

# WHAT IS SCIENCE?

S2

## I. KEY THOUGHTS

S3

### 1. Science is Difficult to Define

S4

- Did the Babylonians practice science?

they made remarkable celestial observations & predictions

BUT believed that stars are gods & influence human lives

- Was **Sir Isaac Newton** (1642-1727) a scientist?

S5

formulated Law of Gravitation & key figure in the 17<sup>th</sup> century scientific revolution

BUT

*Principia Mathematica* (1687):

S6

1. “This most **legant** system of the sun, planets, and comets, could not have arisen without the **design** and **dominion** of an **intelligent** and **powerful Being**.”

I. Newton, *Mathematical Principles*, Cohen-Whitman trans  
3<sup>rd</sup> ed (Berkeley: California U Press, 1999), 940

#### COMMENTS:

Newton accepted: (1) a Creator

(2) intelligent design

(3) divine action in Origins & Operations

“dominion of an intelligent and powerful Being”

S7 H3

☛ Cosmological Providentialism in Operations

DOUBLE BUT:

S8

2. “The fixed stars would, through their gravity, gradually fall on each other, were they not **carried back** by the counsel of the **supreme Being**.”

I. Newton, Annotation in *Mathematical Principles*, Cohen & Koyre, eds  
2<sup>nd</sup> ed (Cambridge: Harvard U Press, 1972), 2:760

#### NEWTON’S REWINDING OF THE UNIVERSE THEORY

Newton believed the universe is like a clock and that as it runs down

God has to intervene and wind it up

☛ Cosmological Interventionism in Operations

S9 H3

### 2. Trend in the History of Science

S10

- further back into the Past → science connected to religion

increase in teleology

increase in Divine Interventionism & Providentialism

- closer to the Present → science disconnected from religion

increase in dysteleology

increase in natural laws & no need for divine action in explanations

NB: Science is inevitably associated with metaphysics

☛ reflects Metaphysics-Physics Principle → deep human need to relate our beliefs & science

### 3. Post-Modern Epistemological Crisis (roughly around 1950)

S11

- breakdown of Modernity & rise of Post-Modernity

Contributing Factors:

new physics of the 20<sup>th</sup> century

beginning of a new academic discipline: History & Philosophy of Science

- challenges the so-called “pure objectivity” of science

science much more **personal & social**

**II. OXFORD ENGLISH DICTIONARY**

- Etymology S2
  - Latin *scientia*: “knowledge” S3
  - term “natural philosophy” in the past = term “science” today
  - term “scientist” coined in 1833 by William Whewell S4
- Definitions S5
  - General** (older): knowledge in general
  - Narrow** (newer): knowledge of the physical world
  - 3. “4b. in modern use, often treated as synonymous with ‘Natural and Physical Science,’ and thus restricted to those branches of study that relate to the phenomena of the material universe and their laws.” SQ 1 for the rest of this entry

**III. CONCEPTIONS OF SCIENCE**

- Historian of Science David C. Lindberg S6
  - 4. “The nature of science has been the subject of vigorous debate for centuries—a debate conducted by scientists, philosophers, historians, and other **interested parties** [theologians ☺] Although **no general consensus** has emerged, several **conceptions of science** have attracted powerful support.” S7
- David C. Lindberg, *The Beginnings of Western Science*  
(Chicago: U Press, 1992), 1

COMMENTS:

“no general consensus” → science is difficult to define

- Technology S8
  - gaining power over nature
- Theoretical Knowledge
  - theories behind the technology
- Laws S9
  - universal, law-like statements about nature
  - using the language of science → mathematics, stats & formulas
- Method
  - observation & experiment
- Knowledge of the Physical World
  - non-physical realm (eg, spiritual world) not investigated by science
- Epistemology S10
  - a way of knowing reality that is tentative and based on evidence, not dogma or authority
- Exacting Procedure
  - characterized by “rigour, precision & objectivity”
- Epithet of Approval
  - a cultural value today

**IV. ANCIENT SCIENCE**

- the study of history always offers helpful insights to understand the present S11
- QUESTION:
  - was there science in the past?
  - ☛ this is a key idea in this course

- Outline: S12
  1. Prehistoric Science (in Preliterate or Oral Societies)
  2. Egyptian & Mesopotamian Science
  3. Greek Science

**1. Prehistoric Science**

S2

DEF: science in societies without writing → preliterate or oral societies

characteristic: emergence of many **technologies**

spears for hunting (450,000 years ago)

tools for farming (10,000 years ago)

**QUESTION**

S3

Is prehistoric science limited only to **technology**?

Problem: no written records → oral societies

Solution: Cultural Anthropology & the study of preliterate societies

**ANSWER**

found in ORAL TRADITION

**BE AWARE: Lamoureux has a hermeneutical agenda!**

S4

did the ancient preliterate Hebrews have an Oral Tradition?

did the basic ideas in Gen 1-11 first begin as an Oral Tradition?

**A. Oral Tradition**

S5

**DEFINITION:**

5. “Oral tradition ... serves as the principle repository for the collective experience and

S6

general **beliefs**, attitudes, and **values** of the community ... The **primary function** of oral tradition is the very practical one of **explaining**, and thereby **justifying**, the present state and structure of the community, supplying the community with a continuously evolving ‘**social charter**’ ...

[Oral traditions] will almost always include an **account of origins**—the beginning of the world, the appearance of first humans, the origin of animals, plants, and other important objects, and finally the formation of the community ...

S7

Oral traditions typically portray **the universe** as consisting of [1] sky and [2] earth, and perhaps also an [3] underworld.

S8 H6

Related to the account of origins is often a **genealogy** of gods, kings, or other heroic figures in the **community’s past**, accompanied by stories about their heroic deeds ...

S9

**Deity** is an **omnipresent** reality in the world of oral traditions.”

Lindberg, 6-8

**COMMENTS:**

Reflects: Metaphysics-Physics Principle  
Message-Incident Principle

S10 H5

**Beliefs & Values** → Metaphysics & Message

**Account of Origins** → Physics & Incidental Ancient Science

S11 H5

community’s understanding of nature (science)

the origin of: plants & animals

1<sup>st</sup> humans & community → beginning of human history

3-tier universe [1] sky (heaven)

[2] earth

[3] underworld

REMEMBER

S2

**Purpose** of oral tradition is **Social**, not **Scientific**

social charter (Beliefs & Values) cements the community together

*If it doesn't, then the community dies*

account of origins does not cement the community together

all have a 3-tiered universe

*ALL are wrong → the ancient science is **incidental** to the social charter*

QUESTION

Are you starting to see the similarities to Gen 1-11?

**B. The Account of Origins in Oral Traditions: Is it Science?**

S3

**Characteristics of Oral Traditions:**

• **Explanatory**

S4

a psychological need → where do we & the world come from?

EG Genesis 1-11

origins of the universe, living organisms, the Hebrew community & surrounding nations

☛ isn't explanation part of science? YES

• **Use of Models & Metaphors**

S5

employ familiar objects & processes in explanations

agricultural & human reproductive models (EG, 1-seed theory/preformatism)

EG Egyptian Origin of the Universe

S6

god Atum **masturbates** & from his seed arise:

the gods Shu (air) & Tefnut (moisture)

Shu & Tefnut mate & give birth to earth & sky

Mesopotamian Origin of Humans

S7

gods planted the seeds of humans in the earth and then "**humans** broke through the earth's surface **like plants**" *Hymn to E'engura*, Line 3

Origin of Animals in Genesis 1 on the 6<sup>th</sup> Day of Creation

S8

"God said, 'Let the **LAND produce** living creatures according to their kinds:

livestock, creatures that move along the ground, and wild animals.'" Gen 1:24

similar to Sumerian origins → animals sprout out of the earth

Hebrew verb translated "produce" is *yātsā'*

same verb used for the origin of plants on the 3<sup>rd</sup> Day of Creation

"The **LAND produced** vegetation: plants . . ." Gen 1:12

☛ isn't the use of models & metaphors part of science? YES

• **Notion of Causality (Causation) in Nature**

S9

a deeply rooted instinct in all of us

something causes something, which causes something, etc, etc, etc . . .

HOWEVER:

S10

**Ancient Causality**

Agentic (a personal agent) → actions of the God/s, angels, demons, etc

decisive, dramatic, isolated events

EG Genesis 1: Origin of the Universe in Six Days

"And God said, 'Let there be . . .'"

**Modern Causality:**

S2

impersonal & mechanical natural processes  
repeatable & usually gradual

- ☛ isn't causality part of science?  
looking for natural causes: YES  
looking for personal agents: NO

**Excursus: De Novo Creation**Latin: *de* 'from' *novus* 'new'

S3

DEF: creation that is: (1) quick  
(2) complete

rapid origins into fully formed: living creatures & inanimate structures (earth, sun, stars, etc)  
characteristic of Divine Action in most ancient accounts of origins

- ☛ Cosmological Interventionism in Origins S4 H3

## QUESTIONS

S5

Does God's *de novo* creative action in the origin of the world in Gen 1 ultimately reflect an ancient (agentic) understanding of causality?

Does divine action in Gen 1 ultimately reflect an ancient science?

Is God's creative action in Gen 1 ACCOMMODATED?

• **No Clear Demarcation between Natural & Supernatural**

S6

the God/s, angels, demons, etc & humans are intertwined

EG Garden of Eden in Genesis 2 & 3

Adam & Eve are in the presence of the Lord God and talking with him

- ☛ isn't this lack of a natural-supernatural demarcation part of science? NO  
science limited to the physical world

• **Brevity**

S7

the length of oral traditions are limited by human memory

EG Genesis 1-11

amounts to only about 10 written pages  
most people can remember the basic contents

## NOTE

not an exhaustive record

*therefore expect incompleteness* → won't answer all your questions

- ☛ isn't brevity part of science? NO  
science is dependent on massive amounts of written information

• **Genealogies**

S8

explain the origins of the community (nation)  
limited by human memory & usually only 5-10 generations

EG Genealogies of the Hebrews in Genesis 1-11

S9

descend from one man—Adam  
Gen 5 & 11 genealogies—10 generations each

- ☛ isn't this part of science? NO  
science (genetics) recognizes that communities (nations) descend from a group of individuals, not just one person

• **Lack of Concern for Strict Coherence**

S2

termed a “primitive” or “pre-logical mentality”  
 account are contradictory at times  
*therefore expect some contradictions*

EG Conflicts in the Order of Creation Events:

S3

Genesis 1		Genesis 2	
birds	5 <sup>th</sup> Day	man	v. 7
land animals	6 <sup>th</sup> Day	land animals & birds	v. 19
man & woman	6 <sup>th</sup> Day	woman	v. 22

SOLUTION:

S4

two different creation accounts were edited together:

Priestly Account (500 BC/E) → Gen 1

Jahwist Account (1000 BC/E) → Gen 2

More Anon

- ☛ isn't a lack of concern for strict coherence part of science? NO  
 science is hyper logical

QUESTION:

S5

Is there an **ANCIENT EPISTEMOLOGY** in oral traditions?

an epistemology not obsessed with the foundational epistemological categories of coherence, correspondence, and consilience?

**David Lindberg → YES**

S6

6. “A cosmology [a view of nature] ... exists within every oral tradition, but often beneath the surface, seldom articulated, and almost never assembled into a **coherent** whole.”  
 Lindberg, 6

Therefore,

be cautious not to read oral traditions through our 21<sup>st</sup> century epistemological standards

IMPLICATION FOR HERMENEUTICS

S7

Don't read an ancient text (Bible) which features an ancient epistemology through modern (hyper-logical) 21<sup>st</sup> century epistemological categories

- ☛ EISEGESIS can extend to epistemology

SUGGESTION:

S8

**CUT THE BIBLE SOME EPISTEMOLOGICAL SLACK**

IF historians like Lindberg can recognize & respect ancient epistemology in ancient texts,  
 THEN so too Christians with the Bible

- don't be concerned Christians!  
 only a loosening of incidental features  
 EG order of creative events  
 NOT a loss of the Message of Faith
- this will solve a lot of so-called “contradictions” in Scripture

**CONCLUSION: The Account of Origins in Oral Traditions: Is it Science?**

S9

Is the Origins Account in Oral Traditions Science? Yes & No

Oral Traditions feature an **Ancient Science**

**C. Oral Tradition & Genesis 1-11** S2

**QUESTION #1** S3

Did the Hebrews have an Oral Tradition before they wrote down Gen 1-11?

Assume: S4

Traditional view of authorship

Moses wrote the Pentateuch (1<sup>st</sup> five books of Bible):

Genesis, Exodus, Leviticus, Numbers, Deuteronomy

• 1<sup>st</sup> References to Writing in the Bible are in the Book of Exodus S5

7. “The Lord said to Moses, ‘**Write down** these words, for in accordance with these words I have made a **covenant** with you and Israel’... And he **wrote** on the tablets the words of the **covenant**—the **Ten Commandments**.” Exo 34:27-28

**SQ 2-6.** Other references to Moses writing

COMMENTS: S6

Termed “Mosaic Covenant”

**Covenant**

DEF: an agreement between God & humans

• NO references to the Hebrews writing in the Book of Genesis S7

Abrahamic Covenant (Gen 15:1-19, 17:1-14)

establishes the Hebrew peoples

BUT

in contrast to Moses, Abraham is not told to write down the covenant  
circumcision is “the sign of covenant” (Gen 17:11)

☛ indicates Abraham & his family were an oral community

Assume: S8

Traditional biblical dates:

Abraham 2000 BC/E

Moses 1250 BC/E

Question:

What kept the preliterate Hebrew community cemented together for 750 yrs?

Answer:

Hebrews were an **oral society** & must have had an oral tradition with a **social charter** to keep them functioning as a community

**ANSWER TO QUESTION #1** S9

YES

Hebrews had an Oral Tradition before they wrote down Gen 1-11

Fundamental Beliefs & Values of Gen 1-11 had Oral Phase

based on the Covenant with God → social cement → Messages of Faith

**CONCERN & FEAR** S10

by having an Oral Phase, was there a problem with memory & the loss of words?

BUT

How powerful is your God?

8. Jesus: “The **Holy Spirit**, whom the Father will send in my name, will teach you all things and will **remind** you of everything I have said to you.” Jn 14:26

Therefore, the New Testament had an oral phase

QUESTION #2

S2

Were the Hebrews influenced by the Oral Traditions of the Ancient Near East (ANE)?

Answer: YES & NO

(1) **YES**

S3

FORMAT & characteristics of oral traditions appear in Gen 1-11

SOCIAL CHARTER (Messages of Faith)

Beliefs & Values of the Hebrews

ACCOUNT OF ORIGINS (Ancient Science)

9. To repeat part of **Quote 5**

S4

“[Oral traditions] will almost always include an **account of origins**—

the beginning of the world [Gen 1 & 2],

the appearance of first humans [Gen 1 Day 6; Gen 2:7 & 22],

the origin of animals [Gen 1 Days 5 & 6; Gen 2:19-20],

plants [Gen 1 Day 3; Gen 2:8-9], and

other important objects [eg, Tigris & Euphrates Rivers, Gen 2:14] and finally

the formation of the community [Hebrew Genealogies in Gen 5 & 11] ...

Oral traditions typically portray **the universe** as consisting of

S5

[1] sky [Gen 1 Days 2 & 4; Gen 2:4] and

[2] earth [Gen 1 Day 3; Gen 2:4] and perhaps also an

[3] underworld

Related to the account of origins is often a **genealogy** of gods, kings, or other

heroic figures in the community’s past, accompanied by stories about their

heroic deeds [Hebrew Genealogies in Gen 5 & 11; Table of Nations in Gen 10].

**Deity** is an omnipresent reality in the world of oral traditions [Gen 1-11].”

Lindberg, 7-8

(2) **NO**

S6

CONTENT of the Social Charter

• Radical

compared to the surrounding ANE nations

charter is a Covenant with ONE Holy God (Ethical Monotheism)

• Polemical

S7

it’s in your face

EG creation of sun, moon & stars on 4<sup>th</sup> Day in Gen 1

not gods, but created by the God of Hebrews TO SERVE HUMANS!

• Foundational Beliefs & Values of the Hebrews:

S8

EG there is only one holy God

ANE: many gods & they behaved badly (eg, murders, liars, adulterers, etc)

God created humans to be in a relationship with him

ANE: gods created humans to be their slaves

God chose the Hebrews to bless the entire world

ANE: other nations were to be conquered & subjugated

**Oral Tradition & Message-Incident Principle**

S2 H5

## FORMAT

Account of Origins (Ancient Science) → Incidental

## CONTENT

Social Charter (Covenant with God and Beliefs &amp; Values) → Inerrant Message of Faith

Success of Hebrew Oral Tradition is its Message, not its Ancient Origins Science

☛ impact of the Message is still felt here today in synagogues &amp; churches

**Advantages in Recognizing the Oral Tradition behind Genesis 1-11**

S3

- Relieves problems of incoherence (so-called “contradictions”)

Gen 1-11 has an Ancient Epistemology

Therefore CUT THE BIBLE SOME EPISTEMOLOGICAL SLACK

- Relieves problems of incompleteness

Gen 1-11 is brief and limited by human memory

Therefore it’s not an exhaustive record & it won’t answer all your questions

- Avoids conflicts between the Bible & science

Gen 1-11 features an Ancient Science

Therefore scientific concordism not possible

S4

- Directs attention to the Message of Faith, not the Ancient Science

Biblical Inerrancy is found in the Message

Power of Bible is in the Message which changes the lives of men &amp; women

**D. Transition from Prehistoric Science to Science in Literate Societies**

S5

Contributing factors:

**Invention of Writing**

S6

Dates:

3000 BC/E: pictographs

1700 BC/E: alphabet

Modest &amp; Practical Beginning:

lists → abstractions → criteria for classification &amp; evaluation (CATEGORIES)

Becomes more complex:

charting celestial motions → patterns → mathematical astronomy

Results:

S7

replaces memory

can deal with high volumes of information

allows for new thought patterns → CRITICAL THOUGHT emerges:

- inspection
- comparison
- development of theories
- emergence of rhetoric (rules of argument)

**Prosperous Society with Scribes & Scholars**

S8

society with divisions of labour that is capable of absorbing an academic class

included individuals who could dedicate their attention to understanding the physical world

**2. Egyptian & Mesopotamian Science (3000-500 BC/E)** S2

Key Thought #2: Trend in the History of Science  
 further back into the Past → science connected to religion

**Mathematics** S3

SCIENCE:

- Egypt  
 engineering & construction of pyramids
  - Mesopotamia (Babylonians)  
 mathematical astronomy & celestial predictions  
 simultaneous base 10 (decimal) & 60 (sexagesimal) system  
 we have inherited from them 60 minutes in an hour, 360 degrees in a circle, etc
- Quantification** → Language of Science

RELIGION: S4

Mystic-mathematicians → numbers viewed as Divine

Mystical Numbers

7, 10, & 60 and their multiples

EG

W-B 62 Sumerian King List **BEFORE** the Flood S5 H11

extremely long reigns → 10s of 1000s yrs

all multiples of 100

mathematical formula with the Mesopotamian mystical number 60

Purpose:

legitimize the divinity of the Kings

**Excursus: Biblical Genealogies & Stylistic Numbers** S6

NOTE: no hint of divinity in numbers, but sometimes used stylistically to make a point

**Genesis 5: Genealogy of the Hebrews BEFORE the Flood** S7 H11

- very long lifespan: average 912 yrs
- 15/20 multiples of 5: should be only about 4 in 20.
- 5 non-multiples of 5: become multiples of 5 if you subtract 7

Statistics:

1 in 700 million chance of being a real/natural genealogy

Why the emphasis on number 5? S8

legitimize the importance of the Hebrews

MAYBE to emphasize that the Hebrews are the people of the 5 Books (Pentateuch)?

**Implication for the Origins Debate** S9

numbers in the genealogy are stylistic

☛ therefore genealogies cannot be used to date the age of the earth

young earth creationists add up the genealogies & claim the world is 6000 yrs old

**NB** S10 H11

not all numbers in the Bible are stylistic

EG The Reigns of the Kings of Judah:

17 years, 3, 41, 25, 8, 1, 6, 40, 29, 52, 16, 16, 29, 55, 2, 31, 1/4, 11, 1/4, 11

found in 1 & 2 Kings and 2 Chronicles → historical books

Always ask: is a number in the Bible LITERAL or STYLISTIC? S11

**Genealogies of Jesus (Matthew 1:1-17 & Luke 3:23-38)**

- they don't align with Old Testament genealogies (EG 1 Chr 1-3) S2
- they don't align with each other S3 H12

Matthew 1 S4 H12

Central Theme of Book: Jesus is the Son of David S5-6 H63  
 David's Gematria → 4 + 6 + 4 = 14 S7 H12  
 3 groupings of 14 individuals emphasize the theme S8-9 H12

Luke 3

77 individuals in genealogy from Jesus to God S10 H12  
 7 & its multiples carried notions of: (1) perfection  
 (2) **fulfilment**

Jesus is the **fulfilment** of the Bible S11

**10.** Jesus: "Do not think that I have come to abolish the Law and Prophets [ie, the Old Testament]; I have not come to abolish them, but to **fulfill** them." Matt 5:17

**Conclusion** S12

**11.** Regarding biblical genealogies: "If such non-literal, non-chronological usage seems **strange to us**, that is **OUR problem** and our challenge to understand. The text [Bible] is, after all, our teacher."

Lloyd R. Bailey, *Genesis, Creation & Creationism* (NY: Paulist, 1993), 58

Don't read our modern concept of genealogies INTO the biblical genealogies

☛ EISEGESIS

Astronomy S13

SCIENCE:

**Babylonians**

excellent observations & developed mathematical astronomy  
 could predict seasons, new moons & lunar eclipses

RELIGION: S14

priest-astronomers & astral religion  
 celestial events → influenced the lives of people  
 continues today with astrology & horoscopes

*Agentic Notion of Causality*

stars "act" on the world & change seasons, etc  
 therefore stars are gods → NOT an unreasonable notion

Medicine S15

SCIENCE:

medications, surgery, treatments, wrote up case studies

RELIGION: S16

demons/evil spirits cause diseases → *Agentic Notion of Causality*  
 treated by priest-healers through exorcisms, prayers & sacrifices

**Excursus: Demons, Diseases & Disabilities in the Bible and** S17

blindness, deafness, speechlessness & crippling afflictions caused by demons/evil spirits

**12.** A man in the crowd called out, "Teacher, I beg you to look at my son, for he is my only child. A **spirit** seizes him and he suddenly screams; it **throws him into convulsions** so that he **foams at the mouth**. It scarcely ever leaves him and is destroying him" ... S18

Even while the boy was coming, the **demon** threw him to the ground in a convulsion.

But **Jesus** rebuked the **evil spirit**, healed the boy and gave him back to his father. Lk 9:38-40, 42

COMMENTS:

S2

convulsions & a foaming mouth are classic signs of epilepsy

Matt 17:15 identifies the boy is epileptic. See **SQ 7**

Ancient Medicine

demons/evil spirits cause diseases → *Agentic Notion of Causality*

**Principle of Accommodation**

is Jesus accommodating & using ancient medicine? See **SQ 8-11**

QUESTIONS:

S3

- were ancient people able to understand neuro-pathological mechanisms of epilepsy?
- were ancient people capable of knowing a miracle had happened with the epileptic boy? S4
- was it within their **scope of understanding** to know that a miracle had happened even though they did not know the neuro-pathological mechanisms behind epilepsy?

Also see **Hermeneutical Principle #8** Scope of Cognitive Competence

**CONCLUSION**

S5

Is Egyptian & Mesopotamian science, science?

- Yes & No

YES: observations, math, predictions

NO: *Agentic Notion of Causality* (God/s & demons)

- Again, I term it '**Ancient Science**'

**3. Greek Science** (500-300 BC/E)

S6

called the "Greek Miracle" or Birth of Philosophy

asked questions about:

**Natural World**

S7

- composition: what is it made of?
- operation: how does it work?

- focussed on natural causes

gods not in the explanations

EG eclipses: not supernatural omens

natural cause → the sun was a bowl of fire that turns away

RESULT:

decrease in Divine Interventionism in nature

increase in natural processes

CHARACTERISTICS:

S8

- NOT anti-god

most believed in the gods & their activity in nature

a shift in divine action from interventionism → providentialism

- BUT

S9

by asking questions, it led to fewer functions for the gods in nature

the gods became redundant & DISPOSABLE

Historical Trend:

*De-Sacralization (De-Deification) of Nature* → elimination of god & divine action

☛ **SCIENCE IMPACTS RELIGION**

- BUT

the Greeks did produce the **Atomists**

S10

1<sup>st</sup> Dysteleologists

no mind & no divinity in the world

the world 'nothing but' atoms in random motion

• Huge impact on science in the western world	S2
<b>Aristotle</b> (384-322 BC/E)	
1 <sup>st</sup> great scientist	
More anon in Galileo Affair	
<b>CONCLUSION</b>	S3
Is Greek science, science?	
• Yes & No	
YES: focus on natural causes	
NO: presence of teleology & divine providentialism	
• Getting closer to our idea of science	
<b>CONCLUSION: Ancient Science</b>	S4
Science & Religion → closely connected in past	
13. “The historian, then, requires a <b>very broad</b> definition of ‘science’ ... we should expect	S5
that the farther we go [back in history], the <b>broader</b> we will need to be.”	Lindberg, 3
<u>COMMENT:</u>	
<b>WIDE</b> definition of science	
<b>V. MODERN* SCIENCE</b> *as in ‘Modernity’ (1600-1950)	S6
<b>BEGINS</b> in 17 <sup>th</sup> century as a <b>METHOD</b> to study nature	S7
<b>Sir Francis Bacon</b> <i>Novum Organum</i> (1620) Latin: New Instrument	S8
<u>INDUCTION</u>	
DEF: reasoning from particular facts to general principles	
empirical facts → laws of nature	
<u>DEDUCTION:</u>	
DEF: reasoning from general principles to particulars	
NOT Anti-God: most 17 <sup>th</sup> century scientists were Christians	S9
still believed in some divine interventionism in operations	
EG	
Newton’s Rewinding of the Universe Theory	
BUT there was a significant shift in divine action	S10
focus on natural processes led to:	
• <u>decrease</u> in Cosmological Interventionism	
• <u>increase</u> in Cosmological Providentialism	
☛ God seen as acting through natural processes	
<b>ENDS</b> in mid-20 <sup>th</sup> century as a <b>METAPHYSIC</b> about nature	S11
Features: redundancy of God → no need for divine action	
natural laws can explain everything	
de-sacralization (de-deification) of nature → dysteleological	
Result: <b>SCIENTISM</b>	
<u>conflation</u> of science with positivism, dysteleology & humanist ethics	
<b>NB</b> Excellent Evidence → <b>SCIENCE IMPACTS RELIGION</b>	S12
☛ why bother believing in God & religion?	

**The Peak of Scientism**

S2

Hebert Feigl, "The Scientific Outlook: **Naturalism** and **Humanism**" (1949)

H Feigl & M Brodbeck, eds *Readings in the Philosophy of Science* (NY: Appleton, 1953), 8-18

1<sup>st</sup> paper in an 800+ page volume & included 3 papers by Albert Einstein

**Naturalism** better → **Metaphysical Naturalism**

S3

DEF: a dysteleological worldview conflated with science → Scientism

**Methodological Naturalism**

DEF: study of the physical world limited to nature and natural processes

**Purpose of Paper**

S4

"to dispel certain confusions & misunderstandings" between sciences & humanities

**Cause of the Problem**

S5

humanities "largely ignorant of the nature of modern science"

humanities hold "a distorted view of the philosophical basis of the humanities"

**Errors of Humanities**

S6

SEDUCTIVE FALLACY or "SOMETHING MORE" Myth

humanities believe in the existence of an irreducible spiritual element

REDUCTIVE FALLACY or "NOTHING BUT" Problem

humanities believe that science reduces the world into "nothing but" molecules

they believe that science leads to no human values

BUT Feigl has values (as you'll see)

14. "Neither a **philosophy** of the '**Something More**' nor a **philosophy** of the '**Nothing But**' S7

will do for our time. Only an approach that is resolutely guided by the question 'What is what?' will avoid **reading mysteries into the facts**, as well as refrain from impoverishing them by **reduction** to something less than experience attests them to be." Feigl, 9

**Solution**

S8

- reject pre-scientific thought patterns:  
magic, miracles, theology & METAPHYSICS

Do you see the problem?

☛ doesn't Feigl have a metaphysics?

- disengage human values from theology & METAPHYSICS

S9

Feigl is blind to the fact he has his own metaphysics!!!

15. Theology & METAPHYSICS:

"immature, if not infantile, trait of thinking," "tender-minded,"

"maladjusted individuals," "largely emotive" etc, etc, etc

- Synthesize scientific attitude & human values

S10

16. "**Mature** mankind should be able to **determine** its own value standards on the basis of needs, wants, and the facts of the social condition of man." Feigl, 18.

COMMENT:

humanity is ultimate determiner of values → HUMANIST ETHICS

**Achievement**

S11

"intellectual adulthood" & "mature thinking"

last sentence of the paper:

17. "A Scientific Humanism emerges as a philosophy holding considerable promise for mankind—*if* mankind will at all succeed in **growing up**." Feigl, 18

COMMENT:

demeaning remark to "grow up" was common by scientism in the 1950s

**FEIGL'S DEFINITION OF SCIENCE**

S2

simply excellent!

dissect the good science from the suspect metaphysics → **SEPARATE, DON'T CONFLATE**

**Aspects of Science**

S3

- empirical: factual
- formal-conceptual: rational & logical
- tentative & historically conditioned: gets better with time

**Aims of Science**

S4

- description: (1) observation  
(2) experiment
- explanation: using causal interpretation (natural causes only)
- prediction: fruitfulness & confirmation

**Criteria of Science**

S5

- objectivity: open to public testing
- reliability: repeatable & confirmable
- precision: quantitative (math & stats) instead of qualitative
- coherence: internally consistent
- comprehensiveness: connectedness of all scientific disciplines (consilience)

**THE PROBLEM**

S6

**SCIENTISM'S METAPHYSICAL BLIND SPOT**

DEF: most who accept scientism fail to recognize that they hold a metaphysical position they think that their view is purely "scientific"

Feigl believes METAPHYSICS = TELEOLOGY

BLIND to fact scientism has a dysteleological metaphysic & humanist ethics

BLIND to the Metaphysics-Physics Principle

Lamoureux's suggestion to Feigl:

S7

To repeat Feigl's words in **Quote 14**

"Only an approach that is resolutely guided by the question 'What is what?' will avoid reading mysteries into the facts."

Dr Feigl how about if you:

"avoid reading **your dysteleological metaphysics** into the facts"

Better:

"avoid **CONFLATING your dysteleological metaphysics** and the facts" and passing it off as "The Scientific Outlook" as you attempt to do in your paper

**CONCLUSION: The Peak of Scientism**

S8

**1. Common view of science**

science offers pure **Objective Truth**

wickedly anti-theological & anti-teleological

fuels Science-Religion conflict → academic trash talk

**2. Conflates scientific METHOD & dysteleological METAPHYSIC**

S9

scientism attempts to pass itself off as "science" & "THE scientific position"

BUT in reality it is a dysteleological metaphysic that baptizes itself with scientific authority

**DISTINGUISH Methodological Naturalism from Metaphysical Naturalism**

3. Confident, Triumphant & Patronizing S2  
**Bertrand Russell** S3

depicts the reign & attitude of scientism between **1900-1950**:

18. “The world which Science presents for our belief: That Man is the product of causes which had **no prevision of the end** [teleology] they were achieving; that his origin, his growth, his hopes and fears, his loves and beliefs, are [nothing] **but** the outcome of **accidental collocations of atoms**; . . .

S4

all the labours of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system . . . all these things, if not quite beyond dispute, are yet so **nearly certain**, that no philosophy which rejects them can hope to stand.”

Bertrand Russell, “Free Man’s Worship” (1903) in Egner & Dennon, eds. *Writings of Bertrand Russell 1903-1959* (NY: Simon & Schuster, 1961), 67

COMMENTS: S5

- CONFLATES science and a dysteleological metaphysic tries to pass this off as “science”
- common view of science by mid 20<sup>th</sup> century still here today

- **The 50 Year Rule** S6

it takes about 50 yrs for major concepts to change  
 Why?  
 people have to die!!!

EG Science-Religion Dialogue appears in mid 1990s  
 about 50 yrs after Feigl’s paper

**VI. POST-MODERNITY & ANTI-REALISM** S7

Roughly around 1950:

- a reevaluation of science & scientific **certitude**
- led to a crisis in rationality/epistemology
- gave birth to **Anti-Realism**

DEF: BELIEF that science cannot know physical reality “out there”

**Factors Precipitating the Epistemological Crisis:** S8

1. Professionalization of the History & Philosophy of Science  
 becomes an academic discipline

19. “Philosophers long made a mummy of science. When they finally unwrapped the cadaver and saw the remnants of an **historical process** of becoming and discovering, they created for themselves a **crisis of rationality**. That happened around **1960**.”

Ian Hacking, *Representing and Intervening*  
 (Cambridge: U Press, 1983), 1

COMMENTS: S9

Science is “historical process”

NOT pure **Objective Truth**

BUT dirtier & messier → more (1) social &  
 (2) personal

2. Early 20<sup>th</sup> Century Scientific Discoveries  
so-called “New Physics”

S2  
S3-6

	<b>Modern Science</b> 1600-1900 NEWTON	<b>Post-Modern Science</b> 1900 to present EINSTEIN
<b>“Big Physics”</b>	<u>CLASSICAL MECHANICS</u>	<u>THEORY OF RELATIVITY</u>
Time	universal uniform flow	relative to observer (everyone experiences own time)
Mass	static & unchanging	varies with motion
Space	3-dimensional	4-dimensional; includes time
	NEWTON <u>CLASSICAL MECHANICS</u>	BOHR <u>QUANTUM MECHANICS</u>
<b>“Small Physics”</b>	deterministic	indeterministic
Causality		probabilistic

To summarize:

S7

Newton: space & time → separate

Einstein: space & time → together

Newton: causality → precisely predictable

Bohr: causality → “roughly” predictable

**EPISTEMOLOGICAL IMPLICATIONS**

S8

- undermine the foundations of reason to understand **REALITY**
  1. categories of time, mass & space
  2. notion of causality
- create doubt that science can study **REALITY**  
gave birth to Anti-Realism

**Anti-Realism**

S9

DEF: BELIEF that science cannot know physical reality “out there”  
surrenders science’s claim to truth  
mostly the work of philosophers

Categories of Anti-Realism

- **Conventionalism** S10  
DEF: science is merely democratic truth  
scientific laws & theories are only “conventions” of the scientific community  
**Science = Sociology**
- **Instrumentalism** S11  
DEF: scientific laws & theories are only tools to manipulate nature  
EG 3-Tier Universe Astronomy  
could still bring ships safely to a port despite incorrect astronomy  
**Science = What Works**
- **Anarchism** S12  
DEF: anarchism must replace rationalism  
scientific “anything goes”  
EG astronomy & astrology equally valid!  
**Science = Personal Whatever!**



- 1. Theory Laden Character of Science—Social Factors** S2
- Scientific Community
    - embraces a PARADIGM (foundational theory)
    - EG evolution is the paradigm accepted by biologists
    - new data is FILTERED through the paradigm
  - Society at Large S3
    - science is influenced by social needs & values of our society
    - EG discovery of telescope in 1609 → military
    - space travel in 1960s → US-USSR Cold War
    - internet → military
- BUT NO Post-Modern Excesses: Science ≠ Sociology** S4
- scientific discoveries & revolutions do occur
    - EG geocentricity to heliocentricity in 17<sup>th</sup> century
    - WHY?** PHYSICAL WORLD DICTATES
  - society can retard or accelerate the pace of scientific discovery S5
    - BUT society does not control scientific truth
    - WHY?** PHYSICAL WORLD DICTATES
- 2. Theory Laden Character of Science—Personal Factors** S6
- Science is practised by fallible & limited people
    - influenced by human values & judgment
    - EG physics → beauty & parsimony (simplicity) are values in theories
  - Science is NOT ONLY the application of STRICT LOGIC S7
    - includes personal judgment & the operation of silent (tacit) categories called the “art” of science
- Personal Skill S8
- DEF: application of a set of rules which are not known as such to the person following them
- EG *riding a bike*: are you aware you adjust the curvature of your bicycle’s path in proportion to the ratio of your unbalance over the square of your speed?!?
- language*: are you aware of the rules of grammar?
- working in a lab*: “learn by example” of authority like an intellectual “osmosis”
- Personal Intuition S9
- includes flashes of genius, illuminating insights, hunches
- EG Einstein at 16 yrs of age gets an intuition about theory of relativity it did not arrive through the application of strict logic See **SQ 12**
- Personal Trust S10
- scientists trust & believe:
- physical world really exists (realism) → we’re not in the Matrix
  - paradigm → to set up experiments
  - laws of nature & their repeatability
- EG scientists trust no God/s or demons tinker with natural processes
- BUT NO Post-Modern Excesses: Science ≠ Personal Whatever!** S11
- WHY?** PHYSICAL WORLD DICTATES
- it even shapes our skills, intuitions & trust

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<b>Excursus: Critical Realism—A New Philosophy of Science</b>	S2
this view of science is in the process of being developed & is embraced by many Sci-Rel scholars	
<b>1. Realism</b>	S3
<u>ASSUMES</u> (BELIEVES) the physical world is real and not merely an illusion we are not trapped in some sort of computer program like the Matrix	
<b>2. Intelligibility</b>	
<u>ASSUMES</u> (BELIEVES) the physical world features a deeply embedded rationality & coherence EG Einstein: “The eternal mystery of the world is its comprehensibility”	
<u>ASSUMES</u> (BELIEVES) humans can know & understand the physical world no “4 Fs” mind problem	
<b>3. Explanatory Limitations</b>	S4
<u>RECOGNIZES</u> scientific knowledge is <u>limited</u> to the physical world & natural processes scientific explanations are <u>limited</u> to natural causality science <u>does not</u> recognize agentic/supernatural causality (God/s, demons, etc) <b>NB</b> science <i>does not discount supernatural causality</i> → <i>can’t detect it</i>	
<u>RECOGNIZES</u> scientific knowledge is <u>limited</u> to different levels of the physical world EG Newton’s Laws for objects falling to earth Einstein’s Theory of Relativity for traveling at the speed of light	S5
<b>4. Verisimilitude</b> Latin <i>vēra</i> : true <i>similis</i> : similar	S6
<u>RECOGNIZES</u> scientific knowledge is most likely true & corresponds to physical reality but not absolute or complete or purely objective knowledge	
<b>5. Historically Progressive</b>	S7-9 H6, 22-23
<u>RECOGNIZES</u> scientific knowledge is tentative and becomes more accurate over time EG 3-tier universe → geocentric universe → heliocentric universe → today	
<b>6. Comprehensiveness &amp; Interconnectedness</b>	S10
<u>RECOGNIZES</u> scientific knowledge is extensive & consilient all sciences fit together into one large-scale explanation of the physical world	
<b>7. Fruitfulness</b>	
<u>RECOGNIZES</u> scientific knowledge leads to new explanations & predictions	
<b>8. Counterintuitiveness</b>	S11
<u>RECOGNIZES</u> common sense intellectual categories are at times insufficient EG 20 <sup>th</sup> century “new” physics	
<b>9. Human Factor</b>	
<u>RECOGNIZES</u> scientific knowledge is influenced by personal and social factors EG human values of beauty & parsimony in scientific theories	
<b>10. Primacy of Nature</b>	S12
<u>RECOGNIZES</u> the physical world ultimately <u>dictates</u> scientific knowledge nature imposes itself upon us, more than we impose upon it	
<b>11. Practice of Day-to-Day Scientists</b>	
<u>RECOGNIZES</u> scientists may not be fully aware of Critical Realism, but they employ many of its categories in their scientific work	

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**CONCLUSION: Polkinghorne & Critical Realism**

S2

Polkinghorne's critical realism leads him to a healthy relationship between Science & Religion

21. "I have attempted to defend a view of science which asserts its achievement to be a **tightening grasp** [over history] of **an actual reality** [realism]. In the course of the discussion we have acknowledged the role that [1] **personal judgement**, presented for the approval of [2] the [social/scientific] **community** and pursued along lines which are rational but **not wholly specifiable** [tacit categories & personal skill], has to play in the enterprise. S3

In my view this means that science is not **different in kind** from other kinds of human understanding involving evaluation by the knower, but only **different in degree**. S4  
It is clear that the **personal element** is less significant in science [thus, science is more objective] than in, say, judging the beauty of a painting, **but it is not absent**.

We are to take what science tells us with great seriousness but we are not to assign it an **absolute superiority** [scientism] over other forms of knowledge, so that they are neglected, relegated to the status of **mere opinion** [religion]. Our discussion has taken science off the pedestal of **rational invulnerability** and placed it in the **arena of human discourse**. It is not the only subject with something worth saying. S5

If differing disciplines, such as **science** and **theology**, both have insights to offer concerning a question (the nature of man, for example) then **each is to be listened to with respect to its appropriate level of discourse.**" S6  
Polkinghorne, 24-25

COMMENTS:

S7

- criticizes common perceptions:
  - science not "absolute superiority"
  - religion not "mere opinion"
- opens a COMPLEMENTARY relationship between Science & Religion S8
  - Latin *complēre*: to fill, complete
  - take insights from each at their "appropriate level of discourse"
  - science → physical
  - religion → metaphysical

**VIII. CONCLUSION: WHAT IS SCIENCE?**

S9

**1. Common Definition**

S10

Science = Scientism

Conflation: science & dysteleological worldview

Distinguish: Method of Science from Metaphysic of Scientism

Methodological Naturalism from Metaphysical Naturalism

**2. Academic Definition**

S11

No consensus

History reveals a **WIDE** definition of science (some scientists accept divine action; eg Newton)

Trend Today: moving toward Critical Realism?

3. Science IMPACTS Religion

S2

History of Science reveals:

- science has contributed to the de-sacralization (de-deification) of nature
- natural processes have replaced Cosmological Interventionism in both Origins & Operations

QUESTION:

S3

Is the loss of divine action in the physical world a rejection of God,  
or a rejection of an ancient agentic causality?

- a shift in understanding divine action with religious scientists  
decrease & rejection of Cosmological Interventionism  
increase in Cosmological Providentialism

S4

QUESTION:

Why bother keeping God?

## 4. History of Science has Significant Implications for Hermeneutics

S5

Gen 1-11 points back to an earlier Oral Tradition

Features of Oral Tradition:

Ancient Epistemology → conflicts between events (eg creative acts in Gen 1 & 2)

Ancient Agentic Notion of Causality → *De Novo* Creation of the universe & life (Gen 1 & 2)

Ancient Science → Ancient Science of Origins

- ☛ we need to RECOGNIZE & RESPECT these ancient features when reading the Bible

## IX. TOWARD A WORKING DEFINITION OF SCIENCE

Lamoureux

S6

- Science deals with **knowledge** of the **physical world**—**understanding** its structure, operation, and origin. S7
- Science has been practised by humans throughout **history**, resulting in broad distinctions such as “Ancient Science,” “Modern Science,” and “Post-Modern Science.”
- Science throughout history has been intimately connected to **metaphysics**, including a wide variety of religious beliefs as well as a dysteleological worldview in recent times.

COMMENTS:**WIDE** definition of science

S8

includes the Babylonians, Newton, Dawkins, *et al*

“physical world” → assumes belief in realism

S9

recognizes the primacy of nature → PHYSICAL WORLD DICTATES

“knowledge” & “understanding” → assumes intelligibility: (1) in nature

(2) by humans

“practised by humans throughout history” → recognizes human factor: (1) social

S10

(2) personal

“broad distinctions such as ...” → recognizes science is historically progressive

“intimately connected to metaphysics” → science & religion can’t help but be related

S11

- ☛ reflects Metaphysics-Physics Principle