles do not apply here.

They live more by faith and belief. Strong influence of innate burden of the will. Because of conscience is a god. (→ Kitcher, E.S. Lewis, etc.)

Study, however alone → science.

Moral law within → religious. (Social, account?)

- We live not at war with elements. b. + v. Procreation.



— Faith = commitment, trust, action.

A IS THERE A GOD? (Supernatural) <sup>Medieval</sup> world to Kantian, ↓ Feeling etc no reality

B HUMAN UNIQUENESS? <sup>or</sup> Imago Dei? Imago Animal?

1. Pre 19th Century, ISSUE UNIQUENESS OF THE HUMAN BEING

1.1 Humans - creatures, imago dei - Spirit

1.2 Reason - faculty

1.3 Creation seen in terms of forms - plan of creation,  
(late post Newton - creation = order, laws, mathematical formulas)  
(out of chance -

1.4. Special Creation of Humans - Fixity of Species.

→ introd. of catastrophism. to deal with change.

No gradual change, multispacial evolution.  
CREATIONIST CHANGES AT SPECIAL TIMES.

α? Dispensationalism



1.5 Scientific knowledge (a la KANT)

- Kant was reacting to own pious upbringing - Trust in belief <sup>in inner experience</sup>  
[ Believed in created ~~an~~ orderly world. → Science. <sup>strongly believed</sup>  
Believed in inner experience. eg. morality → Religion <sup>within</sup>  
Reason opened to broader reflection. & can lead us to faith  
(Hume - Instrumentalist)  
Reason & Science are limited. Talk about efficient  
causation: Theoretical science - rigorous, skeptical  
Practical reason - for religion & everyday thought, trusting

(HUME PUT SCIENCE IN MIND OF SCIENTIST.)

- Kant: Reason can order reality. Can't know if this reflects  
The "Thing as such": Categories of the mind - Imho: time,  
space, substance, causality

## 2. LAMARCK. 1802:

- 2.1 Inheritance of Acquired Characteristics
- 2.2 Set Agenda For Darwin.

## 3. DARWIN

- 3.1 5 years death blow to Aristotelian Biology
- 3.2 Failed as a physician & then as a clergyman. Sickly.
- 3.3 H.M.S. Beagle - 5 yrs - study flora/fauna of S. Africa.
- 3.4 Concerned with "Fixity of Species" & Catastrophism.  
Saw sequence of animals → ideas of gradual change.
- 3.5 Read Lyell's Book Principles of Geology → countered catastrophism.  
Advanced Uniformitarianism. Natural causation.
- 3.6 Got into breeding plants & animals for 24 yrs.
- 3.7 Read Malthus. & artificial breeding related to natural selection.
- 3.8 1st book on animals (1860)
- 3.9 ~~1871~~ Descent of Man (1871)  
Proven by degree, natural selection; slow. inorganic  
↳ cruel, wasteful, clumsy, & humbling
- 3.10 Humans → animals.  
Not blind chance

REUCTIONISTS = Evolutionary process & progress.

Preserving the Person:  
C. Steven Evans

Requires to Science

① Capitalists - Give up Faith → Science	} Reinterpreters (Converted)
② Compatibilists - Double talk. live with. Assum both → contradictions	
③ LIMITERS - Interpretalists: Science to certain areas of reality.	} LIMITERS (God / gaps?)
④ PERSPECTIVALISTS - deny ultimate of science.	
⑤ Particularists - 2 types of science not human science of different methods. Re learn a human science	} Humanizers
⑥ GENERALISTS - 2 types of science as pure science	

# 19th Century CENTURES OF EVOLUTION

DARWIN DESTROYS ORIGINISM BIOLOGY (Both challenge of theology)

- Authority of Bible challenged on points of 1st Cause.

## ATTACK ON DIGNITY OF MAN

Evolution man is ~~at~~ same nature

James Hutton = Uniformitarianism (1785) vs Catastrophism (Laws changed over time)

- Kant's morality = Uniqueness of Man is questioned. Morality = Social convention

## DIGNITY OF HUMANS

Charles Lyell

until then Gen: 1:26 Metaphor.

Principles of Geology 1830

Origin of Species - no anti-Christic views

1. DARWIN - Minimizes Distinction - Human & Animal

- Tribes closer to apes in lifestyle. Humans closer to

1.1 MORALS -> Social Contract - ORIGINALS HELD TO MAKE HUMANS UNIQUE & <sup>with</sup> KANT  
- Good & Evil = social construct (threatens society) not moral. Epiphenomenal. ~~Construct~~ Construct.

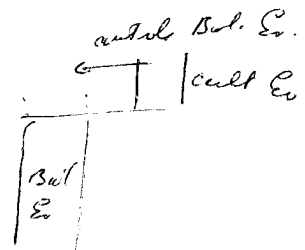
- Nietzsche: Superman can manipulate evolution to -> superior person  
= Antecedent to self-realization movement of modern psych.  
= Precursor to death of God movement. Rejects god who puts us second to other 1st. (Beatitudes)

1.2 EMOTION (Romantics -> set human line animals) -> Franciscans  
Romantics - like God in Emotions

1.3 REASON: (Intellectuals -> unique to human) -> to do evolution.

A.R. Wallace tried to remain culture, reason etc as quantitatively distinct. Ev. platform, but culture is unique. Not gradual development. Given being is around.

To be human is 1) language 2) culture, 3)



## SCIENTIFIC ~~REPRODUCTION~~ PROGRESS

A Creation replaced by progress. Early belief progress, inevitable. Later idea we can control & speed it up

- Christianty - Who would in one generation

- Create world as spectacular by redding of glutton, poverty etc.

- (Progress: explicitly - non-moral judgement. But implied says progress is good.

- Economics: Capitalism. Free competition is good. Survival of fittest. Progress is natural product of competition.

- Huxley: Evolution is not ethically evaluative. Can for self to overcome weak & strong.

## 2. Biblical Authority

- Higher criticism attacked the literalist authority. At 1st seen as an attack.
- Evolution attacked Creationist views.  
attacked  
purposefulness of world  
dignity of human being.
- Reaction: Protestant Scholasticism. Literalist - defenses but the approach  
Not irenic. Usual. Not question Bible
- Some accepted Christian evolution. Bible not truth & correct cosmology. Bible not book of science.

## 18th Century

### RELIGION & ORGANIZED SCIENCE.

Book of Scripture → Religion

Book of Nature → Science. (Religion vocabular)

## 1 Sociological Factors

es:

{ R. Catholic  
Scholastic Protestant  
Anglican }

High Institutional Elitist

- Elitism → Cognitive;

Methodism.

2 FRANCISCANS

2 ANABAPTISTS

Popular Religion

- Common folk - Feeling, Affectivity & "Heart Graft"

- Simplicity, Stress on soul.

- Societas

- anti restraint - little relation to group or in Science

- offer less stress on credulity. Not theology less.

- Experiential

- Stress on local group.

- Science involvement at best, distant Corrosion

## 2. KANT:

- influenced by pretim. <sup>Protestant</sup> a Protestant

- FAITH IN GOD WHO GAVE A CONSCIENCE.

" "Strong heavens without & moral laws within" <sup>Released in</sup> Former → not God  
Latter did God.

- Can talk out of contingencies not of ~~all~~ "causes".  
"Commencement of mind"

- Struggle, conflict, pain.  
 3.3 Extends laws to all of nature. Even chance under laws.  
 Introduction of probability theory.  
 - Determinism in with a vengeance.

3.4 Nature includes "culture" & human life.  
 Biology & paradigm for other sciences such as history.

3.5. End product of impersonal cause-effect system. No Teleological design. Chance. Not Design.  
 Laws not impersonal will of God  
 But mechanical & impersonal forces.  
 "Makes assumption of 'Chance' = old assumption of 'Design'"

REACTIONS FUNDAMENTALISM:

1. Infallibility  
 2. Literal Interpretation

Attacked Evolution  
 Modern Education, as secular, intellectualism  
 Empiricism

3.

- God  
 1 outside system - transcendent - stressed by fundamentalist  
 2 in system immanence. stressed by modernist

MODERNISM:

- Process: Becomes deified: God being in ~~the~~ Heaven via Evolution + Progress  
 - God: is immanent & present in all history & underlying ground of people.  
 Evolution is the paradigm. God leads out to justice.  
 - Human: not a classical doctrine: Augustine: Sinner needing salvation & but human is apex of evolution. ↑  
 Modern man's problem - not sin but what to do with newly evolved powers & decisions making  
 Not sin but spirit of divine to be fulfilled, evolved. Bring back immortality the way

LANGUAGE

- Aesthetic  
 - Evaluation language  
 - Cognitive language  
 1. Real  
 2. Metaphysical (Religious)  
~~Religious language~~

18th Century Nature of Scientific Thinking

19th Century: Quest for Biology. Darwin or Newton in Physics.

WORLD VIEW ① Process.

② QUESTION OF ORIGINS

③ Ethics not illuminated - certain Kant. Ethics = relativism.

Nietzsche - 10 commandments → good for rich - not for poor  
protect private property & rich.

1. Darwin's Precursors

1.1 Lyell's Theory of geology (Rejects) Catastrophism Recedes. in favor of uniformitarianism.  
long process time. Did not understand Bible.

Archaeology = Cultural Evolution (Comte)

1.2 Linnæus - Biological taxonomy. Lyell's DARWIN  
Lamarck - unlimited change in species - passed on in one generation.  
Short term process of evolution. Inheritance of acquired characteristics

1.3 Discussion of Race:

1.4 ~~History of Evolution~~

1.4 (Malthus - "Struggle of Fittest": Struggle for existence.  
visit to Galapagos Islands.

2. Evolution

2.1 Attacks Christian idea of dignity/humour

3. Darwin's Theory 1859 = Origin of Species.

3.1 Random variation. Spontaneous.

3.2 Struggle or Struggle to Survive. Utilitarian Need to Live.  
Conflict within & between species.

3.3 Survival of Fittest.

3.4 Natural Selection. Spread of genetic pool.  
Transient change & random variation but not acquired traits

TRANSMUTATION OF SPECIES OVER TIME (genetic)

4. New Nature

4.1 Importance of change. Stability of ancient illusion

4.2 Time is linear -

4.2 Systemic view of nature. Organism ↔ Environment

Not hostile each  
entity seeking its own  
solution self-interest.